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Structure Matters: Examining Illness Behavior Using Parsons's Sick Role

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STRUCTURE MATTERS:
EXAMINING ILLNESS BEHAVIOR USING PARSONS'S SICK ROLE

A Thesis
Presented to
The Faculty of the Department of Sociology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
Of the Requirements for the Degree
Master of Arts

By
Angela Byrd

December 2013

STRUCTURE MATTERS:
EXAMINING ILLNESS BEHAVIOR USING PARSONS'S SICK ROLE

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I dedicate this thesis to my father, Bob Miller, whose life was shaped
by his wit, resilience, and loyalty – not his disease.

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STRUCTURE MATTERS:
A LOOK AT ILLNESS BEHAVIOR USING PARSONS SICK ROLE

Angela Byrd

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64 Pages

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Although Talcott Parsons's sick role theory, as described in 1951 in The Social System, has been severely criticized for its inapplicability to chronic illnesses, a portion of the theory is still a relevant and necessary factor in terms of understanding and treating chronic illness today. Using data from the 2012 National Health Interview Survey, this study looks at the individual effects of sex, age, race, cohabitation, education and region of residence on the likelihood of chronically ill patients considering themselves limited in their amount or kind of work as an indicator of sick role adaptation. Results show statistically significant relationships between work limitation and sex, age, cohabitation, education and region of residence, when controlling for the duration of the respondents' condition. Further evaluation of these results is provided.

INTRODUCTION

Just as there are roles, or institutionalized ideas and expectations, assigned to an individual's given gender, title, familial part, or occupation, Talcott Parsons theorizes that there are institutionalized ideas and expectations assigned to and adapted by the sick individual. Whether by compassion or by socialization, we are compelled to feel a certain level of empathy and consideration toward those afflicted with a physically impairing condition. Additionally, when we find ourselves sick or physically impaired, we change our ideas about and expectations of ourselves and expect others to do the same. This changing of ideas and expectations due to the illness of oneself or another constitutes Parsons's "sick role" model. The sick role, when adapted, trumps individuals' well role(s) in that it allows them to be exempt from many of their daily obligations and responsibilities, defining their primary role as both the victims and defenders their health. Theoretically idealistic and grand, Parsons's sick role model is not easily detectable in empirical reality. Not only do individuals' well roles and characteristics constitute spectrums of sick role adaptation, but those spectrums must be empirically analyzed against a continuum of illnesses ranging from acute to chronic. The complexities of the theory have led researchers to poorly conceptualize their concepts, oversimplify the model's construction, and under-analyze contributing factors. This study looks to overcome these shortcomings of the existing research by looking at a single component of the sick role model, a specific cohort of respondents, and concisely conceptualized variables.

PREDICTING HEALTH DISPARITIES

To best understand what factors may influence illness behavior, it is necessary to

first discuss the factors that influence illness in terms of morbidity and mortality. Biomedical and social scientists alike know that health disparities exist among and between various U.S. populations. Additionally, it is known that the causes of these disparities exist at both the individual and the structural level. At the individual level, it is most often health behaviors and risk behaviors that contribute to one's predisposition toward morbidity and mortality. "A U.S. Surgeon General's Report indicated that unhealthy behaviors or lifestyles account for half of the annual number of deaths in the United States" (Williams and Collins 1995:373).

Predicting the likelihood of an individual engaging in unhealthy behavior is difficult because of the complexities inherent in studying individual-level motivators among a large population. Using secondary data, it is impossible to account for the individual-level factors contributing to health behavior. Instead, it is valuable to understand disease as resulting from a "broad range of social, behavioral, nutritional, psychological, residential, and occupational variables" (Williams and Sternthal 2010:S18). With this in mind, it is no surprise that morbidity (disease) and mortality (death from disease) rates in the United States are correlated with the master statuses that influence these variables: gender, race, and socioeconomic status. The objectives of the following literature review are to 1) summarize health disparities as related to these three master statuses and 2) illustrate the ways demographics affect health disparities through structural pathways.

Health Disparities and Gender

One of the most evident and persisting health disparities in the United States is the dissimilarity in morbidity and mortality rates between men and women. William

Cockerham explains, “females report more illness and disability. They may be sick more often, but usually live longer” (Cockerham 2012:74). This is because “men are more likely than women to suffer *fatal* [emphasis added] chronic conditions and diseases – and suffer from them at an earlier age” (Courtenay 2000:1385). Men’s greater likelihood of suffering from fatal disease is a key contributor to their shorter life expectancies. “Men in the United States, on average, die nearly seven years younger than women and have higher death rates for all 15 leading causes of death,” Courtenay 2000:1385). This pattern is consistent across races and across levels of socioeconomic status. In 2012, the National Center for Health Statistics reported that females’ life expectancy at birth is longer than their male counterparts across Hispanic, black, and white races. Hispanic women’s life expectancy is five years longer than their male counterparts; white women’s life expectancy is five years longer than their male counterparts; black women’s life expectancy is seven years longer than their male counterparts (National Center for Health Statistics 2012).

Unfortunately, when looking at a population as large and diverse as that of the United States, it is impossible to account for the variance in biological and risk factors between and among men and women. Instead, it is of better interest to the social sciences to recognize that, although some of these gender health disparities may be accounted for by biological risk factors, these factors interact with “culturally patterned gender behavior to produce health and illness” (Lane and Cibula 2000:138).

Taking into consideration the ways that culture shapes gender roles, health disparities between genders in the United States are often discussed in terms of Western ideals of masculinity and femininity. Throughout history in the United States, the pursuit

of masculinity is synonymous with the “pursuit of power and privilege,” which “can often lead men to harmful health behaviors” (Courtenay 2000:1388). In turn, harmful health behaviors can even contribute to a greater degree of masculinity. “By dismissing their health needs and taking risks, men legitimize themselves as the “stronger” sex. In this way, men’s unhealthy beliefs and behaviors help to sustain and reproduce health disparities between genders. At the same time, “society reinforces and rewards men’s poor health habits” (Courtenay 2000:1397).

Women usually behave in ways expected and typical of an idealized femininity in their personal lives and in their occupations. Women have been, historically speaking, more encouraged and likely to “utilize healthcare and positive health behaviors, report illness symptoms, and more often restrict their activities and stay in bed for illness” because these are all behaviors associated with femininity (Courtenay 2000:1389; Lane and Cibula 2000:139). “Women have been encouraged to pay attention to their own health” while men have been expected to research health and provide health care (Courtenay 2000:1395). In U.S. families, the responsibility for the “nutrition, health promotion, and hygiene is placed on the woman, which may influence her to take better care of her own health” (Lane and Cibula 2000:136)

These “masculine” and “feminine” health and risk behaviors are reinforced by societal structures such as objective culture and the division of labor. To some extent, men have no choice but to lead unhealthy lifestyles. The products produced and consumed in the U.S., especially television, movies, video games and social media, perpetuate hegemonic masculinity and thus men’s unhealthy lifestyle choices. Some research suggests that institutional structures – “such as the government, military,

corporations, technological industries, the judicial system, academia, health care systems and the media – foster unhealthy beliefs and behaviors among men, and undermine men’s attempts to adopt healthier habits” (Courtenay 2000:1394). The division of labor especially contributes to men’s higher rates of morbidity and mortality as the most dangerous jobs in the United States are performed by men. Thus, men have “higher accident rates due to an increased exposure to dangerous activities” (Cockerham 2012:73). Although women’s increased participation in the workforce may help to explain the narrowing gap between men’s and women’s mortality rates over the past three decades, the gendered segregation of occupations persists (Cockerham 2012:73; Cotter, Hermerson, and Vannerman 2004).

Social institutions and their effects on gender ideals are interwoven, interdependent, and mutually influential – so much so that it is impossible to distinguish one single institution as the greatest contributor to health disparities between genders. Nonetheless, the disparities exist and are inescapable. Because dissimilarities in men’s and women’s health behaviors exist across levels of socioeconomic status and across ethnicities, it can be argued that gender predicts differences in health and longevity *regardless of* individual agency and biological risk factors (Courtenay 2000).

Health Disparities and Race

Just as evident and persistent as the health disparities between genders are the health disparities between races. With the exception of Asians, non-white Americans are disadvantaged from whites in terms of both morbidity and mortality. For example, “blacks have higher rates than whites of almost all forms of disability. They also differ more in terms of prevalence rather than in incidence, which most likely results from a

long-term and cumulative process of health disadvantages over the lifecycle” (Hayward *et al.* 2000:926). “Native Americans also have health disadvantages relative to non-Hispanic whites” (Cockerham 2012:83). Furthermore, the disadvantages suffered by these racial minority groups have affected their mortality rates throughout history in the U.S.. Williams and Sternthal explain:

The racial gap in health is large. White men and women outlived their black counterparts by 7.4 and 9.3 years, respectively, in 1950. In 2006, white men still lived six years longer than African American men and white women had a four year advantage of their black peers. (Williams and Sternthal 2010:S16)

More recently, research has shown that racial disparities persist in the U.S. but may be becoming more complex. In 2012, the National Center for Health Statistics reported that Hispanic men’s life expectancies are three and eight years longer than white and black men’s, respectively. Hispanic women’s life expectancies are three and six years longer than white and black women’s, respectively, even though they occupy disadvantaged social and economic positions (National Center for Health Statistics 2012; Cockerham 2012:83). The explanation researchers provide for what Cockerham terms this “Hispanic Paradox” is the relatively young age of the U.S.’s Hispanic population; they have not yet reached the age at which most contract fatal chronic diseases (Cockerham 2012:83). Asian Americans, too, seem to be an exception to the rule as they “have typically enjoyed high levels of health and are the healthiest racial group in the U.S.,” despite their minority position (Cockerham 2012:83).

The complexities of health disparities among and between non-white minority groups notwithstanding, blacks in the U.S. consistently suffer the most in terms of morbidity and mortality rates. This can be explained, in part, by discrimination and

residential segregation. Individual experiences of discrimination cause stress, which is known to have an adverse effect on health (Williams and Sternthal 2010:S20; Robert and House 2000:118). In stressful environments, “the body’s physiological defenses against disease are worn down by continuous exposure to adverse social conditions engendered by racism” (Hayward *et al.* 2000; Cockerham 2012:86). These stressful environments are inherent in the economically poor settings that accompany racially-segregated living conditions: poor access to adequate education, fewer job opportunities, limited access to nutritious food, “weak infrastructures, poor interpersonal relationships, more environmental toxins, and poorer access to and quality of care” (Williams and Sternthal 2010:S20). Still, racial minority groups other than blacks are subjected to discrimination and residential segregation yet do not match blacks’ morbidity and mortality rates. Research suggests that blacks experience the greatest health disadvantages because they occupy the worst socioeconomic positions. Among social scientists, “race is so strongly correlated with SES that it is sometimes used as an *indicator* of SES” (Williams and Collins 1995:363). Thus, it makes sense that blacks, who occupy the worst socioeconomic positions, also experience the highest morbidity and mortality rates. Identifying racial health inequalities in terms of SES makes it evident that “the disparity between races in health is rooted in the fundamental social *conditions* [emphasis added] of disease rather than behavioral [or biological] differences” (Hayward *et al.* 2000:926).

Health Disparities and Socioeconomic Status

Although race and gender are closely related to SES, SES is a “distinct system of social ordering that [uniquely] contributes to health risks” (Williams and Sternthal 2010:S19). While the relationship between SES and health is “monotonic, it is not linear”

(Robert and House 2000:121). The effects of SES on health are intricately intertwined with the effects of race, age and gender in ways that are not yet fully understood; the *relative* effects of SES on health versus the effects of health on SES have yet to be determined. Nonetheless, SES undoubtedly accounts for “larger contextual factors that result in structured inequalities and disadvantage” (Angel and Angel 2006:1156). Thus, researchers agree that “the most fundamental causes of health disparities are socioeconomic disparities” (Adler and Newman 2002:61).

Studies of “morbidity and mortality in Canada” have shown “the relative impacts of four key causes of morbidity and mortality: biological determinants, health care, environmental exposure, and behavior and lifestyle” (Adler and Newman 2002:65). In these studies, SES “underlies three [of these four] determinants, which together are associated with an estimated 80 percent of premature mortality” (Adler and Newman 2002:65). Medical sociologists Phelan, Link and Tehranifar assert that SES is a *fundamental cause* of health disparities because it “affects multiple disease outcomes, affects outcomes through multiple risk factors, affects resources available before and after disease diagnosis, and has effects consistent over time despite replaced intervening mechanisms” (Phelan, Link and Tehranifar 2010:S29). If SES is a fundamental cause of health disparities, the “level and distribution of socioeconomic variables in the communities, states, and nations within which individuals and families live and work” are of paramount importance to their health (Robert and House 2000:128).

The effects of SES on health are “typically assessed in line with Weberian notions of stratification such as income, occupation, and education” (Williams and Collins 1995:350). However, “each component [of SES] provides different resources and

displays different relationships to various health outcomes” (Adler and Newman 2002:61). Furthermore, as proposed by Nancy Adler and Katherine Newman (2002), it is through three social, structural pathways (among others) that SES indirectly affects health outcomes: through environmental exposures, through the social environment, and through healthcare. Thus, each component of SES must be discussed individually in terms of its ability to infiltrate these three pathways.

Socioeconomic status and income

Income is the component of SES that most obviously affects health behaviors and access to healthcare. In terms of environmental exposures, “higher incomes can provide better [access to] nutrition, housing, schooling and recreation” (Adler and Newman 2002:62). In terms of social environment, higher income also allows individuals to “live in an advantaged neighborhood [and be] surrounded by an economically advantaged culture . . . [which] provides formal and informal networks that reinforce healthy lifestyles” (Phelan, Link and Tehranifar 2010:S30). Lastly, income determines one’s access to health care if and when health conditions arise. This is especially true in the United States, “where health care is a commodity rather than a right” and the “rationing of health services is based on SES rather than clinical need” (Wright and Perry 2010:S111).

Socioeconomic status and occupation

“Among the employed, occupations differ in their prestige, qualifications, rewards, and job characteristics” (Adler and Newman 2002:65). Occupations associated with the lowest levels of prestige (which are typically also occupations that require the lowest levels of skill) most negatively impact the health of their workers. In terms

environmental exposures, “lower-status jobs expose workers to both physical and psychosocial risks. They [also] carry a higher risk of occupational injury and exposure to toxic substances” (Adler and Newman 2002:65). Furthermore, these same lower-status occupations often require the performance of unskilled labor. In the U.S.’s capitalist economy, the performance of unskilled labor ultimately alienates individuals from other workers, weakening their social environments and diminishing their senses of trust and cohesion (Marx 1977; Adler and Newman 2002:67). Lastly, these low-status occupations often have higher rates of contingent workers, who are “significantly more likely to [have] no health insurance . . . than workers in regular, full-time jobs” (Vallas, 2009:299). Thus, low-status occupations are associated with poorer access to healthcare.

Socioeconomic status and education

Although income and occupation are two components of SES that influence health outcomes, the third component, education, is arguably the most influential component because of its ability to predict the first two. Adler and Newman explain:

Education is perhaps the most basic SES component since it shapes future occupational opportunities and earning potential. It also provides knowledge and life skills that allow better-educated persons to gain more ready access to information and resources to promote health. (Adler and Newman 2002:61).

Furthermore, the effects of “early educational experiences” on health are beneficial, as are “years of completed education” (Adler and Newman 2002:61). More education leads to higher income and higher-status occupations, both which “lead to better health benefits and safer working conditions” (Phelan, Link and Tehranifar 2010:S31). If SES is a fundamental cause of health disparities, then education is their greatest predictor.

Health Disparities, Demographics and Pathways

Adler and Newman's recognition of the three social pathways through which SES influences health outcomes provides researchers with the opportunity to explain the effects of other demographic variables. Because SES is so intricately connected with race, age and gender, this research argues that it is also through these three pathways that race age and gender affect health and illness. The argument here is easy to make. Race, age, gender and SES are all influential in shaping one's environmental exposures in terms of residential and occupational segregation. It is also through one's neighborhood, workplace and family that race, age, gender and SES help to shape one's social networks. Lastly, individuals' likelihood and ability to access adequate healthcare is unquestionably linked to their race, age, gender and SES. (Adler and Newman 2002) Thus, the effects of demographics on health and *illness* are mediated by social pathways, which are inherently structural. This research argues that the effects of demographics on *illness behavior* are also mediated by these same structural pathways.

RESPONDING TO DISEASE: ILLNESS BEHAVIOR

Initially, it may seem that individuals' response to disease is entirely subjective and dependent on agency, not structure. After all, the experience of illness does differ from individual to individual and from group to group. Medical sociologist William Cockerham even defines disease as "an adverse *physical* state, consisting of a physical dysfunction within an individual" while defining an illness as "a *subjective* state, pertaining to an individual's psychological awareness of having a disease and usually causing that person to modify his or her behavior" (Cockerham 2012:167). Health and longevity may not be all that an individual desires. Instead, other life goals or desires

such as social status, freedom from responsibility, “power, manliness, or beauty” may act as stronger motivators for behavior (McElroy and Jezewski 2000:194; Phelan, Link and Tehranifar 2010:S35). Personality and emotional variables such as “self-esteem, perceptions of mastery or control, anger or hostility, feelings of helplessness, hopelessness and repression or denial,” are now being considered as risk factors for poor health (Williams and Collins 1995:375). Nonetheless, there is a common thread among these motivations, desires, personality and emotional variables: they do not form in a vacuum. Instead, one’s psychological awareness is reliant on his or her stocks of knowledge, which are intricately interconnected and interdependent with society. An individual’s goals and desires are a product of culture; “the responses of others are as important in the illness experience as is the interpretation of the one who is ill” (McElroy and Jezewski 2000:191). Thus, “the individual level and the microcultural level, [i.e. agency and structure] interconnect and *mutually* [emphasis added] influence [illness] behavior” (McElroy and Jezewski 2000:195).

The extent to which agency and structure interact to produce illness behavior is evident in the “culturally patterned social and personal elements of sickness” (Kleinman and Seeman 2000:231). For men, illness “raises self-doubts about masculinity” (Courtenay 2000:1389). Low SES predicts “elevated rates of a broad range of psychiatric conditions for both blacks and whites” (Williams and Collins 1995:351). “Younger and middle-aged people often make concerted efforts to manage their illness. They maintain hopes and plans, reasons, and responsibilities” (Charmaz 2000:283). These patterns suggest that the same structural pathways that contribute to health behaviors and thus health disparities also contribute to illness behavior.

Just as questionable as the extent to which an individual has control over his or her propensity for disease is the extent to which one governs his or her response to it. An individual's subjective response to disease is so tortuously intersected with his or her structural position within society that there is no sense in parsing out the effects of structure from the effects of agency. Instead, it is critical to *predict* illness behavior so as to maximize health, manage chronic disease, and minimize the cost of healthcare.

The Importance of Predicting Illness Behavior: Health, Chronic Disease and Healthcare

Although health and illness are subjectively defined by the individual, "influenced by the dialectic between the body and the self," most "laypersons tend to view health as the capacity to carry out their daily activities" (McElroy and Jezewski 2000:191; Cockerham 2010:7). Likewise, the biomedical criteria for health "usually includes instrumental components such as the ability to work and to fulfill expected roles" (McElroy and Jezewski 2000:191). If modern medicine is to maximize its ability to promote "health," as it is unanimously defined, it is necessary to examine the subjective response to disease as well as the structural factors that contribute to that response.

Understanding and predicting the subjective response to disease is of particular interest in today's increasingly complex healthcare setting. Since the development of modern medicine, healthcare in the U.S. has followed a biomedical model in which illness is "an abnormal biological affliction or mental abnormality with a 1) *cause*, 2) *characteristic train of symptoms*, and 3) *method of treatment*," [numbering and emphasis added] (Cockerham 2010:166). In the biomedical model, symptoms are followed by a diagnosis and its prescribed treatment. Following this biomedical model, modern healthcare has developed sophisticated ways of diagnosing and treating most acute and

infectious diseases. Nonetheless, the treatment of chronic illnesses does not fit this regimen. Due to the very nature of “chronic” illnesses, they are not necessarily treatable. Instead, more and more Americans are living with chronic conditions for an extended period of time. Thus, modern medicine must become increasingly concerned with how individuals *live with* and *manage* these chronic illness. Wasserman and Hinote (2012) explain:

Medicine’s accomplishments in treating infectious disease, both in the clinic and through public health measures, initiated the epidemiological transition, where chronic illnesses became the primary mortality threats in developed countries, mainly due to increased life expectancy (Cockerham 2007) This is especially problematic because the profiles of chronic and infectious disease are paradigmatically different. Therefore the modern conception of medicine, which is matched so well with infectious disease, likely will increasingly fall short as chronic illnesses constitute a greater share of the epidemiological picture. (Wasserman and Hinote 2012:147)

Because of the biomedical model’s inability to effectually treat and manage chronic illnesses, and because of the rising costs of healthcare, chronically ill individuals are taking matters into their own hands. They are utilizing “lay and experiential knowledge” which “will increasingly come into conflict with and challenge professional knowledge” (Conrad and Barker 2010:S72). This is concerning not only in terms of the well-being of the individual, but also in terms of the cost of an inadequate healthcare system. A report authored by Williams, Sternthal and LaVeist “estimated that the medical care and lost productivity costs for racial disparities in health [alone] amount to a \$309 billion annual loss to the U.S. economy” (Williams and Sternthal 2010:S23). If modern medicine is to understand how individuals manage and live with chronic disease, to promote the well-being of the individual and to minimize the cost of ineffective healthcare, research must examine the means through which chronically ill individuals

are obtaining lay and experiential knowledge, consciously or subconsciously, to shape their illness behaviors.

Predicting Illness Behavior: Demographics and Social Pathways

Researchers and methodologists could initially argue that “a phenomenological or symbolic interactionist theoretical framework could best explain illness experiences” and thus illness behavior (Conrad and Barker 2010:S68). Sociologists Good and Good advocate for doctors’ use of illness narratives in diagnosing patients, acknowledging that “beliefs and perceptions held by patients and their families constitute an important reality, not only for ethnographers, but also for practitioners” (Good and Good 1980:166). What researchers like Good and Good fail to recognize are the structural factors that may be preventing patient’s ability or willingness to seek professional medical care to begin with. An ethnographic study cannot be performed on the unidentified chronically ill individuals that rely on lay and experiential knowledge to treat their own chronic conditions. Furthermore, illness narratives cannot be generalized to the larger population, to explain variance in illness behavior between demographics (Conrad and Barker 2010:S68). Indeed, the means through which chronically ill individuals are obtaining lay and experiential knowledge to shape their illness behaviors are cultural. Their patterns of meaning-making exist and should be measured at the microcultural level of analysis. “In contrast to the medical model, which assumes that diseases are universal and invariant to time or place,” a social constructionist approach can “emphasize how the meaning and experience of illness is shaped by cultural and social systems” (Conrad and Barker 2010:S68).

It is at the microcultural level of analyses that Parsons’s sick role model can and

should be employed to examine patterns of illness behavior among the chronically ill. Research has successfully illustrated how three demographic variables contribute to health disparities: 1) Gender predicts differences in health and longevity *regardless of* individual agency and biological risk factors (Courtenay 2000). 2) Disparities between races in health are rooted in the fundamental social conditions of disease rather than behavioral [or biological] differences. 3) Socioeconomic status has been shown to be a fundamental cause of disease. Research has failed to sufficiently examine the effects of these demographics on illness behavior. Understanding illness behavior as a subjective response (i.e. the meanings an individual assigns to disease) that is shaped by culture, it is only logical to examine the effects of demographics as mediated by the same social pathways that mediate health disparities: environmental exposures, social environment, and healthcare. Embedded in these pathways are the roles society expects of the sick individual as well as the roles the sick expect of themselves. Thus, measuring the extent to which chronically ill individuals adopt Parsons's sick role model can illuminate patterns in the meaning-making involved in illness behavior.

A REVIEW OF PARSONS'S SICK ROLE THEORY

Throughout sixty years of medical sociological research empirically examining health disparities and behavior, the criteria for physical health typically includes at least one element allusive to the ability to work and fulfill expected roles. From a structural-functionalist perspective, the ability to work and fulfill expected roles is not only necessary to maintain one's individual balance and functioning; it is also critical if equilibrium is to be maintained within one's social system. Similar to the way that illness can be defined as the *psychological* awareness of disease, sickness can be defined as the

social recognition of illness, “signifying an impaired social role for those who are ill” (Cockerham 2012:167).

Talcott Parsons was one of the first to acknowledge sickness a socially constructed phenomenon and define it, in part, as the inability to work and fulfill expected roles. In his 1951 book The Social System, Parsons posited the theory that sickness is not only a physical condition, but a social role in and of itself with “institutionalized expectations and corresponding sentiments and sanctions” (1951:463).

He wrote:

There seem to be four aspects of the institutionalized expectation system relative to the sick role. First, is the exemption from normal social role responsibilities, which of course is relative to the nature and severity of the illness. . . . The second closely related aspect is the institutionalized definition that the sick person cannot be expected by “pulling himself together” to get well by an act of decision or will. . . . The third element is the definition of the state of being ill as itself undesirable with its own obligation to want to “get well.” . . . Finally, the fourth closely related element is the obligation – in proportion to the severity of the condition, of course – to seek technically competent help, namely, in the most usual case, that of a physician and to cooperate with him in the process of trying to get well. (Parsons 1951:437)

Parsons’s sick role model had unique value in its time in that it was the first to “describe a patterned set of expectations defining the norms and values appropriate to being sick” (Cockerham 2012:4). The first element of Parsons’s sick role, exemption from normal social role responsibilities, is still consistent with modern day criteria for illness: the inability to work and fulfill expected roles. Nonetheless, Parsons’s model “was severely criticized and his views are no longer widely accepted” as much literature has been aimed at challenging or disproving his theory (Cockerham 2010:166).

Challenging the Theory

Because Parsons sick role theory was presented as only one small component of a

much grander, macro-level social systems theory in his 1951 book, The Social System, its details and logistics were not immediately nor fully outlined. As a result, Parsons's sick role theory spawned a surge of sociological research, much that aimed to fill the apparent gaps in his model. While more current research associated with Parsons's sick role aims to test the theory empirically, some earlier work was aimed at challenging the theory itself.

Rather than test the extent to which sick individuals adhere to Parsons's sick role, Emil Berkanovic was one who questioned the construct validity of the sick role theory itself. Berkanovic was not concerned with how often sick individuals adapted the sick role. Instead, he explored whether or not the behaviors and exemptions expected *of* and assigned *to* the sick (according to Parsons), are expected and assigned in reality. As fascinating a question as Berkanovic raised, his methodology was poor. By dispersing questionnaires to only 130 Los Angeles workers, who were available by convenience, Berkanovic's test of construct validity of sick role traits was inadequate (Berkanovic 1972).

Also skeptical were Arnold Arluke, Louanne Kennedy and Ronald Kessler, who questioned whether Parsons's model was "the only generally accepted model of appropriate sickness behavior" and whether it was "equally accepted in all segments of society" (Arluke *et al.* 1979:30). Like Berkanovic, the sample used in Arluke, Kennedy, and Kessler's study was not generalizable to a population larger than the 1,000 recently-discharged New York City patients they interviewed. However, their findings cannot be entirely discounted. Though not supportive of Parsons's model as a whole, their findings did support, individually, the four sick role expectations offered by Parsons's theory

(Arluke *et al.* 1979:32).

Empirically Testing the Theory: Seeking the Help of a Physician

Parsons's sick role theory posed additional problems to researchers who wished to test it empirically. In describing a patterned set of norms and values appropriate to being sick, Parsons was defining what was appropriate illness behavior. Illness behavior can be defined as "the activity undertaken by a person who feels ill for the purpose of defining that illness and seeking relief from it" (Cockerham 2012:142). The activity undertaken to seek relief could include self-care, psychosocial development, or environmental adaptations. Nonetheless, the vast majority of research pertaining to Parsons's sick role seeks to measure the frequency of a single activity and the various predictors of that one component: whether or not one seeks medical help.

Some research, such as that of Frederic and Sally Wolinsky and David Britt, suggests that individuals seek medical help to gain "legitimation" of their sick behavior. The ability of the sick to gain support for maintaining his or her sick role was of specific interest in their research. Frederic and Sally Wolinsky looked at different cohorts of ages and socioeconomic statuses, looking for differences in a sick individual's likelihood to expect sick role legitimation as well as his or her likelihood to get it. They find that while older cohorts of low SES are most likely to *expect* sick role legitimation, or support, it is the less educated that are most likely to *get* legitimation (Wolinsky 1981:229).

Like Wolinsky and Britt, Frank Petroni suspected that sick role legitimacy was a key indicator of an individual's likelihood to visit a physician. However, Petroni suspected that this legitimation varied with family size and social class. To test his hypotheses, Petroni interviewed 67 three-generation families, asking a variety of

questions aimed at measuring four variables: legitimacy, family size, social class, and frequency of physician visits. While family size, illness frequency, and social class were fairly straightforward in terms of Petroni's conceptualization, his measurement of sick role legitimacy was unsatisfactory. To measure sick role legitimacy, Petroni asked the "available" spouses of respondents how they would react if the respondent were afflicted with one of several hypothetical illnesses: Is it the sick respondent's "right to 1) be helped physically, 2) see a doctor, 3) relinquish other role responsibilities, 4) assume a dependency role" (Petroni 1969:730). By assuming the sick only obtain role legitimacy from their spouses, Petroni ignored the fact that role reinforcement takes place in social institutions outside marriage. Additionally, Petroni's sample size was too small and limited to generalize any results or gain any true knowledge of the sick role concept as a whole.

Additional research looked at stress as a factor contributing to whether or not the sick individual seeks medical help. In 1961, David Mechanic and Edmund H. Volkart recognized illness as the psychological awareness of disease and examined illness behavior as correlated with the frequency of utilizing medical care. Mechanic and Volkart assert that there is an "analytically separate phenomena of developing illness (symptoms, disease) and coming under medical care," or seeking the help of a physician (Mechanic and Volkart 1961:51). In an attempt to illustrate the variance in those who seek medical care versus those who do not as caused by stress, Mechanic and Volkart measured the stress, frequency of medical visits, and "inclination to adopt the sick role" of 614 freshmen males at a large Western university (Mechanic and Volkart 1961:54). By utilizing the school's medical records along with responses to a twice-distributed

questionnaire, Mechanic and Volkart found that those most likely to adopt the sick role were those most likely to seek medical attention. Stress of the respondents seemed to have little influence on their frequency of medical visits. Unfortunately, Mechanic and Volkart's conceptualization was poor in that they measured the respondents' stress by their inclination to describe themselves as "lonely" or "nervous." Likewise, they measured "inclination to adopt the sick role" by a series of questions regarding how likely they *would have been* to visit the doctor in specified hypothetical situations. Measurement of the number of likely visits to the doctor is measurement of only one of Parsons's sick role elements but is represented as measurement of the entire concept – an unacknowledged fault of Mechanic and Volkart's work. By limiting their sample to only males and only college freshmen, Mechanic and Volkart also failed to generate results that were generalizable to any population larger than that of their study and left too much unexplained variance in sick role behavior.

H. Reed Geertsen and Robert M. Gray focused on the "family as a factor influencing the utilization of existing medical services" (Geertsen and Gray 1970:639). Geertsen and Gray suspected that the more "familialism" the mothers perceived, who were at the time of the study were regarded as the primary caregivers in most households, the more likely they were to utilize medical services and thus adapt Parsons's sick role. Familialism was conceptualized as support for family members, putting family members' needs before oneself, loyalty, and a sense of responsibility to care for family members younger or less able (Geertsen and Gray 1970:641). The relationship between familialism and mothers' tendency to adopt the sick role was positive in this study. However, like Petroni and Mechanic and Volkart, the sample size used disallowed the results to be

generalized to a larger population. Likewise, by interviewing mothers only, Geertsen and Gray missed uncovering the effects of familialism on fathers as well as adults with no children.

Similar research also addressed the impact of SES on sick role adaptation. David Britt explored the reciprocal relationship between “indicators of social class and forms of illness” (Britt 1975:178). Britt hypothesized that if, over a one year period, the income increased for the head of a household, the extent of his self-reported illness (SRI) would decrease. Britt also expected the reverse to be true: As the frequency of SRI increased, the income of the head of a household would decrease (Britt 1975:179). To test these hypotheses, Britt used data from the University of Michigan’s Panel Study of Income Dynamics, which was originally collected from a stratified random sample of households in the United States (Britt 1975:179). Although Britt found what he considered a significant relationship between SRI and income, he did not explore any explanations for the relationship. Instead, he only noted that the stress involved with low income may contribute to physical symptoms that contribute to self-reported illness (Britt 1975:181). “Recent reviews of the evidence of the contribution of medicine to health status indicate that the role of medicine is frequently overstated and that the removal of economic barriers alone will not eliminate social disparities in health care utilization” (Williams and Collins 1995:372).

Complexities of Testing the Theory: Chronic Illness and Expectations

Not only is much of the existing empirical research on Parsons’s sick role not generalizable, it is inconclusive in that it measures only patients’ likelihood to seek medical help. This inconclusiveness is understandable considering Parsons’s model

consists of four components; besides being obligated to seek medical help, the model asserts that the illness is not the sick individual's fault, the sick individual should want to get well, and the sick individual is exempt from daily obligations and responsibilities. It is difficult, if not impossible, to empirically measure more than one of these components at a time. Moreover, it is necessary to account for the variance of each measure along a spectrum of illness ranging from acute to chronic.

The very nature of a "chronic" illness implies that the afflicted individual will be ill for an extended period of time and/or cannot get well. Parsons's failure to address chronic illness in his sick role model was immediately evident. Thus, measuring the extent to which the (acutely or chronically) afflicted individual was at fault or wanted to get well was seemingly meaningless. Fourteen years after the publication of The Social System, and in response to criticism, Parsons published a journal article in which he elaborated on his original ideas regarding illness. In the article, he first clarified that acute and chronic illness can be thought of not only in terms of illness duration, but in levels of capacity to function:

Health as capacity seems to me to help show the relevance to this analysis, not merely of acute illness, but of chronic, even terminal, illness. There are many conditions which are, in any given state of the art of medicine, incurable. However, recovery is the obverse of the process of deterioration of health, that is, a level of capacities, and in many of these chronic situations tendencies to such deterioration can be held in check by the proper medically prescribed measures based on sound diagnostic knowledge. (Parsons 1975:259)

Parsons then explained how the capacity to function can be maintained if the individual seeks medical care and adheres to the prescribed regimen:

The cost consists . . . of adhering to a proper regimen and of deferring to a competent professional authority in defining what it should be. The fact then, that diabetes is not, in the sense of pneumonia, "curable," does not

put it in a totally different category from that of acute illness. (Parsons 1975:259)

Despite Parsons's argument that illness behavior is consistent, regardless of the acute or chronic nature of the illness, critics of his sick role model were still not satisfied. By 1976, researchers still sought a "clearly developed social definition of the role of the permanently disabled or chronically ill" (Segall 1976:164). Some researchers suggested that the "incurable" characteristic associated with chronic illness and disability lessens the degree to which the ill are exempt or detached from their normal everyday roles (Levine and Kozloff 1978:323). To Sol Levine and Martin A. Kozloff, "chronic illness is often associated with old age, [and so] there may be ambiguity in role expectations" overall (Levine and Kozloff 1978:324). Others assert that it is not chronic illness nor age that accounts for the variance in expectations of and assigned to sick, but the presence or absence of medical institutionalization. Those who are medically institutionalized, according to John F. Myles, have no choice but to adapt to the sick role. Myles writes, "Whether or not the individual is really sick becomes irrelevant; what is significant is that inmates inevitably come to believe that they are sick and to behave accordingly. At a social-psychological level, therefore, . . . the treatment becomes the cause of the 'disease' (sic)" (Myles 1978:509). Data collected on a stratified random sample of 4,805 respondents, aged 65 and over, supported Myles's assertion. Most recently, it has been suggested that there is no one clear set of expectations of illness behavior for the chronically ill. On one hand, chronically ill individuals are expected to implement a "routine regimen, self-monitoring and crisis management as prolonged compliance"; on the other they are expected to perform "as far as possible in normal roles" (Varul 2010:83).

Not only does empirically testing Parsons's sick role theory present problems in terms of its four-component structure and the acute vs. chronic nature of illness, it also presents problems in terms of the appropriate level of measurement. While society may expect sick individuals to perform normal roles, sick individuals may or may not expect themselves to perform them. Taking into account the degrees of separation between disease, illness, and sickness, the level at which expectations of illness behavior are measured will undoubtedly influence the results of any study. This research argues that it is individuals' expectations of themselves, their illness behaviors, that are of greatest interest to the social sciences in light of a changing and complex healthcare landscape.

Using the Sick Role to Measure Illness Behavior

Using Parson's four-component sick role model as an indicator of meaning-making and illness behavior, research could measure any one component. However, measuring the extent to which the chronically ill individual is at "fault" for his or her behavior or the extent to which he or she "wants" to get well is empirically difficult. It is possible to measure the extent to which sick individuals consider themselves exempt from daily obligations and responsibilities.

Like research looking at Parsons's sick role model overall, research concerning the sick role and chronic illnesses is inadequate. As previously noted, some studies have investigated an individual's "well" role as influential on his or her own expectations of (and ability to obtain) sick role legitimacy. Others have sought to describe the variance in sick individuals' perception of self versus society's perception of the sick. However, too little has been done to explore any one component of Parsons's sick role apart from the likelihood of the generally-ill to seek medical help. Furthermore, little empirical research

investigates sick role adaptation among chronically ill or disabled individuals.

Resultantly, no empirical research measures the factors influencing sick role adaptation in terms of exemption from daily responsibilities and obligations among chronically ill populations. This latter deficiency of existing literature is the aim of this present research.

METHODS

Empirical research in the field of medical sociology has demonstrated the demographic factors that contribute to individuals' propensity toward chronic illness(es). The objective of this study is three-fold: First, this study seeks to measure the known ways demographic factors (sex, age, race, relationship status, education, and region of residence) influence individuals' propensity toward chronic illness. Second, this study seeks to measure the ways demographic factors influence sick-role adaptation among populations of individuals who are self-reportedly chronically ill. Lastly, this study seeks to compare the effects of demographic factors on chronic illness with their effects on sick role adaptation. To compare these effects, two dependent variables are needed: one that encompasses chronic illness and one that encompasses sick role adaptation. Further discussion of these two dependent variables will follow.

The Data

The secondary dataset used for this study is the 2012 National Health Interview Survey (NHIS) conducted by the National Center for Health Statistics (NCHS) which is part of the Centers for Disease Control and Prevention (CDC). "The National Health Interview Survey is a cross-sectional household interview survey. The sampling plan follows a multistage area probability design that permits the representative sampling of households and noninstitutional groups" (NHIS Codebook 2012). The sample was drawn from the civilian, noninstitutionalized adult population of the 50 United States and the

District of Columbia. Individuals who are in long-term care institutions such as “nursing homes for the elderly or hospitals for the chronically ill or physically or intellectually disabled,” were excluded from the survey (NHIS Codebook 2012).

The 2012 NHIS contains multiple levels of data concerning family, household, adults, and children. Data utilized for this research is the Person-Level, which provides information on respondents’ health status and limitation of activity (NHIS Codebook 2012). The NHIS 2012 codebook explains how data pertaining to limitation of activity were obtained:

Information on activity limitations, including questions about work limitations . . . is collected for each family member. If any limitations are identified, the respondent is asked to specify the health condition(s) causing the limitation(s) and indicate how long the family member has had each such condition. (NHIS Codebook 2012:26)

The Person-Level dataset contains 108,131 persons in 43,345 families. Data were collected through computer-assisted personal interviews and face-to-face interviews. The NHIS Person-Level data used a stratified multistage probability sample in which one adult per family was randomly selected “with enhanced chances of selection for black, Hispanic or Asian persons aged 65 years or older” (NHIS Codebook 2012).

The Dependent Variables

Because this study seeks to compare the effects of demographic factors on chronic illnesses with their effects on sick role adaptation, two *types* of dependent variables are needed. The dependent variables that measure respondents’ propensity toward each chronic illness will be discussed first.

Extended condition durations

Research has shown that members of certain demographic groups are not only

more likely to at some point in their lives have a chronic illness, they are also more likely to get it at an earlier age and thus have it for a longer period of time. Therefore, to test respondents' propensity toward a chronic illness, the first dependent variables need to encompass both the existence of a chronic illness and the duration of that illness. These first dependent variables, *condition durations*, were constructed for each of the eleven conditions using two variables (for each condition, eighteen total) from the dataset.

Figure 1. Construction of Condition Duration Variables

<i>Chronic Condition</i>	X	<i>Chronic Duration</i>	=	<i>Condition Duration</i>	<i>Extended Condition Duration</i>
Which condition causes your limitation?		How long have you had _____?			
Condition 0 = Not Mentioned 1 = Mentioned		1 = Less than 3 mo. 2 = 3-5 mo. 3 = 6-12 mo. 4 = More than 1 yr.		0 = No Condition 1 = Condition < 3 mo. 2 = Condition 3-5 mo. 3 = Condition 6-12 mo. 4 = Condition > 1 yr.	0 = None/ < 1 yr. 1 = Condition > 1 yr.

First, if respondents to the NHIS 2012 survey indicated “yes” to the question, “Are you limited in the kind OR amount of work you can do because of a physical, mental or emotional problem?” they were then asked which condition caused their limitation. The respondents examined in this study indicated they had one of the following eleven chronic conditions: arthritis, back or neck problem, bone or joint injury, heart problem, stroke problem, blood pressure problem, diabetes, cancer, depression or emotional problem, lung or breathing problem, or weight problem. These eleven dichotomous variables are referred to as “*chronic conditions*” in this research project. These eleven chronic conditions were chosen due to the variance in the severity of their accompanying symptoms and the invasiveness of their typically-prescribed medical treatments. Although not all of these conditions may appear to be chronic conditions, it should be noted that at least 94% of respondents who indicated each condition also indicated that condition is chronic. For six out of the eleven conditions, 100% of respondents indicated that their condition is chronic.

Next on the NHIS, respondents who indicated having a chronic condition were asked, “How long have you had [this condition]?” Optional responses to this question were 1= Less than 3 months, 2= 3-5 months, 3= 6-12 months, 4= More than 1 year, 7= Refused, 8= Not ascertained and 9= Don’t know. These eleven ordinal variables are referred to as “*chronic durations*.” It should be noted that respondents who did not indicate a chronic condition were not asked how long they’d had that condition. To measure effects of demographic factors on both the existence of each chronic illness and the duration of that illness, neither *chronic conditions* nor *chronic durations* can be used on their own. *Chronic conditions* does not account for the duration of the illnesses; *chronic durations* excludes those that do not have the indicated condition and unfavorably reduces the sample size of nested regression models. Thus, for the purposes of this research, each condition’s *chronic condition* variable was multiplied with its *chronic duration* variable to get *condition durations*. As an example, Figure 1 illustrates how the diabetes condition duration variable was constructed. The same ordinal variable construction was used for the other ten examined conditions. Each of the eleven ordinal *condition duration* variables were recoded as illustrated in Figure 1, where 0= No chronic condition, 1= Chronic condition for up to 3 months, 2= Chronic condition for 3 to 5 months, 3= Chronic condition for 6 to 12 months, and 4= Chronic condition for more than one year.

It should be noted that, for each of the eleven conditions, the majority of respondents who indicated having that condition also indicated they had had that condition for more than one year. (See the white *condition duration* variables in Table 1.) Because of the skewed distribution of the condition duration variables, it was necessary

to collapse each of them into dichotomous variables for adequate use as dependent variables. Thus, each condition duration variable was also coded as dichotomous, where 0 = No condition or condition for 1 year or less and 1 = Condition for more than 1 year. These dichotomous, condition duration, dependent variables will hereafter be referred to as *extended condition durations*. A summary of each extended condition duration dependent variable can be found in gray in Table 1.

Sick role adaptation

To compare the effects of demographic factors on chronic illnesses duration with their effects on sick role adaptation, a second type of dependent variable was needed that encompasses sick role adaptation. Using the given dataset, one cannot empirically measure the extent to which an individual is exempted from responsibility or fault for his or her condition. This is one of Parsons's four sick role concepts and it is an institutionalized idea rather than a product of the patient's individual attributes. Likewise, because this research is examining chronically ill individuals, the extent to which a respondent regards his or her condition as undesirable would be empirically difficult to measure. Finally, the likelihood of respondents seeking medical help has been overanalyzed by existing literature. This research aims to measure the extent to which respondents adapt the sick role by considering themselves limited in their daily obligations and responsibilities.

The extent to which an individual is exempt from his or her daily obligations and responsibilities is subjective and dependent on the respondent. The interest of this study is not the opinions of society regarding the sick. Instead, this study aims to measure the likelihood that respondents will consider themselves limited in their ability to fulfill their

daily obligations and responsibilities. Because the majority of individuals in the U.S. population share the daily obligation or responsibility of work, the extent to which respondents consider themselves limited in their *work* is used as an indicator of their sick role adaptation.

A single question on the 2012 NHIS survey asks, “Are you limited in the kind or amount of work you can do because of a physical, mental or emotional problem?” Responses to this question were coded as follows: 0 = Unable to work, 1 = Limited in work, 2 = Not limited in work, 7=Refused, 8=Not ascertained and 9=Don’t know. The resulting variable was recoded to be a dichotomous variable where 0 = Not limited in work and 1 = Limited in or unable to work; this variable will hereafter be referred to as “*work limitation*”.

The Independent Variables

Due to the fact that much of the existing literature examines sex, race, and socioeconomic status as indicators of health disparities, these same three variables are also of interest in this study. Unfortunately, information regarding the respondents’ income was not available in the Person-Level dataset. Education was used as a proxy for SES, given its high correlation with income and occupation in U.S. society. Preliminary studies utilizing data on end-stage renal disease patients also suggested that age is a key contributing factor in sick role adaptation; thus, age was utilized in this study as well. Lastly, as this study aims to reveal the structural pathways that influence sick role adaptation, the region of the country in which respondents live and cohabitation were also used as independent variables.

The sex variable was coded as follows: 0= Male and 1= Female. Likewise, the

race variable used was coded to allow us to decipher the effects of being white relative to all other races: 0= Other and 1= White. The education variable was originally interval-ratio, indicating years of education. As the types of employment an individual can secure are more often than not dependent on his or her highest *level* of education completed, or degree, the education variable was recoded to reveal the effects of having earned 0= Less than a high school diploma, 1= High school diploma or GED, 2= Some College, 3= Bachelor's degree, or 4= Masters degree or higher.

Since respondents to the 2012 NHIS had to be at least eighteen years of age to participate in the questionnaires, the minimum age in this dataset is eighteen. The maximum value of age is eighty-five. When bivariate regression was used to examine the influence of age on work limitation (Table 2-2), it appeared that each year of age predicts lesser odds of work limitation, which is not in line with traditional role expectations of the elderly. Since the type of work an individual does varies throughout the life course, as do the expectations society has regarding age and work, it is necessary to control for age in a way that is in line with these changes and expectations. Thus, the age variable in this dataset was collapsed to allow for examination of being a new worker (age 18-35) or an experienced worker (age 35-64), relative to those who are seasoned or retired workers (age 65 and older).

The literature discussed in this study suggests that the extent to which an individual adapts the sick role is dependent on his or her ability to gain support or legitimacy, as well as the number of dependents he or she may be supporting financially. Therefore, an additional variable was needed that could encompass these two influences. Empirically measuring one's ability to gain legitimacy and support is problematic

because legitimacy and support can come from several sources. The existing literature suggests that sick-role legitimization comes from both medicalization and a sense of familialism. Because this study is not concerned with the respondent's frequency of medical visits, measuring legitimacy or support as originating from the medical field would be senseless. Instead, this study aims to measure legitimacy as generated from the respondents' immediate social networks, specifically that of a personal relationship.

Respondents' marital status may not indicate the extent to which they receive emotional support or legitimacy, nor the extent to which they give or receive financial support. Likewise, variance in same-sex and non-married but cohabitating couples cannot be captured by looking at only "married" versus "non-married" respondents. Instead, the partner living condition of respondents is of most value in terms of measuring legitimacy and dependency. The 2012 NHIS asked respondents to describe their marital status and living conditions as one of the following: married and living with a partner, married and not living with a partner, not married but living with a partner, not married and not living with a partner, or never married. The resulting variable was recoded as 0= Not living with partner (married or not married) and 1= Living with partner (married or not married) and will hereafter be referred to as *cohabitation*. Family size was not an available variable in the Person-Level dataset. The region of the country in which respondents live was dummied to four separate variables: South, Midwest, West, and Northeast. The Northeast was used as the reference category in all regression models.

Preliminary Analyses

Because previous research has demonstrated the effects of demographics on chronic illness, no preliminary analyses were performed using extended condition

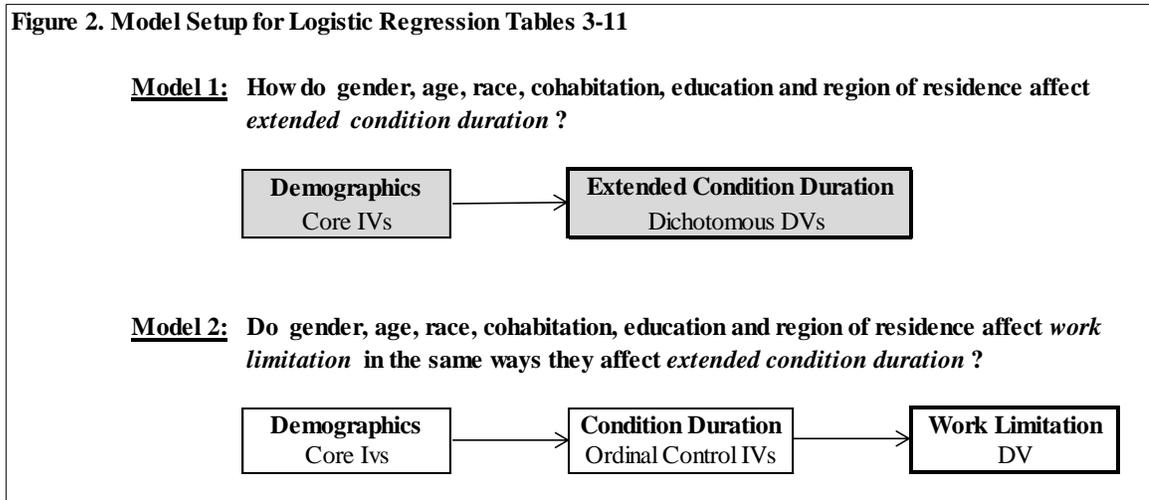
duration as a dependent variable. Preliminary analyses were performed that examined the individual effects of demographics and chronic conditions on work limitation. Using bivariate logistic regression, as illustrated in Table 2-1, it is discovered that age, education, being white, cohabitation, and living in the West are, on their own, statistically significant predictors of lesser odds of work limitation. On the other hand, being ages 18 to 64, being male, and living in the South are, on their own, statistically significant predictors of greater odds of reporting work limitation.

One would expect that the existence of any chronic condition would increase respondents' odds of work limitation. However, when bivariate logistic regression was used to look at the individual effects of all chronic conditions, it was discovered that neither the existence of arthritis nor the existence of a bone or joint injury had a statistically significant influence on the odds of respondents considering themselves limited in their amount or kind of work. (See Table 2-2.) As a result, these two conditions were dismissed from subsequent regression models.

Regression Modeling: Comparing Effects

To compare the effects of demographic factors on extended condition duration with their effects on work limitation, two separate regression models were needed for each chronic condition. Because both *extended condition duration* and *work limitation* are dichotomous, logistic regression was used to examine the effects of independent variables on each dependent variable. Tables 3 through 11 (Appendix) each examine a different chronic condition. Model 1 and Model 2 within each table both examine the same chronic condition. Model 1 in each table (3-11) shows the effects of demographics on extended condition duration (for a given condition). Model 2 in each table (3-11)

shows the effects of demographics on work limitation, when controlling for the condition duration (of that same condition). It should be noted that the condition duration control variables used in Model 2 are ordinal, so as to measure the effects of a one unit increase in condition duration on work limitation. Figure 2 illustrates the ways Model 1 and Model 2 are setup in Tables 3-11.



As preliminary studies have suggested and consistent with the individual effects of the independent variables, the core hypotheses tested here are as follows:

H1: Being male, and in the South, Midwest or West will lead to greater odds of reporting extended condition duration for all conditions.

H2: Being highly educated, ages 18-64, white and cohabitating will lead to lesser odds of extended condition duration for all conditions.

It is anticipated that the duration of respondents' chronic illness can better predict their work limitation than can their demographic characteristics. Thus, the third hypothesis being tested is as follows:

H3: The effects of these demographic characteristics on work limitation will be spurious when controlling for chronic illness duration.

ANALYSES

Tables 3-11 in the Appendix illustrate the effects of demographics on extended condition duration and on work limitation for each of the nine conditions. Although the individual effect of every independent variable in each model is of interest and carries its own implications, the comparative effects of demographics between Model 1 and Model 2 and across conditions are of particular interest in this study.

The Effects of Demographics on Extended Condition Duration

As was discussed in the review of the literature, the demographic variables used in this study are known to be predictors of health disparities. If these variables predict health disparities, they must also predict the propensity toward early-onset of chronic illness and thus extended condition duration. However, the effects of demographics on extended condition duration were not consistent across all nine conditions. Instead, it appeared that the effects of demographics on extended condition duration were specific to each condition. Model 1 in Tables 3-11 in the Appendix illustrate the influence of covariates on extended condition duration. For illustrative purposes, Table 3, which examines respondents who indicated a chronic back or neck problem, will be explained in detail. The individual effects of each independent variable, holding all other variables constant, will be discussed.

Only age, race, and cohabitation were statistically significant predictors of extended condition duration in Table 3. In other words, only age, race and cohabitation can predict the odds of respondents having a chronic back or neck problem for more than 1 year. Respondents ages 18-34 had .29 lesser odds of reporting extended condition duration, relative to respondents ages 65 and older; respondents ages 35-64 had .87

greater odds of reporting extended condition duration, relative to respondents ages 65 and older. Respondents who are white had .17 greater odds of reporting extended condition duration, relative to all other races. Respondents who cohabit with a partner had .13 greater odds of reporting extended condition duration. Education, gender, and region of residence were not statistically significant predictors of extended condition duration.

Subsequent analyses of the effects of demographics on extended condition duration are presented in Model 1 of tables 4-11 and are summarized in the gray columns of Figure 3. In Figure 3, only statistically significant relationships are shown. A plus (+) sign represents a relationship where a one unit increase in the IV leads to significantly greater odds of reporting extended condition duration (gray columns) or work limitation (white columns); a negative (-) sign represents a relationship where a one unit increase in the IV leads to significantly greater odds of reporting extended condition duration (gray columns) or work limitation (white columns).

The effects of demographics on extended condition duration varied and were unique to each condition. Respondents ages 18-34 had lesser odds of reporting extended condition duration if they had a back or neck problem, heart problem, stroke problem, blood pressure problem, or diabetes, relative to respondents ages 65 and older. Because the likelihood of each of these chronic conditions naturally increases with age, this is expected and supports the second hypothesis tested. Nonetheless, these same respondents had greater odds of reporting extended condition duration if they had an emotional problem. One explanation for these condition-specific effects is the stress associated with providing for oneself and one's family as a young, working adult. Compared to respondents ages 65 and older, respondents ages 18-34 could feel a greater sense of

responsibility and unrest due to their fewer life experiences. These negative feelings undoubtedly contribute to emotional problems such as depression or anxiety and likely continue well throughout respondents’ young adult, or “new worker” years.

Figure 3. Direction of Odds of Statistically Significant Predictors of Extended Condition Duration and Work Limitation

	Back or Neck Problem		Heart Problem		Stroke Problem		Blood Pressure Problem		Diabetes		Cancer		Emotional Problem		Lung or Breathing Problem		Weight Problem	
Chronic Duration < 3 mo																		
Chronic Duration 3-5 mo																		
Chronic Duration 6-12 mo																		
Chronic Duration > 1 yr		+		+		+		+		+		+		+		+		+
Age 18-34 (compared to 65+)	-	+	-	+	-	+	-	+	-	+	-	+	+	+	-	+	-	+
Age 35-64 (compared to 65+)	+	+	-	+	-	+	-	+	-	+	-	+	+	+	-	+	+	+
Education		-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
Male		+	+	+	+	+		+		+		+	-	+		+	-	+
White	+				-		-		-				+					
Cohabitation	+	-		-		-		-	+	-	+	-	-	-		-		-
South (relative to Northeast)		+	+	+	+	+	+	+	+	+	+	+	-	+		+		+
Midwest (relative to Northeast)		+	+	+		+	-	+		+		+	-	+		+		+
West (relative to Northeast)		+		+		+		+		+		+	-	+		-	+	+
Constant	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+

Gray columns show statistically significant predictors of extended condition duration
 White columns show statistically significant predictors of work limitation.

Relative to respondents ages 65 and older, respondents ages 35-64 had lesser odds of reporting extended condition duration if they had a heart problem, stroke problem, blood pressure problem, diabetes, cancer, or lung or breathing problem; this also supports the second hypothesis tested. However, these “experienced workers” had greater odds of reporting extended condition duration if they had a back or neck problem, an emotional problem or a weight problem. To explain experienced workers’ greater odds of having a back or neck problem for more than one year, one must account for number of years they have been in the workforce. It is likely that respondents ages 35-64 are still working in professions that take a physical toll on their bodies, including their backs and necks. Compared to respondents ages 65 and older, respondents ages 35-64 are more likely to

have jobs and/or personal lives that demand physical activity. Moreover, they are also likely to experience many of the same pressures and stressors as new workers, which accounts for their greater odds of reporting an emotional problem. Respondents ages 35-64 have not been exposed to cigarette smoke or environmental toxins for as long as their 65 and older counterparts have; thus, it is understandable why respondents ages 35-64 have lesser odds of reporting extended condition duration for lung or breathing problems.

With each additional level of education or degree obtained, respondents had lesser odds of reporting extended condition duration with a heart problem, stroke problem, blood pressure problem, diabetes, and lung or breathing problem. This also supports the second hypothesis that was tested. Nonetheless, the effects of education were again inconsistent across all conditions. Education had no statistically significant effect on extended condition duration for those with a back or neck problem or those with an emotional or weight problem. For respondents with cancer, education significantly predicted greater odds of reporting condition duration. The effects of education on cancer duration can best be explained by income. Respondents with higher levels of education typically have more income by which they can afford the pricey and extensive treatments associated with most types of cancer.

Male respondents had greater odds of reporting extended condition duration if they had a heart problem or stroke problem. However, the effects of being male on extended condition duration only supported the second hypothesis for these two conditions. Male respondents had lesser odds of reporting extended condition duration if they had an emotional problem or weight problem. These condition-specific effects are best understood in light of men's pursuit of hegemonic masculinity, which results in

unhealthy behaviors that lead to heart and stroke problems, and the feminine stigma society attaches to emotional and weight problems.

White respondents had lesser odds of reporting extended condition duration if they had a stroke problem, blood pressure problem, or diabetes; these effects support the second hypothesis tested. However, white respondents had greater odds of reporting extended condition duration if they had a back or neck problem or an emotional problem. One suggested explanation for these condition-specific effects is the difference in the way white culture socially acknowledges and accepts these two conditions. It is possible that white respondents are not more prone to back or neck or emotional problems; they are just more likely to report them because their culture tells them that is acceptable.

Cohabiting respondents had greater odds of reporting extended condition duration if they had a back or neck problem, diabetes, or cancer. These findings do not support the second hypothesis tested. Furthermore, these findings suggest that cohabitation may lead to unhealthy lifestyles or elevated feelings of stress, which contribute to respondents' propensity toward chronic conditions. Nonetheless, cohabitation may contribute to emotional well-being to some extent as cohabitating respondents had lesser odds of extended condition duration for an emotional problem.

All individual effects of region of residence on extended condition duration are relative to respondents who live in the Northeast. Respondents who live in the South had greater odds of reporting extended condition duration if they have a heart problem, stroke problem, blood pressure problem, or diabetes; they have lesser odds of reporting extended condition duration if they have an emotional problem. Respondents who live in the Midwest have greater odds of reporting extended condition duration if they heart

problem, and lesser odds of reporting extended condition duration if they have a blood pressure problem or emotional problem. Respondents who live in the West had lesser odds of reporting extended condition duration if they have an emotional problem or lung or breathing problem. The effects of respondents' region of residence on extended condition duration were inconsistent, inconclusive and did not support the first hypothesis tested.

The Effects of Demographics on Work Limitation

Model 2 in Tables 3-11 in the Appendix illustrate the influence of covariates on work limitation. Again for illustrative purposes, Table 3, which examines respondents who indicated a chronic back or neck problem, will be explained in detail. The individual effects of each independent variable, holding all other variables constant (including condition duration), will be discussed.

Age, education, gender, cohabitation, and region of residence were statistically significant predictors of work limitation in Table 3, even when controlling for condition duration. In other words, age, education, gender, cohabitation, and region of residence can predict the odds of respondents reporting limitation in their amount or kind of work, regardless of how long they had had a back or neck problem. Respondents ages 18-34 had 1.23 greater odds of reporting work limitation, relative to respondents ages 65 and older; respondents ages 35-64 had 1.68 greater odds of reporting work limitation, relative to respondents ages 65 and older. With each additional level of education or degree obtained, respondents had .16 lesser odds of reporting work limitation. Male respondents had .16 greater odds of reporting work limitation, compared to females. Respondents who cohabitate with a partner had .14 lesser odds of reporting work limitation. All effects of

region of residence on work limitation are relative to respondents who live in the Northeast. Respondents who live in the South had .49 greater odds of reporting work limitation; respondents who live in the Midwest had .30 greater odds of reporting work limitation; respondents who live in the West had .17 greater odds of reporting work limitation.

Interestingly, there was no statistically significant relationship between the duration of respondents' back or neck problem and their odds of reporting work limitation if they had had the condition for a year or less. In other words, respondents who had had a back or neck problem for a year or less were no more or less likely to report work limitation than respondents who had no back or neck problem. Respondents who had had a back or neck problem for more than one year had .83 greater odds of reporting work limitation than respondents with no back or neck problem.

The direction of the effect of each independent variable on work limitation was consistent across all nine conditions. All demographic variables except race had a statistically significant effect on the odds of respondents reporting work limitation, even when controlling for condition duration. This in no way supports the third hypothesis that was tested. Subsequent analyses of the effects of demographics and condition duration on work limitation are presented in Model 2 of tables 4-11 and are summarized in the white columns of Figure 3.

Across all nine conditions, respondents ages 18-64 had greater odds of reporting work limitation, relative to those ages 65 and older. This can be explained by the fact that respondents ages 18-64 are more likely to be working than respondents ages 65 and older and are therefore more likely to be limited in their amount or kind of work. Each

additional level of education or degree predicted lesser odds of reporting work limitation, as did cohabitation. Respondents with higher levels of education are less likely to be doing physical labor and are thus less likely to be limited in their amount or kind of work due to a physical impairment. Respondents who live with a partner had lesser odds of reporting work limitation. Cohabiting respondents are likely to share financial obligations with that partner and his or her dependents. Thus they may feel obligated to “work through” physical limitations. At the same time, respondents who share financial obligations with a live-in a partner may have the flexibility to adjust the amount or kind of work they do or gain legitimation for their illness by avoiding work. Thus, the effects of their physical limitation are minimized. Being white had no statistically significant relationship with reporting work limitation.

Male respondents had significantly greater odds of reporting work limitation for all nine conditions. This could suggest that men are more likely to be employed doing physical labor. This could also suggest that illness behavior that demonstrates or exhibits men’s physical suffering may also perpetuate hegemonic masculinity. In other words, men who make rough and tough, “manly” lifestyle and career choices may feel validated as masculine if those choices were executed to such a degree that they resulted in (physical) work limitation.

Respondents living in the South, Midwest, or West had greater odds of reporting work limitation than respondents in the Northeast. This suggests that the workforce in the Northeast is less forgiving for employees who are limited in the amount or kind of work they can do. This less forgiving environment could be explained by a number of factors including the region’s unemployment rate, the proportion of white-collar versus blue-

collar jobs offered in the Northeast compared to other regions, and the Northeast climate. If unemployment is lowest in the Northeast, competition for positions is high and employees cannot “afford” to admit limitation. If the Northeast has a higher proportion of white-collar jobs than do other regions, Northeast workers’ on-the-job performance may be less affected by physical limitations than their blue-collar counterparts’ performance. Lastly, the cooler climate of the Northeast may require more workers in that region to work indoors, protecting them from environmental extremes that would afflict limited workers.

Interestingly, there was no statistically significant relationship between condition duration and work limitation for respondents who had had their condition for a year or less for any of the nine conditions. Respondents who had had their chronic condition for 0-12 months were no more or less likely to report limitation in their amount or kind of work than those with no condition at all, controlling for all other variables.

CONCLUSION

This research shows that illness behavior can be conceptualized in terms of Talcott Parsons’s sick role, a theory that has long been dismissed as too complex and inapplicable to chronic illnesses. Furthermore, this research empirically measures the factors influencing sick role adaptation in terms of exemption from daily responsibilities and obligations among chronically ill populations, a component of Parsons’s theory that has been neglected throughout sick role literature. While existing sociological literature has shown that demographic characteristics such as gender, race and SES can predict health disparities, it has failed to sufficiently examine how these characteristics also contribute to the subjective response to disease or illness behavior. This study of 11,580

NHIS respondents not only illustrates the effects of demographics on illness behavior, it also suggests that demographics are a better predictor of illness behavior than of health disparities.

Summary of Analyses

In this study, demographics *inconsistently* predicted respondents' propensity toward the nine examined conditions. A single demographic characteristic may have predicted greater odds of reporting one chronic condition and lesser odds of reporting another. For some of the examined conditions, respondents' odds of reporting that condition were not affected by all demographic characteristics. Thus, this study demonstrates the known fact that while some demographics can predict respondents' propensity toward a specific chronic condition, they cannot predict respondents' propensity toward all chronic conditions. Instead, the effects of demographics on a chronic condition are specific to that condition.

Demographics *consistently* predicted illness behavior across the nine examined chronic conditions. Thus, the effects of a demographic variable on illness and on illness behavior are not the same. Take the effects of gender as an example. Being male predicted *greater odds* of reporting extended condition duration for two conditions, *lesser odds* of reporting extended condition duration for two conditions, and *didn't predict the odds* of reporting extended condition duration for the remaining five conditions. However, being male consistently and significantly predicted greater odds of reporting work limitation *for all nine chronic conditions*. With the exception of race, the effects of demographics are as follows: inconsistent in terms of illness, consistent in terms of illness behavior.

Implications: A Call for Public Health, Social Research and Policy

In a society where “health” is generally defined as the capacity to carry out daily activities and fulfill expected roles, the extent to which individuals consider themselves limited in their amount or kind of work indicates how they perceive their own health. Because the effects of demographics on work limitation are significant when controlling for condition duration, it follows that demographics also affect individuals’ perceptions of personal health, to some extent regardless of disease or physical symptoms. The U.S.’s biomedical approach to healthcare fails to examine these group-level patterns of meaning-making that occur *after* the onset of disease. In this way, the biomedical approach fails to help the chronically ill to manage their health. The results are costly in more ways than one. It is essential that modern medicine adopts an approach to managing chronic disease that precedes and follows the biomedical model’s sequence of symptoms, diagnosis, and treatment.

The effects of demographics on illness behavior are mediated by three social pathways: environmental exposures, social environment, and healthcare. Thus, to promote “health,” manage chronic disease, and minimize the cost of a failing healthcare system, these social pathways must be understood and affected. Social pathways can be affected by public health, social research and policy. Before and after the onset of disease, public health must continue to educate children and adults about environmental exposures and social environments that will have an adverse affect on their health. Likewise, comprehensive healthcare must foster positive behaviors and lifestyles by offering (if not requiring) support groups and community-developing activities as part of patients’ treatments plans. Social research must continue to explore how demographics

and social pathways intersect to produce illness behavior. Most importantly, policy must promote these public health and social research initiatives. Additional value and emphasis should be placed on programs like vocational rehabilitation services, which help those with chronic conditions to assume their daily roles and responsibilities. It is only by mediating the effects of demographics on illness behavior that any system can affect structural and operational improvements in chronic condition care.

Limitations and Implications for Future Research

As with any research utilizing secondary data, there were obvious limitations to this study. First, the work limitation dependent variable encompasses only one obligation or responsibility from which individuals can consider themselves exempt: work. To best measure the extent to which individuals consider themselves exempt from daily obligations and responsibilities, a survey instrument should include questions about activities related to one's work, home, social, educational, and interpersonal responsibilities. Unfortunately, respondents were not asked about these types of activities as part of the 2012 NHIS.

This study was also limited in its representation of chronic illnesses. To fully understand the effects of demographics on extended condition duration and work limitation, a study would need to examine more than nine chronic conditions. Also, this study cannot account for the variance in respondents' odds of extended condition duration or work limitation *within* each of the nine conditions that were examined. For example, included in cancer are breast cancer, testicular cancer, lung cancer, and leukemia – all which include even more specific “types” of cancer. There are undoubtedly differences in illness behavior across members of these sub-groups that

cannot be measured when cancer is examined as a single condition, as it was in this study. Lastly, this study was limited in its ability to explain the microcultural patterns of illness behavior it summarizes. By examining patterns of illness behavior at the demographic level, this research explains patterns between groups but not within them.

Additional research must measure respondents' likelihood to consider themselves exempt from a number of daily obligations and responsibilities, not just work. Future research should also measure the effects of demographics on extended condition duration and sick role adaptation for a multitude of conditions and for specific conditions. In other words, a study that examines thirty or more chronic conditions and a study that examines only types of cancer would be equally valuable.

Most importantly, future research must explore the ways demographics and social pathways intersect to *explain* these patterns of illness behavior. By explaining patterns of illness behavior among and between groups, social scientists can help guide and direct the future of healthcare – beyond a failing biomedical approach to managing chronic disease and toward changing the structural and cultural canvas on which chronic disease outlines the well-being of our society.

Appendix

Table 1. Descriptive Statistics

	Variable	Obs	Mean	SD	Min	Max
Model 1: DV's	Extended Condition Duration Arthritis/Rheumatism	11864	.22	.41	0	1
	Extended Condition Duration Back/Neck Problem	11864	.23	.42	0	1
	Extended Condition Duration Bone/Joint Injury	11864	.08	.27	0	1
	Extended Condition Duration Heart Problem	11864	.11	.32	0	1
	Extended Condition Duration Stroke Problem	11864	.05	.21	0	1
	Extended Condition Duration Hypertension	11864	.13	.34	0	1
	Extended Condition Duration Diabetes	11864	.12	.33	0	1
	Extended Condition Duration Lung/Breathing Problem	11864	.09	.29	0	1
	Extended Condition Duration Cancer	11864	.03	.18	0	1
	Extended Condition Duration Depression/Anxiety	11864	.13	.34	0	1
	Extended Condition Duration Weight Problem	11864	.04	.20	0	1
Model 2: DV	Work Limitation	11858	.80	.40	0	1
Model 2: Control IV's	Condition Duration Arthritis/Rheumatism	11864	.90	1.66	0	4
	Condition Duration Back/Neck Problem	11864	.97	1.70	0	4
	Condition Duration Bone/Joint Injury	11864	.35	1.11	0	4
	Condition Duration Heart Problem	11864	.49	1.30	0	4
	Condition Duration Stroke Problem	11864	.21	.88	0	4
	Condition Duration Hypertension	11864	.55	1.37	0	4
	Condition Duration Diabetes	11864	.52	1.33	0	4
	Condition Duration Lung/Breathing Problem	11864	.40	1.19	0	4
	Condition Duration Cancer	11864	.16	.77	0	4
	Condition Duration Depression/Anxiety	11864	.55	1.36	0	4
	Condition Duration Weight Problem	11864	.17	.81	0	4
Core IV's	Male	11864	.45	.50	0	1
	Age	11864	58.90	17.28	18	85
	White	11807	.76	.43	0	1
	Cohabitation	11833	.46	.50	0	1
	Education	11666	1.33	1.10	0	4
	South	11864	.39	.49	0	1
	Midwest	11864	.20	.40	0	1
	West	11864	.25	.43	0	1

Education: 0= "Less than HS" 1= "High School or GED" 2= "Some College" 3= "Bachelors" 4= "Masters or higher"

Table 2-1. Bivariate Logistic Regression: Predictors of Work Limitation

Predictor variable	Model 1	
	OR / se	CI (95%)
Age (overall)	.97 *** (.00)	.97/.98
Age 18-34 (compared to 65+)	1.36 *** (.11)	1.16/1.59
Age 35-64 (compared to 65+)	2.41 *** (.12)	2.19/2.65
Education	.84 *** (.02)	.81/.87
Male	1.19 *** (.06)	1.09/1.30
White	.84 ** (.05)	.76/.94
Cohabitation	.94 * (.04)	.83/1.0
South (relative to Northeast)	1.32 *** (.07)	1.20/1.45
Midwest (relative to Northeast)	1.00 (.06)	.90/1.13
West (relative to Northeast)	.84 ** (.04)	.86/.96

Significance: * p < .05 ** p < .01 *** p < .001

Table 2-2. Bivariate Logistic Regression: Predictors of Work Limitation

Predictor variable	Model 1	
	OR / se	CI (95%)
Arthritis	.99 (.05)	.89/1.10
Back or Neck Problem	1.92 *** (.12)	1.70/2.16
Bone or Joint Injury	1.10 (.09)	.94/1.29
Heart Problem	1.74 *** (.04)	1.49/2.03
Stroke Problem	1.53 *** (.17)	1.23/1.92
Blood Pressure Problem	1.62 *** (.12)	1.40/1.88
Diabetes	1.45 *** (.11)	1.26/1.68
Lung or Breathing Problem	1.64 *** (.14)	1.38/1.94
Cancer	1.92 *** (.26)	1.47/2.50
Emotional Problem	2.60 *** (.23)	2.19/3.09
Weight Problem	2.10 *** (.30)	1.59/2.79

Significance: * p < .05 ** p < .01 *** p < .001

Table 3. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Back or Neck Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.63 (.68)	.72/3.70
Condition 3-5 mo	-	-	.76 (.32)	.34/1.73
Condition 6-12 mo	-	-	1.25 (.30)	.79/1.99
Condition more than 1 yr	-	-	1.83 *** (.12)	1.61/2.07
Age 18-34 (relative to 65+)	.71 *** (.07)	.59/.85	2.23 *** (.19)	1.88/2.64
Age 35-64 (relative to 65+)	1.87 *** (.09)	1.69/2.05	2.68 *** (.14)	2.42/2.96
Education	1.04 (.02)	1.00/1.08	.84 *** (.02)	.81/.88
Male	1.09 (.05)	1.00/1.19	1.16 ** (.06)	1.06/1.28
White	1.17 ** (.06)	1.05/1.30	.96 (.06)	.85/1.08
Cohabitation	1.13 * (.05)	1.03/1.23	.86 ** (.04)	.78/.95
South (relative to Northeast)	.95 (.06)	.84/1.09	1.49 *** (.10)	1.29/1.71
Midwest (relative to Northeast)	.88 (.07)	.76/1.02	1.30 ** (.10)	1.11/1.51
West (relative to Northeast)	1.00 (.02)	.85/1.12	1.17 * (.09)	1.01/1.35
Constant	.18 *** (.02)	.15/.21	2.20 *** (.19)	1.86/2.61
Pseudo R-Square	.02		.06	
- 2 log likelihood	-6168.21		-5433.53	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 4. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Heart Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.37 (.59)	.60/3.17
Condition 3-5 mo	-	-	1.60 (.80)	.60/4.25
Condition 6-12 mo	-	-	1.42 (.38)	.84/2.40
Condition more than 1 yr	-	-	2.10 *** (.19)	1.76/2.49
Age 18-34 (compared to 65+)	.11 *** (.02)	.08/.17	2.39 *** (.21)	2.02/2.83
Age 35-64 (compared to 65+)	.57 *** (.03)	.50/.64	2.96 *** (.15)	2.67/3.27
Education	.87 *** (.02)	.82/.92	.85 *** (.02)	.82/.89
Male	1.41 *** (.09)	1.26/1.59	1.14 * (.06)	1.03/1.25
White	1.05 (.08)	.92/1.21	.97 (.06)	.87/1.09
Cohabitation	1.01 (.06)	.90/1.14	.87 ** (.04)	.79/.96
South (relative to Northeast)	1.56 *** (.15)	1.30/1.88	1.44 *** (.10)	1.26/1.65
Midwest (relative to Northeast)	1.36 ** (.14)	1.10/1.67	1.26 ** (.10)	1.08/1.48
West (relative to Northeast)	1.11 (.12)	.90/1.37	1.16 * (.09)	1.01/1.34
Constant	.14 *** (.02)	.11/.18	2.18 *** (.19)	1.84/2.58
Pseudo R-Square	.04		.06	
- 2 log likelihood	-3976.19		-5440.08	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 5. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Stroke Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.73 (.95)	.58/5.10
Condition 3-5 mo	-	-	3.46 (3.66)	.43/27.49
Condition 6-12 mo	-	-	1.55 (.52)	.80/3.00
Condition more than 1 yr	-	-	1.88 *** (.24)	1.46/2.43
Age 18-34 (compared to 65+)	.07 *** (.03)	.03/.15	2.27 *** (.19)	1.92/2.68
Age 35-64 (compared to 65+)	.51 *** (.05)	.43/.61	2.88 *** (.15)	2.61/3.19
Education	.87 *** (.04)	.80/.94	.85 *** (.02)	.81/.88
Male	1.31 ** (.12)	1.10/1.57	1.16 ** (.06)	1.05/1.28
White	.73 ** (.07)	.60/.89	.98 (.06)	.88/1.10
Cohabitation	1.06 (.10)	.89/1.27	.87 ** (.04)	.79/.95
South (relative to Northeast)	1.32 * (.18)	1.00/1.74	1.47 *** (.10)	1.28/1.68
Midwest (relative to Northeast)	1.05 (.17)	.76/1.44	1.28 ** (.10)	1.10/1.50
West (relative to Northeast)	1.20 (.18)	.89/1.61	1.16 * (.09)	1.01/1.35
Constant	.08 *** (.01)	.06/.12	2.28 *** (.20)	1.93/2.70
Pseudo R-Square	.04		.05	
- 2 log likelihood	-2125.30		-5465.46	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 6. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Blood Pressure Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.36 (.77)	.49/4.14
Condition 3-5 mo	-	-	2.60 (2.79)	.32/21.34
Condition 6-12 mo	-	-	1.98 (.81)	.89/4.40
Condition more than 1 yr	-	-	1.72 *** (.14)	1.47/2.02
Age 18-34 (compared to 65+)	.10 *** (.02)	.07/.15	2.34 *** (.20)	1.97/2.77
Age 35-64 (compared to 65+)	.75 *** (.04)	.67/.84	2.87 *** (.15)	2.60/3.18
Education	.85 *** (.02)	.80/.89	.85 *** (.02)	.82/.89
Male	.89 (.05)	.80/1.00	1.17 ** (.06)	1.07/1.29
White	.53 *** (.03)	.47/.60	1.01 (.06)	.90/1.14
Cohabitation	.89 (.05)	.80/1.00	.88 * (.04)	.79/.97
South (relative to Northeast)	1.49 *** (.13)	1.26/1.76	1.45 *** (.10)	1.26/1.66
Midwest (relative to Northeast)	.77 * (.08)	.63/.95	1.30 ** (.10)	1.12/1.52
West (relative to Northeast)	1.04 (.10)	.86/1.26	1.16 * (.09)	1.01/1.35
Constant	.37 *** (.04)	.30/.45	2.10 *** (.18)	1.77/2.50
Pseudo R-Square	.06		.06	
- 2 log likelihood	-4274.42		-5454.37	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 7. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Diabetes

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	2.50 (1.88)	.57/10.90
Condition 3-5 mo	-	-	.87 (.72)	.17/4.42
Condition 6-12 mo	-	-	1.45 (.56)	.68/3.11
Condition more than 1 yr	-	-	1.49 *** (.12)	1.28/1.74
Age 18-34 (compared to 65+)	.20 *** (.03)	.14/.27	2.27 *** (.19)	1.92/2.68
Age 35-64 (compared to 65+)	.82 ** (.05)	.73/.92	2.84 *** (.15)	2.57/3.14
Education	.80 *** (.02)	.76/.85	.85 *** (.02)	.82/.89
Male	1.02 (.06)	.91/1.14	1.17 ** (.06)	1.06/1.28
White	.74 *** (.05)	.65/.84	.99 (.06)	.88/1.11
Cohabitation	1.12 * (.07)	1.00/1.26	.86 ** (.04)	.78/.95
South (relative to Northeast)	1.23 * (.11)	1.03/1.45	1.46 *** (.10)	1.28/1.68
Midwest (relative to Northeast)	.84 (.09)	.70/1.03	1.29 ** (.10)	1.12/1.50
West (relative to Northeast)	1.06 (.10)	.88/1.28	1.16 * (.09)	1.00/1.34
Constant	.25 *** (.03)	.21/.31	2.23 *** (.19)	1.88/2.64
Pseudo R-Square	.03		.05	
- 2 log likelihood	-4218.22		-5466.51	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 8. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Cancer

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.21 (.55)	.49/2.97
Condition 3-5 mo	-	-	1.18 (.68)	.78/3.67
Condition 6-12 mo	-	-	1.38 (.42)	.75/2.53
Condition more than 1 yr	-	-	2.75 *** (.48)	1.95/3.88
Age 18-34 (compared to 65+)	.14 *** (.05)	.07/.30	2.24 *** (.19)	1.89/2.65
Age 35-64 (compared to 65+)	.79 * (.08)	.64/.97	2.84 *** (.15)	2.57/3.14
Education	1.15 ** (.05)	1.05/1.25	.84 *** (.02)	.81/.88
Male	.97 (.10)	.79/1.20	1.16 ** (.06)	1.06/1.28
White	.94 (.11)	.73/1.20	.98 (.06)	.87/1.10
Cohabitation	1.42 ** (.15)	1.15/1.75	.86 ** (.04)	.78/95
South (relative to Northeast)	.97 (.15)	.72/1.32	1.48 *** (.10)	1.29/1.70
Midwest (relative to Northeast)	.94 (.16)	.67/1.32	1.28 ** (.10)	1.10/1.49
West (relative to Northeast)	.97 (.16)	.70/1.34	1.17 * (.09)	1.01/1.35
Constant	.03 *** (.00)	.02/.05	2.33 *** (.20)	1.97/2.76
Pseudo R-Square	.02		.05	
- 2 log likelihood	-1681.69		-5459.24	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 9. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Emotional Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.70 (1.29)	.38/7.57
Condition 3-5 mo	-	-	Dropped	
Condition 6-12 mo	-	-	1.33 (.44)	.69/2.56
Condition more than 1 yr	-	-	2.16 *** (.20)	1.80/2.60
Age 18-34 (compared to 65+)	5.61 *** (.54)	4.65/6.77	1.93 *** (.17)	1.63/2.29
Age 35-64 (compared to 65+)	3.83 *** (.29)	3.30/4.45	2.62 *** (.14)	2.37/2.90
Education	.95 (.03)	.90/1.00	.85 *** (.02)	.81/.88
Male	.71 *** (.04)	.67/.80	1.19 *** (.06)	1.08/1.31
White	1.20 * (.08)	1.06/1.38	.96 (.06)	.86/1.08
Cohabitation	.83 ** (.05)	.74/.93	.88 * (.04)	.79/.97
South (relative to Northeast)	.76 ** (.06)	.65/.89	1.50 ** (.11)	1.31/1.73
Midwest (relative to Northeast)	.81 * (.07)	.68/.97	1.30 ** (.10)	1.12/1.52
West (relative to Northeast)	.77 ** (.07)	.65/.91	1.18 * (.09)	1.02/1.37
Constant	.08 *** (.01)	.06/.10	2.27 *** (.19)	1.92/2.69
Pseudo R-Square	.06		.06	
- 2 log likelihood	-4239.70		-5441.69	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 10. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Lung or Breathing Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	1.18 (.69)	.38/3.68
Condition 3-5 mo	-	-	1.28 (1.06)	.26/6.44
Condition 6-12 mo	-	-	2.45 * (.99)	1.11/5.42
Condition more than 1 yr	-	-	1.65 *** (.15)	1.37/1.98
Age 18-34 (compared to 65+)	.67 ** (.08)	.53/.86	2.21 *** (.19)	1.87/2.61
Age 35-64 (compared to 65+)	1.09 (.07)	.95/1.24	2.82 *** (.14)	2.55/3.11
Education	.89 *** (.03)	.84/.95	.85 *** (.02)	.82/.89
Male	1.01 (.07)	.89/1.15	1.16 ** (.06)	1.06/1.28
White	1.10 (.08)	.95/1.28	.97 (.06)	.86/1.09
Cohabitation	.92 (.06)	.81/1.04	.87 * (.04)	.79/.96
South (relative to Northeast)	.86 (.08)	.72/1.03	1.49 *** (.10)	1.30/1.70
Midwest (relative to Northeast)	.82 (.08)	.67/1.00	1.29 ** (.10)	1.11/1.50
West (relative to Northeast)	.70 *** (.07)	.57/.85	1.18 * (.09)	1.02/1.36
Constant	.14 *** (.02)	.11/.17	2.27 *** (.20)	1.91/2.68
Pseudo R-Square	.01		.05	
- 2 log likelihood	-3622.49		-5462.63	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

Table 11. Logistic Regression Showing Influence of Covariates on Condition Duration (Model 1) and Work Limitation (Model 2) for Weight Problem

Predictor variable	Model 1 DV: Condition Duration > 1 yr		Model 2 DV: Work Limitation	
	OR / se	CI (95%)	OR / se	CI (95%)
Condition up to 3 mo	-	-	.67 (.89)	.13/3.47
Condition 3-5 mo	-	-	Dropped	
Condition 6-12 mo	-	-	4.95 (5.12)	.65/37.40
Condition more than 1 yr	-	-	2.08 *** (.31)	1.55/2.79
Age 18-34 (compared to 65+)	.87 (.16)	.61/1.25	2.18 *** (.19)	1.84/2.58
Age 35-64 (compared to 65+)	1.40 ** (.14)	1.15/1.71	2.80 *** (.14)	2.53/3.10
Education	1.06 (.04)	.98/1.15	.84 *** (.02)	.81/.88
Male	.61 *** (.06)	.50/.74	1.18 ** (.06)	1.07/1.30
White	1.19 (.14)	.95/1.49	.97 (.06)	.87/1.09
Cohabitation	.88 (.08)	.73/1.07	.87 * (.04)	.79/.96
South (relative to Northeast)	1.02 (.14)	.78/1.35	1.48 *** (.10)	1.29/1.70
Midwest (relative to Northeast)	.97 (.16)	.71/1.33	1.29 ** (.10)	1.10/1.50
West (relative to Northeast)	1.21 (.18)	.90/1.61	1.16 * (.09)	1.00/1.35
Constant	.04 *** (.01)	.03/.05	2.33 *** (.20)	1.97/2.76
Pseudo R-Square	.01		.05	
- 2 log likelihood	-1997.84		-5465.09	
N (sample size of model)	11586		11580	

Significance: * p < .05 ** p < .01 *** p < .001

NOTE: *Condition 3-5 mo* dropped in Model 1 due to estimatability

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