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UNDERSTANDING MESOSYSTEMIC INFLUENCES ON REPORTED HEALTH AMONG RURAL LOW-INCOME WOMEN: A STRUCTURAL EQUATION ANALYSIS

by

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UNDERSTANDING MESOSYSTEMIC INFLUENCES ON REPORTED HEALTH AMONG RURAL LOW-INCOME WOMEN: A STRUCTURAL EQUATION ANALYSIS

Tiffany Bice-Wigington, Ph.D.

University of Nebraska, 2011

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While ensuring access to health insurance and health care services is important, emerging research indicates that individual health and well-being result from a complex array of environmental, social, and psychological factors. The delineation of how factors of health and well-being unfold and impact rural low-income women is particularly salient for social workers who provide services to rural residents and who work within a rural context. Utilizing components from the ecological systems perspective, this study explored how the factors associated with health risk influenced reported health and mesosystemic processes among rural low-income women. This sample (n=304) for this study was drawn from *Rural Families Speak*, a multi-state study of rural low-income women. Through the use of Structural Equation Modeling (SEM) the hypothesized relationship between factors associated with health risk, reported health problems, and mesosystemic processes were estimated. Findings suggest that factors associated with health risk influence mesosystemic processes; further the processes inherit in mesosystemic processes are affected by and affect reported health problems over time among rural low-income women.

Dedicated to Cela and Tanner

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"Well-behaved women seldom make history"-Laurel T. Ulrich

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"For too long our rural health care and social service providers have been burdened with rules and regulations designed for urban and suburban communities." (Tommy Thompson, Department of Health and Human Resources Secretary, 2002)

Introduction

Understanding health and well-being among rural residents is essential to effective social work practice within a rural context, and among those who may serve rural populations. While ensuring access to health insurance and health care services is important, emerging research indicates that individual health and well-being result from a complex array of environmental, social, and psychological factors. These factors, among which there are vast differences between urban and rural settings (Mulder, Kenkel, Shellenberger, Constantine et al., 1999), have been shown to create differences in susceptibility to health problems and overall health (Coward, 2006). Further, among rural populations, the susceptibility to health problems and overall health differ by gender (Centers for Disease Control and Prevention, 2000), suggesting the processes occurring within the rural context are different for women and men.

Rural women experience barriers in employment access, educational opportunities, and access to health and human services (Merwin, Snyder & Katz, 2006) contributing to health disparities, when compared to both rural men and urban populations. Health disparities, as defined by The National Institutes of Health, are "the differences in incidence, prevalence, morbidity, mortality, and burden of disease that exist among specific populations"(NIH, 2002). Disparities arise out of an inequitable distribution of healthcare resources, delay in seeking healthcare services, cultural incongruence, and lack of knowledge of how to access the appropriate care (Smedley et

al., 2003; Mitchell & McCormack, 1997; McGuire & Miranda, 2008; Sarkar, Fisher & Schillinger, 2006). Research indicates that rural areas rank poorly on 91% of population health indicators, including health behaviors and maternal/child health measures (Hartley, 2004). The dominance of health disparities among rural communities is demonstrated in the high prevalence of chronic disease, such as diabetes, cardiovascular disease, and cancer (Healthy People, 2001; Gamm, 2003).

Health inequalities' experienced by marginalized groups have been linked to determinants of health such as socioeconomic status, ethnic background, gender, education, social support, and environmental influences (Graham, 2004; Niederdeppe, Bu, Borah, Kindig, & Robert, 2008). Although an understanding of the impact of determinants of health on health inequalities is further developed for some factors than others (Marmot & Wilkinson, 1999; Davis, Cohen, & Mikkelsen, 2003), research has yet to explore how determinants of health influence the behavioral, cognitive, and affective processes associated with health and well-being. Further, as an established health disparities population, behavioral, cognitive, and affective processes among rural low-income women warrants investigation. The delineation of how factors associated with health risk unfold and impact rural low-income women is particularly salient for social workers that serve rural residents. This study examined how factors associated with health risk influenced the report of current health problems and the report of health problems over time, and the subsequent influence on the behavioral, affective, and cognitive processes within the mesosystem among rural low-income women.

Theoretical Perspective

This study is grounded in an ecological systems perspective, which views individuals and the environment as a unitary system within a particular cultural and historical context (Germain & Gitterman, 1995). Exchanges between individuals and the environment are seen as reciprocal, where influence and change is a fluid process occurring across several layers encompassing societal norms, values, institutional structures, interactions between families and systems, and the family system itself (Bronfenbrenner & Morris, 2006; Bengtson, Acock, Allen, Dilworth-Anderson & Klein, 2005). The layers in which exchanges occur include: the macrosystem, exosystem, mesosystem, and microsystem (Bengston et al.).

The macrosystem refers to the generalized patterns that exist at the level of culture and ideology, including values and customs (Bronfenbrenner & Morris, 2006). The exosystem refers to the environment that is external to the immediate context, but that potentially influences interactions at the microsystem level (Forte, 2007). The mesosystem represents the interrelationships between settings, providing the connection between structures present in one's immediate microsystem (McIntosh, Everette, Carlson, Bates, & Loera, 2008; Tacon, 2008). Mesosystems permeate everyday processes, through the relationships between individuals, families, and community components. The microsystem refers to the immediate context of an individual, involving person-to-person interactions and relationships where an individual expresses behaviors, intrapersonal characteristics, and participates in bi-directional interactions (Tacon, 2008).

Conceptual Model

The conceptual model for this study will utilize components from the ecological systems perspective to explore how the interactional nature of the mesosystem influences the report of health problems among rural low-income women. Specifically the interactional nature of the mesosystem is conceptualized through behavioral, affective, and cognitive processes. The left side of model is an illustration of the perceived microsystem and mesosystem, where traditional "boundaries" separate the two systems into distinct categories. This model contributes to the literature by proposing that the mesosystem and microsystem are more fluid in nature, where the affective and cognitive processes occur across system levels forming a mental mesosystem.

The right side of the model delineates the process by which interactions are hypothesized to occur across system levels. Factors associated with health risk are represented by a collection of individual characteristics of rural low-income women such as educational attainment, employment status, marital status, and ethnic background. From within the microsystem, the individual is conceptualized as the "primary link" that establishes the existence of the mesosystem. McIntosh and colleagues (2008) propose that the mesosystem emerges through behavioral, affective, and cognitive processes. These processes represent transitory mesosystem experiences allowing individuals to recall interactions and apply them in subsequent mesosystem and/or microsystem experiences. In essence the processes blur the boundary between the two ecosystem levels, creating the mental mesosystem. These mesosystemic processes are observable behaviorally as *multisetting participation*, affectively and cognitively as *intersetting knowledge* (McIntosh).

Multisetting participation entails an individual's physical behavior in two or more microsystem settings. For example, multisetting participation might entail an individual engaging in a support group, volunteering in her child's school, and the utilization of local services. The impact of participation is measured in frequency of utilization and by the interactions that occur within the setting. In this study, the behavioral processes of interest are multisetting participation in the health care and formal social support services settings. As illustrated in Figure 1, multisetting participation is hypothesized to be impacted by the factors associated with health risk and, in turn, impact intersetting knowledge as well as reported health problems either directly or indirectly through intersetting knowledge.

Less explicit but equally relevant, *intersetting knowledge* refers to an individual's ability to recall and apply information from one setting to another. For example, a participant of the Women, Infant, and Children (WIC) program is provided nutritional education in one setting. The ability for the participant to recall and apply the skills taught through WIC at the grocery store would be an observable application of intersetting knowledge, as the participant applied information across settings. In this study, the cognitive and affective processes of interest are perceived self-sufficiency and perceived social support. Intersetting knowledge is hypothesized to be impacted both directly by multisetting participation and indirectly by the factors associated with health risk through multisetting participation. In turn, intersetting knowledge is hypothesized to directly impact reported health problems.

Background

Understanding the health and well-being among rural low-income women is particularly salient in the rural context as social workers are often called upon to provide health intervention and treatment options for rural residents in nontraditional settings (Block, 2006; Gant, Gioia, Benn, & Seabury, 2009). To inform practice within rural settings and among rural low-income women, this study examines the processes by which *multisetting participation* and *intersetting knowledge* influence health and well-being. The following discussion provides an overview of the literature on the health of rural low-income women, the outcome of interest in the current investigation. Then important elements of the context of rural poverty are presented. Finally, literature providing insight into the interactional nature of the mesosystemic processes is reviewed by outlining multisetting participation within both formal social support services and health care settings, and addressing the role of intersetting knowledge as represented by perceived social support and perceived self-sufficiency.

Health Outcomes among Rural Women

Rural women experience an overwhelming number of health concerns over and beyond rural men and urban residents in general (Mulder, Kenkel, Shellenberger, Constantine et al., 1999). These health concerns result from economic, cultural, physical, and emotional stressors that contribute to health status and the likelihood of suffering from diabetes, cancer, hypertension, heart disease, stroke, and lung disease (Centers for Disease Control and Prevention, 2000). Chronic diseases among rural women are exasperated by unhealthy behaviors such as smoking, lack of exercise, and non-compliance with medical recommendations (Coward, 2006). Rural women are less likely

to participate in preventative services such as wellness visits, prenatal care, and/or cancer screenings (Muldoone, 1996; Schootman, 1999; Coward, 2006). This is demonstrated in Duelberg's (1992) research on rural preventative health behaviors, where rural women were less likely to have routine PAP smears compared to urban women. Further, rural women experience decreased access to maternal health providers, resulting in disproportionately higher rates of fetal, infant, and maternal mortality in rural areas (United States Congress, Office of Technology Assessment, 1990). Pregnancy rates among rural women ages 18 to 19 are 30-40% higher than in urban women (Skatrud, 1996).

Approximately 26% of rural women live with disabilities (Mulder et al., 2006). Living with disabilities increases the likelihood of reported urinary tract infections, depression, inflammatory bowel disease, heart disease, and kidney disease over women who do not experience disabilities (Mulder, 2006).

Rural low-income women experience a high prevalence of depressive symptoms (Simmons, Huddleston-Casas, & Berry, 2007). Psychological complaints account for more than 40% of patient visits to rural medical providers (Rost, Williams, Wherry, & Smith, 1995). Yet only 5% of depressed patients received any form of mental health care. Van Hook (1996) found that rural women are unlikely to discuss symptoms of depression with their medical provider, however present with psychosomatic symptoms. Mental health is of utmost concern as depressive symptoms are often an antecedent to health impairments, including heart disease and diabetes as well as a risk factor for non-compliance with medical treatment recommendations (American Heart Association, 1998; Black, Markides, & Ray, 2003; DiMatteo, Lepper, & Croghan, 2000). Taken

together the health challenges rural women face, are thought to be exasperated for rural low-income women.

Lack of available resources, limited education, and lack of employment opportunities increase the risk of poor health in low-income rural women (Coward, 2006). Limited education is associated with risky health behaviors, lower literacy levels, and less exposure to health related information (Davis, et al., 2003). Lack of employment increases the likelihood of rural women being underinsured and unable to afford medical care.

Context of Rural Poverty

Poverty within rural communities is persistent, deep, and generational (ERS, 2007; Deavers & Hoppe, 1992; Imig, Bokemeir, Keefe, Struthers, & Imig, 1997; Haynie & Gorman, 1999). Unlike poverty in urban settings, rural poverty often does not fluctuate with the ebb and flow of the U.S. economy (Blalock, Tiller, & Monroe, 2004). In 2002, 14.2% of the rural population was considered poor (ERS, 2007), with the duration of poverty lasting 15% longer than in urban areas (US Census Bureau, 2005). County level poverty is considered persistent when the rate of poverty is 20% or more over the last four decades (Blakely & Locke, 2005). Of counties experiencing persistent poverty, 88% were rural (ERS, 2007). Limited educational and employment opportunities, an insufficient network of formal social support services, and a lack of health care services in rural communities perpetuate the consistent state of poverty in rural communities (Coward, 2006).

Limited Educational Opportunities. Rural individuals tend to have lower levels of educational attainment and marketable job skills (Haynie & Gorman, 1999). This lack of

education and skill set results in decreased employment opportunities for rural individuals and increases the likelihood of experiencing poverty during a lifetime (Carnevale & Rose, 2001; Rank, 2001). The lack of education among rural individuals has been attributed to the adopted model of education in rural communities, which places importance on agricultural education and building trades (NCES, 2002). Rural schools are less likely to offer vocational programming in health, life science, and computer industries (NCES, 2002). Further, the educational gap between rural and urban communities is most apparent in those who receive a college education (HCS, 2005). In 2007, approximately 20% of rural residents (ages 25- to 44 years-old) had a four-year college degree compared to 35% of urban residents (Current Population Survey, 2007).

The impact of limited educational opportunities for rural residents disproportionately impacts rural women. According to the 2007 Current Population Survey, only 12% of rural residents with a college degree were women. And research suggests that obtaining a college education does not guarantee rural women access to economic opportunity. Porterfield (2001) reports that rural women with a college education do not have increased employment opportunities over their peers with a high school diploma, and Mulder and colleagues (1999) suggest that the rural economy is often unfavorable to women.

Limited Employment Opportunities. It is widely documented that rural communities offer limited employment opportunities (Bushy, 1993; Gallagher & Delworth, 1993; Goldsmith, Puskin & Stiles, 1993), that are heavily weighted toward low-wage jobs (Gibbs, 2001; Henderson, 2002; Lichter & Jensen, 2002), offering fewer hours, and few to no benefits (Boushey, 2002; Gibbs, 2002; Wavelet & Anderson, 2002).

The lack of employment opportunities in rural communities perpetuates the incidence of poverty within rural working families as rural workers are consistently under-employed (Slack, &Jensen, 2002) and earn less than a family-sustaining wage (O'Hare, 2009).

Further, employment opportunities for women are often dictated by rural culture (Flora & Flora, 2004), which considers part-time or temporary work as appropriate for female residents (Gringeri, 1995). Limited to part-time employment and possessing fewer skills (Gibbs, 2001) significantly reduces the earning potential for rural women (Hauenstein & Boyd, 1994). The lack of social and economic resources in rural communities further increases the economic vulnerability of rural women (Folk, Nickols, Peck, 1989) perpetuating the likelihood of persistent poverty and the prevalence of health disparities among rural low-low income women.

Insufficient Network of Formal Social Support Services. Social policies intended to enhance individual and family well-being often pose hardships for those living in rural communities (Riebschleger, 2007). The monumental shift in welfare policy promoting work-based economic self-sufficiency resulted in a reduction of formal support services as individuals became employed (Rodgers & Weil, 2000). The reform of welfare policy did not address factors that continually contribute to poverty in rural communities (National Advisory Committee on Rural Health and Human Services, 2008). These factors include isolation associated with rural life, weather problems, the declining economy (Bush, 1993), and the lack of social, educational, and childcare resources (Hauenstein & Boyd, 1994).

It is widely documented that rural communities experience a shortage of social support services. Several factors contribute to the scarcity of rural resources, such as the

inability of rural communities to sustain formal social support programs due to the lack of utilization despite need among rural residents, and the limited tax base to fund such programs (NACRHHS, 2008). In order to sustain programming in rural areas, both federal and regional resources are often combined to create a regional hub of formal social support, requiring residents to commute to surrounding communities to receive services (Fletcher et al. 2002). This centralization of formal social support further hinders rural residents as transportation issues have been well documented as a barrier in receiving necessary services and employment options.

Lack of Health Care Services. Research demonstrates that the incidence, prevalence, morbidity, and mortality rates for disease in rural populations is significantly higher than in the general population, leading to disparities in health (Gamm, 2003). Rural adults are more likely to experience physical inactivity, obesity, dental problems, cardiovascular disease, suicide, and motor vehicle accidents (NCHS, 2001). Rural disparities in health are exasperated by the obstacles rural residents experience in accessing physical, mental, and ancillary health care services (Merwin, Snyder, & Katz, 2006).

Ensuring that basic health care needs of rural residents are met is a challenge as health care delivery in rural communities is often a patchwork of primary care providers, clinics, and hospitals (HCS, 2005). Approximately 20% of the United States population resides in a rural area (OTA, 1990), which is likely to be federally designated as a medically underserved population (Stamm, Lambert, Piland, & Speck, 2007). It is estimated that only 10% of all practicing physicians work in rural communities (HHS, 2002; Merwin, Snyder & Katz, 2006). Specialty care in rural communities is also in short

supply, resulting in primary care providers practicing services without appropriate training (Merwin, Hinton, Dembling, & Stern, 2003). More than half (55%) of rural counties lack mental health practitioners or social workers (Pion, Keller, & McCombs, 1997), resulting in an inadequate network of resources for referrals and consultation (Merwin et al., 2003).

Women living within the context of rural poverty confront multiple interrelated challenges to their health and well-being. Limited health and social services infrastructure, higher rates of poverty, lower rates of employer health insurance coverage, and a systemic lack of health care providers (DHHS, 2002) all contribute to the health disparities characteristic of the rural low-income population. However, the ways in which rural low-income women navigate the barriers encountered may give rise to differences in health outcomes within this population.

Multisetting Participation

Multisetting participation is hypothesized to be an effective strategy for accessing the resources needed to address barriers to health and well-being experienced by rural low-income women. *Multisetting participation* refers to an individual's behavioral participation in two or more microsystem settings; entailing explicit behaviors in which an individual engages. In this study, the behavioral processes of interest are reflected by multisetting participation in the formal social support services setting and in the health care setting.

Utilization of Formal Social Support Services. It is believed that formal social support services are key to the well-being of low-income families, as subsides are intended to "enhance the quality of family life" (DeMarco & DeMarco, 2009; Healy &

Darlington, 1999, p. 7). Formal social support services often are delivered through the provision of governmental programs, such as Women, Infant, and Children (WIC), Housing Assistance, Medicaid, Temporary Assistance to Needy Families (TANF), State Child Health Insurance Programs (SCHIP), and Supplemental Nutritional Assistance Program (SNAP-formerly Food Stamps). These programs attempt to promote economic self-sufficiency and well-being by providing temporary income maintenance as well as assisting families in obtaining adequate nutrition, health care, and housing (Turner, Popkin, & Cuningham, 1999). However, despite the existence of these programs and the apparent need among rural low-income populations, formal social support services are often under-utilized by both urban and rural populations.

Emerging research from the Rural Policy Research Institute (RUPRI) indicates that rural families are less likely to use formal social support services (2008-09). Further, research reveals that reporting agencies often do not differentiate between rural and urban program recipients (RUPRI). Among the agencies that do distinguish between urban and rural participation, under-utilization is documented. For example, a disproportionately low rate of participation in TANF was reported in 2003, where only 14.5% of program eligible rural families received cash assistance despite the high rate of poverty in rural communities (RUPRI, 2008-09).

Despite the dearth of information specific to utilization of formal social support services among rural populations, insight into under-utilization is available in research examining participation rates among urban populations. DeMarco and DeMarco (2009) found that low-income participants utilized on average two out of the seven available social support programs, despite their eligibility. Further, urban non-working poor, or

those most impacted by social isolation, were less likely to participate in, or access supportive services within the community (Fernandez, & Harris, 1992). A number of factors contribute to the failure to access such services including: inadequate linkages between service providers in different program areas, inefficient administration, lack of cultural competency, and insufficient outreach efforts (Nightingale, 2001; University of Wisconsin, 1999). Among low-income individuals the complexity of eligibility determinants (GAO, 2000), emphasis on job search over utilization of support services (Klerman et al, 2000; Nightingale, 2001), and the lack of information about formal social support services available (GAO, 2002; Nightingale, 2001; University of Wisconsin, 1999) also contribute to the under-utilization of services.

Utilization of Health Care Services. It is well documented that rural residents experience decreased access to health care services due to barriers such as a shortage of health care providers, lack of financial resources, inadequate health insurance coverage, and transportation issues (Merwin, Snyder, & Katz, 2006). As previously noted, despite the fact that 20% of the nation's population resides in rural communities, only 10% of the nation's health care providers serve those same communities (OTA, 1990; HHS, 2002; Merwin, Snyder & Katz, 2006). Not surprising, this inequitable access to health care providers contributes to differential health outcomes among rural residents. Access to health care services has been found to reduce inequalities in health (Korda et al., 2007), yet accessibility alone does not ensure the utilization of necessary medical services. Research suggests that even when health care services are available they are under-utilized in deprived areas despite greater levels of need (Barnett, Pearce, & Howes, 2006). To date, research exploring the utilization of health care among rural residents

continues to place emphasis on barriers to utilization versus providing reports of actual utilization.

Taken together, the discrepancy between the need for rural formal social support services and health care services and the actual utilization of formal services and health care calls into question why rural residents hesitate to participate in programs and services they appear to need. Formal social support and health care services are often not prepared to handle the magnified needs and cultural barriers of rural residents (Templeton & Mitchell, 2004).

Barriers to utilization of formal social support services and health care. Rural residents are characterized as having an underlying culture of independence and self-reliance (Breams et al., 2006). These traits are thought to foster personal barriers such as feelings of being stigmatized, socially ostracized, and the target of gossip creating a reluctance to seek formal support services as well as health care (Geauvreau, 1996; Wagonfield, 2003). Research by Cochran and colleagues (2002) found that the rural social support programs did not meet the needs of rural families due to the lack of flexibility of these programs. Emerging research confirms and expands upon prior research identifying time limitations, fear of the unknown, low health priority, and lack of companionship or support as reported barriers to seeking preventative health services among rural low-income residents (Murimi & Harpel, 2010). From their findings, Murimi and Harpel conclude that low-income rural individuals have a health literacy gap interfering with their utilization of services (p. 280). This literacy gap impedes recipients of formal social support services as they experience difficulties completing paperwork and providing supporting documentation (Hasting, Taylor, & Austin, 2005). These

factors combined with the traditional values of self-reliance and independence have been shown to contribute to the reluctance of seeking medical care until health conditions cause impairment in daily functioning (OTA, 1990; Bryant & Mah, 1992; Walker, Lucas, & Crespo, 1994; Reding et. al., 1997; Strickland & Strickland, 1996).

Further, reluctance to seek formal social support services and health care is exasperated by a lack of transportation, inadequate health insurance, and depleted financial resources (Merwin, Snyder, & Katz, 2006). Arcury and colleagues (2005) found that distance to care was a determining factor in the number of health care visits, where a greater distance resulted in fewer routine visits, a finding supported in other research where health care utilization decreased as travel time and distance increased (Pierce, Williamson, & Cruse, 1998; Hippisley-Cox, & Pringle, 2000; Polsky et al, 2006). Simmons, Anderson, and Braun (2008) found that having some form of health insurance increased the likelihood of rural women receiving appropriate medical care and filling prescriptions. Their research further demonstrated that having a “regular” doctor significantly influenced the utilization of preventative and treatment based health care (Simmons et al.). Yet those without health insurance are less likely to have a medical provider or utilize preventative medical services within their community (Taylor, Cohen, & Machlin, 2001). The high cost of basic medical care prevents low-income families from seeking treatment for treatable illnesses (Hastings, Taylor, & Austin, 2005).

Factors that limit access to formal social support services and health care services combined with cultural and personal barriers experienced by rural populations result in under-utilization of formal social support and health care services where available. This under-utilization among rural populations results in “unrecognized and undiagnosed

problems" (Stamm et al., p. 300) which in turn, further contribute to health disparities among rural individuals. While improvement in health care access is a central goal across rural communities (Gamm, Hutchison, Dabney, & Dorsey, 2003) in isolation, these efforts are likely to have limited impact on health outcomes. Research suggests that only between 3.5 to 10% of health outcomes are accounted for by the *actual delivery of health care* (Hartley, 2004; Williams, D.R., 2002). Put in other words, a minimum of 90% of health outcomes must be explained by something other than health care delivery. This suggests that bridging the gap to access will only partially impact the health disparities experienced within this population.

Intersetting Knowledge

The behavioral processes present in multisetting participation are hypothesized to impact affective and cognitive processes inherent in intersetting knowledge. Thus, intersetting knowledge may bridge the gap between multisetting participation and the subsequent impact on the health and well-being experienced by rural low-income women. *Intersetting knowledge* refers to an individual's ability to recall and apply information from one setting to another. In this study, intersetting knowledge is reflected by reports of perceived social support and indicators of perceived self-sufficiency. As individuals participate in multiple settings, they bring knowledge they have acquired from one setting into another. The various settings in which rural low-income women participate offer opportunities to build and maintain social relationships. For example, participation in a work setting may result in the building and maintenance of a supportive friendship with a co-worker, a resource that is available in settings beyond the workplace. Similarly, participation across settings offers opportunities to build and maintain self-sufficiency by

developing knowledge and skills in one setting that can be productively applied in other settings as well. Intersetting knowledge is hypothesized to be impacted both directly by multisetting participation and indirectly by factors associated with health risk through multisetting participation. In turn, intersetting knowledge is hypothesized to directly impact reported health problems.

Perceived Social Support. Rural communities have dense social networks, social ties of long duration, and a shared history among residents (Phillips & McLeroy, 2004). Understanding social networks within rural communities can be "powerful and effective" when paired with formal social support services (Riebschleger, 2007, p. 207). Historically, social support has been identified as an important determinant of health risk serving as a protective factor. In other words, a lack of social support increases the susceptibility to health problems, as the protective qualities gained through social support are not available. In their pioneering study of social contact and mortality, Berkman and Syme (1979) found that individuals with low levels of social contact had mortality rates that were two to four and a half times greater than those with strong social ties. Although Berkman and Syme were not studying social support per se, their research documents the importance of social relationships to health outcomes. Subsequent research suggests that social support provides access to well-being through its ability to provide a protective barrier during stressful situations or life transitions, as well as enhancing ones personal strengths (Caplan, 1974; McCubbin & Boss, 1980).

Emerging research indicates that low-income individuals who report high levels of perceived social support are less likely to utilize formal social support services despite meeting qualification guidelines (De Marco, & DeMarco, 2009). In a study of low-

income women, Green and Rodger (2001) found that women who believed that they had tangible and belonging support reported higher levels of perceived mastery and lower levels of stress. Green and Rodger further argued that women who established strong social networks also demonstrated greater mastery and control over their lives.

In a study of rural health care needs, Weinert and Long (1987) found that rural residents generally viewed social support consistently higher than residents living in urban settings. The researchers further hypothesized that the higher perception of social support lead to decreased utilization in formal resources. Cochran and colleagues (2002) found that rural residents viewed family as central to well-being due to geographic isolation. In her study of a population of rural low-income women, Seiling (2006) found that positive social support increased physical and mental health through facilitating educational and employment opportunities, as well as access to housing, childcare, and transportation. Additional research supports earlier conclusions that social support contributes to better health outcomes (Surkan, Peterson, Hughes, & Gottlieb, 2006; Bovier, Chamot, & Perneger, 2002).

Perceived Self-Sufficiency. Perceived self-sufficiency is hypothesized to be a link in the process by which utilization of formal social support and health care services impacts reported health problems. Broadly defined, self-sufficiency refers to an individual's ability to make use of acquired knowledge and skills to solve problems and productively move forward. Self-sufficiency is frequently associated with economic stability of an individual, and often the goal of government subsidy programs. Yet there is not a clear definition, or evaluative tool designed to measure levels of self-sufficiency (Hawkins, 2005). Research asserts that self-sufficiency is more than mere financial

security, suggesting that it is a process rather than a goal (Daugherty & Barber, 2001; Gowdy & Pearlmutter, 1993; Braun, Olsen, & Bauer, 2002). Gowdy and Pearlmutter's (1993) research suggest that self-sufficiency reflects dimensions of autonomy, financial security and responsibility, family and self well-being, and basic assets for living in the community. In their research on the impact of community health programs on low-income mothers Becker, Kovach, and Gronseth (2004) define self-sufficiency as an individual's ability to maintain social, political, economic, and psychological control through the ability to access information, knowledge, and skills, as well as make decisions. This control allows individuals to define their own needs, find solutions, and move forward to the next need. However, beyond the research of Becker and colleagues, there is no other research explicitly linking the concept of self-sufficiency to health outcomes.

Summary and Hypotheses

Rural women experience an overwhelming number of health concerns including diabetes, cancer, hypertension, heart disease, and lung disease (Centers for Disease Control and Prevention, 2000). Ensuring access to health insurance and health care services are important, but research suggests that health is a result of a multitude of additional factors including economic, cultural, physical, and emotional factors that are related to residing in a rural community. Yet an understanding of how these factors influence the interactional nature of the mesosystem found in the behavioral, affective, and cognitive processes is unclear. This study examined how factors associated with health risk influenced the report of current health problems and the report of health problems over time, and the subsequent influence on the behavioral, affective, and

cognitive processes within the mesosystem among rural low-income women. Specifically, this study explored the mesosystemic processes through the behavioral processes evident in multisetting participation and the affective and cognitive processes inherit in intersetting knowledge (figure 2). This study endeavored to test the following four hypotheses:

1. *Factors associated with health risk* will be associated with *Reported Health Problems at Time 1*. This hypothesis is represented on figure 2 as path A.
2. *Time 1 Reported Health Problems* will be associated with *Time 2 Reported Health Problems*. This hypothesis is represented on figure 2 as path B.
3. *Multisetting participation at Time 1* will mediate the relationship between *Reported Health Problems at Time 1* and *Reported Health Problems at Time 2*. This hypothesis is represented on figure 2 as path C D.
    (a) Time 1 reported health problems will be associated with multisetting participation such that, an increase in reported health problems will be associated with a decrease in multisetting participation. This hypothesis is represented on figure 2 as path C.
    (b) Time 1 multisetting participation will be positively associated with Time 2 reported health problems such that, as multisetting participation increases, reported health problems decrease. This hypothesis is represented on figure 2 as path D.
4. *Intersetting knowledge at Time 1* will amplify the mediating effect of *Multisetting Participation*.

(a) Time 1 multisetting participation will be positively associated with Time 1 intersetting knowledge such that, as multisetting participation increases, intersetting knowledge increases. This hypothesis is represented on figure 2 as path E.

(b) Time 1 intersetting knowledge will be associated with Time 2 reported health problems such that, an increase in intersetting knowledge will be associated with a decrease in reported health problems at time 2. This hypothesis is represented on figure 2 as path F.

Data and Methods

To examine the hypothesized relationships among factors associated with health risk, reported health problems at Time 1, multisetting participation, intersetting knowledge, and reported health problems at Time 2 among rural low-income women, the current investigation employs data from *Rural Families Speak* (RFS). RFS, a longitudinal multistate research study, assessing the well-being of rural low-income mothers and their families as policies and programs shifted due to welfare reform. Three waves of data were collected between 1998 and 2000. The RFS dataset is comprised of 465 participants from non-metropolitan counties in fourteen states[1] across the U.S. (populations between 2,500 and 19,000), as identified through the Butler and Beale (1994) coding scheme. Eligible RFS participants were women 18 years old or older with at least one child 13 years of age or younger and a family income below 200% of the poverty threshold. RFS participants were recruited through a self-selection process where informational fliers with eligibility criteria were posted at sites that participants might frequent, including Head Start program sites, Medicaid and WIC offices, and adult education sites. To ensure sensitivity to ethical issues, RFS investigators obtained necessary approvals from the Institutional Review Boards of each investigator's university. All RFS participants provided consent to participate in the study and were informed of the purpose of the study, their role and definition of participation, their rights, and confidentiality procedures. All identifying information was previously separated from the data set.

Sample

The sample for this study was drawn from the *Rural Families Speak* (RFS) data set. Time 1 data is derived from Wave 1 of RFS, where approximately 414 women

[1] Participating were: California, Colorado, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New York, Oregon, and Wyoming.

completed the interview protocol; Time 2 data is derived from Wave 2 of the RFS data set, where approximately 315 women completed the interview protocol. Using listwise deletion only those cases in Wave 2 with full health data were utilized, resulting in a sample of 304. All demographic variables are drawn from Wave 1 and include cases of only those with full health data at Time 2 (table 1).

Because RFS eligibility criteria specified that participants had to be females, 18 years of age or older, living in families with incomes below 200% of the federal poverty line, and be the primary caretaker of at least one child aged 13 or younger; the sample is relatively homogenous with little variability in demographic measures. The demographics identified as measures within the current study are described below and presented in Table 1.

Measures

Factors of Health Risk: Demographic Characteristics *(Time 1).* Factors of health risk are operationalized utilizing demographic variables that have historically been linked to health. Descriptive statistics are provided in table 1, whereas table 3 provides a measure overview.

Age: Age is represented as a participant's reported age at the Time 1 interview, and is measured in years. Participants on average were 29.5 years of age (range 18-58) at time 1.

Marital Status: Marital status is represented as the participant's response to their relationship status at Time 1(1= Single, 2=Divorced, 3=Separated, 4=Living with Partner, 5= Married), where a large portion of the participants reported being married (42.8%) or living with a partner (16.1%). In order to understand the unique relationship between

marital status and reported health problems at Time 1, each status designation was independently estimated within the analyses. Marital Status responses were recoded into new variables as demonstrated below, where the responses that were different than the status designation of interest were coded as 0.

Single. The single designation is based on the participants who identified themselves as single (1= Single, 0=Divorced, Separated, Living with Partner, and Married).

Married. The married designation is based on the participants who identified themselves as married (1= Married, 0= Single, Divorced, Separated, Living with Partner).

Living with Partner. The living with partner designation is based on the participants who identified themselves as living with a partner (1= Living with Partner, 0= Single, Divorced, Separated, and Married).

Separated. The separated designation is based on the participants who identified themselves as separated (1=Separated, 0=Single, Divorced, Living with Partner, and Married).

Divorced. The divorced designation is based on the participants who identified themselves as divorced (1=Divorced, 0=Single, Separated, Living with Partner, and Married).

Level of Education: Level of education is based on the participant's response to the highest level of education completed at the Time 1 interview. Participant's educational levels ranged from less than an eighth grade education to a graduate degree, with 17.8% having some high school education or less, 30.1% of the participants holding

either a high school diploma or a GED, and 40.8% having either vocational training or attended some college without degree attainment.

Ethnicity: Ethnicity is based on a participant's self-identified ethnicity. A large portion of the participants within the sample identified themselves at white (68.1%), followed by Hispanic (18.4%), and African Americans (6.9%), the sample is representative of the total RFS sample. In order to understand the unique relationship between minority status and reported health problems at Time 1 and Time 2, Hispanic and African American designation were independently estimated within the analyses. Ethnicity responses were recoded into new variables as demonstrated below, where the responses that were different than the ethnic designation of interest were coded into 0.

Hispanic. The Hispanic designation is based on the participants who identified themselves as Hispanic/Non-white (1= Hispanic, 0= White, African American, Native American, Asian, Multiracial, and Other).

African American. The African American designation is based on the participants who identified themselves as African American (1= African American, 0= White, Hispanic, Native American, Asian, Multiracial, and Other).

Health Insurance: Health insurance is based whether a participant reported having insurance for themselves at the Time 1 interview (1=Yes, 0=No), with over half (64.7%) of the participants reporting having some form of health insurance.

Currently Employed: A participant's employment status is based whether the participant was currently employed either part-time or full-time at the Time 1 interview (1=Yes, 0=No); almost half of the participants were employed (45.4%) at the Time 1 interview.

Mediating Variables

Multisetting Participation (*Behavioral Processes*).

In this study, behavioral processes refer to an individual's participation in two or more microsystem settings, entailing explicit behaviors in which an individual engages. Thus behavioral processes are reflected in a participant's multisetting participation (table 4). Through the utilization of formal social support services and health care settings, multisetting participation is hypothesized to be an effective strategy for accessing the resources needed to address barriers to health and well-being experienced by rural low-income women.

Multisetting Participation: Utilization of Formal Social Support Services (Time 1). Utilization of formal social support services is operationalized using participant's reported participation in federally funded assistance programs at time 1 (e.g. WIC, Free/reduce lunch program, Tax credits, Childcare assistance, Housing assistance, Energy assistance, Transportation assistance, Diversionary assistance, Educational assistance, and Medicaid). The count represents the sum total of "yes" responses indicating participation. In other words, a lower score would indicate that the participant is participating in fewer federally based programs.

Multisetting Participation: Healthcare Utilization (Time 1). Healthcare utilization is operationalized using a continuous variable where

participants provided an estimated number of visits to a health care provider within the last 12 months at the Time 1.

Intersetting Knowledge (*Latent Variable*).

Intersetting knowledge is hypothesized to bridge the gap between multisetting participation and the subsequent impact on the health and well-being experienced by rural low-income women. Intersetting knowledge refers to an individual's ability to recall and apply information from one setting to another. In order to capture intersetting knowledge among this sample, a latent construct was created that represents both the affective and cognitive processes. Affective processes are estimated utilizing the *Parenting Ladder* (Richards, 1998), as cognitive process were estimated utilizing the *Even Start Life Skills and Community Resource Assessment* (Richards).

Affective Processes: In this study, the *affective processes* of interest are captured through an individual's report of perceived social support and perceived self-sufficiency. Because the sample is comprised of women who have at least one child under the age of 13, perceptions of social support and self-sufficiency were assessed using the *Parenting Ladder,* an instrument developed for utilization in a statewide evaluation of the Healthy Start Program in Oregon (Richards, 1998). The Parenting Ladder has a reported reliability coefficient of $a = .87$, reliability for this sample $a = .856$.

Intersetting Knowledge: Perceived Social Support *(Time 1).*

Affective perceived social support is operationalized using select

items from the *Parenting Ladder*. The six selected items from the *Parenting Ladder* assess the degree to which the participant has people on whom to rely for support with a 6-point Likert scale that ranges from low to high. Items include: other parents for you to talk to, someone to help you in an emergency, someone to offer helpful advice and moral support, someone to relax with, a professional to talk to, and overall satisfaction with the amount of support.

Intersetting Knowledge: Perceived Self-sufficiency *(Time 1).* Affective self-sufficiency is operationalized using select items from the *Parenting Ladder*, which captures an individual's perceived confidence in parenting. These items were chosen as the sample utilized in this study were all currently parenting at least one child. The seven selected items assess the degree of confidence a participant has in their abilities as a parent from low to high. Items include: Knowledge of children's growth and development, confidence that you know what is right for child, ability to create safe home for child, success in teaching child to behave, ability to find fun activities of interest to child, amount of stress right now, ability to cope with stress.

Cognitive Processes: In this study, the *cognitive processes* of interest are captured through an individual's report of perceived social

support within the community and perceived self-sufficiency as related to the ability to accomplish tasks critical in everyday living.

Intersetting Knowledge: Perceived Social Support *(Time 1).* Perceived social support is cognitively operationalized using the community resource component of the *Even Start Life Skills and Community Resource Assessment* (Richards, 1998). Through a series of 20 yes/no questions the **community resource component** assesses the degree in which participants are aware of available health and social services in their community at Time 1. The total count represents the sum total of "yes" responses indicating knowledge of where to get help within the community, with a reliability coefficient of $a = .888$.

Intersetting Knowledge: Perceived Self-sufficiency *(Time 1).* Cognitive self-sufficiency is operationalized utilizing the **life skills component** of the *Even Start Life Skills and Community Resource Assessment*. Participants responded on a yes/no basis to questions related to the ability to accomplish tasks critical in everyday living (e.g., obtaining a driver's license, car insurance, car registration, health insurance, checking account, local library card; developing a good credit history, ability to write personal checks, manage bills, make family budgets, stretch groceries at the end of the month, registering to vote, applying for credit cards, preparing meals, getting telephone service, working with landlord,

filing a consumer complaint, talking to children's teachers, applying for a job, creating a resume, joining local clubs, and creating a personal support system). The count represents the sum total of "yes" responses indicating a participant's perceived level of life skills, with a reliability coefficient of $a = .778$. In other words, as the sum total increases a participant perception of ability to accomplish critical tasks increases.

Health Outcomes of Rural Low-Income Women (*Time 1 and Time 2).*

The health outcomes of rural low-income women are operationalized using a 29-item scale at both Time 1 and Time 2 in which participants responded on a yes/no basis if they experienced specific health problems (e.g. High blood pressure, Diabetes, Cancer, Depression, Joint Pain, Fatigue, Allergies, Frequents colds, and Headaches). The count represents the sum total of "yes" responses indicating reported health problems.

Data Analysis

The analysis occurred in two steps. First, the relationships between the variables were assessed using bivariate correlations in *SPSS*. Bivariate correlations are presented in Table 2. Table 2 shows the correlation matrix with means and standard deviations for the observed variables. Statistically significant correlations are presented at both the $p \leq .05$ and $p \leq .01$ levels. Next, separate Structural Equation Models (SEM) were developed to test each hypotheses using *Mplus*. Structural Equation Modeling allows for the examination of the specified relationships between the variables of interest (Bengtson, 2005) upon the assumption that the variables of interest would affect reported health problems at Time 2, as outlined in the previously stated hypotheses (Kline, 1998). All

models are presented with fully standardized (STDYX) coefficients. Maximum Likelihood (ML) was utilized to account for missing data, as ML utilizes available data from variables with values to obtain likelihood values of missing data points (Enders & Bandolos, 2001).

In order to assess the quality of each model three fit indices were utilized. First, the most common fit indices, the chi-square (x^2) test of model fit test the overall fit of a model. A non-significant chi-square value indicates a good fit, whereas a significant value would indicate that the given model's covariance structure is significantly different for the observed covariance matrix (Kline, 1998). Due to the sensitivity to sample size additional fit indices are employed.

The Comparative Fit Index (*CFI*) and Tucker Lewis Index (*TLI*) are similar in nature as each compares the fit of the model to a null model or independence model, respectively. In both cases the indices vary from 0 to 1, where indices greater than .90 indicate an acceptable fit for the estimated model (Kline, 1998).

The third indicator of model fit employed is the Root Mean Square Error of Approximation (*RMSEA*), which is the measure of incongruence per degree of freedom (Klein, 1998). An *RMSEA* value near .05 or less than indicates close approximate fit, values between .05 and .08 suggest reasonable error of approximation, and greater than .10 suggest poor fit (Browne & Cudeck, 1993).

Results

The purpose of this study was to explore the behavioral, affective, and cognitive processes, evident in multisetting participation and inherent in intersetting knowledge, to gain a better understanding of how the interactional nature of the mesosystemic processes

are influenced by and influence reported health problems among low-income women. In order to understand the well-documented relationship between the determinants of health and health outcomes among rural low-income women, the first two models estimate the relationship between the factors associated with health risk and the subsequent affect on reported health problems at Time 1 and Time 2. The results are presented in models 1 and 2 accordingly, with fully standardized (STDYX) coefficients. Model 3 introduces hypothesis 3, which estimates the relationship between reported health problems at Time 1 and Time 2 when multisetting participation, the mediating variable, is added to the model. Lastly model 4 introduces intersetting knowledge, the latent construct constructed of both affective and cognitive processes, establishing the interactional nature of the mesosystem through estimating the relationship between multisetting participation, the behavioral processes, and reported health problems at Time 2.

Hypothesis 1

The first model (model 1) examines the cross-sectional relationship between reported health problems at Time 1 and the factors associated with health risk at Time 1. These results indicate that when controlling for the combined factors of health risk at Time 1, a standard deviation (SD) increase in a participant's age is associated with a .161SD ($p \geq .05$) *increase* in reported health problems. At the same time a standard deviation increase in employment status is associated with a .216SD ($p \geq .001$) *decrease* in reported health problems at Time 1. All other factors associated with health risk did not significantly influence reported health problems at Time 1.

Hypothesis 2

The second model (model 2) examines the relationship between the factors associated with health risk at Time 1, reported health problems at Time 1, and reported health problems at Time 2. The relationship between the factors associated with health risk at Time 1 and reported health problems at Time 1 remain consistent with the findings from the first model, with only a slight decrease in effect. Further, a standard deviation increase in reported health problems at Time 1 is associated with a .709SD (p <. 001) *increase* in reported health problems at Time 2. It is important to note that reported health problems at Time 2 are lower than reported health problems at Time 1 (table 2), a difference that is statistically significant (t (286)= 3.515, p<. 001). Participants reported more health problems (mean=4.22) at Time 1 than at Time 2 (mean=3.69).

Results also indicate several indirect effects between the factors associated with health risk and reported health problems at Time 2. For example, a standard deviation increase in age is expected to *increase* reported health problems at Time 2 indirectly through reported health problems at Time 1 by .110SD. Whereas being employed is expected to *decrease* reported health problems at Time 2 indirectly through reported health problems at Time 1 by .150SD.

It is important to note that the model 2 does not fully explain the relationship between the factors associated with health risk and reported health problems at Time 1 and/or Time 2 as evident in the approximate variability in reported health problems at Time 1 (R-square= .088, p$\geq$ .05) and reported health problems at time 2 (R-square= .502, p$\geq$ .001). These findings suggest that the factors associated with health risk only explain

a portion of the health and well-being inequalities experienced among rural low-income women.

Hypothesis 3

Building upon the established relationships between the factors associated with health risk at Time 1, reported health problems at Time 1, and reported health problems at Time 2; hypothesis 3 introduces the interplay between the individual's microsystem, the environment, and institutions by introducing multisetting participation. Thus hypothesis 3 states that multisetting participation at Time 1 will mediate the relationship between reported health problems at Time 1 and reported health problems at Time 2. The mediating relationship and results are presented in model 3, with fully standardized (STDYX) coefficients. The model yields reasonable fit indices (Chi-Square 69.683, df=40, P-Value= 0.0025; CFI=. 888; TLI= .838; RMSEA= .049), however the results do not fully support the hypothesis in that, multisetting participation (reported visits to a health care provider and utilization of formal social support services) is not *significantly* associated with reported health problems at Time 2. The findings further do not support the hypothesized relationship between reported health problems at Time 1 and multisetting participation. Rather the opposite was found, a standard deviation increase in reported health problems at Time 1 is associated with an *increase* in multisetting participation [reported visits to a health care provider (.238SD, $p \geq .001$), and utilization of formal social support services (.141SD, $p \geq .05$)]. In other words, an increase in reported health problems at Time 1 among rural low-income women is associated with an increase in multisetting participation; yet multisetting participation is not *directly* associated with reported health problems at Time 2.

Results indicate several indirect effects between the factors associated with health risk and multisetting participation. For example, a standard deviation increase in age is expected to *increase* reported visits to a health care provider indirectly through reported health problems at Time 1 by .0367SD. Whereas being employed is expected to *decrease* reported visits to a health care provider indirectly through reported health problems at Time 1 by .050SD. Similar indirect effects are found among utilization of formal social support services, where a standard deviation increase in age is expected to *increase* utilization of formal social support services indirectly through reported health problems at Time 1 by .022SD. An expected *decrease* of .030SD in the utilization of formal social support is expected for those who are employed, indirectly through reported health problems at Time 1.

Although the findings in model 3 did not support the hypothesized relationship between reported health problems at Time 1, multisetting participation, and reported health problems at Time 2, results indicate that mesosystemic processes, specifically behavioral processes, are influenced by factors associated with health risk.

Hypothesis 4

Hypothesis 4 proposes that mesosystem influences extend into cognitive and affective processes establishing a mental mesosystem, processes inherently seen in intersetting knowledge. Model 4 estimates that intersetting knowledge in Time 1 will amplify the mediating effect of multisetting participation such that, as multisetting participation increases so does intersetting knowledge, and in turn decreases reported health problems at Time 2. The results from model 4 extend the previous findings and are presented with fully standardized (STDYX) coefficients. The model did not perfectly

reproduce the covariance structure of the data, as the fit indices indicate a “bad” fit (Chi-Square 236.308, df=108, P-Value= 0.000; CFI=.764; TLI= .711; RMSEA= .063).

The model partially supports hypothesis 4 in that, as a standard deviation *increase* in utilization of formal social support services is associated with a .219SD ($p \geq .05$) *increase* in intersetting knowledge, controlling for reported visits to a health care provider. However when controlling for utilization of formal social support services, reported visits to a health care provider does not significantly effect intersetting knowledge. Results from the model also indicated that a standard deviation *increase* in intersetting knowledge is associated with a .108SD ($p \geq .05$) *increase* in reported health problems at Time 2, which does not support the hypothesized relationship.

Results also indicate several indirect effects between the factors associated with health risk, multisetting participation, and intersetting knowledge. For example, a standard deviation increase in age is expected to *increase* intersetting knowledge indirectly through utilization of formal social support services and reported health problems at Time 1 by .005SD. Whereas being employed is expected to *decrease* intersetting knowledge indirectly through utilization of formal social support services and reported health problems at Time 1 by .006SD.

Although the hypothesized relationship is not supported, it is important to reiterate the slight decrease in reported health problems over time (t (286)= 3.515, p<.001). Hypothesis 3 revealed that multisetting participation was not *directly* associated with reported health at Time 2, however the hypothesized relationship between reported health at Time 2 and multisetting participation is established with the addition of intersetting knowledge to the model. Indicating that the behavioral, affective, and cognitive processes

of rural low-income women are potentially influenced by reported health problems at Time 1, and moderately influence reported health problems at Time 2.

Additional Analyses

Due to the less than ideal fit statistics from models 3 and 4, an additional two models were estimated in order to understand if the limited variability found among the factors associated with health risk subsequently affected model fit. After trimming the factors associated with health risk, models 5 and 6 re-estimated hypotheses 3 and 4 respectively. Results are presented with fully standardized (STDYX) coefficients.

Model 5 perfectly reproduced the covariance structure of the data, as indicated in by the fit indices (Chi-Square .0558, df=1, P-Value= 0.4552; CFI=1.0; TLI=1.012; RMSEA= .000). A similar finding occurred in model 6, where the fit indices dramatically improved upon trimming the factors associated with health risk (Chi-Square 35.223, df=17, P-Value= 0.0058; CFI=.957; TLI=9.28; RMSEA= .059). However, despite the significant change in the fit indices of both models, the relationships between reported health problems at Time 1, multisetting participation, intersetting knowledge, and reported health problems at Time 2 did not change, thus providing support to the previously reported findings.

Discussion

Emerging research indicates that individual health and well-being result from a complex array of environmental, social, and psychological factors. These factors, among which there are vast differences between urban and rural settings (Mulder, Kenkel, Shellenberger, Constantine et al., 1999), have been shown to create differences in susceptibility to health problems and overall health (Coward, 2006). Yet there is little

understanding of how environmental, social, and psychological factors influence mesosystemic interactions among rural low-income women. Given the gap in research literature, this study explored how the factors associated health risk influenced the behavioral, cognitive, and affective processes within the mesosystem among rural low-income women. Understanding how the factors associated with health and well-being influence mesosystemic processes is essential to effective social work practice. Social workers are called upon to provide a culturally competent practice, which encompasses the ability to merge demographic differences and economic diversity between individuals and groups. This study highlights that health and well-being among rural low-income women may not be solely the result of historically defined determinants of health, but a combination of determinants and mesosystemic processes.

Factors Associated with Health Risk

The analysis revealed that among a highly homogenous sample of rural low-income women, two factors emerged as having a statistically significant influence on reported health problems, above and beyond the environmental, social, and psychological factors associated health risk among rural residents and low-income individuals. Current age and employment status were found to be associated with the presence or lack of current health problems, and health problems over time. What may be of more interest is what the analysis did not reveal. Among this sample of rural low-income women ethnicity did not distinguish differences in reported health problems, multisetting participation, or intersetting knowledge. Nor did relationship or marital status. The findings suggest that the factors associated with health risk, and those that may provide a protective layer, may differ from historically defined factors.

Interactional Nature of the Mesosystem

Findings suggest that the mesosystem is interactional, as behavioral, affective, and cognitive processes directly influence each other. Results of this study support the argument that access to health care and formal social support programs *alone* do not improve the reported health of rural low-income women. Neither reported utilization of health care nor utilization of formal social support services were found to have a *direct* significant effect on reported health problems over time. In fact, despite the fact that the rural low-income women from this study utilized slightly more formal social support programs than urban populations (three programs versus two programs) (DeMarco & DeMarco, 2009), their higher rate of utilization did not significantly affect future reported health problems.

By moving beyond a behavioral focus on service utilization and shifting attention to the affective and cognitive processes that make up the mental mesosystem, a missing link between service utilization and future reported health emerges. In particular, findings from this study demonstrate that an increase in intersetting knowledge is significantly influenced by utilization of formal social support services but not by health care visits. Further, increases in intersetting knowledge subsequently increase reported health problems over time. This relationship and the preceding findings suggest two competing interpretations of how the interactional nature of the mesosystem influences health and well-being among rural low-income women.

Intersetting Knowledge Increases Self-awareness. One interpretation of the findings showing that increases in intersetting knowledge are predictive of increases in reported health problems is that women who possess more intersetting knowledge may

also be more self-aware. Perhaps higher utilization of formal social support services enhances intersetting knowledge both affectively as evidenced by increases in perceptions of social support and reported self-sufficiency, as well as cognitively, as evidenced by increases in life skills and knowledge of community resources. Enhanced intersetting knowledge potentially afford women the ability to make use of acquired knowledge and resources and, in turn, allow them to define their own needs, become self-aware, and be able to better identify health related concerns.

The conceptualization of intersetting knowledge in both the educational (Campbell, 1994) and medical fields (McIntosh, 2008) suggest that intersetting knowledge reinforces mesosystem experiences by linking behavioral, affective, and cognitive processes to unlinked microsystems. As applied in this study, the increase in intersetting knowledge as attributed to multisetting participation suggest that the affective and cognitive processes experienced through the utilization of formal social support programs subsequently were applied within the microsystems of the rural low-income women. The use of prior experiences, or intersetting knowledge, affords participants the perception of higher levels of social support and self-sufficiency. This interpretation fails to explain the lack of significance between utilization of health care and intersetting knowledge.

Rural Independence and Fear of Social Stigma. A competing interpretation of the findings demonstrating increases in intersetting knowledge as predictive of increases subsequent reported health problems attributes the relationship to the under-lying rural culture. As previous research has established, rural individuals are often reluctant to access social support and health care services due to personal barriers, a culture of self-

reliance, and lack of autonomy (Breams et al., 2006). Of the rural low-income women who sought and engaged in more formal social support services and reported an increase in perceived social support and self-sufficiency, it is conceivable that they did not further apply the acquired knowledge and resources in an effort to lessen the perceived stigma associated with their initial utilization of formal social support and health care services. Failure to apply their intersetting knowledge may have contributed to worsening reports of health problems at Time 2.

Previous research on rural culture would lend one to lean toward the rural independence and fear of social stigma interpretation, where the lack of autonomy and fear of stigmatization prevents the full utilization of the interactional nature of the mesosystemic processes among rural low-income women. Although perceived and tangible social support has been linked to higher levels of perceived mastery (Green & Rodger, 2001), well-being (Cochran et al., 2002), and physical and mental health (Seiling, 2006) among rural residents; emerging research suggest that presumed social support associated with individuals living in rural communities might actually hinder access to necessary supportive programs when rural individuals are most vulnerable (Kelly, Shedlosky-Shoemaker, Porter, DeSimone, & Andrykowski; 2011).

Implications

Although findings from this study are not surprising, they reveal interesting implications for social work practice and education. First, findings suggest that attempts to lessen or alleviate disparities in health and well-being among rural low-income women, should embrace an ecological approach. From an ecological stance programs and services focused on behavioral processes, involved in seeking, making use of, and

conforming to program requirements or recommendations; would move toward an integrated holistic approach focused on the interplay between the behavioral, affective, and cognitive processes within the mesosystem to promote health and well-being.

Findings further suggest that a move toward an integrated holistic approach would entail that cultural competency be re-defined to embrace an understanding of rural diversity, in that differences are apparent within and between rural low-income women (Riebschleger, 2007). These differences often extend beyond individual factors or historical definitions of minority status, as each rural community often has set class stratification (Riebschleger) and role assumptions, thus limiting rural low-income women the ability to move beyond oppression.

An understanding of rural culture and the interactional nature of the mesosystem may entail a paradigm shift, moving programs away from urban focused modalities to a more balance perspective of factors associated with health and well-being. A more balanced perspective would allow practice modalities and resources to be tailored to the unique needs of rural communities and individuals. Yet, schools of social work, program models, and practitioners are gravitating toward clinical approaches. A move toward clinical approaches, within the rural context, contributes to the restrictive nature of social service programs, and furthers exasperates the stigma attached with service utilization (Locke & Winship, 2005), subsequently contributing to the differences in health among rural low-income women.

Limitations

As with most research, there are limitations. The sample, although unique in that participants were drawn from a variety of rural communities, is not nationally

representative. Participants in this sample were recruited utilizing a self-selection process though local Food Stamp program sites, Medicaid offices, WIC offices, and adult education sites, which skew findings toward those more likely to participate in formal social support services. Participants were provided incentives to participate in the study. The combined sampling technique, study criteria, and incentive-based participation led to a highly homogenous sample, thus decreasing the variability in factors associated with health risk among rural low-income women. Furthermore, participants drawn from a self-selection process may not represent the experiences of all rural low-income women. It is also important to note that intersetting knowledge, or the affective and cognitive processes, were assessed utilizing an interview style approach. This approach potentially constrained the responses provided for all of the study measures, thus reflecting either higher or lower levels of reported health problems, multisetting participation, and intersetting knowledge. Finally, and maybe the most critical limitation, health among rural low-income women is operationalized using participants self reported health problems, thus lacking the reliability of a standardized measure. However research demonstrates that over time, self-evaluation of one's own health status is considered one of the best indicators of mortality and morbidity (Idler & Kasl, 1991).

Future Directions

This study provides a unique perspective in the area of rural health, poverty, and culture; through the examination of factors associated to health risk, reported health problems, and mesosystemic processes among rural low-income women. Further, this study challenges prior assumptions in that, factors associated to health and well-being may be defined differently within and between rural individuals.

Future research should build upon the models presented in this study, to further explore the multidimensional aspects of the mesosystem found in intersetting communication and in indirect linkage. The ability to assess all four (multisetting participation, intersetting knowledge, intersetting communication, and indirect linkage) mechanisms in which the mesosystem interactions are expressed would allow for a greater understanding of the processes as they occur among rural low-income women.

An understanding of the mesosystemic processes, and the dimensions in which they present, could lead to the understanding of how social networks, cultural influence, and community partnerships within the rural context influence health and well-being. Further models should be applied to a larger data set with a similar sample to determine if findings are generalizable.

Further work in this area will improve knowledge about rural health, poverty, and culture. This knowledge can inform not only social work practitioners, models of practice, and schools of social work but to other fields associated to promoting health and well-being among rural individuals and communities.

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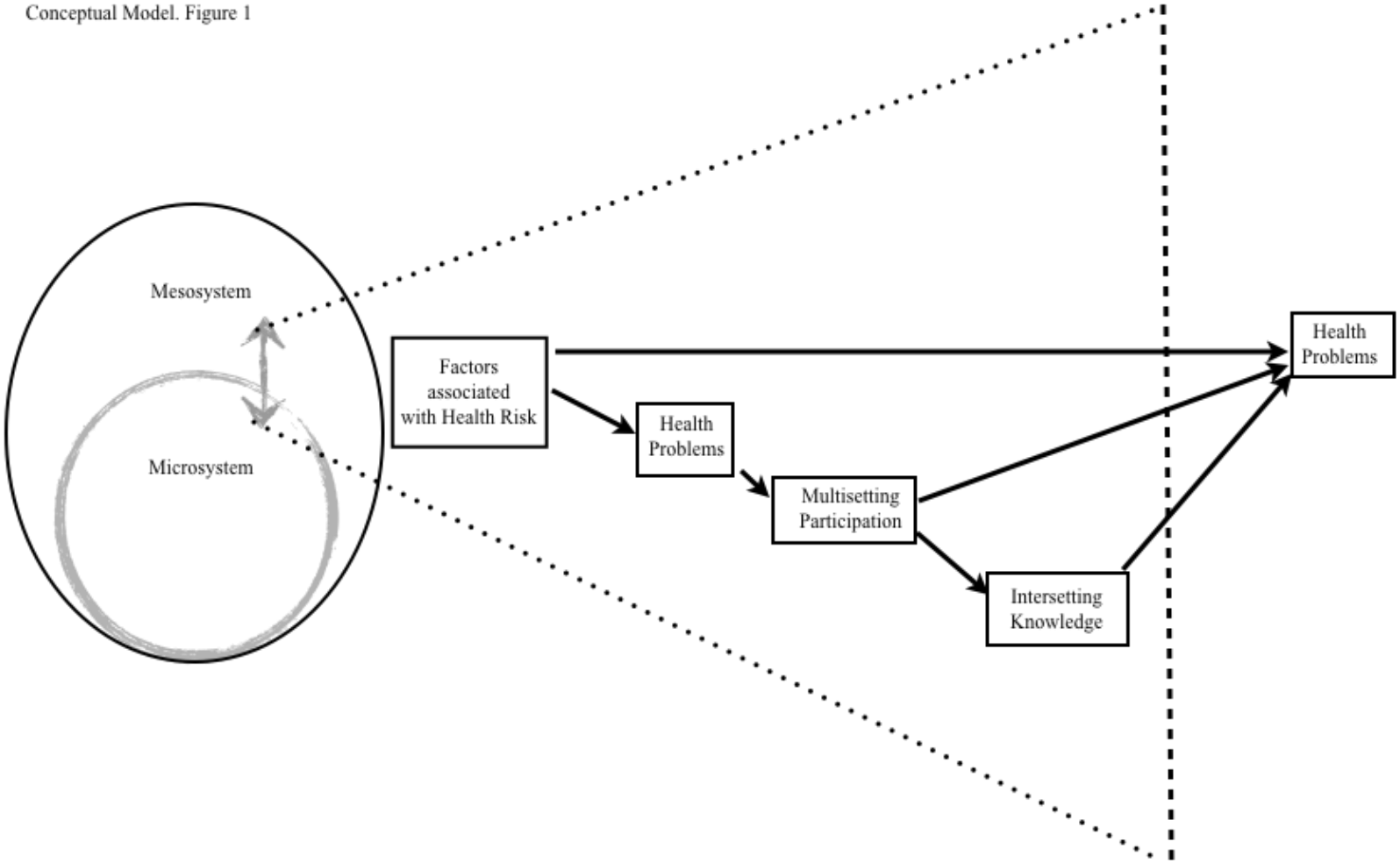
Table 1. Demographic Characteristics (n= 304)	**Percent of Frequency**	**Mean**	**Standard Deviation**
Age		29.5	7.0
Education Level			
8th grade or less	8.2%		
Some High School or Less	17.8%		
High school graduate or GED	30.1%		
Vocational training	14.4%		
Some college	26.4%		
College graduate	2.4%		
Graduate Degree	.7%		
Marital Status			
Single	20.7%		
Divorced	10.9%		
Separated	5.9%		
Living With partner	16.1%		
Married	42.8%		
Race/Ethnicity			
White	68.1%		
Hispanic	18.4%		
African American	6.9%		
Native American	1.0%		
Asian	.3%		
Multi-racial	3.6%		
Other	.3%		
Employment Status			
Employed	54.6%		
Unemployed	45.4%		
Number of Children Residing in Participants Home		2.26	1.24
Participants Age when first gave birth		20.9	4.00
Participant has medical insurance			
Yes	64.7%		
No	35.3%		

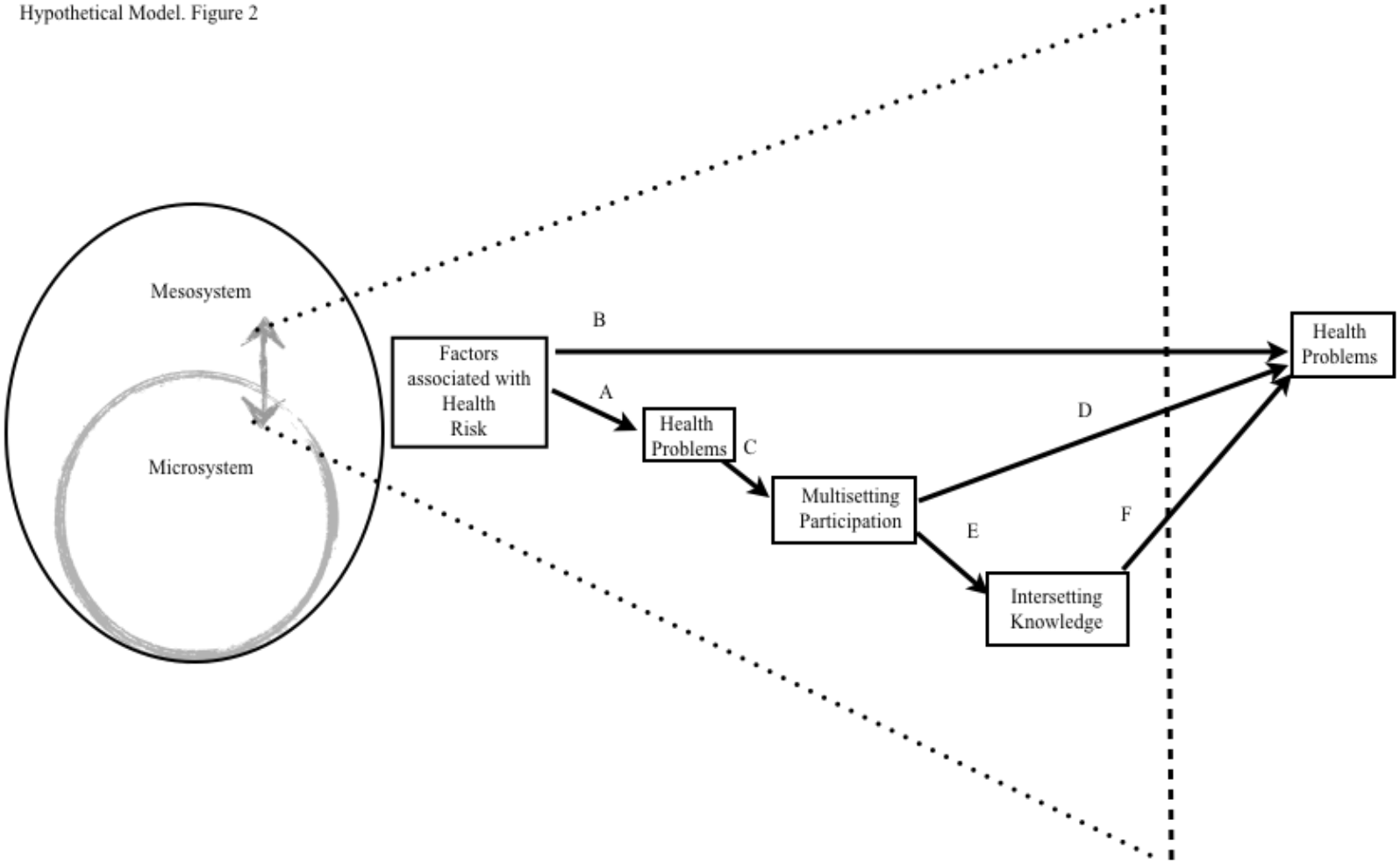
Table 2. Standard deviations, means and intercorrelations between study variables, [** Significant at .01 level; * significant at .05 level (2-tailed)]

	Reported Health Problems at Time 1	Utilization of Formal Social Support	Reported Visits to Health Care Provider	Knowledge of Community Resources	Parental Confidence	Perceived Social Support	Life Skills	Reported Health Problems at Time 2
Reported Health Problems at Time 1	1	.150**	.239**	.020	-.143**	-.220**	-.026	.792**
Utilization of Formal Social Support	.150**	1	-.007	.260**	.016	.050	.086	.100
Reported Visits to Health Care Provider	.239**	-.007	1	.025	-.113	.011	.025	.237**
Knowledge of Community Resources	.020	.260**	.025	1	.149*	.290**	.575**	.102
Parental Confidence	-.143**	.016	-.113	.149*	1	.424**	.238**	-.087
Perceived Social Support	-.220**	.050	.011	.290**	.424**	1	.370**	-.120**
Life Skills	-.026	.086	.025	.575**	.238**	.370**	1	.017
Reported Health Problems at Time 2	.792**	.100	.237**	.102	-.087	-.120*	.017	1
Mean	4.22	3.46	9.22	16.58	30.82	26.59	14.44	3.69
Std. Deviation	3.51	1.55	13.54	4.79	4.92	7.54	3.32	3.29
N= Missing=	287 17	275 29	282 22	234 70	279 25	278 26	217 87	304 0

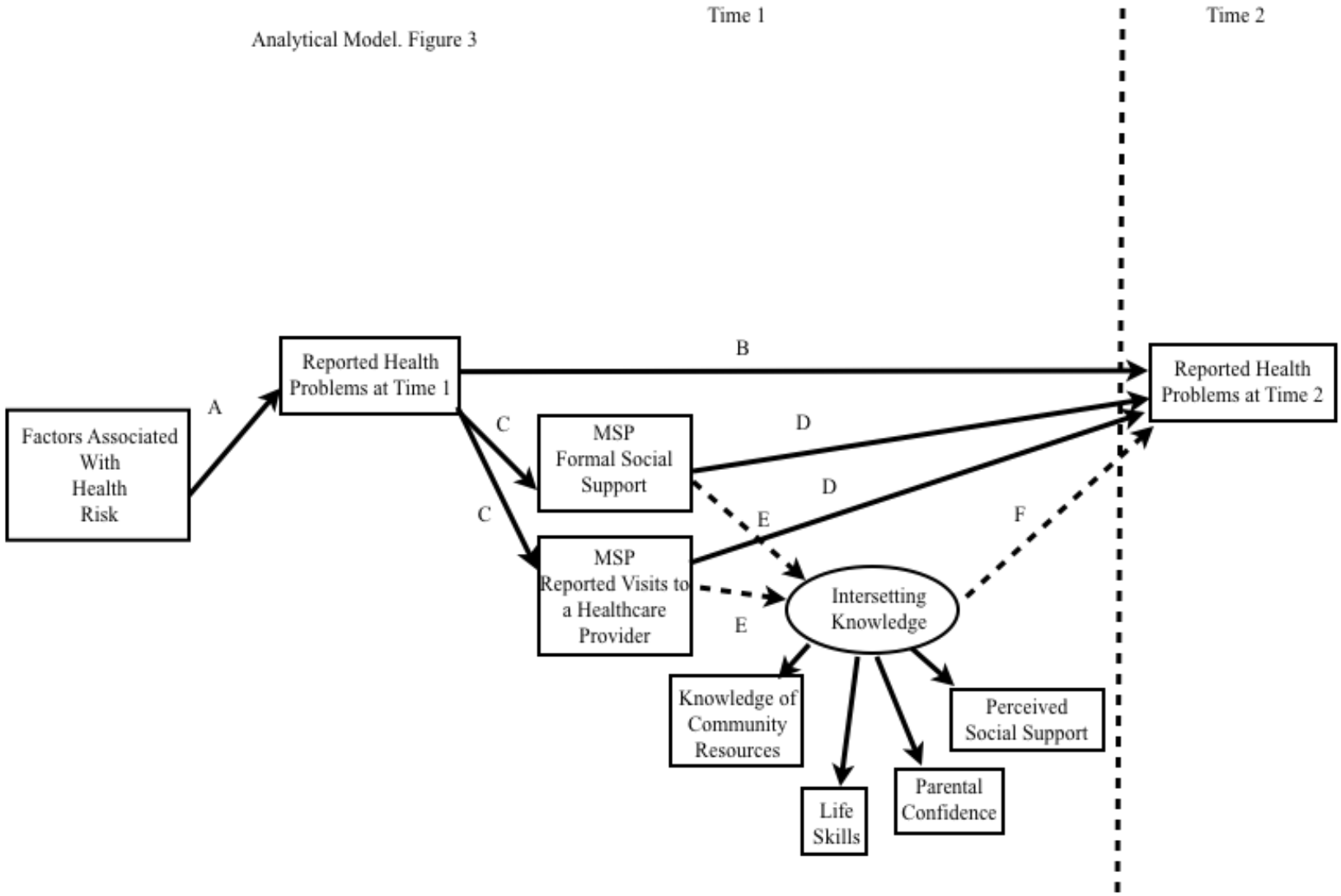
Conceptual Model. Figure 1



Hypothetical Model. Figure 2

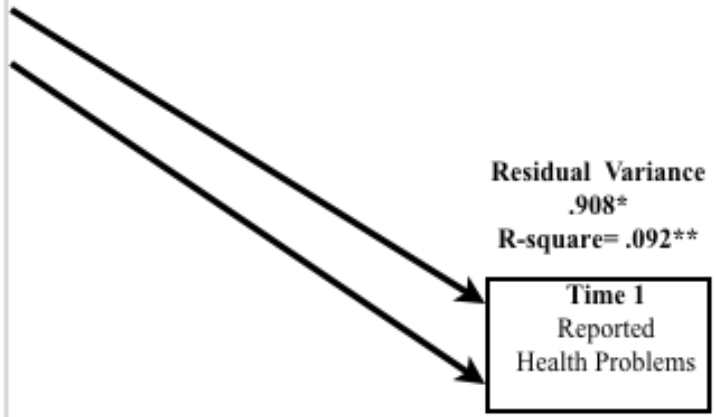


Analytical Model. Figure 3



Model 1. Hypothesis 1

Variable	Estimate
Age	**0.161****
Currently Employed	**-0.216***
Health Insurance	-0.056
Level of Education	0.033
African American	0.020
White	-0.069
Hispanic	0.012
Married	-0.026
Living with Partner	-0.131
Divorced	-0.091
Single	-0.020
Separate	0.034



Chi-Square Test of Model Fit

Value	0.000
Degrees of Freedom	0
P-Value	0.000

CFI/TLI

CFI	1.000
TLI	1.000

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.000

* Significant at .001 level; ** significant at .05 level (2-tailed)

Model 2. Hypothesis 2

Variable	Estimate
Age	**0.155****
Currently Employed	**-0.211***
Health Insurance	-0.052
Level of Education	0.038
African American	0.003
White	-0.068
Hispanic	0.015
Married	0.007
Living with Partner	-0.082
Divorced	-0.058
Single	-0.020
Separate	0.065

Chi-Square Test of Model Fit

Value	18.828
Degrees of Freedom	13
P-Value	0.1285

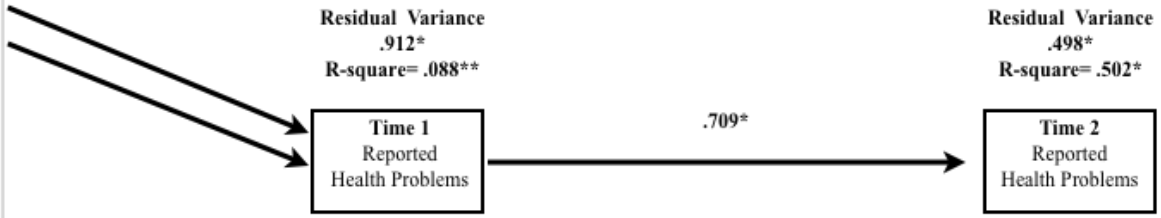
CFI/TLI

CFI	.974
TLI	.945

RMSEA (Root Mean Square Error Of Approximation)

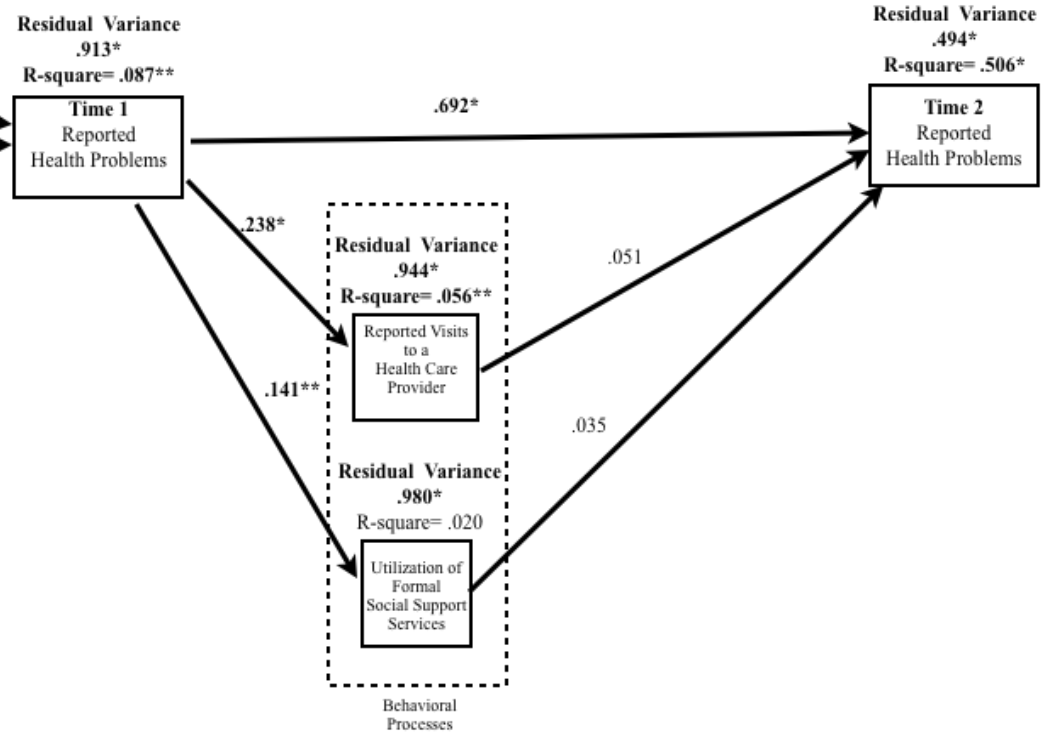
Estimate	0.038

* Significant at .001 level; ** significant at .05 level (2-tailed)
Bolded paths are significant



Model 3. Hypothesis 3

Variable	Estimate
Age	**0.155****
Currently Employed	**-0.210***
Health Insurance	-0.052
Level of Education	0.038
African American	0.003
White	-0.068
Hispanic	0.016
Married	0.007
Living with Partner	-0.083
Divorced	-0.059
Single	-0.020
Separate	0.065



Chi-Square Test of Model Fit

Value	69.683
Degrees of Freedom	40
P-Value	0.0025

CFI/TLI

CFI	0.888
TLI	0.838

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.049

* Significant at .001 level; ** significant at .05 level (2-tailed)
Bolded paths are significant

Model 4. Hypothesis 4

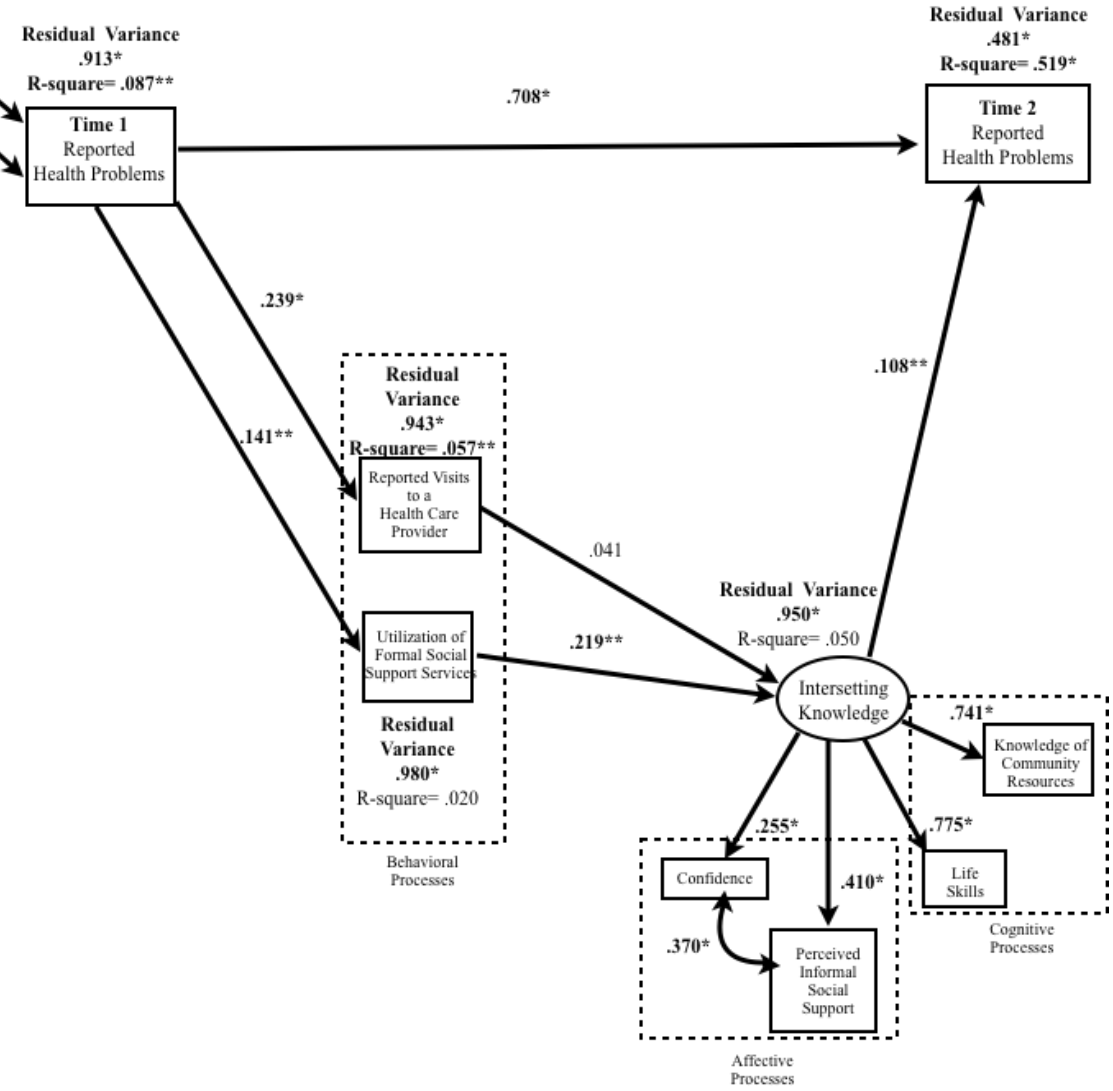
Variable	Estimate
Age	**0.155****
Currently Employed	**-0.209***
Health Insurance	-0.052
Level of Education	0.038
African American	0.003
White	-0.068
Hispanic	0.016
Married	0.007
Living with Partner	-0.082
Divorced	-0.059
Single	-0.020
Separate	0.065

Chi-Square Test of Model Fit
- Value 236.308
- Degrees of Freedom 108
- P-Value 0.0000

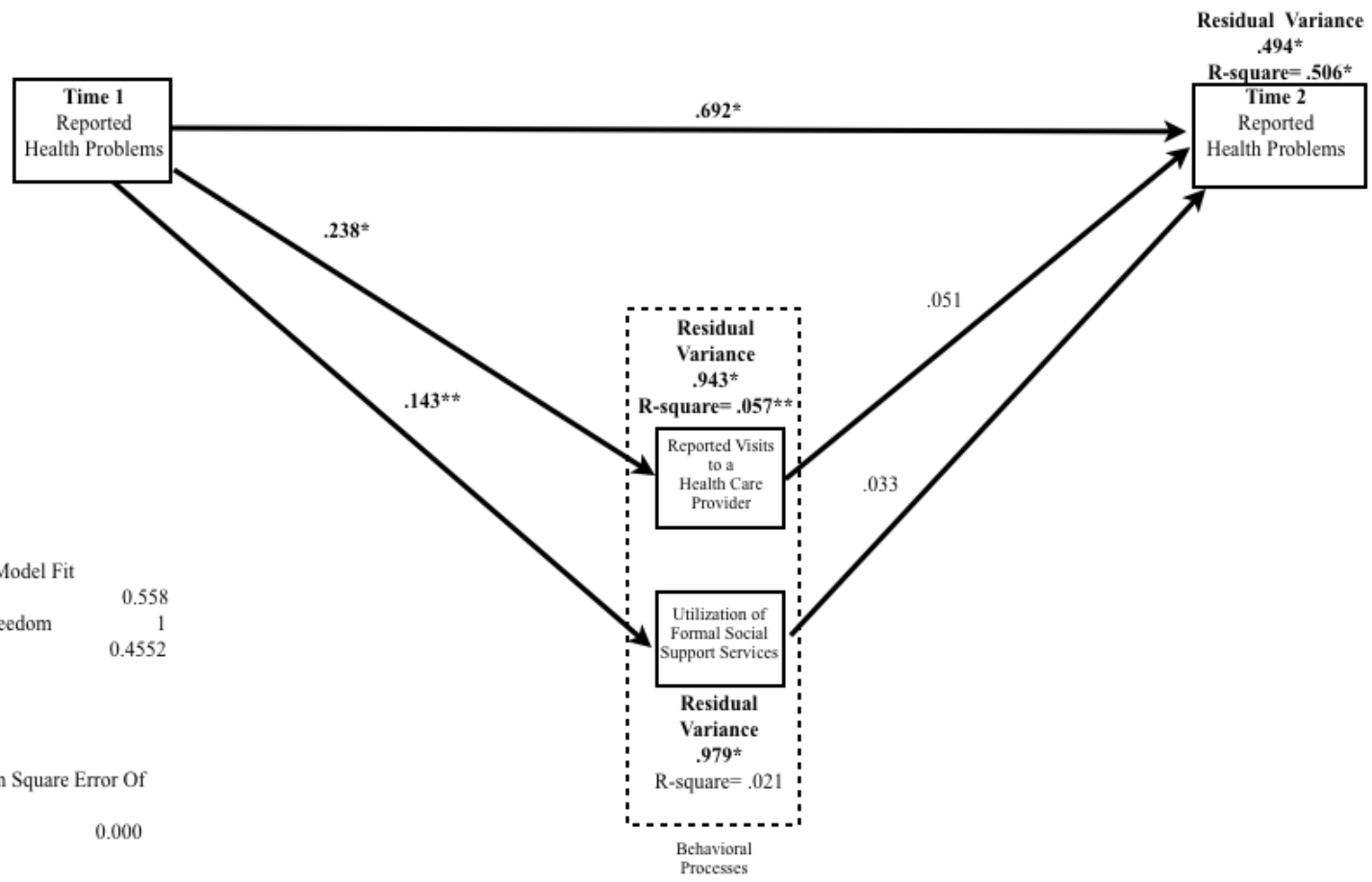
CFI/TLI
- CFI 0.764
- TLI 0.711

RMSEA (Root Mean Square Error Of Approximation)
- Estimate 0.063

* Significant at .001 level; ** significant at .05 level (2-tailed)
Bolded paths are significant



Model 5.
Hypothesis 3-a



Chi-Square Test of Model Fit

Value	0.558
Degrees of Freedom	1
P-Value	0.4552

CFI/TLI

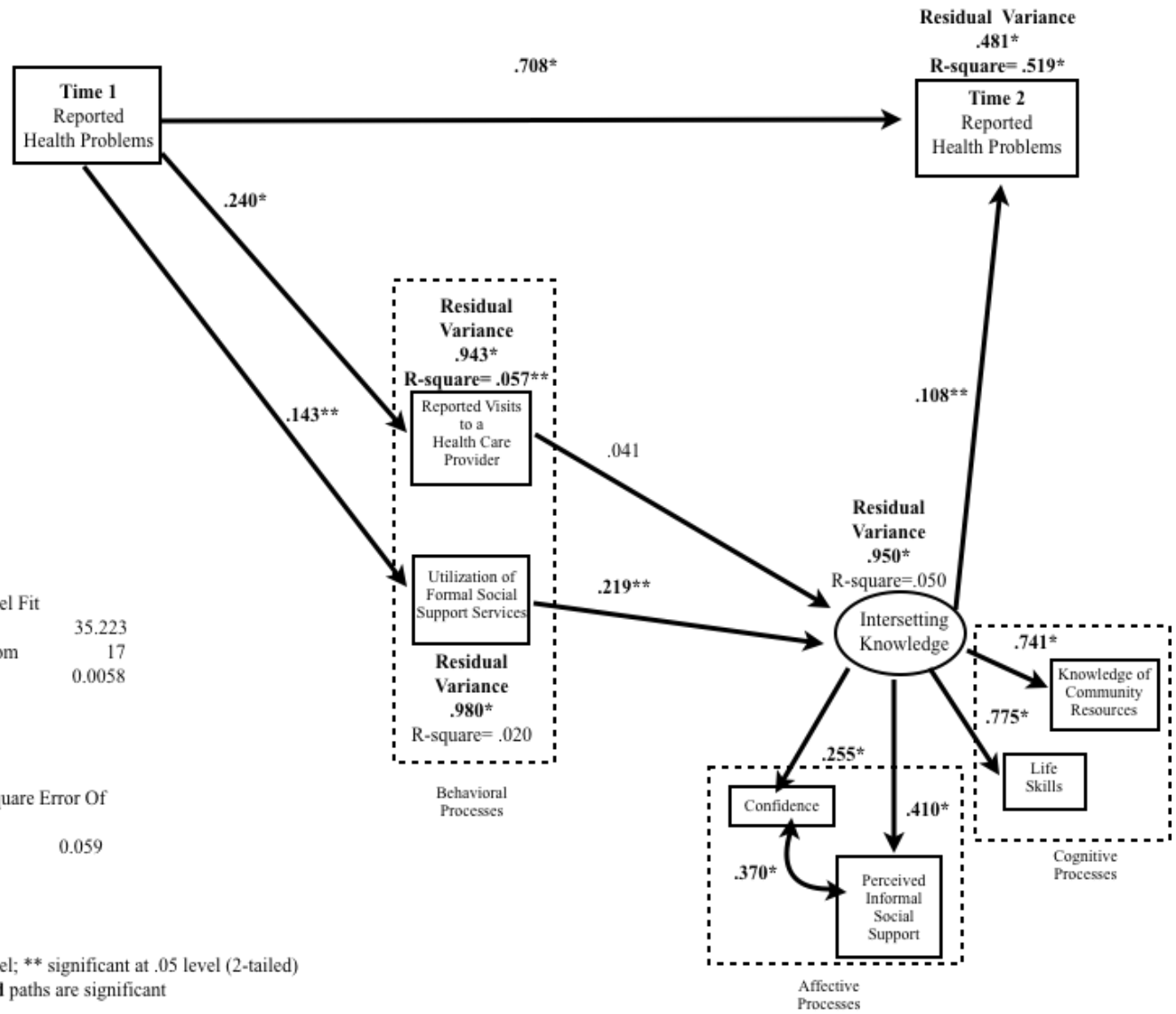
CFI	1.000
TLI	1.012

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.000

* Significant at .001 level; ** significant at .05 level (2-tailed)
Bolded paths are significant

Model 6.
Hypothesis 4-a



Chi-Square Test of Model Fit

Value	35.223
Degrees of Freedom	17
P-Value	0.0058

CFI/TLI

CFI	0.957
TLI	0.928

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.059

* Significant at .001 level; ** significant at .05 level (2-tailed)
Bolded paths are significant