WELL-BEING IN A RURAL CONTEXT: A MODEL OF SELECT FACTORS

INFLUENCING HEALTH AND ECONOMIC WELL-BEING IN RURAL, LOW-INCOME

MOTHERS

by

LEIGH ANN SIMMONS-WESCOTT

(Under the Direction of David W. Wright)

ABSTRACT

A model of economic well-being for rural, low-income mothers (N=414) was identified and tested over time using structural equation modeling (*SEM*). The data were from a multi-state, longitudinal investigation tracking the well-being of rural families in the context of Welfare Reform, known as "NC-223, Rural Families Speak." The identified model included the factors of food insecurity, social support, human capital, depression, and poor physical health. Results indicated that higher levels of social support and human capital were associated with greater economic well-being. Social support was negatively associated with depression and poor physical health, while food insecurity was positively associated with depression and poor health. Analyses over time suggest that economic well-being may be a better predictor of depression and poor health than depression and poor health are predictors of economic well-being, especially for poorer families. Implications for public policy and programs that may mitigate the negative effects of poverty on rural residents are discussed.

INDEX WORDS: Rural poverty, health, depression, economic well-being, human capital,
                 food insecurity, social support, public policy, low-income families

WELL-BEING IN A RURAL CONTEXT: A MODEL OF SELECT FACTORS

INFLUENCING HEALTH AND ECONOMIC WELL-BEING IN RURAL, LOW-INCOME

MOTHERS

by

LEIGH ANN SIMMONS-WESCOTT

B.A., University of California, San Diego, 1992

M.F.T., MCP-Hahnemann University, 2000

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial

Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHPY

ATHENS, GEORGIA

2004

WELL-BEING IN A RURAL CONTEXT: A MODEL OF SELECT FACTORS

INFLUENCING HEALTH AND ECONOMIC WELL-BEING IN RURAL, LOW-INCOME

MOTHERS

by

LEIGH ANN SIMMONS-WESCOTT

Major Professor:	David W. Wright
Committee:	Bonnie Braun
	Thomas Coleman
	Charles Halverson

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
August 2004

DEDICATION

For my mom, whose love has been my lifelong beacon of light in all sorts of weather, and for all the mothers in my life, past and present, whose strengths continue to amaze and inspire me. You know who you are.

ACKNOWLEDGEMENTS

There are so many people who have helped, supported, and loved me during not only my academic career, but also my life. (Some may argue these are one and the same.)

First, thanks to the members of my committee, David, Bonnie, Chuck, Mick, and Larry, who have put up with my changing academic programs, flying off to DC on a regular basis, sending pages and pages of drafts by email, and last minute requests for letters of recommendation. Your support of my pursuits outside of UGA has been tremendous. A special thanks to Bonnie Braun, who three years ago took a chance on a student from Georgia and allowed her to participate on Rural Families Speak. Who knew one summer would turn into a dissertation, several papers and presentations, and most importantly a friend and mentor?

A very special thanks to David Wright. You've been an incredible mentor, advocate, cheerleader, and friend. As I began to stretch my wings and venture on unknown paths (academic and otherwise), your unwavering confidence in the process and my ability to handle any outcome kept me going, especially when I doubted myself. I feel privileged to have someone like you in my corner – you are always a "5" in my book. Of course, this note of thanks wouldn't be complete without mentioning your other (better?) half. Anette, thank you for all your love, encouragement, and support (and for being there during all my belly piercing moments). You are a true friend (my GA family), and I'm excited for the day when Jackie realizes what an amazing mom she has.

To Diane Adams, without whose help making sure I got registered for classes, reserved rooms and computers, and turned in my paperwork on time, I would not be graduating in August.

To Kirsten – for your friendship and the walks that helped retain my sanity. To Michelle – for 10 years of friendship, support, and helping to pave the way on the PhD journey. Thanks to Scott and Carlin Miller for the *SEM* sleepovers. I appreciate all your help, encouragement, and willingness to give up (and take care of me on) weekends so that I could finish. To Ang and R – my Philly parents. R – for your introspection, art, and hind-/foresight. Ang - for being my top supporter to go back to school – even if it was highly correlated with getting me off "the crying chair" and back to my desk so you could work – and for always being there.

Many thanks to my family. First, to my in-laws, Emilie, Richard, Kristin, Katie, and Nikki – for always keeping me on my toes and reminding me of what's most important in life. A special note to Em for the midday writing breaks – I will miss our noontime tête-à-têtes. To my Auntie Barb and Uncle Jer – for being my lifelong second parents. I appreciate all your love and support. To my stepfather, Tom – for your unwavering love and dedication to both my mom and me, and for not taking no for an answer. To my mom ("Maryland") – for being a shining example of independence, grace, strength, courage, and love on this wild ride called life. It's impossible to put into words how fortunate and grateful I am to have you for a mother. And of course, my chocolate lab Hershey – for keeping my toes warm on cold nights, wagging your tail no matter what kind of mood I'm in, and reminding me there's always time for a little play.

Finally, but never least, to my husband, David. From that 4th of July afternoon when I sat upstairs taking a stats midterm while you cooked dinner, you've supported me (and kept me well fed) throughout this process. Thank you for understanding how important my work is, for being there whenever I need you, for always trying to do the right thing, for sharing your amazing self with me, and for loving me wholly, unconditionally, and fearlessly. You are an incredible partner and friend, and I am so lucky to share my life with you. I love you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Understanding poverty, or the converse, understanding the ability of families to be

economically self-sufficient, has been the topic of much political debate over the last 40 years.

From President Johnson's 1964 declaration of "an all-out war on human poverty and

unemployment in these United States" (lines 7-8, GPO, 1965) to President Clinton's 1994

campaign promise to "end welfare as we know it" (Clinton, 1995, ¶3), addressing the sources of

poverty and providing appropriate resources, public policies, and programs to reduce poverty

have been ongoing challenges for the United States (Katz, 1996).

These political challenges are paralleled in American social science poverty research.

Social scientists do not yet agree on a measure of economic self-sufficiency and well-being

(Wagle, 2002). Studies of poor families have measured family economic circumstances using the

official federal poverty threshold, poverty gaps, wage and income data, and income to needs

ratios, each of which has distinct implications for human development and programmatic

intervention. Debate also continues over the generalizability of existing poverty research. There

is a long history in American social science of studying urban poverty (which originally grew out

of the need to understand the social dilemmas associated with urbanization and industrialization

in the late 19th and early 20th centuries) while making little distinction, and paying modest

attention to, issues of rural poverty (Tickamyer & Duncan, 1990; Wilson & Aponte, 1985). As a

result, most policies and programs aimed at reducing poverty and addressing the needs of poor

families have been modeled after urban families with little consideration for how rural families differ (Tickamyer & Duncan, 1990; Lichter & Jayakody, 2002).

A primary goal of the present study was to contribute to filling the gap in poverty research by considering rurality as a unique context of human development. Using ecological (Bronfenbrener, 1979, 1992, 1993), human capital (Becker, 1993) and social stress (Cohen & Willis, 1985; House, Umberson, & Landis, 1988; Kessler & McLeod, 1985; Pearlin, 1983; Wheaton, 1985) theories, a model of selected intrapersonal factors related to the health and economic well-being of rural, low-income mothers was developed and tested over time using structural equation modeling (*SEM*). The sample of 414 mothers came from a longitudinal, multi-state project, known as NC-223[1], "Rural Families Speak," the goal of which was to track the well-being of low-income, rural families in the context of Welfare Reform. This study provided data that contributes to emerging findings regarding the long-term welfare of the NC-223 families, and results inform both previous findings and future analyses related to their health and economic well-being. Results from this study also provide insight into strategic points of public policy and programmatic intervention for poor rural women, which may mitigate the negative effects of poverty on rural residents over time.

---

[1] See Chapter 3, Methods, for more information on the sample.

CHAPTER 2

LITERATURE OVERVIEW

Theoretical Background

Limitations of Past Research

In their seminal work "Poverty Research and Policy for Rural America," Duncan and

Tickamyer (1988) advocated for research and policy that both recognized and accepted the

cultural components of poverty, especially with regard to the rural poor. At that time they

suggested there was "an ideological trap inherent in the culture of poverty model" (p. 251),

which allowed stereotypes about what it means to be poor, and what poor people are like, to

guide poverty research and policy. Rather than continue to follow this model, they urged

researchers -- and policymakers -- to recognize the cultural and experiential components of

poverty, and that these differ based upon geographic location. Duncan and Tickamyer argued for

empirical work that

> disaggregates poverty and poses fundamental questions about who is poor, for how long
>
> and what reason, and to what extent…their social relations and behavior [are] rational.
>
> Specific items to investigate include…persistent poverty for [rural] people and places
>
> (p. 254).

Some researchers have suggested that rurality is not a separate analytic context, but

rather one end of the rural-urban continuum that does not warrant specific research (Falk &

Gilbert, 1985; Tickamyer & Duncan, 1990). However, demographic data of rural and urban

residents indicate there are differences. Rural residents are more likely to be older, less

educated, in poorer health, and earning lower incomes than their urban counterparts (Flynt, 1996; Ricketts, Johnson-Webb, & Randolph, 1999; Tickamyer & Duncan, 1990). In fact in 2000, real median annual income for urban residents rose by 1.7% (from $44,200 to $45,000), while real median annual income fell 3.8% for residents outside urban areas (from $34,100 to $32,800) (Census Bureau, 2001). Further, research on participation in means-tested programs demonstrates that people living in areas with greater population density are more likely to participate in welfare and food stamp programs than people living in lower population density areas, despite higher poverty rates in less dense areas (Hirsch & Rank, 1991).

More than fifteen years since Duncan and Tickamyer's seminal article, little of their suggested work has been undertaken. A literature search of peer reviewed journals for empirical studies of rural poverty in America over the last decade finds fewer than 20 studies, and few of these studies are longitudinal in nature. Similar trends were noted by Weber and Duncan (2001), who found that since 1991, few national and comprehensive studies have evaluated the economic implications of welfare reform for rural America. To date little published research has focused on elucidating potential pathways to economic well-being in rural families, or attempted to track these pathways over time.

Ecological Theory

Bronfenbrenner's (1979, 1992, 1993) ecological model of development works especially well when examining larger contextual influences, because it provides a conceptual framework that considers the importance of multiple influences on human development and experience. According to this model, development is a process that occurs as a joint function of the person and the environment: The developing person interacts with a variety of environmental contexts in unique and meaningful ways that over time determine the person's developmental trajectory.

Two important features of Bronfenbrenner's model include: (a) the concept of "developmentally instigative characteristics" (DICs) (Bronfenbrenner, 1992, p. 220), and (b) a hierarchical system of environmental influence.

DICs are those characteristics of the individual that are unique and directly affect the way in which the person both perceives and interacts with those in the immediate environment (i.e., parents, siblings, and peers). These characteristics also include what Bronfenbrenner (1993) terms "personal stimulus characteristics" (p. 11), or those features of an individual that both invite and discourage reactions from the environment.

The hierarchical system of environmental influence consists of four, interdependent and dynamic levels extending out from the developing individual: (a) the microsystem, (b) the mesosystem, (c) the exosystem, and (d) the macrosystem. Within and between each of the four systems are interactions involving multiple persons. Interactions that occur at any one level can influence interactions at any other level, and any interactional exchange can both directly and indirectly impact the individual's developmental trajectory. In addition to the four levels, consideration is given to the ongoing factor of time, which is accounted for through the chronosystem.

Bronfenbrenner defines each of the four levels according to its relationship with the developing individual, which in the case of this study is the rural, low-income mother. The microsystem consists of the totality of patterns of activities, roles, and interpersonal relationships experienced by the developing mother in specific face-to-face settings (i.e., home or work). The mesosystem consists of the interrelationships between two or more microsystemic settings in which the mother participates. These may include relationships between home and any of the following settings: (a) work, (b) a child's daycare or school, (c) the neighborhood, or (d) the

social service office (i.e., Department of Family Services). The exosystem consists of the connections and processes that occur between two or more settings, at least one of which does not typically contain the developing individual. This may include the county government, which implements state and federal policies and programs at the local level, or a major factory or other business in the community where the mother is not employed, but which provides jobs and economic stimulus for the surrounding area. Finally, the macrosystem includes the overarching patterns that are characteristic of a given culture, subculture, or broader social context. These contexts influence such factors as belief systems, available resources, life styles, opportunity structures, and life course options. The macrosystem is sometimes referred to as the "societal blueprint" or the "cultural repertoire of beliefs" (Bronfenbrenner, 1992, p. 228). For poor, rural women, some cultural contexts/beliefs may include the stigma associated with seeking mental health treatment or receiving public assistance, an acceptance that educational opportunities are limited, or the belief that women and men have defined employment opportunities.

The chronosystem includes the dimension of time. More specifically, it takes into account the changes over time (development) that occur both within a person and within the environment, and the dynamic relationship between the two processes (Bronfenbrenner, 1986, 1995). Understanding how individual characteristics remain stable or change over time might provide insight into the structure of poverty in rural areas.

Ecological theory provides some general hypotheses regarding the effects of the larger context, including the endemic poverty in rural areas, on rural women's economic well-being. However, it does not offer specific hypotheses regarding how individual characteristics promote or hinder economic well-being. Human capital theory and social stress theory present some

concrete notions about the effects of individual characteristics on health and economic well-being, and these notions integrate well with ecological theory.

Human Capital Theory

Gary Becker (1993) developed human capital theory as a means for conceptualizing how economic resources and the ability to garner economic resources affects outcomes. Human capital is the sum of the acquired knowledge, skills, and attitudes an individual possesses. It is an individual characteristic that represents education, training, and experience, which is converted into wages and economic benefits in the labor force (Gaughan, 2002). Essentially, what people know and what people are capable of doing make a difference for their success in the labor market.

An individual develops differently depending on the socioeconomic status of the family of origin (Becker, 1993). Family background has strong effects on an individual's ability to obtain higher education. Research suggests that the higher the socioeconomic status of the family and the higher the level of skills of the parents, the more likely the values of education and generating more human capital are imparted to offspring (Gaughan, 2002). Essentially, children of more educated parents are more likely to stay in school longer and to have higher levels of education. Additionally, while educational attainment is an important component of human capital, the mere process of attending school promotes human capital growth (Gaughan, 2002). The longer an individual stays in school, the more skills the individual acquires with respect to personal relationships and self-management, which contribute to later success in the labor market. Given the relationship between human capital and later economic success, it is hypothesized that the more personal resources upon which an individual may draw, the more likely the person is to be in better health and have greater economic well-being.

Social Stress Theory

A number of researchers have examined the relationship between external stressors and the ability to cope, most notably examining the interaction effects as described by the stress accumulation and stress-buffering models (Cohen & Willis, 1985; House, Umberson, & Landis, 1988; Kessler & McLeod, 1985; Pearlin, 1983; Wheaton, 1985). Personal stress can be defined as the self-perception that circumstances exceed one's coping capabilities, and social stress research suggests that strong personal resources (i.e., a feeling of self-efficacy) and social supports (i.e., family, friends, community) may mitigate the impact of negative (i.e., stressful) conditions (House, Umberson, & Landis, 1988; Kessler & McLeod, 1985).

Research on depression in low-income women supports this finding. Studies show that in the absence of sufficient income, support received from kinship and friendship serves to buffer the effects of economic stress (Young, 1999). Further, a perceived lack of social supports inhibits women's abilities to provide for their material needs (i.e., food, clothing, and shelter) (Ennis, Hobfoll, & Schroder, 2000). For women with children, social supports moderate the perceived stress associated with parenting (Jackson, 1999). Given the importance of social supports in mitigating stress, it is hypothesized that mothers with higher perceived levels of social support will have better health and greater economic well-being.

The Macrosystemic Context: Understanding Rurality

According to ecological theory, development must be understood in context. The macrosystem, or broader social context in which an individual lives and from which community structures emerge, must be viewed as influential in the process of human development, and in the kinds of choices that are made throughout the life course. While some authors have suggested that rurality is not a specific or unique context (Falk & Gilbert, 1985), others have argued -- and

this author agrees -- that rural life is unique in character, function, and influence (Tickamyer & Duncan, 1990).

What Is Rural?

When people think of rural America, they often associate it with the agrarian countryside and large farms in the Midwest. While farming was once a strong characteristic of rural life, it is not so today. Since World War II, the number of people living and working on farms has declined substantially, and during the 1990s, the rural farm proportion of the population fell to less than 2% of the total (Ricketts, Johnson-Webb, & Randolph, 1999).

Historically, the federal government has used two principal designations of rurality, which were provided by the U.S. Census Bureau and the U.S. Office of Management and Budget (OMB) (ERS, 2003a; RAND, 2003; Ricketts, Johnson-Webb, & Randolph, 1999). The Census Bureau uses a rural-urban classification, where rural is defined as all territory, population, and housing units located outside urbanized areas or urban clusters (U.S. Census Bureau, 2003). An urbanized area or cluster is defined as core census block groups or blocks with a population density of at least 1,000 people per square mile, and surrounding census blocks that have an overall density of at least 500 people per square mile.

OMB designates counties as metropolitan or nonmetropolitan, based on whether the county has a large city and suburbs, and the degree to which the designated county is integrated into the surrounding areas (ERS, 2003a). A nine-part classification scheme, which distinguishes the three metropolitan groupings from the six nonmetropolitan groupings, known as Rural-Urban Continuum Codes (RUCCs), is used to identify the counties. Nonmetropolitan areas are further classified according to whether they have some functional proximity (adjacency) to metropolitan areas. A nonmetropolitan county that physically borders one or more metro areas and has at

least 2% of its employed labor force commuting to central metropolitan counties is defined as adjacent. Nonmetropolitan counties that do not meet these criteria are classified as nonadjacent. Tables 1 and 2 present the specific RUCC designations.

<center>Poverty: Microsystem, Exosystem, or Macrosystem?</center>

Depending upon how it is discussed, poverty can be viewed in a microsystemic, macrosystemic, or exosystemic context. Two major theories dominate the research about the causes of poverty (Schiller, 1984). One is an individual level theory, which states that certain individual characteristics (i.e., developmentally instigative characteristics) influence a person's success or failure in the labor market. In particular, poor people are viewed as lacking the appropriate education, skills, desire, or motivation to take advantage of economic opportunities. From this perspective, poverty is viewed as a microsystemic issue, and poverty policy is aimed at improving the individual characteristics of the poor by providing education, training, and other experiences to improve their access to, and success in, the labor market.

The second theory is a structural level theory, which states that external factors, such as problems with the economy or society, cause poverty (Schiller, 1984). In this exosystemic view, poor people are viewed as not having fair access to vital resources, such as education, adequate housing, or good jobs. Embedded in this view is the notion that institutionalized racism or other segmentation prevents equal access to the labor market. From this perspective, poverty policy is aimed at the exosystemic context to reduce the institutional barriers facing the poor, so they can improve their participation in, and benefit from, the labor market.

Deavers and Hoppe (1992) argue that these two theories are too simplistic to readily capture the multifaceted construct of poverty, and this is especially so for rural poverty. These authors point to the fact that these theories offer no explanations for the endemic rural poverty

Table 1

Rural-Urban Continuum Codes (RUCCs)

Code	Description

Metropolitan Counties:

1   Counties in metro areas of 1 million population or more

2   Counties in metro areas of 250,000 to 1 million population

3   Counties in metro areas of fewer than 250,000 population

Nonmetropolitan Counties:

4   Urban population of 20,000 or more adjacent to metro area

5   Urban population of 20,000 or more not adjacent to metro area

6   Urban population of 2,500 to 19,999, adjacent to metro area

7   Urban population of 2,500 to 19,999, not adjacent to metro area

8   Completely rural or less than 2,500 urban population, adjacent to metro area

9   Completely rural or less than 2,500 urban population, not adjacent to metro area

Source: Economic Research Service (ERS) (2003a). *Measuring rurality: Rural-urban continuum codes.* Washington, DC: United States Department of Agriculture. Retrieved November 26, 2003, from http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon

Table 2

Rural-Urban Continuum Codes by Number of Counties and Population

Code	Number of Counties	2000 Population
Metropolitan Counties		
1	413	149,224,067
2	325	55,514,159
3	351	27,841,714
Nonmetropolitan Counties		
4	218	14,442,161
5	105	5,573,273
6	609	15,134,357
7	450	8,463,700
8	235	2,425,743
9	435	2,802,732
U.S. Total	3,141	281,421,906

Source: Economic Research Service (ERS) (2003a). *Measuring rurality: Rural-urban continuum codes.* Washington, DC: United States Department of Agriculture. Retrieved November 26, 2003, from http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon

that exists in some geographic locations, such as the South. They suggest that communities where the rate of poverty is extremely high and of long duration likely have a unique dynamic at work that must be explained and understood in more complex terms. Perhaps there is some broader social value, or macrosystemic influence, at work that must be more fully understood. Or, perhaps there are issues at all levels of Bronfenbrenner's system that must be considered in order to fully understand rural poverty.

Most analyses of poverty data are conducted from a macrosystemic or exosystemic view of poverty. Analyzing poverty statistics (i.e., percents and absolute numbers about poor residents and some defining demographic characteristics) is one means for assessing national economic well-being (Proctor & Dalaker, 2003). The poverty rate specifically provides an overall indication of the level of need in a population, although it does not measure the extent of need among poor families, or the types of services that would be most beneficial (CRS, 2002; Meyer & Cancian, 1998). In 2002, the official poverty rate was 12.1%, and 34.6 million people were living below the poverty threshold, which was $18,859 for a family of four that year (Proctor & Dalaker, 2003). Data on poor families indicate that over the last 15 years, the median family income as a percent of need has remained relatively steady (CRS, 2002).

<div align="center">Rural Poverty</div>

Like the concept of rurality, poverty -- and what it means to be poor -- comes with its own set of assumptions. For many people, poverty is associated with life in the inner city, not with thoughts of rural landscapes. However, the reality of poverty worldwide -- and in the United States -- is quite a different story. Worldwide, 1.2 billion people live in poverty, and 75% of them live and work in rural areas (IFAD, 2001). Despite global rural-urban migration patterns,

poverty in rural areas continues to remain high, and estimates show that by 2020, 60% of the world's poor will continue to be rural residents (Rahman & Westley, 2001).

A similar trend can be seen in the United States. Poverty rates for rural Americans are consistently higher than for those in urban areas (14.2% compared to 11.1% in 2002) (Proctor & Delaker, 2003). The highest concentration of poverty in the United States exists in four, non-metropolitan pockets (Flynt, 1996; Proctor & Delaker, 2003; Tickamyer & Duncan, 1990). These pockets include: (a) the Appalachian mountain region, which is mostly white poor; (b) the old Southern "cotton belt," which is mostly black/African American poor; (c) the Rio Grande Valley/Texas Gulf Coast, which is mostly Hispanic poor; and (d) the Native American reservations in the Southwest, which is nearly all Native American poor. In fact, while 12.1% of all Americans live in poverty, 20% of rural Americans are poor (Proctor & Delaker, 2003). Female-headed families have higher poverty rates than other household types (Proctor & Delaker, 2003; USDA, 1999a). Additionally, the greatest increases in poverty since the early 1970s have been in rural areas adjacent to metropolitan places (Lahr, 1993).

Historically, rural poverty has been resistant to economic cycles and government policies and programs (Flynt, 1996). In every census since 1960, the same 540 counties of the 3,000 counties nationwide have been categorized as non-metropolitan with at least 20% of residents classified as poor (Flynt, 1996). This is despite radical changes in the social welfare system in the 1960s, with President Johnson's war on poverty and the creation of Aid to Families with Dependent Children (AFDC). This is despite the economic booms of the early 1980s and mid-1990s. This is despite 1996 welfare reforms and the creation of Temporary Assistance to Needy Families (TANF). In rural areas, poverty can be attributed at least in part to few employment opportunities and low wages, especially for individuals with few skills (Henderson, 2002).

What is challenging about poverty in rural areas is that people are not poor because they are not working. In fact, families residing in rural areas of the United States, whose incomes fall below or near the poverty line, have a much higher labor force attachment than their urban/metro counterparts (Tickamyer, 1992).   Research shows that nearly one-fifth of working poor rural families engage in full-time, year-round work (Deavers & Hoppe, 1992). Despite these work rates, working rural people are twice as likely to be poor as working central-city residents (Maharidge, 1992), and seven out of ten rural poor heads of household work at least part-time (U.S. Department of Labor, 2002). Underemployment, defined as working fewer hours than desired or working in a job at a lower skill level than for which one is qualified, helps to explain why so many rural families have dual incomes and still live at or near the poverty level (Cochran, Skillman, Rathge, et al., 2002).

One reason for the urban-rural differences in poverty is a continually growing income gap between rural and urban workers. Since the 1970s, there is a growing share of workers earning poverty-level wages, even though they engage in the equivalent of full-time, year-round employment, and this share of low-wage earners is especially large in rural America (Gorham, 1992). In 1979, 32% of rural workers were low wage earners (Gorham, 1992), and rural workers earned $4,800 less than urbanites (Maharidge, 1992). In 1987, 42% of rural workers were low-wage earners (Gorham, 1992), and in 1989, rural workers earned $6,400 (in constant dollars) less than urban workers (Maharidge, 1992). More recent figures demonstrate that the inflation-adjusted, average nonmetropolitan weekly earnings for wage and salary workers in 1997 was $436 (in 1997 dollars), while metropolitan earnings were nearly unchanged (USDA, 1998).

Does Living Above the Poverty Line Equal Economic Well-Being?

There are various approaches to understanding and studying poverty, including studying the "opposite" of poverty, economic self-sufficiency (Wagle, 2002). Researchers and policymakers often use the term economic self-sufficiency to define the goal for individuals on public assistance (especially welfare or Temporary Assistance to Needy Families [TANF]), with the implication that an individual who is not receiving public assistance is self-sufficient. Research on families who have recently left the welfare rolls does not support this implication, as welfare leavers often experience economic insecurity, and many return to welfare, sometimes very quickly (Loprest, 2001; Meyer & Cancian, 1996). Further, the poverty status (as defined by the federal poverty level[2]) of welfare leavers shows that most welfare leavers are poor (i.e., earning incomes below the federal poverty line) or near poor (i.e., earning incomes between 100% and 200% of the federal poverty line) (Cancian, Haveman, Meyer, & Wolf, 2002; Meyer & Cancian, 1996). They also tend to have inconsistent work patterns and earn low wages (Cancian & Meyer, 2000). Additionally, with changes in the welfare law in 1996, many former welfare recipients have reached their five-year time limit, and although they have technically left the welfare rolls, they are not employed and are struggling financially (Bloom, Farrell, & Fink, 2002). These data on welfare-specific families indicate that not receiving cash assistance does not equate to economic self-sufficiency.

Although many researchers and policymakers use the term economic well-being, few researchers have actually defined the term. Braun, Olson, and Bauer (2002) identified components of economic well-being by noting that economic well-being implies a level of sustainability that surpasses mere self-sufficiency in an economic sense, where income is

---

[2] The terms "federal poverty level," "federal poverty line," and "federal poverty guidelines" are often used interchangeably to denote the administrative version of what constitutes poverty for a given family size.

sufficient to address needs. The authors' rationale is that the ability to sustain self-sufficiency and to meet needs over time leads to a higher overall quality of life or general well-being. Other researchers have conceptualized economic well-being by referring to where a family's income falls along the federal poverty guidelines or how dependent a family is on public assistance programs (Beverly, 2001; Lichter & Jakayody, 2002; Marlowe, 1996; Meyer & Cancian, 1996; Meyer & Cancian, 1998; Wagle, 2002). The rationale of these researchers is that if a family's income falls at or near the poverty line and/or the family uses a large number of public welfare programs, they are not experiencing economic well-being.

Some researchers argue that although measuring self-sufficiency and well-being based on participation in means-tested government programs can be useful, it is underdeveloped and too simplistic to account for family economic well-being (Marlowe, 1996; Meyer & Cancian, 1996; Meyer & Cancian, 1998). Similar arguments have been made about using the federal poverty threshold as an accurate indicator of economic well-being (Beverly, 2001; Lichter & Jakayody, 2002; Meyer & Cancian, 1998; Wagle, 2002). Wagle (2002) contended that absolute poverty measured by some preset standard fails to account for either the quality of survival or for all essential components of survival a given family might need, such the ability to save and provide for the future. He suggested that more comprehensive studies using an integrative approach to economic well-being are necessary. Other researchers have suggested the federal poverty line does not account for geographic cost-of-living differentials, changes in expenditure patterns, tax credits (i.e., Earned Income Tax Credit [EITC]), or expenses that cannot be used to purchase necessities, such as child care, transportation, and other work-related expenses (Beverly, 2001; Lichter & Jakayody, 2002).

Assessing the adequacy of income to needs -- or economic self-sufficiency -- is another way researchers measure economic well-being (Beverly, 2001; Meyer & Cancian, 1998). These estimates are based on official poverty guidelines developed by the U.S. Census Bureau, and individuals are assigned an income to poverty ratio (total annual household income divided by the poverty threshold that applies to the household size). While the income to needs ratio has some limitations, because it is based on the federal poverty guidelines, used in conjunction with other indicators, it can be a useful tool for understanding family economic well-being (Meyer & Cancian, 1998).

There is also some research indicating that an individual's perception of economic well-being is a good indicator of how economic well-being has changed -- or remained stable -- over time. Rosenstone, Hansen, and Kinder (1986) found that asking individuals to assess their current economic well-being in relation to the previous year as "better," "the same," or "worse" proved to be as valid and reliable as measures that assess behavioral or action-specific data surrounding personal economic conditions.

Research on rural poverty specifically indicates that the structure of work opportunities prevents rural residents from escaping poverty, and thus is an important consideration when discussing the economic situation of rural residents (Tickamyer & Duncan, 1990). Specifically, rural areas are dominated by low wage, seasonal, and part-time employment. Given the inequalities in the distribution of income and jobs in rural communities, hourly wages and family income have been used as measures of economic well-being (Cancian & Meyer, 2000). Cancian and Meyer (2000) suggest that using wages -- as opposed to earnings -- is a more accurate indication of labor market success. Higher wages are necessarily positive, while higher earnings may simply reflect increases in hours worked rather than increases in wages.

Physical and Mental Health: Factors Affecting Economic Well-Being

The relationship between poor physical health and economic well-being has been well documented. Chronic illness affects a significant portion of poor families (Chavkin & Wise, 2002), and stress due to poor economic conditions plays a role in disease (Adler, Boyce, Chesney, Folkman, & Syme, 1993). Studies of welfare leavers show that having a health limitation or condition is significantly associated with a high risk of job loss (Earle & Heymann, 2002). Individuals in low-income families are more likely to have chronic health conditions than individuals in middle and upper class families (Loprest, 2001).

The link between poverty and mental health disorders is also well established. Research demonstrates that individuals in lower socioeconomic groups experience higher rates of psychiatric problems than individuals in higher socioeconomic groups (Adler, Boyce, Chesney, Folkman, & Syme, 1993; Eaton, Muntaner, Bovasso, & Smith, 2001; Jayakody & Stauffer, 2000). Likewise, single mothers who report experiencing moderate to severe material hardship are twice as likely to experience depressive symptoms as married mothers (Brown & Moran, 1997). Poor mental health is also an important barrier to employment and economic well-being among low-income families (Jayakody & Stauffer, 2000; Lichter & Jayakody, 2002). A growing body of research suggests that mental health problems result in decreased rates of participation in the workforce, reduced work hours, and lower earnings (Ettner, Frank, & Kessler, 1997; Jayakody, Danziger, & Pollack, 1998).

While the relationship between mental health status and socioeconomic status is well recognized, the unresolved question surrounds the direction of causality (Lichter & Jayakody, 2002). One view is that individuals with mental illness are more likely to be in lower socioeconomic groups because of social selection (i.e., following a Darwinian approach to

natural selection) (Dohrenwend & Dohrenwend, 1969), and some longitudinal research suggests that for individuals with psychological disorders -- including depression -- risk for unemployment may begin in childhood (Caspi, Wright, Moffitt, & Silva, 1998). A second view is that the relationship between socioeconomic status and mental health is one of social causation (Dohrenwend & Dohrenwend, 1969). Specifically, the conditions associated with growing up and living at a lower socioeconomic status, such as more stressful life events, limited social and economic resources, and other demographic disadvantages, produce mental disorders (Ensel & Lin, 1991). Other research suggests there is a sequential and reciprocal relationship between psychological well-being and employment, such that individuals with higher depression exhibit greater risk of future job loss, and job loss and inadequate employment are related to increased depression (Dooley, Prause, & Ham-Rowbottom, 2000).

Research does support the negative effects of growing up in a low-income household. Children raised in poor families are likelier to develop traits and coping resources that may affect later risk for mental and physical disorders (Adler, Boyce, Chesney, Folkman, & Syme, 1993). Exposure to greater stress in childhood increases the likelihood that as adults, these individuals will experience greater depression and helplessness, both of which have been linked to disease (Booth-Kewley & Friedlan, 1987). Individuals in lower income brackets also experience a lower sense of locus of control, or the perception that they have control over their environments, which contributes to greater feelings of hopelessness and depression (Rodin, 1986).

Rural Health

Just as with the discussion about poverty, it is important to discuss health within the context of rurality, because health and health care are linked to demographic, geographic, social, and economic conditions of a particular place (Ricketts, 1999). Some facts about rural health

and rural health care paint the picture. Although rural Americans make up 20% of the nation's population, only 9% of the nation's physicians actually practice in rural counties (Ricketts, 1999). Rural patients see doctors less often, and they are usually later into the course of an illness by the time they seek treatment (Ricketts, 1999). When rural patients stay in a hospital for care, it is usually for a longer time period, even though the hospital is paid less for the visit compared to a patient in an urban hospital. Due to geographic isolation, new technological and more effective medical advances spread slowly so that rural health systems are not primed to meet the health needs of the communities they serve (Ricketts, 1999). The health status of rural populations tends to be poorer than that of urban populations, and so many of the illnesses associated with poverty tend to be worse in rural areas (Ricketts, Johnson-Webb, & Randolph, 1999). Trauma mortality due to motor vehicle accidents and gun-related incidents is disproportionately higher in rural areas, and rural residents are more likely to suffer from nonfatal accidents and injuries than their urban counterparts (Ricketts, Johnson-Webb, & Randolph, 1999).

Access to health care is challenging in rural areas. Rural populations are often viewed as vulnerable with regard to access, because there are poorly developed and fragile health infrastructures, high prevalence of rates of chronic illnesses and disability, and barriers to access including distance and availability of transportation (Rowland & Lyons, 1989). Rural residents are more likely to not have a usual source of health care (i.e., a primary care doctor), and they cite the inability to get to a doctor as the main reason (Schur & Franco, 1999). The lack of health insurance is also a barrier to care. Compared to urban residents, rural residents are less likely to have private insurance coverage through their employers, because more rural workers are part-time, and rural residents overall are more likely to be uninsured (Schur & Franco, 1999).

Rural physicians face challenges to providing care to rural people. Research demonstrates that compared to their urban counterparts, rural physicians spend an average of 16% more time in direct patient care and perform 38% more patient visits per week (AAFP, 1999). Additionally, rural physicians often lack the support systems they need to coordinate care, making them spend more time on administrative tasks, and less time on practice management, patient education, and preventive care (AAFP, 1999). Specialty physicians are also lacking in rural areas. The more highly specialized the physician, the less likely that physician is to be located in a rural practice (Rosenblatt & Hart, 1999). These deficiencies result in poorer health care, especially in screening activities. In one study rural women were screened for breast and cervical cancer 10% less frequently than urban women (AAFP, 1999).

Rural public health systems demonstrate similar insufficiencies. A comparison study of rural and urban public health departments found that rural public health personnel were less likely to have formal public health training and more likely to work part-time (Rosenblatt, Casey, & Richardson, 2002). Rural public health personnel also had much smaller work teams and a narrower range of public health skills represented in the office. Further, this study found that formal input (i.e., from physicians and dentists) was almost nonexistent. Most rural health departments had only a volunteer physician to sign death certificates or participate in a rare meeting.

Similar trends are seen in mental health care in rural areas. There are well-documented barriers to accessibility including shortages of qualified professionals, lack of service outreach, and the far distances help seekers must travel to reach available services (Human & Wasem, 1991; Spoth, 1997; Wagenfeld, Murray, Mohatt, & DeBruyn, 1994). Urban models control rural mental health care systems, and delivery systems and methods developed in cities have been

imposed on rural areas (Arons, 2000). Very little programmatic research on preventive interventions with rural populations has been conducted, leaving the existing mental health system in need of revamping (Spoth, 1997).

The infrastructure issues are compounded by rural ideas about mental illness and psychological care. Research on the acceptability and accessibility of mental health services in rural areas suggests that rural people's values and preferences regarding formal psychological care create barriers to access (Spoth, 1997; Spoth & Redmond, 1993; Spoth & Redmond,1996). In fact, rural residents with a history of depressive symptoms are less likely to seek mental health care, because of the negative labeling associated with seeking professional help (Arons, 2000; Rost, Smith, & Taylor, 1993). Further, individuals with higher levels of depressive symptoms are likelier to have a more stigmatized view of mental health services than individuals with lower levels of depressive symptoms (Hoyt, Conger, Valde, & Weihs, 1997).

Health Insurance

Health insurance is the key to health care for most Americans, and health care is integral to positive health and wellness (Garkovich & Harris, 1994). Individuals without health insurance often do not get the medical care they need, and mortality rates among the uninsured are 25% higher than among the insured (Creighton, 2002). For individuals living at or near the federal poverty line, the risk of being uninsured is high. A study conducted by the Institute of Medicine (IOM) showed that 39% of adults in working families earning $20,000 or less annually were uninsured in 2001, and 20% experienced at least one period of being uninsured in the two years prior to data collection (IOM, 2002).

Having health insurance is associated with better health outcomes for adults, and being uninsured is associated with deteriorating health (IOM, 2002). Adults without health insurance

are less likely to receive recommended preventive health screenings (i.e., mammograms, pap tests, and colorectal exams). They also experience greater declines in general health, including increases in blood pressure, decreased ability to perform daily activities, and decreased overall self-perceived wellness (IOM, 2002). Uninsured adults with chronic health conditions (i.e., diabetes, heart disease, and asthma/allergies) have worse clinical outcomes than insured patients, and are more likely to die sooner than individuals with continuous health coverage (IOM, 2002).

In contrast to their urban counterparts, rural residents are less likely to be covered by employer-provided health plans, and they are more likely to be uninsured (Garkovich & Harris, 1994; Schur & Franco, 1999). In 1996, only 54% of rural residents had employer-provided insurance, compared to 63% of urban residents. One main reason for the high uninsured rates in rural areas is that a large number of employers are small businesses (Garkovich & Harris, 1994). Small firms are less likely to provide health coverage, because high premiums preclude their participation. The second main reason for the high uninsured rates in rural areas is the prevalence of part-time, seasonal, and low-wage work (Schur & Franco, 1999). These jobs tend to not provide health benefits, and the families may earn too much to qualify for Medicaid, but not enough to pay the high cost of private insurance coverage.

<div align="center">Factors Affecting Health</div>

Education as Human Capital

Research demonstrates that human capital in the form of education has an effect on labor market success. In a study of welfare leavers, women with higher educational levels were more likely to earn higher wages and less likely to return to cash assistance (Meyer & Cancian, 1998). Similarly, a study of the employment status of parents receiving welfare showed that parents

who had attended college or had college degrees were almost twice as likely to be employed than parents with a high school degree or less (Kim, 2000).

Limited human capital also has a negative effect on health status. Individuals with fewer social and economic resources (human capital) make less use of preventive health screening, and thus are more likely to be diagnosed later in an illness (Adler, Boyce, Chesney, Folkman, & Syme, 1993). Studies also show that having less than a high school education is associated with poor access to mental health care (Commander, Sashi-Dharan, Odell, & Surtees, 1997).

Trends in educational attainment in rural America show that rural adults have lower educational levels than adults in metropolitan areas in every age group (ERS, 2003b). In 2000, only 15.5% of rural adults 25 years of age and older held a bachelor's degree or higher, while 23.2% of adults did not hold a high school diploma or GED equivalent (ERS, 2003b). There are also geographic differences in educational levels. Rural counties in the South, especially those in central Appalachia and with large minority populations, have the lowest high school completion rates (ERS, 2003b).

Food Insecurity

Food insecurity is defined as being, at some time during the year, uncertain of having, or unable to acquire, enough food to meet the needs of all family members due to insufficient money or other resources (ERS, 2003c). It is a commonly used indicator of poverty status, as food (along with shelter and clothing) is one of the costs from which the poverty guidelines are calculated (Nord, 2000). The most recent food security survey reveals that 11.1% of households in the U.S. -- or 34.9 million people -- were food insecure (ERS, 2003b). One-third of these households -- or 9.4 million people -- were food insecure with hunger, meaning that at least one family member experienced the "uneasy or painful sensation" (lines 17-18) caused by lack of

food, the latter of which was due to lack of resources (ERS, 2003b). The remaining two-thirds of food insecure households -- or 25.5 million people -- were able to obtain enough food to avoid hunger, by utilizing a number of coping strategies, including eating a less varied diet, participating in federal food assistance programs, and acquiring emergency food from food pantries and other community supports.

The prevalence of food insecurity tends to vary among household types, and groups traditionally at risk (i.e., women, minorities, and children) are more likely to be food insecure. (Bickel, Nord, Price, Hamilton, & Cook, 2000; ERS, 2003b). Data from 2002 demonstrate that households with incomes below the federal poverty line and households headed by single mothers tend to have higher levels of food insecurity than national averages (ERS, 2003b). The percentages of these families that were food insecure were 38.1 and 32.0 respectively. Minority households also had higher than national averages for food insecurity. Twenty-two percent of black/African American and 21.7% of Hispanic households were food insecure. Households with children were more than twice as likely to be food insecure than families without children.

Regional differences were also apparent in 2002 studies (ERS, 2003b). Households located in central cities and nonmetropolitan areas (as defined by RUCCs) were more likely to be food insecure than households in the suburbs and other metropolitan areas outside central cities. Geographically, the South and West had the highest rates of food insecurity (12.4% and 12.1% respectively), while the Midwest and Northeast had lower rates of food insecurity (9.6% and 9.2% respectively). Central city households and those located in the South and West were more likely to report food insecurity with hunger.

Rural residents have more limited access to affordable food than their urban counterparts. The USDA (1999b) found that supermarket prices in rural areas are on average 4% higher than

in suburban areas. Rural areas also have fewer supermarkets, and a larger number of smaller grocery stores, which have prices that nationwide average 10% higher than chain supermarkets. Low-income rural areas are particularly vulnerable to paying higher prices for food. An analysis of food stamp redemptions showed that in low-income rural areas, supermarkets accounted for only 52.8% of redemptions, compared to 76.7% of redemptions in supermarkets nationwide (USDA, 1999b). These data suggest that although a significant number of rural residents are eligible for food stamps, they are not using them.

Food insecurity is linked to malnutrition in adults and children, and it has direct effects on individual development, including stunted growth, weakened resistance to infection, and disrupted cognition and mental performance (Brown & Pollitt, 1996). A 2000 study on health status outcomes for women living in California showed that food insecure women were more likely than food secure women to report poor general health and more days of restricted activity (Dumbauld & Baumrind, 2002). A growing body of research demonstrates a strong connection between nutrition -- specifically a deficiency in folate -- and depression (Alpert & Fava, 1997; Alpert, Mischoulon, Nierenberg, & Fava, 2000). These findings indicate that folate deficiencies cause neurological interactions that inhibit the antidepressant response, thereby contributing to the emergence and severity of depressive illness. Similar findings from a study of adolescents demonstrate that food insecurity is associated with dysthymia and suicidal behavior (Alaimo, Olson, & Frongillo, 2002). Conversely, studies of nutrition show that women who eat breakfast regularly have improved mood and feelings of calmness (Lombard, 2000).

Social Support

There is a considerable amount of research suggesting that social support has positive effects on psychological well-being and the ability to deal with chronic and acute stressful life

events (Cohen & Willis, 1985; Duck & Silver, 1990; Kalil, Born, Kunz, & Caudill, 2001; Lepore, Evans, Schneider, 1991; Thoits, 1984, 1986). These findings are supported by research on preventive mental health programs, which demonstrates that the strength of social support networks is an important factor in reducing psychological symptoms (Spoth, 1997). The positive relationship between social support and well-being can be found in studies using various definitions of social support, including social support as (a) the qualities of interpersonal relationships, (b) individual perceptions of support, and (c) individual ability to garner assistance or information when needed (Green & Rodgers, 2001). Other researchers have examined the process of social support and those factors associated with the ability to acquire, develop, maintain, and engage in different types of social support (Dilworth-Anderson & Marshall, 1996; Hobfoll & Stokes, 1988). Results from these studies indicate a need to better understand why individuals might feel more or less supported.

Studies also examined the relationship between social support and mastery, or an individual's belief that they are self-efficacious and have some control over their environment, but these studies are unclear about the direction of the relationship (Hobfoll & Lerman, 1986; Hobfall, Shoham, & Ritter, 1991). Findings indicated that under high stress conditions, individuals with higher levels of personal mastery report greater satisfaction with the amount of social support they receive. Likewise, under high stress conditions, individuals who report receiving high levels of social support have higher levels of personal mastery. It is likely that the relationship between social support and personal mastery is reciprocal. However, there is some evidence to indicate that this relationship is more complex for low-income women (Green & Rodgers, 2001).

Social support becomes challenging to evaluate in the context of current poverty policy, which places an emphasis on self-sufficiency and independence, even when it may be wholly appropriate for an individual or family to seek support from family, friends, and even the government, in order to sustain themselves at least temporarily given their current economic situations (Green & Rodgers, 2001). Historically, poor women have had to balance the need for independence with the need to utilize established support systems (Belle, 1982). Some researchers suggest that the effects of social support on psychological well-being are at least in part dependent on the quality of the relationship in which the support is received (Ryan & Solky, 1996). That is, if the support received is perceived as supportive of autonomy, then it has a positive effect on psychological well-being. If the support is perceived as controlling, it has potentially negative effects on well-being. From a policy perspective, this suggests that if social welfare policies and programs are perceived as controlling, and feelings of self-efficacy are challenged, then supports such as welfare will have a negative effect on psychological well-being.

Research specifically on the buffering role of social support for low-income people and low-income people on welfare underscores this finding. Alter (1996) found that long-term welfare (Aid to Families with Dependent Children [AFDC]) recipients who participated in a family support program that promoted long-term independence felt greater self-efficacy and more confident about their ability to cope with every day life and to meet the needs of their families. Studies linking social support with stress suggest that these greater feelings of self-efficacy (mastery) could lead to increased psychological well-being. Similarly, in a longitudinal study of low-income women, Green and Rodgers (2001) found that women who reported more social support at time one (where social support was defined as a sense of belonging as opposed

to dependence) also reported reduced levels of stress and higher psychological well-being at subsequent points of measurement.

As with other factors in this research, the context of rurality plays an essential role in understanding the importance of social support for rural residents. Although there is not a lot of research on rural social support, one study examined the social networks, services, and supports affecting rural families (Cochran, Skillman, Rathge, Moore, Johnston, et al., 2002). Findings indicated that rural residents see family as central to rural life, because they are often isolated from neighbors by the geographic distance between homes. While there are a number of essential local supports available, such as churches and local businesses, social service providers cite a lack of flexibility in social service programs to meet the needs of rural families. Participants in this study noted a lack of high-quality, affordable childcare as a needed critical support.

<div align="center">Filling the Gap: A Study of Rural Mothers</div>

Upon examining the state of current knowledge, an obvious gap exists in the lack of research on low-income, rural women over time, especially with regard to understanding what factors contribute to long-term economic well-being. This knowledge gap is particularly critical, because current and pending poverty policy is focused on promoting individual responsibility for long-term self-sufficiency with little regard for contexts, such as the structure of economic opportunities or living and earning conditions in rural areas (i.e., the Personal Responsibility and Work Opportunity Reconciliation Act [PRWORA] of 1996[3]). Given that most poverty policy has been developed using urban models, and current policy proposals perpetuate the urban bias,

---

[3] PRWORA is the current welfare law, which provides time-limited assistance, mandates work with few exceptions, and limits education and training countable as work. There are no provisions in the law for addressing periods of high regional, state, or national unemployment, or for addressing issues specific to rural areas. Reauthorization proposals have continued this focus.

it is important to establish a body of research to determine the need for more customized policies and programs.

For rural, low-income women, research shows the important relationships between health status and economic well-being, but little is known about the predictive nature of this relationship, or about key intrapersonal factors that either promote or inhibit positive mental and physical health, and thus economic well-being, over time. This study will begin to explore the relationships of human capital, food insecurity, and social support to physical and mental health and economic well-being, and it will answer the following questions:

(a) To what degree do levels of human capital, social support, and food insecurity predict depression and poor physical health?

(b) To what degree do food insecurity, social support, and human capital predict economic well-being over time?

(c) Are depression and poor health better predictors of economic well-being than economic well-being is a predictor of depression and poor health?

Theoretical Model

The theoretical model that serves as the framework for this analysis is presented in Figure 1. Definitions of the constructs and the measured indicators are presented in Table 3. The follow-up/time component of the analysis is presented in Figure 2.

The model is based on the following assumptions:

(a)   Economic well-being is a multi-dimensional construct that is encapsulated by absolute values related to income (wages) and the personal perception of one's economic situation.

Table 3

Major Theoretical Concepts

Concept	Definition	Indicators
Human capital	Personal resources upon which an individual relies, including education, knowledge, and skills	Level of education, score on life skills assessment, score on community knowledge
Food insecurity	Being uncertain or unable to acquire food due to lack of resources	Score on Core Food Security Module
Social support	The perception that there are people upon whom the mother can rely for assistance	Score on Parental Ladder for social support
Depression	Experiencing symptoms that are identified as being at risk for clinical depression as defined by the Diagnostic and Statistics Manual for Mental Disorders	Scores on subscales of Center for Epidemiological Study of Depression
Poor health	Having one or more chronic health conditions that interfere with daily activity and/or require regular medical attention	Number of visits to the doctor in the past year, number of chronic health problems, number of missed days of work in the last year

Table 3 Continued

Concept	Definition	Indicators
Has health insurance	Has any health insurance coverage, including major medical, catastrophic, preventive coverage, etc. that is government or employer sponsored	Response to single-item question on whether the mother has any type of health insurance
Economic well-being	The belief that one's income is enough to be able to provide for food, shelter, clothing, as well as other necessities of daily living such as child care, transportation, medical care, etc. and the earnings to support this belief	Perception of whether the family income is enough, perception of how the current economic situation compares to last year, the mother's wages
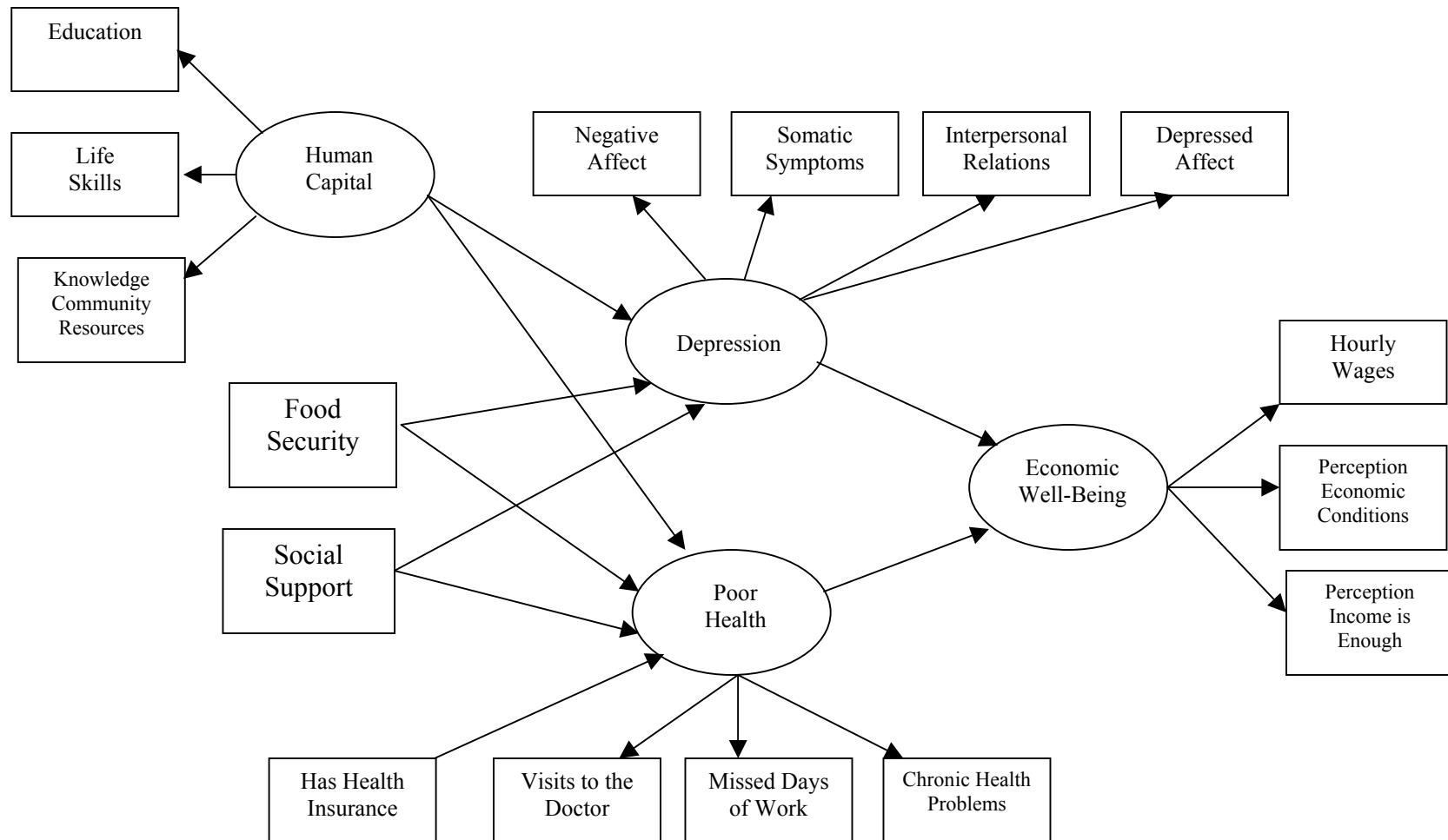
Figure 1. Theoretical Model of Relationships at Time 1
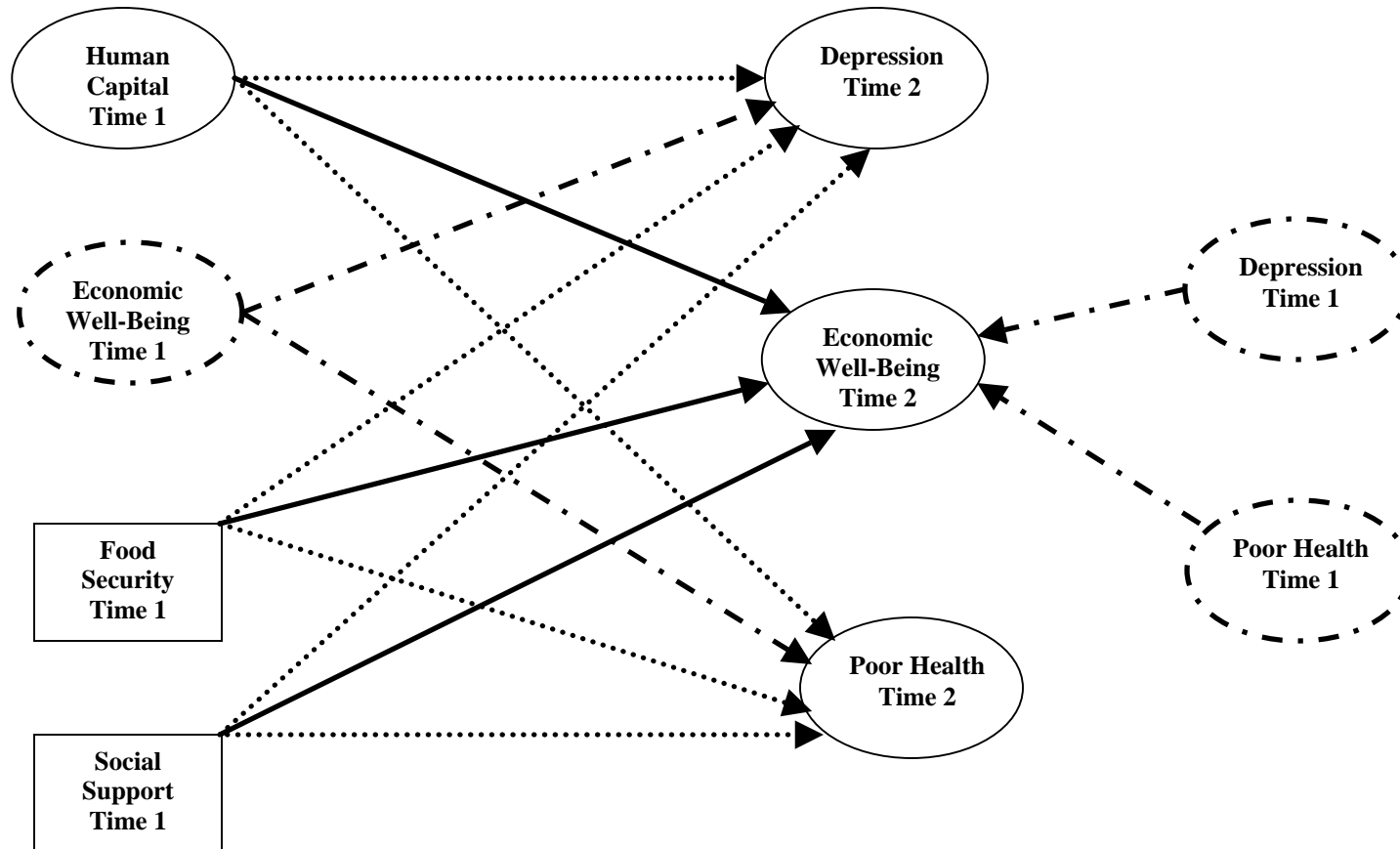
Figure 2. Model of hypothesized structural relationships over time

········▶ Hypothesis 3

————▶ Hypothesis 4

— · —▶ Hypotheses 5 and 6

(b)   Poor physical and mental health are barriers to employment, and thus, impediments to economic well-being.

(c)   Adequate nutrition is an important component of positive health, so food insecurity will lead to depression and poor physical health.

(d)   Individuals with higher levels of human capital (i.e., education, knowledge, and skills) are more likely to earn higher wages and thus have enhanced economic well-being.

(e)   Individuals who believe their social supports are strong will have a more positive outlook on life than individuals who believe their social supports are weak, which will result in improved mental and physical health.

(f)   Individuals who have health insurance are more likely to have better health.

(g)   Mental and physical health and economic well-being are reciprocally influencing factors that influence each other over time.

Testing of the model will rely on the following hypotheses:

(a)   Hypothesis 1: The hypothesized model is a plausible representation of the path to economic well-being in rural low-income women.

(b)   Hypothesis 2: Women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have lower levels of depressive symptoms and better health at time 1.

(c)   Hypothesis 3: Women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have lower levels of depression and poorer health at time 2.

(d)   Hypothesis 4: Women with higher levels of human capital and social support and lower levels of food insecurity at time 1 will have greater economic well-being at time 1 and time 2.

(e)   Hypothesis 5: Women who report higher levels of depressive symptoms and poorer health at time 1 will have lower levels of economic well-being at time 1 and time 2.

(f)   Hypothesis 6: Women who report lower levels of economic well-being at time 1 will have higher levels of depressive symptoms and poorer health at time 2.

The methods for testing the model and associated hypotheses are presented in the next chapter.

CHAPTER 3

DESIGN AND METHODS

The present study utilized data from a multi-state research project, known as NC-223, "Rural Low-Income Families: Monitoring Their Well-Being in the Context of Welfare Reform"[4]. This project is a collaborative, longitudinal investigation by 14 universities[5]. The goals of the project were to track changes in the well-being of low-income families and to analyze the interaction of broader community and governmental initiatives and policies on family well-being. Three waves of data were collected between 1999 and 2002. In the present study, the first two waves of data were utilized, because the third wave of data was not cleaned in time for analysis.

This data set provides detailed information regarding parameters pertinent to this study, including: (a) an assessment of important human capital resources; (b) a standardized measure of respondents' food security status; (c) a measure of the presence of social support; (d) detailed information regarding income characteristics, including the mother's earnings, and perception of income adequacy and current economic situation; (e) a standardized measure to assess depressive symptomotology; and (f) an adult health survey that includes information about chronic health conditions, the experience of injuries or illnesses in the last year, the effects of health status on daily living, including missed days of work and visits to the doctor, and whether the mother has health insurance.

---

[4] For more information, see the project website: http://www.ruralfamilies.umn.edu/.
[5] Cooperating states were: California, Colorado, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New York, Oregon and Wyoming.

Participants

Sample

Demographic information for the sample is summarized in Table 4. The age ranges for participants in the first year of the study were 18 to 58 years, with a mean of 29.17 years. Educational levels ranged from less than eighth grade to a graduate degree, with the average being just above a high school degree or equivalent. Participants lived in households with an average annual household income of $15,526, and their incomes placed them at 85.74% of the federal poverty line ($18,400 for a family of four at the time the statistical analyses were conducted [GPO, 2003]). Nearly half of the participants were married (44.7%, *n*=185), and another 15% (*n*=62) were living with a partner. The remaining participants were single (24.6%, *n*=102), divorced (9.2%, *n*=38), or separated (6.5%, *n*=27). The majority of participants identified as white/non-Hispanic (64.6%, *n*=265), followed by 21.5% (*n*=88) Hispanic/Latina, and 8.8% (*n*=36) African American. The remaining 5% (*n*=21) identified as Asian, multi-racial, or other.

Recruitment

A variety of methods were used to recruit participants for the Rural Families Speak project. Information about the project was distributed through programs that serve low-income families, including Food Stamps, Head Start, Welfare-to-Work, low-income housing, and migrant worker services. Flyers were also placed in locations thought likely to be visited by families with limited resources, such as public health clinics and second-hand stores.

NC-223 is based on a voluntary sample of respondents with no sampling to capture nationally representative data, and this is a limitation of the data set. The national study team

Table 4

Demographic Characteristics of Participants (N=414)

Characteristic	Mean	*SD*
Age	29.17	7.42
Educational Level	3.30 (high school +)	1.41
Annual Household Income	$15,526	$10,404.77
Percent of Poverty	85.74%	54.14%

Marital Status	Percent	*N*
Single	24.6	102
Married	44.7	185
Living with partner	15.0	62
Divorced	9.2	38
Separated	6.5	27

Ethnicity		
White, Non-Hispanic	64.6	265
Hispanic/Latina	21.5	88
African American	8.8	36
Multi-racial	3.4	14
Native American	1.2	5
Asian	0.2	1
Other	0.2	1

conducted comparisons of the participants in the study to rural, low-income families in the

Current Populations Survey (CPS), a nationally representative survey of labor force

characteristics conducted monthly by the Bureau of the Census.   The analysis showed that

compared to families earning below 200% of the Federal Poverty Line in the CPS, the mothers in

NC-223 were younger, less likely to have a high school diploma or GED, and less likely to be

married (Richards, 2003). The NC-223 families were also more likely to receive food stamps,

cash assistance, and housing assistance. The representation of minorities was comparable to the

CPS subsample. Results from the present analyses should be considered within the context of

these comparisons.

To be eligible for the study, participants had to be living in families with incomes below

200% of the federal poverty line, be at least 18 years old, and have at least one child aged 13 or

younger. In wave 1, 414 women completed the interview, which was developed by the research

team and included quantitative and qualitative protocol; in wave 2, 315 of these same women

completed the interview for an attrition rate of 23.9%. The attrition rate is comparable to at least

one other longitudinal study of low-income, rural families (Smith, Krannich, & Hunts, 2001).

A t-test was conducted to assess differences between mothers with complete and

incomplete data on demographic and study variables. Table 5 shows the results. Statistically

significant differences (alpha level of .05) between those mothers who remained in the study and

those who dropped out were found on only two variables: (a) where the families were placed on

the federal poverty line (FPL) ($t = -2.07, p = .04$); and (b) total household income ($t = 1.96$,

$p = .05$), which is used in calculating where a family's income falls in relation to the FPL. Those

families with lower annual household incomes and lower on the FPL were more likely to not

have participated in wave 2.

Table 5

Results from Comparison of Mothers With and Without Complete Data at Wave 2 (N=414)

Variable	*t*	*p*
Age	-1.42	.16
Education	-0.80	.42
Marital Status	-1.07	.28
Race/Ethnicity	-1.13	.26
Annual Household Income*	1.96	.05
Percent of Poverty*	-2.07	.04
Food Insecurity	-0.36	.72
Parental support	-0.88	.38
Knowledge of Community Resources	1.07	.28
Total Depression Scores	1.62	.10
Has Medical Insurance	0.90	.37
Number of Chronic Problems	1.38	.17
Missed Days of Work	-1.20	.23
Visits to Doctor	1.08	.28
Injury/Illness in Last Year	0.89	.37
Participant Monthly Wages	-0.67	.50
Economic Situation Has Changed	-0.87	.38
Income is Enough	-0.58	.56

*Significant at $p = .05$

Procedure

Between 1999 and 2001, trained interviewers conducted semi-structured interviews with each participant. The interviews were conducted in the mother's native language in her home or in a private community meeting place and lasted approximately one and one-half to three hours. Both qualitative and quantitative data were collected. Interviews were transcribed by each state according to a format predetermined by the national study team, which included entering responses on standardized measures into an SPSS (version 10.1) data file. The SPSS files from each state were then compiled at a centralized location to produce the study-wide wave 1 and wave 2 data files.

Measures

In the present analysis, only quantitative data were used. The measures that were evaluated included: (a) Employment/Current Work, (b) Education, (c) Economic Situation, (d) Knowledge of Community Resources, (e) Life Skills Assessment, (f) Depression (CES-D), (g) Adult Health Survey/Problems, and (h) Food Insecurity (Core Food Security Module). Questions for the predictor and outcome variables were the same across all respondents and across both waves of data.

Theoretical Model Study Variables: Measurement Model

The first part of this study was to develop and test a model of economic well-being for rural, low-income mothers. The hypothesized model, presented in Figure 1 (Chapter 2), includes both directly observed variables (represented by rectangles) and latent variables (represented by ovals), the latter of which were developed from the dataset based on the literature. Critical to this process was to determine the degree to which the proposed model fit the data, or whether an

alternative model was more appropriate. The following variables were included in the initially hypothesized model.

Outcome Variable

The main outcome variable examined was economic well-being. As there are multiple definitions and measures in the literature, actual income values were combined with perception variables to measure this latent construct. Specifically, the multiple-item variable included the mother's self reported hourly wages and two single-item perception variables indicating the mother's beliefs about how family economic conditions have changed over time and how adequate are the family earnings. As suggested by Cancian and Meyer (2000), the mother's self-reported wages were translated into base-10 logarithms (intercorrelation of these two variables was good, [$r = .89$]), so any changes in wages could be interpreted on a per unit basis.

Predictor Variables

Human Capital. Human capital was hypothesized to promote feelings of self-efficacy and mastery, both of which have been shown to be negatively correlated to poor mental and physical health and positively correlated with economic well-being. Human capital was a latent construct initially measured by three variables: (a) the mother's educational level, (b) the mother's knowledge of community resources, and (c) the mother's life skills. The mother's educational level was measured using a scale ranging from 1 (8th grade or less) to 8 (graduate degree).

Knowledge of community resources and life skills were measured by the Even Start Life Skills and Community Resources Assessment, which was developed as an index for these variables (Richards, 1998). The Community Resources Assessment is a 20-item "yes-no" questionnaire used to determine the degree to which the mothers know about available health and

social resources in the community. Questions include: "Do you know where to apply for WIC?"; "Do you know where to find a doctor?"; and "Do you know where to find family planning resources?" Reliability for this sample was calculated at and α=0.88. The Life Skills Assessment is a 25-item, "yes-no" questionnaire used to assess a variety of life skills. Questions include: "Do you know how to make a family budget?"; "Do you know how to register to vote?"; and "Do you know how to write a resume?" Reliability for this sample was calculated at α=0.89.

Food Insecurity. Given the relationship between poor nutrition and mental and physical health, food insecurity was hypothesized to have a direct and positive effect on both mental health (depression) and poor physical health. Food insecurity was measured by the Core Food Security Module (CFSM), an 18-item scale with a 12-month time reference currently administered as part of the Current Population Survey conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. The scale has good validity and reliability, with a reliability coefficient of α=0.81 for households with children (Hamilton, Cook, & Thompson, 1997). The CFSM is also reliable with diverse populations, showing similar patterns of response for racial and ethnic minorities (Frongillo, 1999). Reliability for this sample matched reported reliability for the measure.

Social Support. Research supports the idea that having and using social support mitigate the negative effects of stress on physical and psychological well-being (Young, 1999). Thus, social support was hypothesized to have a direct negative effect on depression and poor health. Social support was measured directly using the Parenting Ladder, which was developed for utilization in a statewide evaluation of the Healthy Start Program in Oregon (Richards, 1998). The Parenting Ladder has six items on a 6-point scale that ranges from "low" to "high" and assesses the degree to which the respondent has people on whom to rely for support. Items

include: (a) "someone to help in an emergency", (b) "professionals to talk to", and (c) "someone to offer helpful advice or moral support". It has a reported reliability coefficient of α=0.87, and reliability for this sample was α=0.86.

Depression. Depression has been a good indicator for studying the reciprocal relationship between economic stress and well-being (Dooley, Prause, & Ham-Rowbottom, 2000). It was hypothesized that mothers who were at risk for depression would have lower levels of economic well-being. Depression was measured using the Center for Epidemiologic Studies-Depression Scale (CES-D), which was designed to measure depressive symptomotology in the general population (Radloff, 1977). The measure includes 20 items, rated on a 4-point scale ranging from "rarely" to "most or all of the time." Respondents are asked to report on how they have been feeling over the last week. Statements include: (a)"I felt depressed"; (b)"I felt everything I did was an effort"; and (c) "I felt lonely". There are four subscales, which include depressed affect, negative affect, interpersonal relationships, and somatic symptoms. The four questions for negative affect are framed positively and then reverse coded in scoring. Reliability for the CES-D is α=0.85 in the general population and α=0.90 in psychiatric populations. Reliability in this sample matched the reliability reported for the general population.

Poor health. Research suggests that poor health interferes with an individual's ability to work and the kinds of work in which the individual engages. As there was not a standardized measure of health in the first two waves of the multi-state project, this variable was a latent construct measured by three indicators: (a) the number of chronic health problems, (b) the number of missed days of work, and (c) the number of visits to the doctor. Combined, these variables account for three important components for assessing poor health, as they include behavioral responses to physical conditions as well as the presence of the conditions themselves.

The missed days of work and the number of visits to the doctor are single item variables, so reliabilities could not be calculated. However, the number of chronic problems was constructed from multiple responses to single item questions. Thus, it was treated as a scale with a calculated reliability of $\alpha = 0.78$.

Health insurance. Studies have shown that individuals who have health insurance are more likely to be in better health (Creighton, 2002; IOM, 2002). While the causal nature of the relationship is unclear, it seemed important to control for the participants who had health insurance with regard to poor health status, in order to determine the real effects over time on economic well-being. This control variable comes from a single-item question asking mothers if they have health insurance.

<p style="text-align:center">Statistical Analyses</p>

LISREL 8.54 (Jöreskog & Sörbom, 2003), a structural equation modeling (*SEM*) program, was utilized to perform confirmatory factor analysis of the hypothesized model and to test the final model over time. According to Byrne (1998), the primary focus of the estimation process in *SEM* is to produce parameters wherein the discrepancy between the sample covariance matrix and the population covariance matrix implied by the model are minimal.

To accomplish this task, the hypothesized model was entered into LISREL, including: (a) the relationships between the observed variables and their underlying constructs (entered into the lambda-y $[\lambda_y]$ matrix); (b) the relationships between the observed exogenous variables (entered into the gamma $[\gamma]$ matrix); (c) the relationships among the latent endogenous variables (entered into the beta $[\beta]$ matrix); (d) the associated variance-covariance for the exogenous factors (entered into the phi $[\varphi]$ matrix) and the endogenous factors (entered into the psi $[\psi]$ matrix); and (e) the associated variance-covariance among the measurement errors for the

exogenous observed factors (entered into the theta-delta [θ_δ] matrix) and the endogenous observed factors (entered into the theta epsilon [θ_ε] matrix). LISREL then computed the parameter estimates for the causal model from the data specified and provided unstandardized and standardized output data for review.

Confirmatory Factor Analysis

Evaluation and modification of the theoretical model (Figure 1, Chapter 2), and all subsequent models until a good fitting model was produced, involved two steps. The first step was to examine the specific parameter estimates to determine sources of misfit. These parameter estimates included the standard error in relation to the coefficient estimate, the *t*-statistic (and its significance), and the squared multiple correlation (R^2) for each indicator as it related to the latent construct it was hypothesized to represent. The objective was to produce a model wherein the standard error was small relative to the coefficient estimate; the *t*-statistic was significant ($t > 1.64$ is statistically significant at the .05 level for a unidirectional hypothesis); and the R^2 was at least .25, indicating the indicator accounted for 25% of the variance in the latent construct.

The second step was to test overall model fit, as evidenced by statistically significant goodness-of-fit statistics. Specifically, the statistics used to determine the degree of model fit were: (a) the chi-square (χ^2) value in relation to degrees of freedom; (b) the RMSEA, a sample size-independent test of close model fit (MacCallum et al. 1996); and (c) the adjusted goodness-of-fit index (AGFI) (Bentler & Bonett, 1980). As proposed in Byrne's (1989) analysis of goodness-of-fit indices, the goal was to produce a model where the chi-square was small relative to degrees of freedom; the RMSEA value was < .05 with a p-value > .50; and the AGFI > .90.

When the results indicated that the model fit poorly, or the observed variables were not good indicators of the latent construct, the next step was to determine which theoretically based modifications in the model should be attempted to improve fit. The modifications were based upon differences between partially constrained models and hypothetical constraints and assumptions to see if changing the relationships between some of the constructs, removing a construct, or replacing a construct when theoretically appropriate improved model fit. The normalized residuals of the measured variables, the statistics, and the modification indices were used to assess associations between pairs of variables that were not accounted for by the proposed associations specified in the original model. All modifications to the model and the relationships among the variables reflected the assumptions in the literature.

Nested Models and Analyses Across Time

A nested models approach (Bollen, 1989; Byrne, 1998; Widamon, 1985) was utilized to test the hypothesized model and its usefulness as a tool for evaluating the pathway to economic well-being over time. Nested models consisted of testing a baseline model with the parameters of interest constrained. This provided a baseline chi-square value with degrees of freedom, which were used to test subsequent models with the parameters of interest, freed one at a time. If the hypotheses about the relationships between the variables represented a good fit for the data, then freed paths were expected to provide a statistically significant improvement over the baseline model. The statistical significance of the change in chi-square value in relation to degrees of freedom lost for each subsequently freed parameter was examined on a chi-square distribution table. If freeing the additional parameters provided a statistically significant improvement in the model's fit, this was indicative of an important path in the model.

Deleting parameters. In gauging the efficacy of a change to the hypothesized model, there were several balancing considerations. The effect on fit of deleting a parameter from the model was considered from the standpoint of overall model fit and the significance of the regression coefficient for the indicators. In most cases, deleting a parameter that does not add value to the model results in a statistically *insignificant* change in the chi-square per degrees of freedom, indicating that the model *with* the parameter is not significantly different from the model *without* it; so the simplified model is just as useful (Cook, 1994). However, in some instances, deleting a parameter may yield a statistically *significant* difference in chi-square change per degrees of freedom, which may indicate the parameter does add a distinct element to the model.

Determining whether a deletion results in a less informative model must be balanced against competing interests: (a) other statistics relevant to overall model fit (i.e., the RMSEA and AGFI); (b) the utility of having only parameters in the model that are good indicators of the latent constructs under study; and (c) how the changes are supported by theoretical knowledge (Jöreskog & Sörbom, 2001). If deleting a parameter results in better overall model fit statistics and/or rids the model of indicators that do not account for unique variance in the latent construct they are supposed to reflect, then a statistically significant chi-square reduction may be appropriate.

An additional consideration in model trimming as it related to deleting parameters in the present study was the intent of this model: To be tested over time. Given that the sample size was not very large for the number of parameters to be estimated over time, including parameters in the model with statistically insignificant coefficients or low squared multiple correlations would have potentially limited the scope of the follow up analyses, because the sample size

could not support the number of parameters being estimated. Again, these decisions had to be weighed against theoretical constraints, the goals of the study, and the hypotheses to be tested.

Freed paths. In the case of freeing additional paths in the model, evaluation of the utility of the modification is slightly different. It is expected that any additionally freed parameters will produce a statistically significant reduction in the chi-square value, as one degree of freedom is lost for each path freed (Pedhazer & Schmelkin, 1991). Since significance of the chi-square value is tied to degrees of freedom, more degrees of freedom are preferred. Any reduction in degrees of freedom resulting from additional freed paths should only accompany a statistically significant decrease in chi-square, as determined on a chi-square distribution table. If freeing the additional parameters provided a statistically significant improvement in the model's fit ($\Delta\chi^2 =$ 3.71 is significant at $p = .05$ for a unidirectional hypothesis), this was indicative of an important relationship over time. Improvements in the RMSEA were also considered, where a lower RMSEA indicated improvement in the model.

Hypotheses Related to Change Over Time

Four hypotheses (3 through 6[6]) suggested relationships among model variables to be tested over time. Table 6 provides the hypothesized relationships and the expected direction of effects for the paths of interest. In each test, statistically significant improvements in model fit, as demonstrated by reductions in chi-square relative to degrees of freedom lost and lower RMSEA values, were used to test the hypotheses.

Hypothesis 3. Hypothesis 3 states that women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have lower levels of depression and better health at time 2. To test this hypothesis, a baseline model was estimated. In this

---

[6] See the previous chapter under the section, "Hypothesized Theoretical Model."

Table 6

Hypothesized Structural Relationships Among Time 1 Study Variables

Path	Direction of Effect
Social Support to Depression	Negative
Social Support to Poor Health	Negative
Food Insecurity to Depression	Positive
Food Insecurity to Poor Health	Positive
Human Capital to Depression	Negative
Human Capital to Poor Health	Negative
Depression to Economic Well-Being	Negative
Poor Health to Economic Well-Being	Negative

model, the paths between the three time 1 variables (social support, human capital, and food insecurity) and these same variables at time 2 were freely estimated to control for time 1 status and ensure the variability that arose from freeing a path of interest was not accounted for by time 1 status. The paths between the three variables at time 1 and health and depression at time 1 were also freed.

From the baseline model, the paths of interest were freed one at a time, beginning in the gamma matrix with the exogenous variables, social support and food insecurity, and moving to human capital, an endogenous variable in the beta matrix. Figure 3 represents the paths that were tested using depression as an example. In accordance with the hypothesis, it was expected that the freed paths would produce a statistically significant reduction in the model's chi-square value and improvement in the RMSEA. The paths were also expected to be significant and negative between social support and depression, social support and health, human capital and depression, and human capital and health. The paths were expected to be significant and positive between food insecurity and depression and food insecurity and health.

Hypothesis 4. Hypothesis 4 states that women with higher levels of human capital and social support and lower levels of food insecurity at time 1 will have higher economic well-being at time 1 and time 2. Although these relationships were not in the hypothesized or final models, they were easily tested. First, a baseline model was created by estimating the final model as specified across time. Then, the paths of interest were freed individually to evaluate any chi-square changes and/or improvements in RMSEA. Figure 4 shows the paths that were freely estimated.

In accordance with the hypothesis, it was expected that the freed paths would provide a statistically significant decrease in chi-square relative to degrees of freedom lost and an
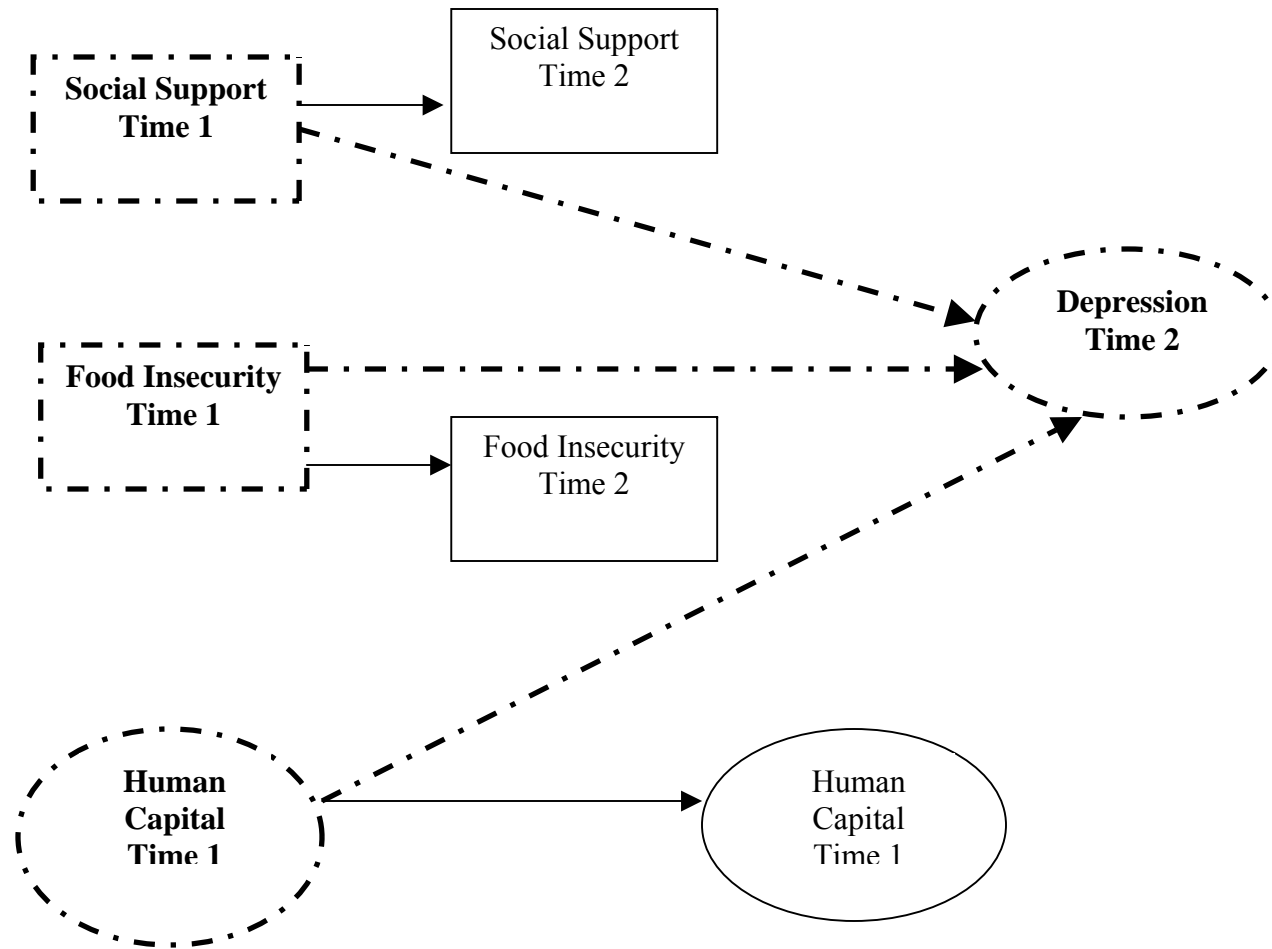
Figure 3. Structural paths estimated for hypothesis 3: Depression Example

——————▶ Freely estimated in baseline model

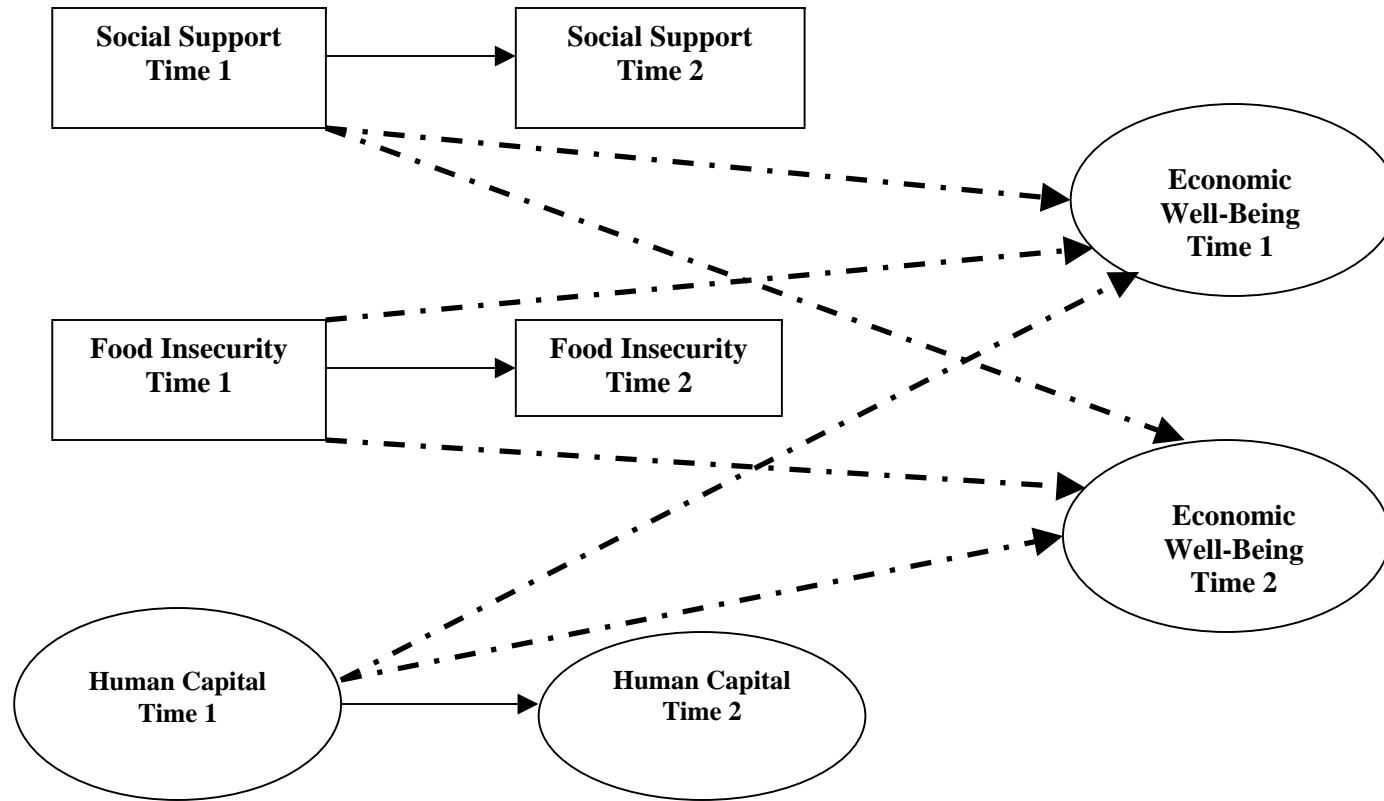— · — ▶ Freed one at a time in nested models

Figure 4. Structural latent variable model for hypothesis 4

———▶ Freely estimated paths in baseline model

– · –▶ Paths freed one at a time in nested models

improved RMSEA. Further, the paths for social support and human capital at time 1 to economic well-being at time 1 and time 2 were expected to be significant and positive. The paths from food insecurity at time 1 to economic well-being at time 1 and time 2 were expected to be significant and negative.

Hypotheses 5 and 6. The first part of hypothesis five states that depression and poor health at time 1 will have a negative effect on economic well-being at time 1. These relationships were estimated directly in the confirmatory factor analysis of the final identified model. Statistically significant beta coefficients indicated the relationships were significant.

The second part of hypotheses 5 and hypothesis 6 were geared toward answering the following question: Are depression and poor health better predictors of economic well-being than economic well-being is a predictor of depression and poor health? To answer this question, a baseline model for comparison was estimated. This model included the final model where all the paths linking depression, health, and economic well-being across time (waves) were constrained, but the within waves paths and the paths of time 1 variables to the same variables at time 2 were freely estimated, thereby controlling for these relationships across time (Figure 5). The time 1 to time 2 paths of interest were then freed one at a time. As with the above analyses, statistically significant reductions in chi-square relative to degrees of freedom were the criteria for significance. If depression and health are better predictors of economic well-being, then it was expected that these freed paths would provide an improvement in chi-square and the paths (beta coefficients) would be significant and negative.

To determine if economic well-being is a better predictor of depression and poor health, the paths from economic well-being at time 1 to depression and poor health at time 2 were freed
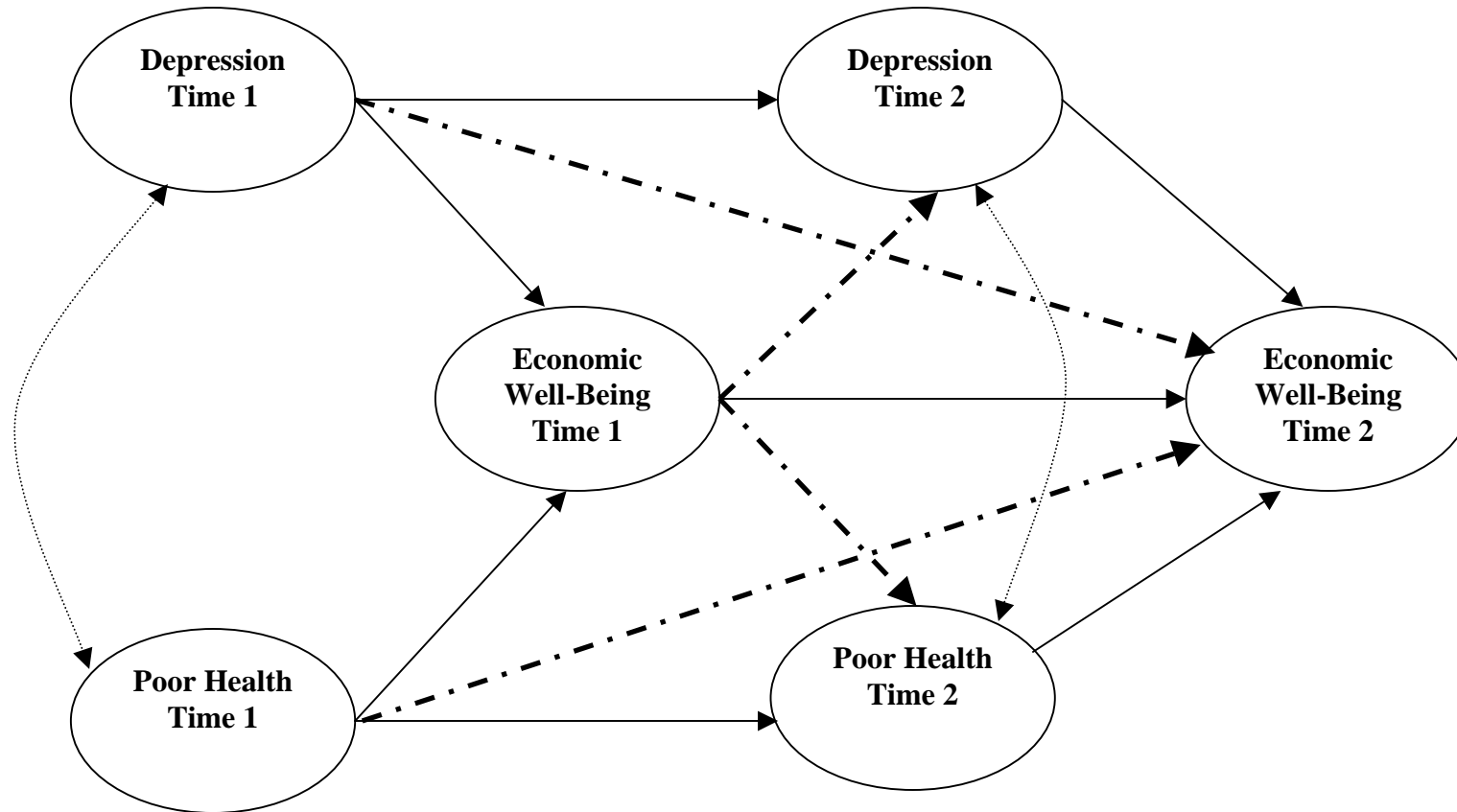
Figure 5. Structural latent variable model for hypotheses 5 and 6

→   Freely estimated in the baseline model

–·►   Freed paths in nested models

    Covariance
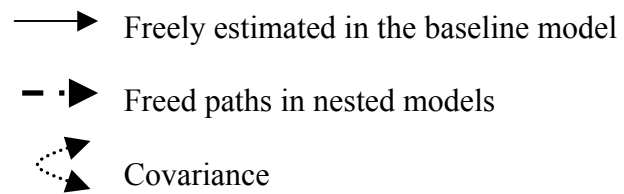
one at a time, beginning from the baseline model. Again, statistically significant reductions in

the chi-square value in relation to degrees of freedom were the criteria. If indeed economic well-

being is the better predictor, then these freed paths would provide an improvement in chi-square,

and the paths would be significant and negative.

Attrition

As in most longitudinal studies, attrition of participants is an issue in this study, and there

are missing data in wave 2. To use all available data and account for individuals who dropped

out of the study in wave 2, full information maximum likelihood (FIML) was utilized (Enders &

Bandolos, 2001). For individuals with missing data, the maximum likelihood function in FIML

uses available data and parameter estimates for variables with available values to obtain

likelihood values for missing data points. The data points are not imputed, simply implied

(Enders & Bandolos, 2001). The assumptions with FIML are that missing data are missing at

random (MAR) (i.e., the probability that an observation is missing may depend on another

observed variable, but it does not depend on "y"), and a single model applies to missing data. For

purposes of the present analyses, all missing data were assigned the value –999. To activate

FIML, "MI = -999" was specified on the "DA" (data) line of the LISREL syntax.

Measurement Error

According to Bollen (1989), the path coefficients for all observed variables in a model

decrease in relation to the path coefficients in the latent variable model due to the inherent

measurement error of the constructs, or imperfect reliability. When specifying a model, the

researcher can correct for measurement error by specifying some of the variance to a fixed value.

To calculate this value, the total variance (σ^2) for an observed variable is multiplied by the

amount of variance due to measurement error ($1-\rho_{xy}$), or one minus the reliability for the measure

of the observed variable (Bollen, 1989). Correcting for measurement error was incorporated into the across time analyses of the model by fixing the error variance of the observed variables for which there were calculated reliabilities in the theta epsilon (θ_ε) and theta delta (θ_δ) matrices to a value equal to (σ^2)(1-ρ_{xy}). Fixing the error variance provided better model fit with an increase in degrees of freedom for each fixed error term. For the present analyses, this was especially important, given the large number of parameters to be estimated in relation to the sample size.

CHAPTER 4

RESULTS

In this study of rural, low-income mothers, there were two major components. The first component was testing the hypothesized model of economic well-being, which was constructed from a review of the relevant literature. Once a model of economic well-being was identified, the second component involved testing the relationships among the study variables over time. Following is a summary of the degree to which the data support the hypotheses.

Confirmatory Factor Analysis: Hypothesis 1

The first objective of the present study was to test the hypothesis that the theoretical model (Figure 1 in Chapter 2) is a plausible representation of a path to economic well-being for rural, low-income mothers. Statistically, the goal was to identify a model that would account for the observed variance-covariance matrix of the sample data. This involved two steps: (a) determining the degree to which the observed indicators represented the underlying factors in the hypothesized model; and (b) determining the degree to which the model accurately reflected the structural relationships between those factors.

Analyses were based on the associations among the study variables, represented as a covariance matrix[7]. Table 7 shows the correlation matrix with means and standard deviations for the observed variables. Statistically significant correlations (at $p = .05$ for a 2-tailed hypothesis) are noted.

---

[7] See Appendix A for the covariance matrix of the observed variables.

Table 7

Correlations Among Indicators in Hypothesized Model

	Education	Community Resources	Life Skills	Depressed Affect	Negative Affect	Interpersonal Relations	Somatic Symptoms	Missed Work	Visits to Doctor	Chronic Problems	Economic Situation	Income Enough	Monthly Wages	Food Insecurity	Social Support	Health Insurance
Education	1.000															
Community Resources	.196*	1.000														
Life Skills	.464*	.439*	1.000													
Depressed Affect	-.040	-.059	-143*	1.000												
Negative Affect	-.035	-.029	-.153*	.488*	1.000											
Interpersonal Relations	-.043	-.140	-.179	.688*	.330	1.000										
Somatic Symptoms	.005	.031	-083	.701*	372*	.565	1.000									
Missed Work	-.017	.089	.030	.028	.097	-017	.018	1.000								
Visits to Doctor	-.053	.038	-.048	-.025	.017	.029	.086	.158	1.000							
Chronic Problems	.105*	.071	.073	.240*	.100*	.229*	.371*	.080	.225*	1.000						
Economic Situation	-.109*	-.061	-.043	-.159*	-.213*	-.094	-.182*	-.065	-.060	-.163*	1.000					
Income Enough	-.002	-.017	.057	-.180*	-.189*	-.119*	-.275*	-.069	-.071	-.250*	.374	1.000				

Table 7 Continued

	Education	Community Resources	Life Skills	Depressed Affect	Negative Affect	Interpersonal Relations	Somatic Symptoms	Missed Work	Visits to Doctor	Chronic Problems	Economic Situation	Income Enough	Monthly Wages	Food Insecurity	Social Support	Health Insurance
Monthly Wages	.140	.016	.116*	-.072	-.055	-.007	-.052	.056	.036	.003	.030	.022	1.000			
Food Insecurity	-.064	-.105*	-.164*	.266*	.166*	.291*	.306*	.086	.162*	.310*	-.209*	-.342*	.074*	1.000		
Social Support	.039	.167*	.211*	-.259*	-.210*	-.264*	-.278*	.020	.060	-.186*	.075	.112*	.016	-.184*	1.000	
Health Insurance	.181*	.230*	.239*	.078	.023	-.032	.109*	.099*	.132*	.193*	-.178*	-.100*	.143	.100*	-.033	1.000
M	3.303	16.504	18.910	3.271	3.396	3.205	7.649	3.971	8.993	3.839	3.365	2.463	1.887	3.514	26.922	.665
SD	1.408	4.367	3.580	3.200	3.025	3.002	4.537	10.457	14.018	3.390	1.386	.888	.248	3.686	7.403	.465

* Significant at p < .05

The initial estimation of the hypothesized model yielded an overall $\chi^2_{(95)}$ of 265.43 with a RMSEA = .066 (p = .0030), and an AGFI of .89. According to the criteria established by Byrne (1998), this represented reasonable errors in approximation, but improvement in fit was both possible and desirable.

To determine where modifications in the model might be made to improve overall fit, the standardized LISREL output was reviewed. Specifically, the t-statistics and standard errors for the coefficients in the lambda-y, gamma, and beta matrices, the squared multiple correlations for the observed indicators, and the standardized residuals were considered. From this review, several sources of misfit in the original model were identified. These included: (a) life skills as an indicator of human capital, which had standardized residuals > 4.0; (b) missed days of work and visits to the doctor as indicators of poor health, with R^2 = .03 and R^2 = .09 respectively; (c) the mother's wages as an indicator of economic well-being, which had an insignificant path coefficient (λ_y = 0; SE = .12; t = .04); (d) the path from human capital to depression, which had an insignificant coefficient (β = -.15; t = -1.47); and (e) the path from depression to economic well-being, with an insignificant coefficient (β = .05; t = 1.45).

The modification indices were also reviewed to determine additional paths to be freed in the model, which were consistent with the literature. First, the indices suggested improvement in model fit might come from freeing in the beta matrix the path between health insurance and human capital. A review of the Community Resources Assessment revealed that 9 of the 20 questions are healthcare-related questions, such as: "Do you know where to find a mental health counselor?"; and "Do you know where to access family planning services?". Given that human capital was defined as acquired skills and knowledge, and given the health focus of the community resources scale, knowledge acquired about health services realistically could have

come from having a health insurance plan. Thus, this path was consistent with the measures in the study, and with how human capital was defined.

Second, the modification indices suggested the model fit could be improved both by freeing the covariance between depression and poor health (psi), and freeing the structural relationships (beta) from depression to poor health and from poor health to depression. The link between mental and physical health is well documented in the literature, so it was theoretically consistent to include at least one of these relationships in the final model.

CFA Model Modifications

Based upon review of the output, the following modifications were made to the initial model, one at a time and in the order listed, each producing improvements in fit as indicated by statistically significant reductions in the chi-square value in relation to degrees of freedom, reduction of the RMSEA, and/or improvements in the squared multiple correlations of the indicators: (1) life skills as an indicator of human capital was removed; (2) depression was trimmed from a 4-indicator to a 3-indicator latent variable, as suggested in other studies (Carpenter, Andrykowski, Wilson, Hally, Rayons, et al., 1998; Segrist, 1999; Sheehan, Fifield, Reisine, & Tennen, 1995) and as confirmed through principal axis factoring with this sample; (3) the path from health insurance to human capital was freed and the path from health insurance to poor health deleted (gamma matrix); (4) the covariance between depression and health was freed in the psi matrix; (5) visits to the doctor was removed as an indicator of poor health in the lambda-y matrix; (6) days of missed work was replaced by the mother having experienced injury or illness in the past year as an indicator of poor health; (7) the error covariance between chronic problems and injuries in the last year was freed in the theta epsilon matrix; and (8) the "income is

enough" indicator was removed from economic well-being in the lambda-y matrix. The final

model resulted in a good fit, as described by Byrne (1998) ($\chi^2_{(43)}$ = 85.32; RMSEA = .049

[p = .72]; AGFI = .94). Table 8 presents the goodness-of-fit statistics for the initial model, and

each subsequent model.

In the first modification, the deletion of life skills, the chi-square difference was

statistically significant. However, it resulted in two well-fitting parameters for the human capital

latent variable, and eliminated a series of high residuals in the model, leading to a better overall

chi-square for the model. The second modification also resulted in a statistically significant

reduction in chi-square. However, given the support in the literature and with these data for a

3-factor depression model with the CES-D, the concern for how the model would fit over time,

and the reduction in residuals that occurred with this modification, this was considered an

improvement in the model, especially with the reduction in the RMSEA.

Modification 3 was a two-step process. First, the path from health insurance to human

capital was freed, providing a statistically significant drop in the chi-square value

($\Delta \chi^2_{(1)}$ = 33.22). A review of the statistics at this point revealed the path between health

insurance to health was no longer significant. This path was then removed from the model

showing no statistically significant difference (at p = .05 for a unidirectional hypothesis),

indicating the path was not improving model fit and could be omitted in subsequent models.

The deletion of the number of visits to the doctor as an indicator of poor health worked

in the same was as deleting life skills and trimming depression into a 3-factor latent variable.

Although the chi-square value increased, deletion of this variable eliminated a parameter with an

extremely low squared multiple correlation and improved the overall model's RMSEA. The

increase in chi-square at modification 6 demonstrates the result of a continued source misfit in

Table 8

Fit Indices for the Confirmatory Factor Analysis Model

Model	χ^2	df	$\Delta \chi^2/df$	$p(\Delta \chi^2)$	RMSEA
0. Initially Hypothesized Model	265.43	95	----	----	.066
1. Remove Life Skills	226.71	81	38.72/14	< .005	.066
2. Depression to 3-Factor	170.86	68	55.85/13	< .001	.061
3. Health Insurance to Human Capital	137.64	67	33.22/1	< .001	.051
4. Remove Health Insurance to Health	140.18	68	+2.54/1	NS	.051
5. Covary Depression and Poor Health	127.24	67	12.94/1	< .001	.047
6. Remove Visits to the Doctor	96.88	55	30.56/12	< .005	.043
7. Replace Missed Days of Work with Injury/Illness	110.02	55	+13.54/0	< .001	.049
8. Free Error Covariance Between Health Indicators	98.82	54	11.20/1	< .001	.045
9. Remove Income is Enough	85.32	43	13.60/11	NS	.049

NS = Not Significant

the model: The weak indicators for the poor health latent variable. Two of the three indicators (missed days of work and number of visits to the doctor) had repeatedly poor R-square values ($R^2 < .10$) with every iteration of the model in which they were included. Even after deleting visits to the doctor, there was no significant improvement in the missed days of work regression coefficient or R-square value.

Given a primary goal of the CFA was to produce a model with relevant indicators, it seemed important to find a good indicator within the scope of acceptable alternatives given the literature. Since rural residents are more likely to experience injury from accidents (Ricketts, Johnson-Webb, & Randolph, 1999), this seemed a reasonable alternative to at least one of the variables. Further, since access to health care and sick time are limited for rural residents, in retrospect, these variables were probably not the best choices for indicators for poor health in this sample. When injuries replaced missed days of work, the chi-square value increased ($\Delta\chi^2_{(1)} = 13.54$, $p < .01$), but it did not exceed the previous high chi-square value. This change also produced an indicator for poor health with a statistically significant t-value and an R-square value more than two times the size of the original indicators ($R^2 = .21$). Further, covarying the errors for the poor health indicators (in the theta-epsilon matrix), as suggested in the modification indices, produced a statistically significant decrease in the chi-square value, thereby improving model fit even more.

The second source of continued misfit in the model concerned the economic well-being latent variable and its indicators. The mother's monthly wages continued to have a poor R-square value that improved very little with subsequent iterations of the model ($R^2 = .04$ in the final model), while the perception variables continued to have very high coefficients relative to the mother's wages. From a theoretical standpoint and because one of the goals of this study was

to influence policy, retaining an actual income value seemed important in a variable indicating economic well-being. Attempts were made to replace the mother's wages with other income variables, including the total household monthly income (transformed into base-10 logarithmic values as with mother's wages). However, these attempts continued to render an error message ("Matrix to be analyzed is not positive definite"). Even with start values and other modifications to the input syntax, the model could not be estimated, which suggested that including total household monthly income in this particular model did not fit these data.

An alternative approach was considered to remedy the economic well-being variable, which was to try using a single perception variable, thereby maximizing the value of the specific wage indicator. When the "income is enough" parameter was deleted and the "economic situation" parameter remained in the model, there was no statistically significant difference in the chi-square value ($\chi^2_{(43)} = 85.32$; $\Delta \chi^2_{(11)} = 13.60$). However, when the "economic situation has changed" variable was deleted and the "income is enough" variable was left, there was a statistically significant change ($\chi^2_{(43)} = 79.31$; $\Delta \chi^2_{(11)} = 19.61$, $p = .05$). This indicated the simplified model with the single perception variable of "economic situation has changed" was equally well-fitting.

The goodness-of-fit indices for the final model[8] indicated that the model was good fitting ($\chi^2_{(54)} = 85.32$; RMSEA = .049; AGFI = .94). An examination of the statistics in the lambda-y matrix (the coefficients for the indicators) showed that all t-statistics were statistically significant and the standard errors were low relative to the coefficient estimates. However, in the beta matrix, which provides the coefficients for the structural relationships, two path coefficients were not statistically significant: (a) the path from human capital to depression; and (b) the path from depression to economic well-being. These paths were left in the model, however, because

---

[8] See Appendix B for the covariance matrix for the final model.

overall model fit was good, and they were important to analyses over time and testing subsequent

hypotheses. Figure 6 shows the final model with standardized coefficients and measurement

errors. Table 9 shows the factor loadings and uniqueness of the indicators.

<div align="center">Hypothesis 2</div>

The second hypothesis to be tested was whether women with higher levels of social

support and human capital and lower levels of food insecurity at time 1 would have lower levels

of depressive symptoms and better health at time 1. The final identified model provided

information regarding the relationships among time 1 variables, and Table 10 delineates the

specific path relationships and their significance. The estimations in the final model indicated

that higher levels of social support at time 1 were negatively associated with depression at time 1

and poor health at time 1, and these paths were statistically significant ($\gamma = -.25$, $t = -5.69$ and

$\gamma = -.12$, $t = -3.15$, respectively). Thus, the first part of the hypothesis was supported.

The estimations in the final model regarding the relationships between human capital at

time 1 and depression and poor health at time 1 showed that the first hypothesis is only partially

supported. The results indicated the path from human capital at time 1 to health at time 1 was

statistically significant ($\beta = .62$, $t = 3.47$). What is interesting about this path is that it is positive,

not negative like hypothesized. Possible explanations for this result are discussed in Chapter 5.

The path from human capital at time 1 to depression at time 1 was not statistically

significant ($\beta = .10$, $t = 0.64$). In fact, removing this path in the beta matrix did not yield

statistically significant changes in the model ($\Delta \chi^2/+1\mathrm{df} = +0.44$), so the model could have been

trimmed further with this path omitted, thereby producing an equally well-fitting model with

greater degrees of freedom. However, it was retained in order to test subsequent hypotheses. The

estimations in the final model did support the hypothesis that food insecurity at time 1 affects
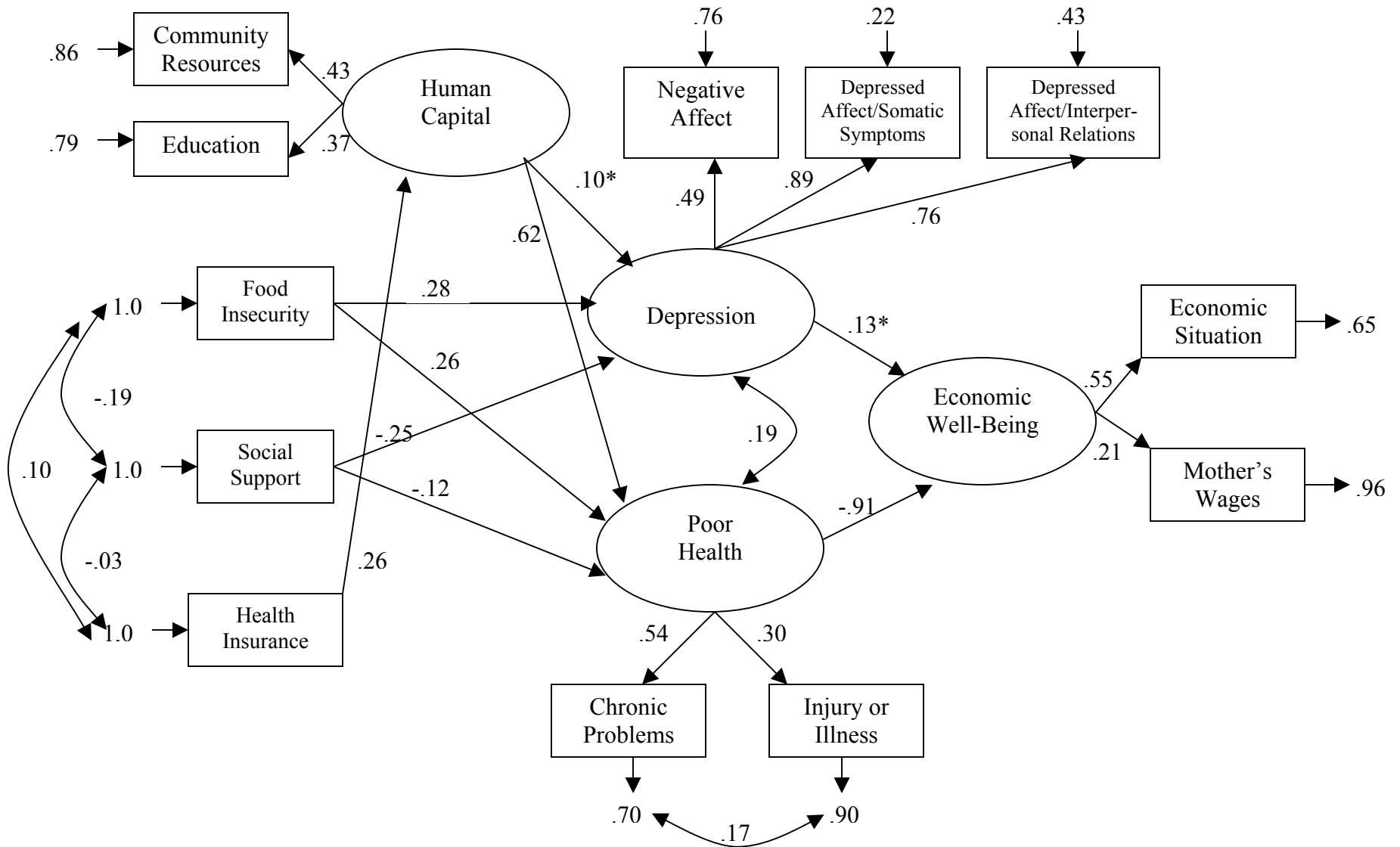
Figure 6. Final confirmatory factor analysis model $\chi^2_{(54)} = 85.32$; RMSEA = .049 (*p* = .53); AGFI = .94

* = Not significant at *p* = .05

Table 9

Factor Loadings and Uniqueness for Indicators in Final Model

Measure and Variable	Unstandardized Factor Loading	*SE*	Uniqueness (R^2)
Human Capital			
Knowledge of community resources	1.00		.19
Education	.85	.23	.14
Depression			
Depressed affect/Somatic symptoms	1.00		.24
Negative affect	.56	.06	.78
Depressed affect/Interpersonal relations	.85	.07	.57
Poor health			
Chronic problems	1.00		.30
Injury or illness in last year	.58	.11	.10
Economic well-being			
Economic situation has changed	1.00		.35
Mother's wages	.35	.15	.04

Table 10

Path Relationships and Significance for Hypothesis 2

Path (Matrix)	Coefficient Estimate	t	p
Social Support T1 to Depression T1 (γ)	-.25	-5.69	< .001
Human Capital T1 to Depression T1 (β)	.10	0.64	NS
Food Insecurity T1 to Depression T1 (γ)	.28	6.19	< .001
Social Support T1 to Health T1 (γ)	-.12	-3.15	< .001
Human Capital T1 to Health T1 (β)	.62	3.47	< .001
Food Insecurity T1 to Health T1 (γ)	.26	6.29	< .001

NS = not significant at *p* = .05

depression and poor health at time 1, and these results were statistically significant. Food insecurity was positively associated with both depression ($\gamma = .28$, $t = 6.19$) and poor health ($\gamma = .26$, $t = 6.29$), such that higher rates of food insecurity at time 1 lead to more depressive symptoms and poorer health at time 1.

Hypothesis 3

The third hypothesis was the first to address the issue of effects over time. Specifically, it states that women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have lower levels of depression and better health at time 2. To test these hypotheses, a baseline model was estimated where the time 1 paths between the variables were freely estimated, but the time 2 paths were constrained. (Refer to Figure 3 in the previous chapter.) This estimation yielded a model with $\chi^2_{(183)} = 251.55$.

The paths from the time 1 to time 2 indicators then were freed one at a time, beginning with the exogenous variables. First, the path between social support at time 1 and depression at time 2 was freed in the gamma matrix. This yielded a model with $\chi^2_{(182)} = 251.13$. The change in the model from freeing this path was not statistically significant ($\Delta \chi^2_{(1)} = 0.42$). Next, the path from food insecurity at time 1 to depression at time 2 was freed in the gamma matrix. This estimation yielded a model with $\chi^2_{(181)} = 251.15$, for a chi-square change of 0.02 with one degree of freedom, also not statistically significant. Finally, the path between human capital at time 1 and depression at time 2 was freed in the beta matrix. This yielded a model with $\chi^2_{(180)} = 251.11$, which was a statistically insignificant reduction in chi-square of 0.23 per one degree of freedom. These results did not support the hypothesis that food insecurity, social support, or human capital at time 1 affect depression at time 2.

To determine potential significance of the paths from social support, food insecurity, and human capital at time 1 to poor health at time 2, the paths were freed one at a time, beginning from the baseline model as above. First, the path from social support at time 1 to poor health at time 2 was freed in the gamma matrix. This yielded a model with $\chi^2_{(182)} = 251.47$, with a chi-square difference of 0.08 per one degree of freedom. This was not statistically significant at $p = .05$. Next, the path from food insecurity at time 1 to poor health at time 2 was freely estimated in the gamma matrix. This yielded a $\chi^2_{(181)} = 247.35$, which was a statistically significant decrease in chi-square ($\Delta\chi^2_{(1)} = 4.12$, $p < .05$). The model also yielded a statistically significant path coefficient of .12 ($t = 2.00$, $p < .05$). Finally, human capital at time 1 to health at time 2 was freely estimated in the beta matrix, yielding a model with $\chi^2_{(180)} = 251.30$. This resulted in an increase in both the chi-square and the RMSEA, indicating a worse fit overall. These results did not support the hypothesis that social support and human capital affect poor health over time. However, they did support the hypothesis that food insecurity positively affects poor health over time. Table 11 shows the change in chi-square with each path tested.

Hypothesis 4

Hypothesis 4 states that women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have greater economic well-being at time 1 and time 2. To test these relationships, a baseline model was estimated as a point of comparison by estimating the final model across time. The paths of interest were then freed one at a time. Results from these analyses are presented in Table 12.

The baseline model yielded $\chi^2_{(175)} = 241.53$. To test the time 1 relationships, the paths of interest were freed one at a time, beginning with the exogenous variables. Freeing the path

Table 11

Fit Indices for the Third Hypothesized Model

Path Freed (matrix)	χ^2	df	$\Delta\chi^2/df$	$p(\Delta\chi^2)$	RMSEA
Baseline	251.55	183	----	----	.030
Social Support T1 to Depression T2 (γ)	251.13	182	.42/1	NS	.030
Food Insecurity T1 to Depression T2 (γ)	251.15	181	+ .03/1	NS	.030
Human Capital T1 to Depression T2 (β)	251.11	180	.04/1	NS	.030
Baseline	251.55	183	----	----	.030
Social Support T1 to Depression T2 (γ)	251.47	182	.08/1	NS	.030
Food Insecurity T1 to Poor Health T2 (γ)	247.35	181	4.12/1	< .05	.030
Human Capital T1 to Poor Health T2 (β)	251.30	180	+ 3.95/1	< .05	.031

NS = not significant at *p* = .05

Table 12

Fit Indices for the Fourth Hypothesized Model

Path Freed (matrix)	χ^2	*df*	$\Delta \chi^2/df$	$p(\Delta \chi^2)$	RMSEA
Baseline Model	241.53	175	----	----	.030
Social Support T1 to Economic Well-Being T1 (γ)	240.42	174	1.11/1	NS	.030
Food Insecurity T1 to Economic Well-Being T1 (γ)	242.68	173	+ 2.26/1	NS	.031
Human Capital T1 to Economic Well-Being T1 (β)	237.88	172	4.80/1	< . 05	.030
Baseline Model	241.53	175	----	----	.030
Social Support T1 Economic Well-Being T2 (γ)	237.68	174	3.85/1	< .05	.030
Food Insecurity T1 to Economic Well-Being T2 (γ)	247.60	173	+ 9.92/1	< .001	.032
Human Capital T1 to Economic Well-Being T2 (β)	242.40	172	5.20/1	< .025	.031

NS = not significant at *p* = .05

between social support at time 1 and economic well-being at time 1 yielded a model with

$\chi^2_{(174)}$ = 240.42, which did not produce a statistically significant change in chi-square

($\Delta\chi^2_{(1)}$ = 1.11). Next, the path between food insecurity and economic well being at time 1 was

freed in the gamma matrix. This produced a model with $\chi^2_{(172)}$ = 240.42, which was not a

statistically significant change in chi-square ($\Delta\chi^2_{(1)}$ = 2.26). Finally, the path between human

capital at time 1 and economic well-being at time 1 was freed in the gamma matrix, yielding a

model with $\chi^2_{(173)}$ = 237.88. This produced a statistically significant reduction in chi-square

($\Delta\chi^2_{(1)}$ = 4.80), and it reduced the RMSEA from the previous model. However, the beta

coefficient was not statistically significant at p = .05 (β = .10; t = 1.01). The lack of significance

for the coefficient may have resulted from low power, as the number of parameters being

estimated was high relative to the sample size. Based on these analyses, only the hypothesis that

human capital at time 1 positively affects economic well-being at time 1 was not rejected. This

result was consistent with the literature on human capital, indicating that individuals with more

human capital are more likely to have greater economic well-being.

The second part of the hypothesis was that time 1 human capital, social support, and food

insecurity would affect *time 2* economic well-being. These relationships were tested in a similar

fashion as above, beginning with the baseline model, and using the nested models approach of

freeing the paths of interest one at a time. The path between social support at time 1 and

economic well-being at time 2 produced a statistically significant decrease in chi-square

($\Delta\chi^2_{(1)}$ = 3.85; p < .05), however as above, the coefficient was 0 (indicating no relationship) and

not statistically significant. When the path from food insecurity at time 1 to economic well-

being at time 2 was freed, both the chi-square and RMSEA value increased, indicating poorer

model fit than baseline. Human capital was freed last. This freed path did produce a statistically

significant decrease in chi-square and RMSEA from the previous model ($\Delta\chi^2_{(1)}$ = 5.20; $p < .025$; RMSEA = .031), although both values in this model were larger than for the baseline model. That the chi-square did go down, however, indicated that this path may be significant over time, and a more powerful test is needed. Results from these data suggested only the hypothesis that time 1 levels of social support influence time 2 economic well-being should be supported.

<center>Hypotheses 5 and 6</center>

The first part of hypothesis five states that depression and poor health at time 1 will be negatively associated with economic well-being at time 1. These relationships were estimated in the final identified model. Although the association between depression and economic well-being was negative, it was not statistically significant ($\beta = -.12$; $t = -1.10$). The association between poor health and economic well-being was both negative and statistically significant ($\beta = -.91$; t = -3.93; $p < .05$). These results indicate that only the hypothesis that poor health affects economic well-being cannot be rejected.

Hypotheses 5 and 6 state that mothers with higher levels of depression and poorer health at time 1 will have lower economic well-being at time 2. Similarly, women with lower economic well-being at time 1 will have higher levels of depression and poorer health at time 2. These hypotheses were geared toward answering the question: Are depression and poor health better predictors of economic well-being in low-income rural women than economic well-being is a predictor of depression and poor health?

To answer this question, a nested models approach was again used. Table 13 shows the results. The baseline model yielded a fit of $\chi^2_{(185)}$ = 268.35. The path between depression at time 1 and economic well-being at time 2 was freed first in the beta matrix, yielding a model with

Table 13

Fit Indices for Models in Hypotheses 5 and 6

Path Freed (All β Matrix)	χ^2	df	$\Delta \chi^2/df$	$p(\Delta \chi^2)$	RMSEA
Baseline Model	268.35	185	----	----	.035
Depression T1 to Economic Well-Being T2	267.29	184	1.06/1	NS	.034
Health T1 to Economic Well-Being T2	270.72	183	+3.43/1	NS	.036
Baseline Model	268.35	185	----	----	.035
Economic Well-Being T1 Depression T2	270.77	184	+2.42/1	NS	.033
Economic Well-Being T1 to Health T2	266.40	183	4.28/1	< .05	.033

NS = not significant at *p* = .05

$\chi^2_{(184)} = 267.29$. The chi-square change for this estimation was $\Delta\chi^2_{(1)} = 1.06$, which was not statistically significant. Next, the path between poor health at time 1 and economic well-being at time 2 was freed in the beta matrix. This yielded a model with $\chi^2_{(183)} = 270.72$, which was a statistically insignificant (at $p = .05$) increase in chi-square ($\Delta\chi^2_{(1)} = 3.43$). These estimations suggest that depression and health at time 1 do not influence time 2 economic well-being in this sample, and this hypothesis should be rejected.

To test the idea that economic well-being is a better predictor of depression and poor health, the freed paths above were constrained again to produce the baseline model ($\chi^2_{(185)} = 268.35$). Then the path from time 1 economic well-being to time 2 depression was freed in the beta matrix. This yielded a model with $\chi^2_{(184)} = 270.77$, which is not statistically significant ($\Delta\chi^2_{(1)} = 2.42$).

The path from time 1 economic well-being to time 2 poor health was freed next in the beta matrix. This produced a model with $\chi^2_{(183)} = 266.40$, which was a statistically significant difference in chi-square from the previous model ($\Delta\chi^2_{(1)} = 4.28$; $p < .05$). Although this chi-square value does not represent a statistically significant decrease from baseline ($\Delta\chi^2_{(2)} = 1.86$), and the beta coefficient was small ($\beta = .01$) with an insignificant t-value, these results suggest that time 1 economic well-being may affect time 2 health status, but the scope of the test is perhaps limited by the sample size. A larger sample size may be needed to produce statistically significant path coefficients. Thus, the hypothesis that economic well-being at time 1 affects later health is supported, but results must be interpreted cautiously.

Exploratory Analyses

The tentative results indicating that economic well-being may affect future health status prompted a follow-up research question: Are individuals of different levels of economic well-

being at different risk for later health problems? To answer this question, exploratory analyses

were conducted to determine if the income level of the mother might influence these results.

Given that most means-tested programs assess income eligibility against the federal

poverty line (FPL), the sample was split into thirds (to maintain an adequate sample size)

according to where the family's income fell in relation to the FPL. The high third ("high group";

$m = 147.24$[9]; $SD = 35.90$) and low third ("low group"; $m = 29.57$[10]; $SD = 18.58$) groups were

selected for comparison. Note each group mean is two standard deviations from the other

group's mean, indicating two distinct groups in terms of this variable.

Before comparisons could be conducted, measurement invariance/equivalence had to be

established across the high and low groups with regard to economic well-being and poor health

(Vandenberg & Lance, 2000). Measurement invariance provides a degree of certainty that the

same attributes are being measured in both groups. It was built in to the model for depression, as

residuals were fixed for the indicators according to the calculation $(\sigma^2)(1-\rho_{xy})$[11].

A two-group analysis was conducted wherein the residuals in the theta epsilon matrix

were constrained to be equal across identical items for economic well-being and poor health for

the two groups. The residuals were selected for comparison, because the residuals indicate the

variance remaining once the model is identified. If the covariance matrices for the two groups are

the same, as assumed with measurement invariance (Vandenberg & Lance, 2000), then

constraining the paths of interest to be equal and freeing the error variances in group 2 will not

produce a statistically significant change in the chi-square. However, if the two groups are not

the same, (i.e., there is not measurement invariance), then the residuals in the second group will

---

[9] Note this means the mothers in this group live in families where the average total annual household income is
147.24% of the FPL, or \$26,261 annually, for a family of four.
[10] These mothers are living in families where the average annual total household income is 29.57% of the FPL, or
\$5441 annually, for a family of four.
[11] See Measurement Error section in Chapter 3.

be higher to account for the remaining variance that would have been explained by the path between the latent and observed variables, had these paths been freely estimated. Figure 7 depicts this model for economic well being with dashed lines representing equality constraints. The constrained errors in the second group were then freed one at a time for each parameter across waves. A statistically significant decline in chi-square with the freed residual would have indicated that the same attributes were not being measured in both groups. Table 14 shows the results, which indicate no statistically significant decreases in the chi-square value with any additionally freed residual, thereby ensuring with 95% certainty there was measurement invariance across groups on these variables.

With measurement invariance established, the two groups could be compared across time, as depicted in Figure 4 (refer to Chapter 3). A baseline model was estimated where all time 1 to time 2 paths were freed for the high group (group 1), but for the low group (group 2) were constrained to be equal to group 1. This yielded a baseline model with $\chi^2_{(132)} = 148.27$. Next, the path from depression at time 1 to economic well-being at time 2 was freed in the beta matrix for the low group. This produced a chi-square difference that was not statistically significant ($\Delta\chi^2_{(1)} = 0.08$). The path from poor health at time 1 to economic well-being at time 2 was then freed in the beta matrix. This also produced an insignificant chi-square difference ($\Delta\chi^2_{(1)} = 0.01$). These results suggest there are no differences between the high group and the low group with regard to their depression and poor health at time 1 and subsequent economic well-being at time 2.

The effects were then tested in the forward direction to see if economic well-being at time 1 affected depression and poor health at time 2. Working from the baseline model ($\chi^2_{(132)} = 148.27$), the path from economic well-being at time 1 to depression at time 2 was freed
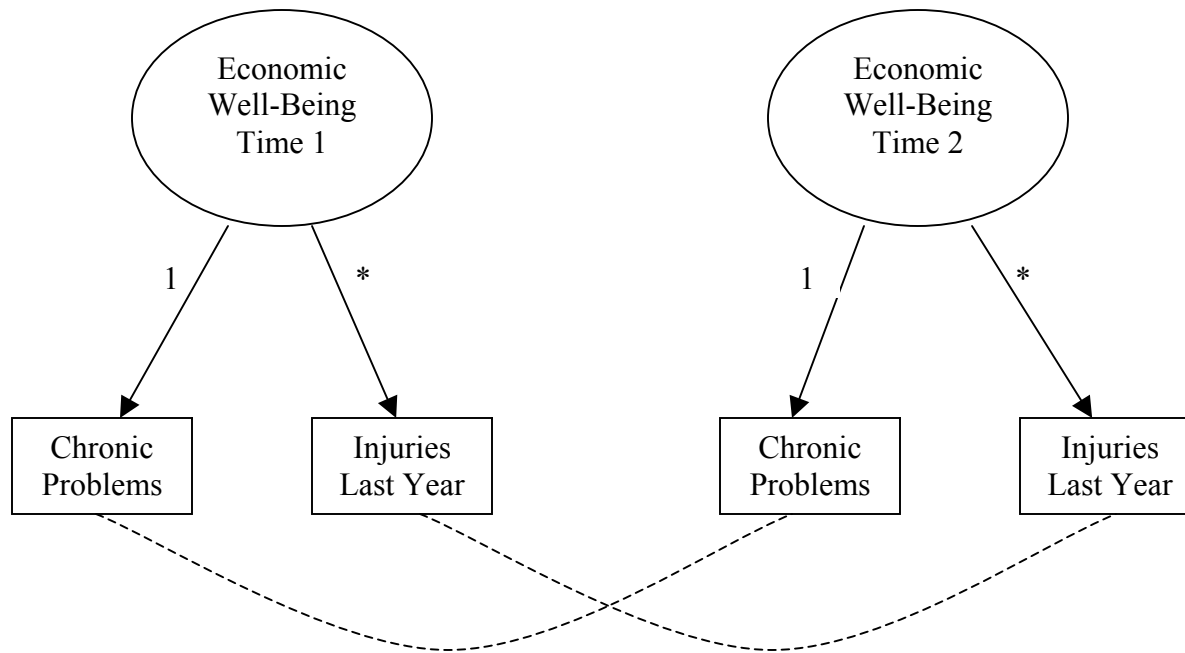
Figure 7. Test of measurement invariance: Economic well-being example

```
- - - - - -    Paths tested
*              Estimated
1              Fixed to 1
```

Table 14

Fit Indices For Tests of Measurement Invariance Across Groups

Model	χ^2	df	$\Delta \chi^2/df$	$p(\Delta \chi^2)$	RMSEA
Testing Economic Well-Being: Baseline	154.44	140	----	----	.027
Free Group 2, Parameter 1 T1	154.41	139	.03/1	NS	.028
Free Group 2, Parameter 1 T2	154.39	138	.02/1	NS	.029
Baseline Model	154.44	140	----	----	.027
Free Group 2, Parameter 2 T1	152.77	139	1.67/1	NS	.027
Free Group 2, Parameter 2 T2	152.58	138	.19/1	NS	.028
Testing Poor Health: Baseline	157.63	140	----	----	.030
Free Group 2, Parameter 1 T1	155.39	139	2.24/1	NS	.029
Free Group 2, Parameter 1 T2	155.39	138	0/1	NS	.030
Baseline Model	157.63	140	----	----	.030
Free Group 2, Parameter 2 T1	156.78	139	.85/1	NS	.031
Free Group 2, Parameter 2 T2	156.47	138	.31/1	NS	.032

NS = Not significant at *p* = .05

in the beta matrix of the low group. This yielded a drop in the chi-square value ($\Delta\chi^2_{(1)} = 3.29$), which is statistically significant at $p \cong .07$ level. For purposes of this exploratory analysis with a small sample size relative to the number of parameters being estimated, and in consideration of what Cohen (1990) calls the "arbitrary unreasonable tyranny" (p. 1307) of the .05 significance level, this was considered significant. Essentially, there is only a 7% chance the predictive relationship between economic well-being and depression occurred by chance.

Interestingly, when the path between economic well-being at time 1 and poor health at time 2 was freed last in the low group, it yielded no statistically significant change in the chi-square value ($\Delta\chi^2_{(1)} = 0.51$), as it did when the groups were analyzed together. These results, summarized in Table 15, suggest that for individuals living in lower income brackets as defined by the FPL, the hypothesis that economic well-being -- or lack thereof -- contributes to higher levels of depression over time should not be rejected.

Summary of Results

The results show that social support, food insecurity, and human capital were important contributors to health and depression in this sample of rural, low-income mothers. Social support was negatively related to depression and poor health, while food insecurity was positively related to depression and poor health. Food insecurity was particularly influential on poor health, as its effects were demonstrated across both waves. Findings related to human capital were unexpected. At time 1, the association between human capital and depression was not statistically significant as hypothesized, and the association between human capital and poor health was positive rather than negative as hypothesized.

Human capital and social support were also positively related to economic well-being. The effects of human capital were significant at time 1, while the effects of social support were

Table 15

Fit Indices for Exploratory Analyses

Path Freed (All β Matrix)	χ^2	*df*	$\Delta \chi^2/df$	$p(\Delta \chi^2)$	RMSEA
Baseline Model	148.27	132	----	----	.030
Depression T1 to Economic Well-Being T2 (Group 2)	148.19	131	.08/1	NS	.031
Health T1 to Economic Well-Being T2 (Group 2)	148.18	130	.01/1	NS	.032
Baseline Model	148.27	132	----	----	.030
Economic Well-Being T1 Depression T2 (Group 2)	144.98	131	3.29/1	.07	.028
Economic Well-Being T1 to Health T2 (Group 2)	145.59	130	.51/1	NS	.029

NS = not significant at *p* = .05

significant at time 2. While the results pointed to a direct and negative relationship between concurrent poor health status and economic well-being as predicted, findings did not support a similar relationship between depression and economic well-being. Analyses across time showed that lower economic well-being does affect depression and poor health. Results from exploratory analyses suggest that these effects may be different for families according to how poor they are as measured by the federal poverty line. An exploration of the results and their implications are discussed in the next chapter.

CHAPTER 5

DISCUSSION

Understanding poverty has been an ongoing challenge for policymakers and social scientists in the United States. Most poverty research and programs have been modeled after urban families, with little understanding of how poverty, or the consequences of poverty, are different for rural families. Two primary theses in the present investigation were that rurality is a unique context of living, and more research specifically focused on rural families is needed. This study contributes to filling the existing gap in the poverty literature. Specifically, the goal was to identify a model of economic well-being for rural, low-income mothers and to test the model over time.

Two waves of data from a multi-state project known as NC-223, "Rural Low-Income Families: Monitoring Their Well-Being in the Context of Welfare Reform," were used for this study. This project is a collaborative, longitudinal investigation by 14 universities to track changes in the well-being of low-income families and analyze the interaction of broader community and governmental initiatives and policies on family well-being. In the present study, the following hypotheses were tested with these data:

(a) Hypothesis 1: The theoretical model is a plausible representation of the path to economic well-being in rural low-income women.

(b) Hypothesis 2: Women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have lower levels of depressive symptoms and better health at time 1.

(c) Hypothesis 3: Women with higher levels of social support and human capital and lower levels of food insecurity at time 1 will have lower levels of depression and poorer health at time 2.

(d) Hypothesis 4: Women with higher levels of human capital and social support and lower levels of food insecurity at time 1 will have greater economic well-being at time 1 and time 2.

(e) Hypothesis 5: Women who report higher levels of depressive symptoms and poorer health at time 1 will have lower levels of economic well-being at time 1 and time 2.

(f) Hypothesis 6: Women who report lower levels of economic well-being at time 1 will have higher levels of depressive symptoms and poorer health at time 2

Exploration of Results

The results from this study provide insights into some key factors related to positive mental and physical health and improved economic well-being for rural, low-income mothers. These insights have implications for policies and programs related to low-income rural families. Findings also suggest directions for future research.

Social Support

The findings related to social support were as expected in the original hypotheses and consistent with the literature. The presence of social support was negatively associated with depression and poor health for the mothers in this sample. Although these relations were not significant over time in these analyses, results supported the idea that improving social supports can reduce the immediate experience of depression and poor health.

Strong social support was also positively associated with better economic well-being over time. This finding provides support for research identifying the relationship between social

support and perceived mastery (Hobfall & Lerman, 1986; Hobfall, Shoham, & Ritter, 1991). This relationship suggests that women who believe their social supports are strong have an increased sense of mastery and perceived ability to handle difficult situations. If the rural women in this sample believe their social supports are strong, perhaps they feel better equipped to deal with difficult financial situations, because they have people in their lives who can provide financial assistance if they need it. Women with stronger social supports perhaps also are likelier to use their supports for assistance with childcare or transportation, which would mitigate the effects of their financial difficulties, and improve their abilities to gain and maintain employment.

Human Capital

The results for the associations of human capital with depression and poor health were surprising. Although hypothesized to have negative associations with both depression and poor health, the relationship between human capital and depression was not statistically significant, and there was a positive association with poor health at time 1. Review of the literature on human capital and depression suggests that individuals with higher levels of education are less likely to be depressed (Adler, Boyce, Chesney, Folkman, & Syme, 1993; Commander, Sashi-Dharan, Odell, & Surtees, 1997). However, results from this study do not support this assertion, and may suggest that education serves a different role for rural women.

In the population as a whole (geographic residence not considered), education is positively associated with employment. In rural areas, one's educational level does not necessarily reflect employment status (Flynt, 1996). A contributor to low paying jobs or lack of employment is the lack of employment opportunities (Henderson, 2002). This might suggest that education should not be the first point of intervention for rural, low-income mothers, and the

factor loadings for human capital reflect this. Education accounted for less variance in human capital than the knowledge of community resources.

The positive association of human capital to poor health seems inconsistent with the literature. As with depression, individuals with more education tend to have fewer health problems (Adler, Boyce, Chesney, Folkman, & Syme, 1993). An examination of some of the measurement of poor health provides some explanation for the positive relationship that emerged.

One of the variables to measure poor health was the number of chronic problems the mother reported, which came from a "yes-no" index of 28 health problems/conditions. If a mother did not know that she had a health condition, or did not know what the symptoms of a health condition were, she would most likely answer "no" to the condition. A mother with more education likelier would have information about common health problems and/or have been to a doctor for screening or diagnosis of potential health problems (Commander, Sashi, Dharan, Odell, & Surtees, 1997). So this mother would be able to respond "yes."

Another component related to the effects of measurement on the relationship between human capital and poor health is the indicator of "knowledge of community resources." In this indicator, 9 of the 20 questions were questions regarding access to health-related services. Again, a mother who knows about available health services more likely would access them, and subsequently, be more informed about her health status.

Finally, recall health insurance was identified in the final model as a predictor/control for human capital. Research shows that having health insurance is associated with a higher likelihood of receiving preventive health screenings and other forms of primary care (IOM,

2002). This provides additional support for the increased likelihood that a mother would know she had a health condition and be able to report it when asked.

In these analyses, human capital at time 1 was associated positively and significantly with economic well-being at time 1. This finding is consistent with the literature, which indicates that more education leads to more consistent employment in higher paying jobs (Kim, 2000; Meyer & Cancian, 1998).   This association was not significant at time 2, however. This finding might reflect the structure of economic opportunities in rural areas (Henderson, 2002). Even if mothers are able to increase their educational levels or receive training, there may not be higher paying jobs available for them.

Food Insecurity

As expected, food insecurity was positively and significantly associated with depression and poor health. This finding is consistent with the literature, which says that poor nutrition affects both mental and physical health (Alpert & Fava, 1997; Brown & Pollitt, 1996). In this sample, these associations were fairly high. Twenty eight percent of the changes in depression and 26% of the changes in poor health were attributable to food insecurity in the final model. This suggests more mothers could benefit from food stamps, and improving access to and use of food stamps is critical. Proposals to this end are discussed under implications.

The association of food insecurity and poor health was significant over time as well. This is certainly intuitive. There has been much research about the importance of good nutrition for physical health and well-being (Alaimo, Olson, & Frongillo, 2002; Alpert, Mischoulon, Nierenberg, & Fava, 2000; Brown & Pollitt, 1996). The relationship between food insecurity and depression over time was not significant, however. One explanation for the lack of significance is what is known as the "trait-state" debate regarding depression (Dumenci & Windle, 1996;

Norman & Parker, 1992; Voelz, Walker, Petit, Joiner, & Wagner, 2003). If depression is a trait (i.e., it is an inherent characteristic of an individual), then changes in depression will not accompany changes in food insecurity. Conversely, if depression is a state (i.e., a changeable state of being or mood), then changes in food insecurity will affect changes in depression. Given only two waves of data were analyzed in this study, it is difficult to tell if these results support the idea of depression as a trait, especially given CES-D results have shown to be consistent for a year. A third wave of data would give more information in this regard.

The association between food insecurity and economic well-being was not significant in this sample, either at time 1 or time 2. Food insecurity has been shown to be a good indicator of socioeconomic status: Individuals and families who are food insecure tend to live in families that are near or below the federal poverty line (Nord, 2000). A review of the modification indices for some of the models indicated that freeing a path from economic well-being to food insecurity would have improved model fit. Thus, if the relationship were tested in the reverse (i.e., food insecurity as an indicator of economic well-being), the results might have been different. What this suggests is that economic well-being -- or lack thereof -- probably leads to food insecurity, and not the other way around. If this is true, this relationship also points to a recursive cycle of poverty. Lower economic well-being leads to food insecurity, which leads to poorer health, which is negatively associated with economic well-being.

Depression, Poor Health, and Economic Well-Being

A focal point of this study was the relationship between mental and physical health and economic well-being. In the identification of the theoretical model, the relationship between depression and economic well-being was not significant in the final model. If understood from the framework that depression is a trait that leads to lower economic well-being, then this result

is not consistent with the literature. However, if understood from the framework that economic well-being is a changeable condition that causes depression (a state), then this finding is consistent, because this is the direction of effect that should be -- and was -- significant.

In consideration of the relationship of poor health to economic well-being, it is important to note the statistically significant covariance between depression and poor health. Although the path from depression to economic well-being was not significant, depression served as an important variable in the model as it related to poor health. Thus, for all results where a path to or from poor health was significant, depression should be considered an influential component of the relationship. Likewise, where a path to or from depression was significant, poor health should be considered an influential component of the relationship.

As expected, the relationship between poor health and economic well-being was significant and negative. Consistent with the literature (Ricketts, Johnson-Webb, & Randolph, 1999), individuals with more chronic health problems and injuries or illnesses in the last year had lower economic well-being. These results support arguments for improving the health status of low-income, rural residents, so they can better participate in the labor market, and strategies for doing so are discussed in the section on implications.

The analyses linking depression, poor health, and economic well-being over time were an attempt to determine whether mental and physical health are better determinants of economic well-being than economic well-being is a predictor of physical and mental health. While the results must be interpreted cautiously, as there is lack of statistical power due to the sample size and the path coefficients were not statistically significant, there is some indication that economic well-being -- or lack thereof -- is a better predictor of mental and physical health than the reverse.

When the associations were tested over time with both the entire sample and the two groups separately in the exploratory analyses, the paths from depression and poor health at time 1 to economic well-being at time 2 did not produce significant improvements in the model. However, the path from economic well-being at time 1 to poor health was significant for the entire sample, and the path from economic well-being to depression was significant for the low group in the two-group analysis. These results are consistent with the literature that supports the theory that poor economic conditions produce mental and physical health conditions (Dohrenwend & Dohrenwend, 1969; Ensel & Len, 1991). Given this sample is of rural mothers, these results also may reflect the effects of living in poor rural areas, where poverty is endemic. The reality of life in low-income, rural areas is that resources and access to health care are limited, and these both cause and exacerbate negative health conditions (Ricketts, 1999; Rowland & Lyons, 1989; Schur & Franco, 1999). With regard to the trait-state argument for depression, this may provide evidence for depression as a state. All the mothers in the study live in limited resource families, yet the results suggest that the poorer the families, the likelier the mother is to be depressed. If economic conditions improved, perhaps these mothers' moods would also improve. A third wave of data is needed to tease out the role of depression as it relates to economic well-being.

<div align="center">Limitations</div>

These results must be considered within the limitations of the study. One of the limitations in the study, which is reflected in the literature, is the difficulty in defining -- and thus operationalizing -- economic well-being (Wagle, 2002).   It seems critical to include some actual income variables when assessing economic well-being (Cancian & Meyer, 2000), yet doing so did not provide a statistically significant indicator for the latent variable in this model.

Conversely, the perception variable did serve as a good indicator, but alone this does not provide numerical data (i.e., wages or income) for comparison. In the future, perhaps economic well-being should be assessed with two separate latent constructs -- actual income values and the perception of the income values. In a study like the present one, a distinct perception variable likely would be influenced by depression, as individuals with depressed affect would probably experience their economic situations more negatively (or some might say "realistically") than those who are not depressed. Having two separate variables would allow a researcher to understand how these distinct aspects of economic well-being affect each other, and how they are affected by other aspects of the individual (i.e., being employed, personality traits, and health status). It would also provide growing understanding of an interesting segment of the population, those families who by simple numbers are "poor" (i.e., living below the poverty line), but who when asked, do not identify as poor.

A second limitation is the use of single-item indicators for latent variables for which there were no scales in the dataset. The indicators for the poor health and economic well-being latent variables both included indicators with single-item variables, and both these variables posed challenges in the confirmatory factor analysis of the model. The use of standardized instruments to assess these constructs would have provided additional reliability that the latent constructs intended to be measured were actually measured, thereby adding to the overall strength of the model. In wave three of the multi-state project, the SF-36® (Ware & Sherbourne, 1992), a widely used standardized health instrument, was included in the health survey, and this will be an important addition to the model identified in this study. At present, a reliable instrument to identify economic well-being has not been developed, and this is certainly an area for future research.

A third limitation is the sampling. This is not a nationally representative sample. The mothers who participated in the multi-state project learned about it from flyers at social service agencies and other community venues, and they self-selected to participate. As previously mentioned, the NC-223 sample does differ from a similar sample in the Current Population Survey (CPS) in that the NC-223 mothers and their families utilize more social service program (Richards, 2003). This is an expected finding, given many mothers were recruited from flyers at social welfare agencies. However, it is important to bear this in mind when interpreting results from this study, as the characteristic differs from what we know about rural families. Research shows that rural families are less likely to participate in means-tested programs than their urban and suburban counterparts (USDA, 1999bE). Thus, this sample is unique in that regard.

Results from this sample cannot be generalized to the individuals who chose not to participate when they saw the flyer. The question, "Why did you participate in this study?" was not asked, so only suppositions can be made about why these mothers chose to commit to be followed for three years. There are undoubtedly a number of reasons, including the desire to share their story, to make a difference in their personal lives, and to contribute to positive change in their communities. Whatever the reason, suffice to say that the women who chose to participate have something in common, and probably differ in some unique ways from those who saw the flyer and chose not to participate.

Results from this sample also cannot be generalized to those individuals who never saw the flyer. It is difficult to say who these mothers are and what their families and economic situation look like. Some hypotheses can be made. They may be families who do not access social welfare services. Perhaps they do not have reliable or even any transportation. They also

may not go regularly into the local town or community. There is still much to be learned about these families that the present study cannot address.

The fourth limitation is the sample size. While 414 participants is an adequate number for the model identification and confirmatory factor analysis, it is small for the analyses across time. The ramifications of this were apparent in the limited statistical significance of the path coefficients where the model as a whole showed statistically significant improvements. Trimming the model and only looking at the variables of interest across time might improve this, although it would lose the whole model effect. Applying this model to a larger, nationally representative sample of rural mothers might provide more information about these pathways.

The last limitation is the issue of missing data. In any study where there are missing data, there is always the potential for bias in the findings. Although Full Information Maximum Likelihood (FIML) reduces the bias by including all available parameter estimates (Enders & Bandolos, 2001), results from this study still should be considered with this potential bias in mind. In the comparison of the mothers who remained in the study and those who left, the two variables on which there were statistically significant differences were total family income and where the family's income fell in relation to the federal poverty line. The mothers who dropped out were living in families where their incomes were lower than for the mothers who remained. This suggests that families with lower incomes are more vulnerable and perhaps less stable (i.e., they move regularly, so the research team had difficulty maintaining contact). There may be some important information these families can provide about the economic well-being of lower-income rural families that the 2-group analysis was reflecting. A closer examination of the families who dropped out may suggest ideas for further research.

Implications

Results from this study have provided insights into potential pathways to economic well-being for rural, low-income mothers. These insights have several implications for public policies and programs aimed at low-income residents in rural areas, as well as for the future of the multi-state study.

Social Support Networks

One of the findings in this study was the significant and negative relationship of social support to depression and poor health. These results suggest -- and the literature supports -- the idea that improved social networks for rural, low-income mothers might mitigate the effects of depression and poor health. One common informal network in low-income rural areas is the informal childcare network (Shoffner, 1986). Rural parents tend to use informal childcare providers, because access to formal care providers is difficult (Cochran, et al., 2002). Services often are not available, too far to reach, or too expensive. Increasing financial resources for informal childcare networks through the Child Care Development Block Grant (CCDBG) or the Social Services Block Grant (SSBG) might provide additional needed support for these mothers. Mothers could be financially and logistically supported in developing childcare cooperatives, which would serve two functions. It would provide a much needed service, and it would provide mothers opportunities for meeting similar women and developing friendships.

Informal transportation networks also might provide needed support for these mothers. Transportation subsidies are commonly used in major metropolitan areas, where public transportation is readily available (NEDLC, 2004). However in rural areas, where public transportation is less common, these subsidies might be better spent supporting informal transportation assistance. Mothers without cars could be given transportation vouchers, which

they could "spend" on mothers with cars, who would pick up their neighbors for work, school, childcare arrangements, health care visits, and the like. The driving mothers would then be reimbursed for their vouchers on a biweekly or monthly basis. Through these transportation networks, mothers with limited access to transportation could improve their mobility and access to community services, while increasing potential for developing friendships and adding new sources of social support.

Food Stamp Programs

Another key finding in this study was the finding that the more food insecure the mother was, the more likely she was to experience depression and poor health. The major federal programs aimed at ensuring families do not go hungry and get good nutrition is the Food Stamp Program, and its associated education programs, Food Stamp Nutrition Education Programs (FSNEP). However, many families who are eligible for the Food Stamp Program are not using it. The USDA recently released a report, which showed less than one-half of eligible families knew they were eligible (Bartlett & Burstein, 2004). Although there was nothing in this study about how these results compare geographically (i.e., if there were differences in understanding the Food Stamp Program among rural, urban, and suburban families), this report suggests more families need to be educated on eligibility. In rural areas, where use of public welfare programs is less frequent than in urban areas (USDA, 1999b), this suggests even more intensive eligibility campaigns need to be undertaken, so that more families participate.

One issue identified in the USDA report was that 27% of the eligible non-recipient families said they would never apply for food stamps, and 44% of them cited a main reason for not applying as the stigma associated with using food stamps in the grocery store. One way that some states (see Oregon, Illinois, District of Columbia government sites as examples) have

reduced the stigma associated with using food stamps is by providing a card that works like a debit card for families to use at the store, although these are not available everywhere yet. Changing the way in which food stamps are rendered nationwide, but particularly in rural areas, perhaps would lessen the stigma associated with using this form of assistance. It would be less clear to fellow shoppers if the purchaser were using a debit card, credit card, or food stamp card.

A specific role for FSNEP in improving food stamp use is to educate eligible non-recipients on the negative effects of poor nutrition. Helping people to understand the immediate and long-term effects of poor nutrition might encourage some individuals to choose their health and the health of their children over the concern that members of the community know they use food stamps. An educational campaign could be run in front of the smaller grocers and supermarkets, where shoppers are informed about the importance of good nutrition and the potential ramifications of poor nutrition, and given a quick "yes-no" inventory to determine if they are eligible for food stamps. Those who score as eligible would receive a flyer telling them how, where, and when to apply in their communities.

Tax Policy

In a discussion of poor families, it might seem out of place to include tax policy in terms of big business tax credits, as opposed to Earned Income Tax Credits. However, tax policies can be designed so that low-income workers benefit. One important strategy to improve economic well-being for low-wage rural workers is to get good paying jobs with benefits into rural communities. To bring jobs to rural areas, however, businesses need incentives: They want to ensure if they move jobs to an area, the workforce is skilled to fill them. This seems to create a catch-22 scenario, as rural residents tend to have lower educational levels than their urban and suburban counterparts (ERS, 2003b).

A holistic approach to this apparent catch-22 is to develop a program where tax incentives are provided to companies that move jobs into designated rural areas. As part of the employment program, the businesses would provide the county into which they are moving a business plan that outlines the specific education and training needs for the pending jobs. Through either government-sponsored education and training programs, or through programs provided by the companies themselves and supported through government monies or additional tax credits, local residents would be trained/educated to fill the jobs. Additional business tax credits could be provided to companies that provide health insurance and onsite childcare. These cooperative programs would provide economic stimulus to areas that need it, and low-wage earners would be able to improve their incomes and family economic situations.

Welfare

The present study was not a study about welfare specifically, although the data analyzed were from a project designed to better understand how rural families are faring in the era of Welfare Reform. What the results demonstrated is that for these rural women, human capital is significantly and positively associated with concurrent economic well-being. Women with more human capital had higher levels of economic well-being, and this finding supports the existing literature (Meyer & Cancian, 2000).

This study also demonstrated a positive and significant association between human capital and poor health. From the model we also know that poor health is negatively associated with economic well-being in this sample. Thus, from a welfare reform perspective, if the goal is to move women from welfare to work and to encourage self sufficiency, and human capital is a contributor to both good health and economic well-being, then an investment in human capital is an important component of any future welfare policy. Results from this study support welfare

initiatives to expand the availability of education and training for women receiving welfare[12]. In rural areas, this expansion should be planned and accompany job prospects in the community. Funds in the TANF program could be provided to counties to assess the future local job needs and then provide the requisite education and training. This program could also be tied to programs providing incentives to companies to move jobs to designated rural areas as discussed above.

Rural Health Care

This study demonstrated that poor health is negatively associated with economic well-being. While there are many studies that have pointed to poor health as a barrier to employment, this study also suggested that having health insurance indirectly supports good health by providing individuals with health insurance more information and resources (i.e., human capital) with which to address their health problems. Most studies linking health and health insurance have examined the link from a correlation standpoint -- if you have health insurance, you are more likely to be in better health than if you do not have health insurance (Creighton, 2002; Gargovich & Harris, 1994; IOM, 2002). However, the mechanism through which this occurs is usually not the focus of study. Although this mechanism was not the focus of the present study either, it was an interesting finding nonetheless.

The arguments that more rural low-income people need access to health insurance (Garkovich & Harris, 1994; Schur & Franco, 1999), or that a comprehensive, government-sponsored health insurance program is needed (Collins, Davis, & Lambrew, 2004) are not new. Findings from this study add support for these arguments. Poor health is indeed a barrier to economic well-being for this sample of rural, low-income mothers, and increasing the number of

---

[12] For example, S.262 was a bill introduced in the 108th Congress by Senator Jeff Bingaman (D-NM) to improve access to education and training for welfare recipients

adults and children receiving Medicaid and the State Children's Health Insurance Program

through educational campaigns is important.

Simply having health insurance is not enough, however. Revamping the rural health

system so that rural residents can access health care services is a critical component of improving

the health of rural mothers and their families (Human & Wasem, 1991; Rosenblatt, Casey, &

Richardson, 2002; Spoth, 1997). While simply stated, actually changing the landscape of rural

health care systems is a costly, challenging, and immense task that will require research

dedicated specifically to the task. There are some beginning strategies, however. For one,

federal and state support of more mobile physical, mental, and dental health centers is needed.

Two, transportation assistance could be bundled with Medicaid and State Children's Health

Insurance plans, so that residents can get to the doctor via car service or cab if necessary. Third,

clinics could receive governmental support for providing the transportation to and from their site.

These strategies may work as a precursor to, or in conjunction with, more advanced changes to

rural health care infrastructures as they are deemed effective.

Minimum Wage

A main goal of this study was to identify a pathway to economic well-being for rural,

low-income mothers. Results from these data provide preliminary support for the theory that it is

the lack of economic well-being that leads to poor mental and physical health, and in the case of

poor health, subsequently contributes to further compromised economic well-being. It follows,

then, that improving the economic circumstances of rural mothers would begin to break the

cycle.

Labor statistics cite low wages as a major impediment to economic well-being in rural

families (DOL, 2002). So, for those who work, no single government action would have as much

impact on increasing income than increasing the minimum wage. This is especially true in the last eight years, when wage growth for minimum and low-wage jobs has been slowed by the influx of former recipients of public assistance into the labor market (Hanson & Hamrick, 2004). Adding $2.00 per hour to the current minimum wage, as some proposals have suggested[13] for a full-time worker[14], would increase family income by $4000 annually, or nearly 22% for a family of four. This change would enhance a family's purchasing power to afford more life necessities, thereby increasing economic well-being. Further, it could mean the difference between living above and below the poverty line.

The Multi-State Project

Results from this study have several implications for the multi-state project. For one, this study is the first of its kind using NC-223 data where missing data techniques that did not involve deletions or mean substitutions were incorporated into longitudinal analyses. Given the differences found in analyses using FIML versus other techniques for analyzing missing data (Enders & Bandolos, 2001), there may be implications with regard to bias in the previous findings. The methods used here might be replicated with models from previous studies, to see if there are differences in results. If differences emerge, such a finding might provide insight regarding the effects of selection bias on results from analyses essentially conducted with only mothers who remained in the study across multiple waves.

A second implication is the issue of health data. The addition in the wave 3 protocol of a standardized health instrument, the SF-36® (Ware & Sherbourne, 1992), may pose some challenges in looking across all three waves of data with regard to the mothers' health. While the

---

[13] The Boxer-Kennedy amendment to the TANF Reauthorization bill (S. Amdt. 2945) in March 2004 would have increased the minimum wage by $1.85 per hour over 26 months.
[14] This figure is for an individual who works 40 hours per week for 50 weeks, assuming two weeks of unpaid vacation.

SF-36® is a reliable measure, finding bases for comparison with the first two waves of health data where it was not included will be imperative for examining health over time. Results from this study, particularly with regard to the confirmatory factor analysis and poor health indicators, may provide some bases for creating comparable indicators across all three waves.

Finally, there are some key data missing that would be both useful and interesting as the project moves forward to wave 4 and beyond. First, including a reliable measure of economic well-being will be critical to understanding the components of this complicated variable. This study demonstrated some of the complications with measuring economic well-being, and results might provide ideas for proceeding in this regard, including incorporating both perception and real income measures. Second, understanding why people chose to participate in the study, and why they remain, would provide some insight into how these mothers and families might be different from those living in rural areas who do not participate or who drop out over time. These data could be gathered quantitatively, qualitatively, or both. Lastly, some data on personality and self-efficacy would also be interesting to include in the next round of data collection. This information would give additional insights into how specific personality traits and beliefs in self-efficaciousness affect perceptions and experiences of physical and mental health and economic well-being over time. Such data also might help to explain attrition and retention, the understanding of which are critical to interpreting results from longitudinal studies.

Conclusions

The present study contributed to filling a gap in the extant literature on poverty by identifying a model of economic well-being for rural, low-income mothers and testing the final model over time. Results indicated that social support, food insecurity, and human capital are all factors associated with depression and poor health, and a number of policies and programs in

these areas could be modified or expanded to improve the mental and physical health status of the rural women in this sample. Results also suggested that economic well-being is a better predictor of depression and poor health over time than depression and poor health are predictors of economic well-being. This finding must be interpreted cautiously, but may be related to the endemic poverty in rural areas. Further studies with additional waves of data are necessary to determine the extent of this relationship.

Findings from this study can serve as a stepping stone for future research in the area of rural poverty. Specifically, the identified model and the relationships tested over time should be applied to larger data sets with a similar sample, to see if the results are generalizable. Comparisons should also be made with a similar sample of urban residents, as these results may provide additional support for considering rurality as a unique context of human development. Further work in this area will serve to improve the current state of knowledge and provide needed data to public policymakers, so their decisions contribute to the long-term well-being of rural residents.

REFERENCES

Adler, N. E., Boyce, W. T., Chesney, M. A., Folkman, S., & Syme, S. L. (1993). Socioeconomic inequalities in health: No easy solution. *JAMA: The Journal of the American Medical Association, 269*(24), 3140-3150.

Alaimo, K., Olson, C. M., & Frongillo, E. A. (2002). Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents. *The Journal of Nutrition, 132*(4), 719-725.

Alpert, J. E., & Fava, M. (1997). Nutrition and depression: The role of folate. *Nutrition Review, 55*(5), 145-149.

Alpert, J. E., Mischoulon, D., Nierenberg, A. A., & Fava, M. (2000). Nutrition and depression: Focus on Folate. *Nutrition 16*, 544-581.

Alter, C. F. (1996). Family support as an intervention with female long-term AFDC recipients. *Social Work Research, 20*(4), 203-216.

American Academy of Family Physicians (AAFP) (1999). Rural physicians face challenges in providing high quality care. *Family Practice Management, 6*(8), 18.

Arons, B. (2000). Mental health services in rural America. *Vital Speeches of the Day, 66*(12), 369-371.

Bartlett, S., & Burnstein, N. (2004). *Food stamp program access study: Eligible non-participants.* Washington, DC: USDA Economic Research Service. Retrieved May 20, 2004, from http://www.ers.usda.gov/publications/efan03013/efan03013-2/efan03013-2.pdf

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis with special reference to education, 3rd ed.* Chicago: University of Chicago Press.

Belle, D. (1982). *Live in stress: Women and depression*. Beverly Hills, CA: Sage.

Bentler, P. M. & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Beverly, S. G. (2001). Material hardship in the United States: Evidence from the Survey of Income and Program Participation. *Social Work Research, 25*(3), 143-151.

Bickel, G., Nord, M., Price C., Hamilton, W., Cook, J. (2000). *Guide to measuring household food security.* Washington, DC: United States Department of Agriculture, Food and Nutrition Service, Office of Analysis, Nutrition, and Education.

Bloom, D., Farrell, M., & Fink, B. (2002). *Welfare time limits: State policies, implementation, and effects on families*. New York: MDRC. Retrieved January 4, 2004, from http://www.mdrc.org/publications/51/overview.html

Bollen, K. A. (1989). *Structural equations with latent variables.* New York: John Wiley & Sons.

Booth-Kewley, S., & Friedlan, H. S. (1987). Psychological predictors of heart disease: A quantitative review. *Psychological Bulletin, 101*, 343-362.

Braun, B., Olson, P. D., & Bauer, J. W. (2002). Welfare to well-being transition. *Social Indicators Researcher, 60*(1-3), 147-154.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments in nature and design.* Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology, 22*(6), 723-742.

Bronfenbrenner, U. (1992). Ecological systems theory. In R. Vasta (Ed.) *Annals of child development. Six theories of child development: Revised formulations and current issues* (pp. 187-249). London: Jessica Kingsley.

Bronfenbrenner, U. (1993). Ecology of cognitive development. In R. H. Wozniak & K. W. Fischer (Eds.) *Development in context: Acting and thinking in specific environments* (pp. 2-43). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bronfenbrenner, U. (1995). The bioecological model from a life course perspective.: Reflections of a participant-observer. In P. Moen, G. H. Elder, & K. Luscher (Eds.) *Examining lives in context: Perspectives on the ecology of human development* (pp. 599-618). Washington, DC: American Psychological Association.

Brown, G. W., & Moran, P. M. (1997). Single mothers, poverty, and depression. *Psychological Medicine, 27*, 21-33.

Brown, J. L., & Pollitt, E. (1996). Malnutrition, poverty and intellectual development. *Scientific American, 274*(2), 38-43.

Byrne, B. M. (1998). *Structural equation modeling with Lisrel, Prelis, and Simplis: Basic concepts, applications, and programming.* Mahwah, NJ: Lawrence Erlbaum Associates.

Cancian, M., Haveman, R. H., Meyer, D. R., & Wolfe, B. (2002). Before and after TANF: The economic well-being of women leaving welfare. *Social Service Review, December,* 603-641.

Cancian, M., & Meyer, D. (2000). Work after welfare: Women's work effort, occupation, and economic well-being. *Social Work Research, 24*(2), 69-86.

Carpenter, J. S., Andrykowski, M. A., Wilson, J., Hall, L. A., Rayens, M. K., Sachs, B., & Cunningham, L. L. C. (1998). Psychometrics for two short forms of the Center for Epidemiologic Studies-Depression Scale. *Issues in Mental Health Nursing, 19*(5), 481.

Caspi, A., Wright, B. R. E., Moffitt, T. E., & Silva, P. A. (1998). Early failure in the labor market: Childhood and adolescent predictors of unemployment in the transition to adulthood. *American Sociological Review, 63*, 424-451.

Chavkin, W., & Wise, P. H. (2002). The data are in: Health matters in welfare policy. *American Journal of Public Health, 92*(9), 1392-1395).

Cinton, W. J. (1995). The President's radio address: July 1, 1995. In *Public Papers of the President: William J. Clinton: Vol. 2* (pp. 1043-1044). Washington, DC: U.S. Government Printing Office. Retrieved December 15, 2003, from http://frwebgate2.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=245471384985+8+0+0&WAISaction=retrieve

Cochran, C., Skillman, G. D., Rathge, R. W., Moore, K., Johnston, J., & Lochner, A. (2002). A rural road: Exploring opportunities, networks, services, and supports that affect rural families. *Child Welfare, 81*(5), 837-848.

Cohen, J. (1990). Things I have learned (so far) occurred by chance. *American Psychologist, 45*(12), 1304-1312.

Cohen, S., & Willis, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310-357.

Collins, S. R., Davis, K. & Lambrew, J. M. (2004). *Healthcare returns to the national agenda: The 2004 Presidential Candidates' Proposals*. New York: The Commonwealth Fund.

Commander, M. J., Sashi-Dharan, S. P., Odell, S. M., & Surtees, P. G. (1997). Access to mental health care in an inner city district, II: Association with demographic factors. *British Journal of Psychiatry, 170*, 317-320.

Congressional Research Service (CRS) (2002). *Trends in welfare, work and the economic well-being of female-headed families with children: 1987-2001*. Washington, DC: Government Printing Office.

Creighton, J. (2002). Lack of insurance linked to health disparities. *Nation's Health, 32*(6), 31-34.

Deavers, K. L., & Hoppe, R. A. (1992). Overview of the rural poor in the 1980s. In C. M. Duncan (Ed.) *Rural poverty in America* (pp. 3-20). Westport, CT: Auburn House.

Dilworth-Anderson, P., & Marshall, S., (1996). Social support in its cultural context. In G. R. Pierce, B. R. Sarason, & I. G. Sarason (Eds.), *Handbook of social support and the family* (pp. 67-79). New York: Plenum Press.

Dohrenwend, B. P., & Dohrenwend, B. S. (1969). *Social status and psychological disorder: A causal analysis.* New York: Wiley.

Dooley, D., Prause, J., & Ham-Rowbottom, K. A. (2000). Underemployment and depression: Longitudinal relationships. *Journal of Health and Social Behavior, 41*(4), 421-436.

Duck, S., & Silver, R. C. (1990). *Personal relationships and social support.* Beverly Hills, CA: Sage.

Dumbauld, S. C., & Baumrind, N. L. (2002). Food insecurity, health status and health risk behaviors: California, 2000. *Annals of Epidemiology, 12*(7), 505.

Dumenci, L., & Windle, M. (1996). A latent trait-state model of adolescent depression using the Center for Epidemiologic Studies-Depression Scale. *Multivariate Behavioral Research, 31*(3), 313-330.

Duncan, C. M., & Tickamyer, A. R. (1988). Poverty research and policy for rural America. *The American Sociologist, 19*(3), 243-259.

Earle, A., & Heymann, S. J. (2002). What causes job loss among former welfare recipients: The role of family health problems. *Journal of the American Medical Women's Association, 57*(1), 5-10.

Eaton, W. W., Muntaner, C., Bovasso, G., & Smith, C. (2001). Socioeconomic status and depressive syndrome: The role of inter- and intra-generational mobility, government assistance and work environment. *Journal of Health and Social Behavior, 42*(3), 277-294.

Economic Research Service (ERS) (2003a). *Measuring rurality: Rural-urban continuum codes.* Washington, DC: United States Department of Agriculture. Retrieved November 26, 2003, from http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon

Economic Research Service (ERS) (2003b). *Rural labor and education: Rural education.* Washington, DC: United States Department of Agriculture. Retrieved January 4, 2004, from http://www.ers.usda.gov/Briefing/LaborAndEducation/ruraleducation/

Economic Research Service (ERS) (2003c). *Food security in the United States: Measuring food security.* Washington, DC: United States Department of Agriculture. Retrieved November 26, 2003, from http://www.ers.usda.gov/Briefing/FoodSecurity/measurement

Enders, C. K., & Bandalos, D. L. (2001). The relative performance of full information maximum likelihood estimation (FIML) for missing data in structural equation models. *Structural Equation Modeling, 8*(3), 430-457.

Endler, N. S., & Parker, J. D. A. (1992). Self-reports of depression and state-trait anxiety: Evidence for differential assessment. *Journal of Personality & Social Psychology, 63*(5), 832-838.

Ennis, N. E., Hobfoll, S. E., & Schroder, K. E. (2000). Money doesn't talk, it swears: How economic stress and resistance resources impact inner city women's depressive moods. *American Journal of Community Psychology, 28*(2), 149-173.

Ensel, W. M., & Lin, N. (1991). The life stress paradigm and psychological distress. *Journal of Health and Social Behavior, 32*, 321-341.

Ettner, S., Frank, R. G., & Kessler, R. C. (1997). The impact of psychiatric disorders on labor market outcomes. *Industrial and Labor Market Review, 51*, 64-81.

Falk, W.W., & Gilbert, J. (1985). Bringing rural sociology back in. *Rural Sociology, 50*(4): 561-577.

Frongillo, E. A. (1999). Validation of measures of food insecurity and hunger. *Journal of Nutrition, 129*, 506S-509S.

Flynt, W. (1996). Rural poverty in America. *National Forum, 76*(3), 32-34.

Garkovich, L., & Harris, R. P. (1994). Health and health care in rural America. *Choices: The Magazine of Food, Farm & Resource Issues, 9*(3), 8-12.

Gaughan, M. (2002). The substitute hypothesis: The impact of premarital liaisons and human capital on marital timing. *Journal of Marriage and the Family, 64,* 407-419.

Gorham, L. (1992). The growing problem of low earnings in rural America. In C. M. Duncan (Ed.) *Rural poverty in America* (pp. 19-39). Westport, CT: Auburn House.

Government Printing Office (GPO) (1965). Annual message to the Congress on the state of the Union, January 8, 1964. *Public papers of the Presidents of the United States: Lyndon B.*

Johnson, 1963-1964, 1(19), 112-118. Retrieved December 4, 2003, from

http://www.lbjlib.utexas.edu/johnson/archives.hom/speeches.hom/640108.asp

Government Printing Office (GPO) (2003). Federal poverty guidelines. *Federal Register, 68*(26), 6456-6458.

Green, B. L., & Rodgers, A. (2001). Determinants of social support among low-income mothers: A longitudinal analysis. *American Journal of Community Psychology, 39*(3), 419-441.

Hamilton, W. L., Cook, J. T., & Thompson, W. W. (1997). *Household food insecurity in the United States in 1995: Summary report of the food security measurement project.* Alexandria, VA: Food and Consumer Service, USDA.

Hanson, K., & Hamrick, K. S. (2004). *Moving public assistance recipients into the labor force: 1996-2000.* Washington, DC: USDA Economic Research Service. Retrieved on May 22, 2004, from http://www.ers.usda.gov/publications/fanrr40/fanrr40.pdf

Henderson, J. (2002). Will the rural economy rebound with the rest of the nation? *Economic Review, 87*(1), 65-83.

Hirschl, T. A. & Rank, M. R. (1991). The effect of population density on welfare participation. *Social Forces, 70*(1), 225-235.

Hobfoll, S. E., & Lerman, M. (1986). Predicting receipt of social support: A longitudinal study of parents' reactions to their child's illness. *Health Psychology, 8*(1), 61-77.

Hobfoll, S. E., Shoham, S. B., & Ritter, C. (1991). Women's satisfaction with social support and their receipt of aid. *Journal of Personality and Social Psychology, 61*(2), 332-341.

Hobfoll, S. E., & Stokes, J. (1988). The process and mechanics of social support. In S. W. Duck (Ed.), *Handbook of personal relationships* (pp. 491-517). New York: Wiley.

House, J. C., Umberson, D., & Landis, K. R. (1988). Structures and processes of social support. *Annual Review of Sociology, 14*, 293-318.

Hoyt, D. R., Conger, R. D., Valde, J. G., & Weihs, K. (1997). Psychological distress and help seeking in rural America. *American Journal of Community Psychology, 25*(4), 449-470.

Human, J., & Wasem, C. (1991). Rural mental health in America. *American Psychologist, 46*, 232-239.

IFAD (2001). *Rural poverty report: The challenge of ending rural poverty.* Oxford: Oxford University Press for IFAD.

Institute of Medicine (IOM) (2002). *Care without coverage: Too little, too late.* Washington, DC: IOM.

Jackson, A. (1999). Nonresident father involvement on single black mothers and their children. *Social Work, 44*(2), 156-166.

Jayakody, R., Danziger, S. H., & Pollack, H. A. (2000). Early-onset psychiatric disorders and male socioeconomic status. *Social Science Research, 27*(4), 371-387.

Jayakody, R., & Stauffer, D. (2000). Mental health problems among single mothers: Implications for work and welfare reform. *Journal of Social Issues, 56*(4), 617-634.

Jöreskog, K. & Sörbom, D. (2001). *LISREL 8.54.* Lincolnwood, IL: Scientific Software International.

Kalil, A., Born, C. E., Kunz, J., & Caudill, P. J. (2001). Life stressors, social support, and depressive symptoms among first-time welfare recipients. *American Journal of Community Psychology, 29*(2), 355-369.

Katz, M. B. (1996). *In the shadow of the poorhouse: A social history of welfare in America: Tenth anniversary edition: Revised and updated.* New York: Basic Books.

Kessler, R., & McLeod, J. (1985). Social support and mental health in community samples. In S. Cohen & S. L. Syme (Eds.) *Social support and health* (pp. 219-240). New York: Academic Press.

Kim, R. Y. (2000). Factors associated with employment status of parents receiving Temporary Assistance for Needy Families. *Social Work Research, 24*(4), 211-221.

Lahr, M. (1993). Nonmetro poverty rate inches back up. *Rural Conditions and Trends, 4*, 48-49.

Lepore, S. J., Evans, G. W., & Schneider, M. L. (1991). Dynamic role of social support in the link between chronic stress and psychological disorders. *Journal of Personality and Social Psychology, 61*(6), 899-909.

Lichter, D. T., & Jayakody, R. (2002). Welfare reform: How do we measure success? *Annual Review of Sociology, 28*, 117-141.

Lombard, C. B. (2000). What is the role of food in preventing depression and improving mood, performance and cognitive function? *Medical Journal of Australia, 173*, S104-S105.

Loprest, P. (2001). How are families who left welfare doing over time? A comparison of two cohorts of welfare leavers. *Economic Policy Review, 7*(2), 9-19.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*, 130-149.

Maharidge, D. (1992). And the rural poor get poorer. *Nation, 254*(1), 10-12.

Marlowe, J. (1996). A family economic self-sufficiency measure. *Consumer Interests Annual, 42*, 205-206.

Meyer, D. R., & Cancian, M. (1996). Life after welfare. *Public Welfare, 54*(4), 25-29.

Meyer, D. R., & Cancian, M. (1998). Economic well-being following an exit from Aid to Families with Dependent Children. *Journal of Marriage & the Family, 60*(2), 479-482.

National Economic and Development Law Center (NEDLC) (2004). *Public funding sources: State TANF funds*. Retrieved on May 25, 2004, from http://www.nedlc.org/center/car_fr_public.htm.

Nord, M. (2000). Does it cost less to live in rural areas? Evidence from new data on food security and hunger. *Rural Sociology, 65*(1), 104-125.

Pearlin, L. (1983). Role strains and personal stress. In H. B. Kaplan (Ed.) *Psychosocial stress: Trends in theory and research* (pp. 3-32). New York: Academic Press.

Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach.* Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA), Pub. L. No. 104-193, §1, 411(b), 110 Stat. 2105 (1997).

Proctor, B. D., & Dalaker, J. (2003). *Poverty in the United States: 2002.* Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. Retrieved November 26, 2003, from http://www.census.gov/prod/2003pubs/p60-222.pdf

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401.

Rahman, A., & Westley, J. (2001). The challenge of ending rural poverty. *Development Policy Review, 19*(4), 553-562.

RAND (2003). *Definitions of rurality*. Arlington, VA: RAND. Retrieved November 26, 2003, from http://www.rand.org/publications/MR/MR1595/MR1595.appb.pdf

Richards, L. N. (1998). *One step at a time: A report on the outcomes of Oregon's 1996/1997 Even Start Programs prepared for Oregon Even Start Programs and Department of Community Colleges and Workforce Development.* Corvalis, OR: College of Home Economics and Education, Oregon State University.

Ricketts, T. C. (1999). Preface. In T. C. Ricketts (Ed.), *Rural health in the United States* (pp. vii-viii). New York: Oxford University Press.

Ricketts, T. C., Johnson-Webb, K. D., & Randolph, R. K. (199). Populations and plaes in rural America. In T. C. Ricketts (Ed.), *Rural health in the United States* (pp. 7-24). New York: Oxford University Press.

Rodin, J. (1986). Aging and health: Effects of the sense of control. *Science, 223*, 1271-1276.

Rosenblatt, R. A., Casey, S., & Richardson, M. (2002). Rural-urban differences in the public health workforce: Local health departments in three rural Western states. *American Journal of Public Health, 92*(7), 1102-1105.

Rosenblatt, R. A., & Hart, G. (1999). Physicians and rural America (pp. 38-51). In T. C. Ricketts (Ed.), *Rural health in the United States* (pp. vii-viii). New York: Oxford University Press.

Rosenstone, S. J., Hansen, J. M., & Kinder, D. R. (1986). Measuring change in personal economic well-being. *Public Opinion Quarterly, 50*, 176-192.

Rost, K., Smith, R., & Taylor, J. (1993). Rural-urban differences in stigma and the use of care for depressive disorders. *Journal of Rural Health, 9*, 57-62.

Rowland, D., & Lyons, B. (1989). Triple jeopardy: Rural, poor, and uninsured. *Health Services Research, 23*(6), 975-1004.

Ryan, R. M., & Solky, J. A. (1996). What is supportive about social support? On the psychological needs for autonomy and relatedness. In G. R. Pierce, B. R. Sarason, & I. G. Sarason (Eds.), *Social support: An interactional view* (pp. 1-26). New York: Wiley.

Schiller, B. R. (1984). *The economics of poverty and discrimination, 4ᵗʰ ed*. Englewood Cliffs, NJ: Prentice-Hall.

Schur, C. L., & Franco, S. J. (1999). Access to health care. In T. C. Ricketts (Ed.), *Rural health in the United States* (pp. 25-37). New York: Oxford University Press.

Segrist, C. (November, 1999). *For example the CES-D: Using the National Longitudinal Surveys to study public health* (ID Number 3800). Chicago, IL: American Public Health Association Meetings (Statistics Division).

Sheehan, T. J., Fifield, J., Reisine, S., & Tennen, H. (1995). The measurement of the structure of the Center for Epidemiologic Studies-Depression Scale. *Journal of Personality Assessment, 64*(3), 507-521.

Shoffner, S. (1986). Child care in rural areas: Needs, attitudes and preferences. *American Journal of Community Psychology, 14*(5), 521-539.

Smith, M. D., Krannich, R. S., & Hunts, L. (2001). Growth, decline, stability, and disruption: A longitudinal analysis of social well-being in four Western rural communities. *Rural Sociology, 66*(3), 425-450.

Spoth, R. (1997). Challenges in defining and developing the field of rural mental disorder preventive intervention research. *American Journal of Community Psychology, 25*(4), 425-448.

Spoth, R., & Redmond, C. (1993). Identifying program preferences through conjoint analysis: Illustrative results from a parent sample. *American Journal of Health Promotion, 8*(2), 124-133.

Spoth, R., & Redmond, C. (1996). Illustrating a framework for rural prevention research: Project Family studies of rural family participation and outcomes. In R. D. Peters & R. J. McMahon (Eds.), *Preventing childhood disorders, substance abuse, and delinquency* (pp. 299-328). Thousand Oaks, CA: Sage.

Thoits, P. A. (1984). Explaining Distributions of Psychological Vulnerability: Lack of Social Support in the Face of Life Stress. *Social Forces, 63*(2), 453-481.

Thoits, P. A. (1986). Social support as coping assistance. *Journal of Consulting and Clinical Psychology, 54*, 416-423.

Tickamyer, A. R. (1992). The working poor in rural labor markets: The example of the Southeastern United States. In C. M. Duncan (Ed.), *Rural poverty in America* (pp. 41-61). Westport, CT: Auburn House.

Tickamyer, A. R., & Duncan, C. M. (1990). Poverty and opportunity structure in rural America. *Annual Review of Sociology, 16*, 67-86.

Turner, R. J., & Marino, F. (1994). Social support and social structure: A descriptive epidemiology. *Journal of Health and Social Behavior, 35*, 193-212.

U.S. Census Bureau (2001). *Population profile of the United States: 2000 (Internet release).* Retrieved December 5, 2003, from http://www.census.gov/population/pop-profile/2000/profile2000.pdf

U.S. Census Bureau (2003). *Census 2000: Urban and rural classification.* Retrieved November 26, 2003, from http://www.census.gov/geo/www/ua/ua_2k.html

U.S. Department of Agriculture (USDA) (1998). *Agriculture fact book.* Washington, DC: USDA Office of Communications. Retrieved November 26, 2003, from http://www.usda.gov/news/pubs/fbook98/afb98.pdf

U.S. Department of Agriculture (USDA) (1999a). Poverty and well-being in rural America. *Family Economics & Nutrition Review, 12*(3/4), 93-95.

U.S. Department of Agriculture (USDA) (1999b). The rural poor's access to supermarkets and large grocery stores. *Family Economics & Nutrition Review, 12*(3/4), 90-9.

U.S. Department of Labor (DOL) (2002). *A profile of the working poor: 2000 (Report 957).* Washington, DC: U.S. Department of Labor, Bureau of Labor Statistics. Retrieved on December 15, 2003, from http://www.bls.gov/cps/cpswp2000.htm

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practice, and recommendations for organizational research. *Organizational Research Methods, 3*(1), 4-70.

Voelz, Z. R., Walker, R. L., Petit, J. W., Joiner, T. E., & Wagner, K., D. (2003). Depressogenic attributional style: Evidence of a trait-like nature in youth psychiatric patients. *Personality & Individual Differences, 34*(7), 1129-1130.

Wagenfeld, M. O., Murray, J. D., Mohatt, D. E., & DeBruyn, J. C. (1994). *Mental health in rural America.* Washington, DC: Office of Rural Health Policy, U.S. Department of Health and Human Services.

Wagle, U. (2002). Rethinking poverty: Definition and measurement. *International Social Science Journal, 54*(171), 155-165.

Ware, J.E., & Sherbourne, C.D. (1992) The MOS 36-Item Short-Form Health Survey (SF-36®): I. Conceptual framework and item selection. *Medical Care, 30*(6), 473-83.

Weber, B. A. & Duncan, G. J. (2001). *Welfare reform reauthorization and rural America: Implications of recent research.* Joint Center for Poverty Research. Evanston, IL: Northwestern University.

Wheaton, B. (1985). Models for stress-buffering functions of coping resources. *Journal of Health and Social Behavior, 26*, 352-364.

Widamon, K. (1985). Hierarchically tested covariance structure models for multitrait-multimethod data. *Applied Psychological Measurement, 9*, 1-26.

Wilson, W. J., & Aponte, R. (1985). Urban poverty. *Annual Review of Sociology, 11*, 231-58.

APPENDICES

Appendix A. Covariance Matrix of Indicators for Hypothesized Model

	Education	Community Resources	Life Skills	Depressed Affect	Negative Affect	Interpersonal Relationships	Somatic Symptoms	Days Missed Work	Visits to Doctor	Chronic Problems	Economic Situation	Income Enough	Mother's Wages	Food Insecurity	Social Support	Health Insurance
Education	1.99															
Community Resources	1.51	23.85														
Life Skills	3.29	10.10	17.77													
Depressed Affect	-0.13	-2.16	-3.74	26.96												
Negative Affect	-0.16	-0.50	-2.38	8.02	9.47											
Interpersonal Relationships	-0.15	-1.51	-1.49	3.73	0.70	2.08										
Somatic Symptoms	-0.07	0.84	-0.17	13.39	4.13	2.07	13.93									
Days Missed Work	-0.34	7.07	2.47	2.12	4.34	-0.85	-0.05	153.08								
Visits to Doctor	-1.12	2.89	-3.58	2.71	0.76	0.61	2.69	32.96	208.61							
Chronic Problems	0.13	0.70	0.46	2.78	0.78	0.54	2.36	1.44	6.68	4.10						
Economic Situation	-0.22	-0.45	-0.29	-1.30	-0.93	-0.10	-0.64	-1.32	-1.24	-0.58	1.94					
Income Enough	0.00	-0.08	0.27	-1.01	-0.53	-0.08	-0.78	-0.92	-0.95	-0.48	0.47	0.80				
Mother's Wages	-0.13	-0.22	-0.59	0.09	0.06	0.06	-0.14	0.21	-1.43	-0.01	0.10	0.06	0.58			
Food Security	-0.38	-2.13	-3.10	6.35	2.07	1.18	4.03	4.98	9.33	2.39	-1.15	-1.20	-0.08	14.41		
Social Support	0.43	7.10	8.13	-12.27	-5.34	-2.86	-6.82	2.35	6.88	-2.86	0.83	0.81	-0.54	-5.67	58.33	
Health Insurance	0.12	0.60	0.57	0.16	0.03	-0.03	0.11	0.68	0.92	0.18	-0.12	-0.14	0.01	0.18	-0.12	0.22

Appendix B. Covariance Matrix of Indicators for Final Confirmatory Factor Analysis Model

	Education	Community Resources	Depressed Affect/Somatic Symptoms	Negative Affect	Depressed Affect/ Interpersonal Relationships	Injuries/Illness in Last Year	Chronic Problems	Economic Situation	Mother's Wages	Food Insecurity	Social Support	Health Insurance
Education	1.99											
Community Resources	1.51	23.85										
Depressed Affect/ Somatic Symptoms	-0.10	-0.83	49.87									
Negative Affect	-0.15	-0.39	9.25	9.15								
Depressed Affect/ Interpersonal Relationships	-0.27	-1.30	14.55	3.48	9.47							
Injuries/Illness in Last Year	0.00	-0.07	0.20	0.06	0.07	0.16						
Chronic Problems	-0.09	0.03	0.62	1.67	0.87	-0.11	11.86					
Economic Situation	-0.04	-0.16	-0.43	-0.51	-0.34	0.03	-0.79	1.94				
Mother's Wages	-0.06	0.09	-0.20	-0.09	0.02	0.01	-0.06	0.10	0.58			
Food Insecurity	-0.06	0.44	-0.19	1.28	0.08	-0.07	4.22	-1.15	-0.08	14.41		
Social Support	-0.54	-1.62	3.60	0.90	0.66	-0.03	-5.08	0.83	-0.54	-5.67	58.33	
Health Insurance	0.04	0.08	0.23	-0.05	0.04	0.01	0.32	-0.12	0.01	0.18	-0.12	0.22