THE FACTOR STRUCTURE OF SIX CULTURAL CONCEPTS ON PSYCHOLOGICAL DISTRESS AND HEALTH RELATED QUALITY OF LIFE IN A SOUTHWESTERN AMERICAN INDIAN TRIBE

by

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The Factor Structure of Six Cultural Concepts on Psychological Distress and Health Related Quality of Life in a Southwestern American Indian Tribe

Thesis directed by Professor Emerita Joan K. Magilvy.

ABSTRACT

This secondary analysis of data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study (Beals, Manson, Mitchell, Spicer, and the AI-SUPERPFP Team, 2003) explored factor structure of six cultural concepts (spirituality, respect, reciprocity, relationship, thinking, discipline) in a Southwestern American Indian (AI) Tribe. The relationships of these underlying factors with psychological distress and health related quality of life were then explored.

The purpose of this study was to highlight concepts in AI culture and to determine their relationships with two common assessments of health among members of a Southwest AI Tribe. The primary investigator sought to determine agreement by cultural experts who evaluated items, selected from a pre-existing database, that potentially reflected the six concepts under review; discover the factor structure of the resulting items; and to determine if a relationship existed between the concept factors and outcomes of psychological distress and health related quality of life in a Southwestern AI tribe. Literature reviewed on the present state of AI health highlighted the present-day health disparities, historical trauma, models of resilience, AI protective factors and led to development of a model modifying the work of Gunnestad.
Exploratory factor analysis, confirmatory factor analysis, and path analysis were conducted on the original sample of 1446 subjects. A 3-factor structure provided the best fitting model. The latent variables were Harmony, Spirituality, and Respect. The health related quality of life measure used separated out physical and mental component summaries (PCS and MCS, respectively). Significant relationships were discovered between Respect and the MCS ($\beta=0.382$), Respect and the PCS ($\beta=0.310$), Respect and psychological distress ($\beta=-0.392$), Spirituality and the PCS ($\beta=-0.09$). No significant relationships found between Harmony and psychological distress or health related quality of life.

Conclusions were that these AI cultural concepts had significant relationships with psychological distress and health related quality of life in a Southwest AI Tribe. Further investigation of cultural concepts is warranted for the development of culturally relevant instruments and health promotion interventions for AI populations.

The form and content of this abstract are approved. I recommend its publication.

Approved: Joan K. Magilvy
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CHAPTER I

INTRODUCTION

There are 566 federally recognized American Indians (AI) tribes in the United States, (Bureau of Indian Affairs [BIA], 2012; Indian Health Service [IHS], 2013a). The terms American Indian (AI), Native American (NA), and American Indian/Alaska Native (AIAN) are terms used to describe the indigenous people of the United States. In Canada, the indigenous prefer the term “First Nations”. Throughout this manuscript, the term American Indian (AI) will be used.

An awareness of AI history is essential when discussing social, health, or environmental states of AI populations. Historical events have directly influenced the present day social, health, and environmental state of AI populations. The AI population of the United States has had a remarkable history with a trajectory originating in sovereignty and independence followed by a period of colonization and oppression. During periods of colonization AI tribes varied in degrees of loss and preservation of their cultural knowledge. The historical losses, historical trauma, and unresolved historical grief experienced by AIs is described in the work of Brave Heart and DeBruyn (1998) among others. Most tribes lost their land, customs, family structure, and languages while other tribes maintained their homelands and preserved their cultural wisdom, language, and teachings. Today, AIs are reclaiming their sovereignty and taking a responsible stance by addressing health, social, and environmental disparities present in AI communities (Warne, 2011). In an effort to become stronger healthier nations, AI tribes are arming themselves with ancient cultural wisdom and there is growing
evidence of the infusion of relevant cultural wisdom into efforts of business
development, resource management, and healthcare delivery (Garroutte, Beals, Keane,
Kaufman, Spicer, Henderson, Henderson, Mitchell, Manson, AI-SUPERPFP Team, 2009;

American Indian (AI) tribes have thrived in the past with their own distinct
languages, practices, beliefs, and ways (patterns) of being in the world. These ancient
practices and beliefs are now relevant for the present day wellbeing of each AI tribe.
Historically, cultural knowledge was passed to younger AI generations through oral
teachings and storytelling (Koithan, 1996). In AI tribes, the ways in which traditional
knowledge and customs were shared have been lost because of the historical adversity
experienced by AIs. Because of these adverse events in AI history, traditions such as
storytelling have been fragmented thereby creating a knowledge gap, making it more
difficult for younger AI generations to access culturally relevant knowledge that was
historically available for the purpose of coping and managing adverse events in life.
Throughout history, AI tribes have both lost and maintained their cultural knowledge
and the literature on AI historical trauma implies that the loss of AI culture has been
detrimental to the health of AI communities (Brave Heart and DeBruyn, 1998).
Remarkably, literature on AI health promotion has begun to acknowledge the health
protective benefits of AI cultural knowledge and practices (Hodge and Nandy, 2011;
Mohatt, Ching Ting Fok, Burket, Henry, Allen, 2011; Pharris, M.D., Resnick, M.D., Blum,
R.W., 1997; Torres Stone, Whitbeck, Chen, Johnson, Olson, 2005). These historical
realities have had both positive and negative influences on the present day health of
AIs. The particularly intriguing premise is the protective nature of cultural wisdom, practices, and knowledge and its relevance for the health and wellbeing of AI communities. Therefore, this study proposes to focus on highlighting and analyzing cultural concepts and existing AI patterns of being that may be health protective for present and future AI generations.

The diversity in the teachings, beliefs, practices, stories, and language among AI tribes in the U.S. is impressive. Regardless of the unique attributes of each tribe, there is a shared similarity in many of the beliefs, teachings, values, and morals. A few specific AI protective factors that have been identified; speaking the Native language, participating in ceremonies and rituals, singing, dancing, storytelling, and the practice of traditional Native healing (Grandbois and Sanders; Hodge and Nandy, 2011; Pharris, et al., 1997; Torres Stone, et al., 2005). Some shared AI beliefs, values, and morals are also believed to be protective and may contribute to better physical and psychological health outcomes that if practiced, may enhance resilience within the AI population. A shared value among AI tribes is the high regard for relationships with self, immediate family, as well as the larger extended family which consists of family, community, tribe, nature, elements, animals, the Creator, spirit beings, and all of Creation (Grandbois and Sanders, 2009; Hodge and Nandy, 2011; Mohatt, et.al, 2011). Other shared and perhaps protective values among AI tribes include humility and respect, sharing and reciprocity, cultural devotion, spiritual devotion, a hard work ethic, perseverance, and disciplined behavior, and a positive and optimistic outlook on life which requires discipline of
thought—positive thinking (Garrouette, Goldberg, Beals, Herrell, Manson, AI-SUPERPFP Team, 2003; Pharris et al., 1997; Garrouette, et al., 2009; Torres Stone, et al., 2005).

Kahn-John (2010) through a literature review process provided a concept analysis on Diné (Navajo) Hózhó, a Navajo wellness philosophy. This author identified six attributes of Hózhó. These six concepts (perhaps protective in nature) are suggested to embody the wellness philosophy of Hózhó. These six attributes (concepts) include the practice of; spirituality, thinking, discipline, relationships, respect, and reciprocity. These six concepts are also very similar to some of the shared inter-tribal beliefs and behaviors identified in the literature review process on AI protective factors. Kahn-John (2010) provides a foundational representation of some AI cultural concepts found within AI culture, and it is these six cultural concepts that serve as a focal point of this proposed secondary analysis. Although research has shed some light on some general AI values, beliefs, and behaviors that may be health protective in nature, further exploration is warranted to clarify and further evaluate the significance of specific AI protective factors that have been identified.

Research on AI health presents descriptions of past and present day health states of AI communities and, the historical trauma experienced by AI communities. Research is beginning to emerge on protective factors and resilience in AI communities. Considering the historical sequence of events in AI history and the course of AI health research, a natural next step in research on AI health is to study specific protective factors such as ways of being, beliefs, practices, teachings, values, and morals that exist within the AI population. A starting point for this type of research is to evaluate the
concepts that have been identified in AI protective factor and resilience literature and evaluate the relationship between identified concepts as well as the impact these identified concepts may or may not have on psychological distress and health related quality of life outcomes in AI populations.

**Purpose of the Study**

The purpose of this study was to highlight existing concepts within AI culture and discover the factor structure among six concepts (spirituality, relationship, respect, thinking, discipline, and reciprocity) to begin to determine whether the presence and/or practice of these concepts impact psychological distress and health related quality of life outcomes in a Southwest AI tribe. The analysis of the six concepts will also provide clarity and understanding on the topics within AI culture that have yet to be fully explored. The outcomes from this study will also lend support for future development of culturally relevant measurement tools specific for AI populations. This study was a secondary analysis of a large data set of AI subjects called the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study (Beals, Manson, Mitchell, Spicer, and the AI-SUPERPFP Team, 2003). The AI-SUPERPFP data provided a strong foundation for addressing the following Specific Aims of the current study.
**Specific Aims**

This investigation had the following aims and associated research questions:

1. To determine if cultural experts agree that selected items (from pre-existing AI-SUPERPFP data) theoretically reflect the definitions of the six concepts; spirituality, relationships, reciprocity, respect, thinking, and discipline.
   
a. Do the items selected adequately reflect the six concepts (spirituality, relationships, reciprocity, respect, thinking, and discipline) as confirmed by AI cultural experts?

2. To discover the factor structure of the concepts spirituality, relationships, reciprocity, respect, thinking, and discipline—as measured by the items determined to be content valid by the expert panel.
   
a. What is the factor structure of the selected items?

3. To determine if there is a relationship between the detected concept factors and health related quality of life in a Southwest Tribe.
   
a. Is there a relationship between the detected concept factors and health related quality of life in this population?

4. To determine if there is a relationship between the detected concept factors and psychological distress in a Southwest Tribe.
   
a. Is there a relationship between the detected concept factors and psychological distress in this population?
Overview and Scope of the Study

This investigation employs secondary analysis of data and begins with a literature review on AI health, protective factors, and resilience. Existing survey data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study were utilized (Beals, Manson, Mitchell, Spicer, and the AI-SUPERPFP Team, 2003). American Indian cultural experts were consulted to establish content validity of the six cultural concepts and their relevance to the items selected from the pre-existing data set. The factor structure of the items representing the six concepts derived from the literature review were explored in a Southwest AI tribe utilizing exploratory factor analysis. Structural equation modeling (SEM) utilizing confirmatory factor analysis and path analysis were performed to determine the influence of the six independent concepts on psychological distress and health related quality of life in a Southwest tribe. In the original AI-SUPERPFP study, the Kessler Screening Scale for Psychological Distress (K6) measured psychological distress and the SF 36 measured health related quality of life. Further discussion on the significance of this study for AI health promotion and future research recommendations will be offered along with implications for nursing education and practice.

Significance of Research on American Indian Protective Factors

This research was conducted by an American Indian student investigator. Nuances of the AI culture may be difficult to comprehend by those outside of AI culture. The insights offered by the AI heritage and familiarity by the AI investigator may provide
additional insights and deeper understandings and translations of AI culture that may be otherwise missed or overlooked.

The significance of this study is it aimed to explore relationships between specific protective factors and health related outcomes in an AI population. The findings from this study provide a contribution to the growing scientific evidence on culturally relevant AI protective factors as they relate to health outcomes in AI populations. The findings from this study also validates the importance of pre-existing health promoting practices within AI culture and supports previous recommendations to integrate cultural wisdom into present day health delivery models.

This study offers several distinct contributions to scientific knowledge development on AI protective factors and resilience. First, the study explored factor structures between the six concepts of interest using exploratory factor analysis and validated the existence of conceptual culturally relevant protective factors in AI resilience exploration. Second, the proposed study determined if specific protective factors impact measureable health outcomes (psychological distress and health related quality of life). Third, the study outcomes signified the importance of the development of culturally relevant measurement tools for AI populations.

Current medical interventions and behavioral interventions available to AI populations have demonstrated deficiencies in their ability to address the health disparities faced by AIs as evidenced by high rates of physical, mental, social, and environmental ills including; diabetes, obesity, mental illness, substance abuse, and obesity (Goodkind, Ross-Toledo, John, Hall, Ross, Freeland, Coletta, Becenti-Fundark,
Poola, Begay-Roanhorse, Lee, 2010; IHS, 2013a; Gone, 2009; Rhoades, and Rhoades, 2014). Expanding the scientific knowledge base on inherent cultural concepts that may positively influence health outcomes will improve the quality and cultural relevance of healthcare delivery efforts and may ultimately result in better health outcomes for populations such as the AI population.

Expansion of the scientific knowledge and awareness of specific AI cultural knowledge that improves health will also contribute to the development of stronger and more effective disease prevention programs. Stronger disease prevention programs may lessen costs related to the provision of medical care and treatment for a population with high rates of physiological and psychological disease (Indian Health Service, 2013a). The inherent cultural concepts, beliefs, teachings, and specific traditional healing practices are diverse among AI tribes. In addition to being diverse, the specific cultural knowledge and traditional healing practices of AI tribes was seldom made known to the larger public audience and to agencies charged with delivering healthcare to AI communities. The diversity of traditional health promotion knowledge among AI tribes and the limited availability and limited access to specific traditional AI healing practices provides a challenge for the healthcare organizations and social, health, and behavioral scientists to develop culturally relevant healthcare delivery models for AI tribes. Despite these challenges, social and behavioral science literature encourage the incorporation of inherent indigenous health and healing knowledge and practices alongside existing western healthcare practices when caring for ethnic populations specifically, AI
populations (Garrouette et. al., 2009; Gone, 2009; Goodkind et al., 2010; Morgan and Lynn, 2009).

The significance and relevance is great when considering the implications of this study for the profession of nursing. Nursing is in a unique position to directly impact health outcomes for patients as well as change the delivery of healthcare. This empowers the profession of nursing with specific and unique culturally relevant knowledge that is individualized to the unique needs of each patient, specifically the AI patient. Because of their proximity to patients in healthcare delivery, nurses have an opportunity to directly apply the findings from this research when caring for AI patients and communities. Indirectly, this knowledge may be applied by nurses through the development of culturally congruent health promotion and disease prevention models and the through the promotion of culturally relevant health policy specific for the AI population. At each of these levels (direct patient care, prevention, education, and policy development) nurses are empowered with relevant scientific knowledge to deliver the highest quality and most effective culturally congruent care to a diverse patient population.

Additionally, the findings from this study will provide some unique insights for nurses who work directly with AI patients in both urban and rural healthcare settings. Indian Health Service (IHS) hospitals and clinics, as well as Tribal hospitals and clinics are the major sources of health care on AI reservations. The patient population in the reservation-based healthcare setting is close to 100% AI. The percentage of AI patients in non-IHS, non-tribal, or urban healthcare settings is likely much smaller. However,
there continues to be a growing number of AIs who live off reservation and have moved to urban settings for education and employment opportunities. Therefore, the number of AI patients seen in urban healthcare settings is increasing. Findings from this study provide the opportunity for nurses to develop a greater understanding of specific worldviews, beliefs, practices, of their AI patient population. This knowledge is particularly important for those nurses who have chosen career opportunities located on or near the AI reservations.

The AI nurse is also another consumer of the nursing workforce who will benefit greatly from the implications of this study. The number of practicing AI nurses is still very small in comparison to the overall nursing workforce in the United States. The United States Department of Health and Human Services (USDHHS, 2010) reported in the 2008 National Sample Survey of Registered Nurses that only 0.3% of all registered nurses in the United States were AI which is very similar to the 2001 National Sample Survey of Registered Nurses that reflected 0.4% of U.S. registered nurses were AI (Spratley, Johnson, Sochalski, Fritz, Spencer, 2001). Two distinct categories of the AI nurse include: the AI nurse with a general understanding of AI traditional values, morals, beliefs, and practices and the AI nurse (despite AI heritage) who has never been exposed to AI teachings and is unfamiliar with AI traditional values, morals, beliefs, and practices. One may assume that because a nurse is of AI heritage that he/she has a full understanding of AI culture and teachings however, this may not always be true. For those AI nurses who are interested in developing a richer understanding and who may desire to apply AI cultural philosophies in their nursing practice, the findings from this
study will empower them to be better equipped with culturally relevant knowledge. For those AI nurses who have greater AI cultural knowledge and insights, his/her knowledge and cultural insights will be supported as the study outcomes provide a point of scientific reference when employing culturally relevant nursing practices. Another matter to consider for the AI nurse is the diversity among AI tribes. An AI nurse may be a member of one or perhaps several AI tribes and be familiar with the culture and teachings however, because of the large diversity among AI tribes he/she may not be familiar with cultural differences between tribes. The diversity among (and sometimes within) AI tribes substantiates the need for the scientific exploration of tribe specific explorations of effective and culturally relevant models of health care delivery for the AI population. For the AI nurse who is unfamiliar with AI culture, it will serve as a source of education providing some relevant (and perhaps general) insights for those who seek a deeper understanding of cultural implications in the delivery of nursing care to AI populations.

In this first chapter, the problem was identified and the design and methods of the study were overviewed. The significance of the study was briefly described. In the second chapter the pertinent literature is reviewed and the design and methods and description of the data set for the secondary analysis are presented. The fourth chapter describes findings of the analyses of data. The final chapter presents a discussion of findings, interpretation, and implications for nursing research, practice, education, and significance of the study.
CHAPTER II
REVIEW OF LITERATURE

A comprehensive literature review was conducted on the topics of: American Indian (AI) health, AI historical trauma, AI Sovereignty, AI protective factors, AI resilience, and general models of resilience within the social, behavioral, and health sciences. A brief summary of the current state of AI health is outlined. Literature that provided specific and relevant information on components of AI resilience and protective factors was scarce. To highlight the importance of AI resilience and protective factors, the principal investigator of this study also reviewed AI historical trauma as those events may have contributed to the present health state of AI populations. General models of resilience were also reviewed for further understanding of existing models of resilience. Electronic databases searched include: CINAHL, PUBMED, and PsychInfo. The electronic database search identified a limited number of relevant research articles specifically related to AI protective factors and resilience (the principal focus of this study). All findings are presented in this literature review.

Several aims existed for this literature review. The first aim was to explore the health status of the AI population. The second aim was to highlight important historical events in AI history including events of historical trauma and the movement toward a return to AI sovereignty. The third aim was to review literature on AI protective factors and resilience to explore, clarify, and compile emergent themes of AI concepts that contribute to physical and psychological health in the AI population. The fourth aim was to review relevant theories and models of resilience within the social, behavioral, and
health sciences. The reason for reviewing general models of resilience was to become familiar with scientific models of resilience. An understanding of general resilience models provides a framework from which to further comprehend AI concepts and/or protective factors that may contribute to physical or psychological health (resilience).

The final aim of this literature review was to compile, integrate, and synthesize the information retrieved from the literature review. The synthesized information provided a backdrop of relevant and historical information that was used to guide this study of the factor structure of the concepts of spirituality, relationship, reciprocity, respect, thinking, and discipline and their impact on psychological distress and health related quality of life in a Southwest AI tribe.

**American Indian Health**

Historically, AI healthcare has been provided to AI people by the United States Government as a result of treaty negotiations. Since 1955, most health care is delivered to AIs with funding routed through the IHS. A government-to-government relationship was established in 1787 between the United States Government and North American federally recognized tribes and is based on Article I, Section 8 of the United States Constitution (IHS, 2013a). The Indian Health Service (IHS) provides, either directly or indirectly, comprehensive health services for approximately 1.9 million AIANs in 35 states, (IHS, 2013a). Although comprehensive health care is provided by the IHS, this agency remains significantly underfunded (Roubideaux, 2005). As a result, the health state of AIs remains alarmingly poor. AIs are currently experiencing high rates of poverty, obesity, diabetes, alcoholism, drug abuse, shame, violence, sexual abuse,
hopelessness, depression, anxiety, developmental delays, self-destructive behavior, aggressive behavior, low self-esteem, learning disabilities, and suicide (Gary, Baker, Grandbois, 2005; Jones, 2006; IHS, 2013a; Pharris, Resnick, Blum, 1997; Rhoades and Rhoades, 2014; USDHHS, 2001).

American Indian Historical Trauma and Sovereignty

The AIs of the United States have experienced historical trauma and continue to experience unresolved historical grief (Brave Heart and DeBruyn, 1998; Duran & Duran, 1995; Jones, 2006). Historical trauma is defined as “a cumulative emotional and psychological wounding across generations, including the lifespan, which emanates from massive group trauma (Brave Heart, Chase, Elkins, Altschul, 2011, p. 283). The Historical Trauma Responses (HTR) is a “constellation of features associated with a reaction to massive group trauma” (Brave Heart et. al, 2011, p. 283). These historical events have had extensive impact on the present day health of AIs. Brave Heart et al. (2011) describe historical unresolved grief as a subcomponent of the HTR and it consists of a “profound, unsettling bereavement resulting from cumulative devastating losses”, p. 283. Whitbeck, Hoyt, & Chen (2004) linked the experience of AI historical trauma with emotional distress such as depression and anger. Whitbeck et al. (2004) assert that the psychological and physical effects of historical trauma vary between individuals and even among tribes depending on the individual or collective perceived historical loss. An example of an AI historical loss is the diminished cultural knowledge experienced by AI individuals and tribes as a result of the historical government restrictions that forbade the practice of Indigenous ceremonies. More research is required to further explain the
HTR as expressed and experienced by AIs. Literature on AI historical trauma describe ways in which historical hardships may have contributed to the current health disparities seen in AI communities when compared to the U.S. general population (Brave Heart and DeBruyn, 1998; Duran and Duran, 1995; Jones, 2006; Morgan and Freeman, 2009; Whitbeck, Adams, Hoyt, & Chen, 2004, USDHHS, 2001).

The IHS (2013a) confirms the health disparities present within AI populations. The IHS (2013a) cites cultural differences, discrimination in health service delivery, poverty, and lower levels of education as possible reasons for the health disparities with AI populations. AIs have a life expectancy that is approximately 4 years lower that all other U.S. populations (IHS, 2013a). Heart disease, malignancies, and unintentional injuries are the leading causes of death for AIs. The IHS (2013a) reports startling statistics when comparing the AI population to the general U.S. population and describes disparate rates of alcoholism (552% higher), diabetes (182% higher), unintentional injuries (138% higher), homicide (83% higher), and suicide (74% higher).

In the face of these challenges, the AI communities are demonstrating signs of resurgence as seen in AI movements to return to sovereign status now referred to as the Indian Sovereignty movement (Steinman, 2012). This movement of self-determination was formalized in 1975 as the American Indian Self-Determination and Educational Assistance Act (ISDEAA-Public Law 93-638) (IHS, 2013b; Steinman, 2012; Warne and Frizzell, 2014). This federal policy was a historical marker in AI history, marking a significant opportunity for AI’s to begin the process of reclaiming their independence. The Indian Self-Determination Act was enacted to shift the decision
making authority over AI issues from federal government based organizations such as
the Bureau of Indian affairs back to the AI leaders and communities. In the late 1970’s
and 1980’s there was much confusion over the exact meaning of Indian Self-
Determination among government programs, states, and tribes. Despite this confusion,
Indian leaders, congressional leaders, and organizations such as the National Congress
of American Indians (NCAI) organized efforts to clarify the meaning of Indian Self-
Determination and Tribal Self-Governance and tribes began to operationalize this
federal policy in various ways (Steinman, 2012). Some tribes reclaimed land and
resources while others led efforts to have more federal policies changed. In 1992 the
federal government amended the ISDEAA to authorize tribes to have the option of
entering compacts and contracts for the autonomous management and delivery of their
healthcare programs. The IHS has recognized that tribal leaders and tribal members are
in the best position to understand the health care needs of their unique populations and
fully supports the implementation of Indian Self-Governance compacts with tribes. The
increasing number of existing self-governance tribes has steadily increased since 1992
and in 2011, 337 of the 566 (60%) of the federally recognized tribes have entered into
compacts to manage their own health care facilities (IHS, 2013b).

As AI tribes move forward in reclaiming sovereign status, many tribes have
assumed greater responsibility for the health of their people. For some tribes, this
simply means taking ownership of their own healthcare facilities. Important to note, for
AI communities this is considered a critical opportunity to aim high and design and
develop cutting edge, strength based, culturally effective healthcare delivery models
that are individualized for the needs of each unique tribe. The time is right for AI communities to showcase their strength based cultural wisdom, wellness philosophies, healing arts and knowledge, artistic creativity, and earth preserving philosophies that have been present throughout history. Though each of the 566 plus federally recognized tribes as well as those that are unrecognized is unique in its culture, language, stories, beliefs, and practices there is still a shared similarity that unites each tribe under the greater family of Indigenous people. Within AI culture, this collective cultural wisdom has been referred to as the Native American Wisdom Tradition (Morris, 1996). This theme of the Native American Wisdom Tradition is presented in a cultural story and a way of being in the world that encompasses—habitats, customs, oral narratives, values, and beliefs that are expressed in an ethical, reverent, and celebratory relationship with the earth, p. 94 (Morris, 1996). It is through this inherent cultural knowledge and wisdom that narrative, immersed in the AI culture, becomes a natural and hearty source of healing and recovery for AIs. This period of transition and reclamation of sovereign status creates an opportunity for AI tribes to take ownership and accept the challenge of addressing the health related adversities they presently face. An opportunity is also created to demonstrate their ability to develop integrated, effective, and culturally relevant solutions to optimize the health status of their communities. These actions could then re-instill a sense of resilience, empowerment, community pride, self-worth, and self-esteem that may replace the individual and community shame, anomie, and despondency that currently overshadows many AI communities.
The review of literature on AI health, AI historical trauma, historical losses, unresolved historical grief and AI sovereignty sparks a curiosity about how the AI people have survived these historical hardships. Questions emerge on what factors contribute to the ability of AIs to survive, persevere, and in some instances, thrive, despite the historical adversity they’ve faced. Therefore, the review of literature on models of resilience, AI protective factors, and AI resilience is a natural next step when conceptualizing the larger picture of health and the impact of historical events on present day health of AIs.

Models of Resilience

Definitions of resilience and protective factors, a brief summary of the history of resilience research and, and introduction to two significant resilience models will be presented. Each model was selected specifically for its relevance to AI resilience and protective factors. The two relevant models of resilience will be presented as a point of orientation for further understanding of the significance of protective factors and resilience in relation to physical and psychological health outcomes.

Resilience is presented by Masten (2001, p.228) as “a class of phenomena characterized by good outcomes in spite of serious threats to adaptation or development”. Luthar (2000) describes resilience as a concept with two dimensions: significant adversity and positive adaptation. Protective factors have been identified as resources (personal, familial, or social) in longitudinal developmental studies and are viewed as contributors to resilient development (Wille, Bettge, Ravens-Sieberer, Bella
Study Group, 2008). Protective factors are the conditions or practices that exist and positively influence an outcome of resilience in the midst of challenge or adversity.

Fleming and Lodogar (2008) conducted a literature review on the resilience research spanning the past forty plus years and identified several stages of research on resilience. Earlier stages focused on the individual while latter stages focused on external factors of resilience including the family, the community, and finally the culture of an individual. Contemporary researchers have concluded that resilience is a complex process involving interactions between risk factors and protective factors; and more specifically, the intensity and duration of the risk exposure; and the quality of the protective factors. These interactions between risk factors and protective factors can be further understood within the three types of resilience models presented by Fleming and Lodogar (2008), the compensatory, protective and challenge models. A compensatory model is a resilience model where a protective factor or a resilience factor directly counteracts a risk factor and eliminates a negative outcome. A protective resilience model is one where protective factors and resources moderate or reduce the effects of risk factors. The third resilience model type is the challenge model. In the challenge model, the exposure to both low and high levels of a risk factor is associated with negative outcomes and moderate exposure to a risk factor is associated with positive outcomes. These three resilience model types described by Fleming and Lodogar (2008) introduce the complexity of the study of resilience and provide some insights as we move toward discussion of two specific resilience models (both protective
model types) that may be appropriate for research and intervention development with AI populations.

The first resilience model presented is one developed by an educator from Norway named Arve Gunnestad (Gunnestad, 2006). The Gunnestad model (see Figure 1) provides a foundational framework from which AI protective factors may be studied and categorized. The second model is the Native American Protection Shield (NAPS) model of resilience (see Figure 2). Kahn-John (2011) amends Gunnestad’s original resilience model slightly by changing the language labels of the three distinct protective factor categories and substituting familiar wording that may be more culturally relevant for AI populations. In a comprehensive manuscript required for doctoral study, Kahn-John (2011) proposed the amendments to the original Gunnestad resilience model. Further descriptions for the specific reasons for the amendment of the Gunnestad model will be presented.

Gunnestad (2006) presents a theoretical model with three categories of protective factors that contribute to resilience (see Figure 1). In the Gunnestad resilience model, protective factors are placed into three categories (1) Network factors (2) Abilities and skills (3) Meaning, values, and faith. The network factors refer to external supports and may include family, relatives, friends, partners, teachers, mentors, and tribal members. Abilities and skills refer to internal innate supports like appearance, intelligence, communication skills, artistic abilities, physical strength, emotional strength, and problem solving skills. Meaning, values, and faith are forms of existential support and include the values, meanings, and attitudes that come from an
understanding of faith. Meaning, values, and attitudes are motivating factors that influence how one makes choices, prioritizes, and interacts with the external world. Gunnestad brings attention to the constant interaction between the three groups of protective factors and stresses how resilience is an outcome of the complex interaction between the individual, the situation, and the protective factors (Gunnestad, 2006). Therefore, identification of specific protective factors is significant in determining effective strategies to promote resilience and optimal health.

The Gunnestad (2006) model serves as a point of reference from which AI concepts and protective factories can be categorized or conceptualized within the three categories of external (network factors), internal (abilities and skills), and existential (meanings, values, and faith). The Gunnestad model was selected as a relevant model of resilience because it aligns with the AI worldview (encompassing internal, external, and existential values) and validates the AI worldview by its inclusion of the external and existential categories (both very important aspects of intertribal AI culture) of protective factors. Figure 1 illustrates the Gunnestad model of Development of Resistance. The principal investigator of this study contacted Dr. Arve Gunnestad via email requesting approval to use the Gunnestad Model of Resilience. Dr. Gunnestad approved the request. The email communication with approval to use the Gunnestad model for the dissertation work of the principal investigator provided by Dr. Gunnestad is presented in Appendix E.
The second resilience model is the Native American Protection Shield Model (NAPS). The NAPS model is presented by Kahn-John (2011) as an amended version of Gunnestad’s resilience model and is inclusive of some of the findings of the literature review on AI protective factors and resilience (see Figure 2). The NAPS model depicts a Native American shield which is a symbol of safety and protection in AI culture. The graphic image of the shield is important as each symbol conveys significant meaning in AI culture. The circular shape of the shield is symbolic in AI culture and represents the revered Mother earth as well as the circular rhythms and cycles present in nature and...
The arrowheads are symbols of protection and were historically used by AIs for survival in acts of war and hunting. Today, the use of arrowheads in AI culture is reserved for spiritual and ceremonial use as sacred items of protection. The sun, earth, and the rainbow represent natural sources and elemental forces of life (fire, water, earth, air). The arrows represent the interactions and the inter-relatedness among all three protective factor categories depicted in the shield. The English language labels from the original Gunnestad model were altered with the use of more relevant English language that may be more easily understood within AI culture. Gunnestads Network factor category was re-titled “Honored Relations”, the Abilities and Skills category was re-titled “Gifts of Self”, and the Meanings, values, and faith category was re-titled “Sacred Loyalties”. The same external, internal, and existential protective factors exist under each category and will be further explained by the specific literature on AI protective factors. It’s important to note that symbolism and language have the ability to resonate deeper understanding and meaning when conceptualizing theories and concepts. For this purpose, modifications to the Gunnestad model were initiated by Kahn-John (2011). As shown in Figure 2, modifications to the Gunnestad model were minimal, yet intentionally designed to increase relevance and induce greater meaning and a deeper understanding of the protective factors specific to the AI population.
American Indian Protective Factors and Resilience

Existing literature on AI protective factors and resilience has previously been introduced in behavioral, social, and health science research. Despite having found their way into AI research literature, introduction to the concepts of AI protective factors and resilience has been limited and is not enough to implement specific evidence-based strategies to address the existing health disparities of the AI population. A gap exists in current literature on the topic of specific AI protective factors and AI resilience. This literature review will summarize and synthesize the existing scientific literature describing specific AI protective factors that contribute to resilience in these
populations. Identification of specific AI protective factors is an important first step in the development of health promotion interventions that will support the resilience and overall wellbeing of AI people.

A literature search was conducted in the search engines CINAHL, PUBMED, and PsychInfo utilizing the search concepts: Native American (NA) protective factors, American Indian protective factors, Native American resilience, and American Indian resilience. CINAHL identified 7 articles on NA protective factors, 23 articles on AI protective factors, 8 articles on NA resilience, and 3 articles on AI resilience. PUBMED identified 20 articles on NA resilience, 20 articles on AI resilience, 116 articles on NA protective factors and 98 articles on AI protective factors. PsychInfo identified 31 articles on AI resilience, 5 articles on NA resilience, 38 articles on AI protective factors and, 12 articles on NA protective factors. Many of the same articles appeared across search engines. One of the primary goals of this literature review is to find evidence of AI protective factors that result in resilience. Only articles that identified specific AI protective factors were selected. The articles selected for inclusion in this compilation included qualitative inquiry and quantitative inquiry. Articles that did not identify or offer specific NA protective factors were excluded. Ultimately, there were 9 articles that identified AI protective factors. A review of the 9 articles is presented (See Table 1.)

Many similarities were apparent across studies that explored AI protective factors and resilience. Despite similarities, the list of protective factors was broad and had to be condensed and synthesized into a structured framework. This is where the Gunnestad Model and the Native American Protection Shield Model were
operationalized to sort and organize the expansive list of identified protective factors into the external, internal, and existential protective factor categories. A brief review of the specific AI protective factors revealed in the literature review is presented. The dates of the selected articles spanned from 1997 to 2009. A table summarizing the reviewed articles (see Table 1) organized by the three protective factors categories (external, internal, existential) is also presented.

In a small qualitative inquiry, Heavy Runner and Morris (1997) identified the following protective strategies or factors that enhance resilience and support Native American strength: spirituality, tribal identity, elders, ceremonies and rituals, humor, oral tradition, family and support networks.

A qualitative interview conducted by Grandbois and Sanders (2009) provides insight into the sources of strength and resilience as expressed by Native American Elders. Five themes emerged: Resilience must be studied and understood within the context of Native American worldview; resilience is embedded within Native American cultures; Native elders attain their strength and resilience from each other their families, relatives, and tribal communities; resilience comes from the Oneness they feel with all creations; and resilience comes from a legacy of survival passed down by the ancient ones.

Torres Stone et al. (2009) conducted a sequential study focused on the protective factors specific to alcohol cessation among American Indians. Torres Stone et al. (2009) asserted enculturation as an overarching theme containing three constituent
protective factors; participation in traditional activities, traditional spirituality, and cultural identity.

In a call for researchers to consider the cultural and political context of resilience (Wexler, DiFluvio, & Burke, 2009) highlight the protective factors associated with enculturation—a strong cultural identity, while reminding us that resilience “is a process involving personal and collective meaning-making and negotiation, which should not be assumed to be a steady state (p. 566)”. The authors encouraged researchers to recognize the dynamic process of resilience and discouraged oversimplified assumptions of the predictors, mediators, and outcomes of protective factors.

Several authors presented the following AI protective factors; cultural identity, sense of belonging to family or tribe, having a role model, and oneness with all of creation (Beebe, Veselly, Oman, Tolma, Aspy, & Rodine, 2008; Denham, 2008; HeavyRunner & Morris, 1997; Grandbois & Sanders, 2009; Torres Stone, Whitbeck, Chen, Johnson, & Olson, 2009; Wexler, DiFluvio, & Burke, 2009). Each of these protective factors are external and were placed in the summary table under the external [network factor] (honored relations) category.

Additional AI protective factors included the following: NA survival legacy (having pride in the survival of NAs despite the historical adversity experienced), body pride (sense of satisfaction with the physical self), pride about going to school, identification of a personal skill or competence, oral tradition, shared sense of humor, shared wisdom, shared ethic of caring, ability to speak traditional language and, ability to practice and participate in traditional practices (Coe, Attakai, Papenfulls, Giuliano, Martin, &
Nuvayestewa, 2002; Cummins, Ireland, Resnick, & Blum, 1999; Denham, 2008; HeavyRunner & Morris, 1997; Torres Stone, et al., 2009; Wexler, et al., 2009). These protective factors were placed into the internal [abilities and skills] (gifts of self) category.

The findings in the literature review identified additional existential AI protective factors that included; NA spiritual practices, religion, enculturation in traditional practices, participation in ceremony and ritual, having a sincere reverence and respect for life, creation, and the universe, (Beebe et. al, 2008; Coe et. al, 2002; Grandbois & Sanders, 2009; HeavyRunner & Morris, 1997). These protective factors were placed into the existential, [meaning, values, and faith] (sacred loyalties) category, as listed in Table 1.

This chapter presented a review of literature on the following; AI health, AI historical trauma, AI Sovereignty, AI protective factors, AI resilience, models of resilience in the social, behavioral, and health sciences. The findings from the literature review on AI protective factors and resilience is of particular importance because of the similarity of themes between the literature review findings and the six cultural concepts under investigation. The Gunnestad resilience model is also of significance because it aligns well with the AI worldview and the findings from the AI literature review of protective factors can be conceptualized and categorized by the Gunnestad protective factor categories; network factors, abilities and skills, and meaning, values, and faith. Kahn-John (2011) utilized the Gunnestad resilience model as a foundation to develop a culturally relevant model of resilience for the American Indian population titled, the
Native American Protection Shield Model (NAPS) model, Figure 2. The NAPS model is a synthesis of the literature review findings on AI protective factors three categories of protective factors identified by Gunnestad, Figure 1. The Gunnestad categories of protective factors were labeled with terms that were identified by Kahn-John (2011) to be culturally meaningful and relevant to the AI population. The six cultural concepts (spirituality, respect, reciprocity, relationship, thinking, discipline) under investigation are thematically similar to the literature review findings on AI protective factors. Table 1 presents the findings from the AI literature review on protective factors, the six concepts under investigation, the NAPS protective factor categories, and the Gunnestad protective factor categories. Both the Gunnestad and the NAPS resilience models are further supported by the findings from the literature review on AI protective factors. These similarities across resilience models and literature review findings on AI protective factors support the importance of studying concepts within AI culture that may have may be relevant to further understanding the development of resilience in AI populations. In the next chapter, the designs and methods for this study are described. Informing the study were the literature review and models described in this chapter.
Table 1

**Literature Review Findings on AI Protective Factors: Categorized by the Gunnestad Model, the NAPS Model, the six cultural concepts under investigation, and author.**

<table>
<thead>
<tr>
<th>Gunnestad Network Factors</th>
<th>Abilities &amp; Skills</th>
<th>Meaning, Values, &amp; Sacred Loyalties</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAPS Honored Relations</td>
<td>External</td>
<td>Internal</td>
</tr>
<tr>
<td>6 cultural concepts</td>
<td>Relationship, Reciprocity</td>
<td>Thinking, Discipline, Respect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tribal identity, elders, family, support network.</td>
<td>Humor, oral tradition.</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HeavyRunner &amp; Morris (1997)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family attention, parental expectations, caring family, adults, school, tribe.</td>
<td>Positive feeling towards school enjoy school, strong academic performance.</td>
</tr>
<tr>
<td>Pharris, Resnick, &amp; Blum (1997)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grandbois &amp; Sanders (2009)</td>
<td>Strength from each other, relatives, and tribe, oneness with all of Creation.</td>
<td>NA Worldview, resilience in NA culture, survival legacy.</td>
</tr>
</tbody>
</table>
CHAPTER III

CONTENT VALIDITY AND METHODS

Research Objectives

This secondary analysis utilized existing survey data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study (Beals, Manson et al. 2003). Spero Manson was the primary investigator for the AI-SUPERPFP project. The research objective of this secondary analysis was to bring attention to existing concepts within AI culture by exploring the factor structure of six concepts (spirituality, relationship, respect, thinking, discipline, reciprocity). A secondary objective of this study was to determine if the presence and/or practice of the identified cultural concepts is related to psychological distress or health related quality of life in a Southwest AI tribe. The purpose of this study was to conduct further conceptual theory exploration/development/refinement, confirmation to support the need for the development of culture-specific measurement tools, and to bring attention to the importance of culturally inherent wellness practices/beliefs within AI populations. Chapter III will present the methods for Specific Aims 1, 2, 3, and 4 as well as the results for Specific Aim 1.

Content validity of the six cultural concepts was obtained through consultation with AI cultural experts. The factor structures among the selected items were discovered using factor analysis. Structural equation modeling, utilizing confirmatory factor analysis and path analysis, was employed for multivariate analysis of both the factor structure of the six cultural concepts as well as their relationship with
psychological distress and health related quality of life in a Southwest AI tribe. The six individual concepts served as independent variables (IV) and both psychological distress and health related quality of life served as the dependent variables (DV).

The exploration of the six concepts provides insights on the concepts, behaviors, and beliefs within AI culture that have yet to be fully examined from within a resilience perspective. The findings from this study provide a starting point from which to build future research in the forms of theory development and perhaps measurement tool development specific to practices, beliefs, behaviors, and/or concepts that may impact the psychological and overall health of AIs. A particularly significant long term goal of this study was to bring forth pertinent and potentially protective AI cultural knowledge resources that have been situated within the teachings of the AI culture from past generations. The particular importance of highlighting this information is for the purpose of reintroducing this knowledge to present day and future AI generations as many AI tribes have lost or forgotten the wisdom of their elders. This work aligns with the recommendations by scientific literature to implement culture-based models of care for the AIAN population (Croff, Rieckmann & Spence, 2014). This work also parallels recent efforts by AI tribes to explore their historical cultural health promotion practices as a means to rediscover and implement innate ways to promote psychological and physical health. This exploration of innate AI practices and beliefs provides a natural source of empowerment to equip present day AIs, healthcare providers, and AI tribal leaders with relevant approaches that may alleviate the health disparities currently faced by AI populations.
Specific Aims

This investigation had the following aims and associated research questions:

1. To determine if cultural experts agree that selected items (from pre-existing AI-SUPERPFP data) theoretically reflect the definitions of the six concepts; spirituality, relationships, reciprocity, respect, thinking, and discipline.
   a. Do the items selected adequately reflect the six concepts (spirituality, relationships, reciprocity, respect, thinking, and discipline) as confirmed by AI cultural experts?

2. To discover the factor structure of the concepts spirituality, relationships, reciprocity, respect, thinking, and discipline—as measured by the items determined to be content valid by the expert panel.
   a. What is the factor structure of the selected items?

3. To determine if there is a relationship between the detected concept factors and health related quality of life in a Southwest Tribe.
   a. Is there a relationship between the detected concept factors and health related quality of life in this population?

4. To determine if there is a relationship between the detected concept factors and psychological distress in a Southwest Tribe.
   a. A. Is there a relationship between the detected concept factors and psychological distress in this population?
Overview of the Original AI-SUPERPFP Study

The information provided in this overview of the original AI-SUPERPFP study comes directly from an article authored by Beals, Manson, et al. (2003). Spero Manson was the primary investigator of the AI-SUPERPFP project. Two AI tribes participated in the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study directed by Drs. Spero Manson, Janette Beals and colleagues. The two participating tribes were a Northern Plains tribe and a Southwestern tribe. Specific tribal names were omitted to protect the confidentiality of each tribe and instead the descriptors of Northern Plains and Southwestern were applied.

Purpose of the Original AI-SUPERPFP Study

The purpose of the original AI-SUPERPFP study was to assess the prevalence of mental health disorders in two separate AI tribes residing on or near their reservation and to assess associated help-seeking patterns or behaviors within these groups. A culturally modified version of the Composite International Diagnostic Interview (CIDI) was utilized to collect the information on the mental health disorders. In addition to the collection of data on mental disorders, information on co-occurring substance use, demographic data, and psychosocial concepts were also collected (Beals, Manson et al. 2003).

Sampling Design of the Original AI-SUPERPFP Study

A cross-sectional probability sample survey design was employed. Participants were enrolled members of either the Northern Plains tribe or the Southwestern tribe,
aged 15-54 at time of sampling and living on the reservation or within twenty miles of the reservation. Tribal rolls are lists of all individuals who meet the minimal requirements for tribal membership. The tribal rolls served as the sampling pool for the study. Stratified random sampling was used to select participants with tribe, age, and sex as the strata. Participants were selected randomly from the tribal rolls to reach the target goal of about 1500 participants per tribe. The Southwestern tribe had 1446 participants (n=1446) and the Northern Plains tribe had 1638 participants (n=1638), Beals, Manson et al. (2003). The methods utilized in the AI-SUPERPFP are described in further detail at their website, Manson and Beals (2014).

Data Collection in the Original AI-SUPERPFP Study

Colorado Multi Institutional Review Board (COMIRB) approval was obtained before data collection. Tribal review board approvals were also obtained for each participating tribe before data collection. Informed consent was obtained for all adult participants in the study and parental consent was obtained before minor assent for all those under 18 years participating in the study. Tribal members were trained to conduct computer-assisted interviews. A computer assisted personal interview was developed with the use of a Ci3 Version 2 (1995). Tribal members who assisted with data collection received intense training in research and interview methods and read questions directly from the laptop computer screen and manually entered the interviewees’ responses. The training protocol and the manual are available at the AI-SUPERPFP web site Manson and Beals (2014). Each trained tribal member signed confidentiality statements to protect the confidentiality of all participants in the study, Beals, Manson et al. (2003).
Measurement in the Original AI-SUPERPFP Study

Psychological distress was measured in the original AI-SUPERPFP study using the Kessler Screening Scale (K6). The K6 has a scale scoring ranging from 0-24. The K6 contains six questions that ask if during the past month if participants felt sad, nervous, restless or fidgety, hopeless, everything is an effort, or worthless. Responses are rated on a 5-point scale ranging from 0 (none of the time) to 4 (all of the time). A high score on the K6 indicates higher levels of psychological distress. The K6 was shown by an analysis by Mitchell and Beals (2011) to be appropriate for use in the measurement of psychological distress in these AI populations.

Health related quality of life was measured in the original AI-SUPERPFP study with the Medical Outcomes Study 36-item Short Form Health Survey commonly referred to as the SF-36. The SF-36 has a two facture structure comprised of the physical component summary (PCS) and mental component summary (MCS) of the eight SF-36 subscales. In the AI-SUPERPFP project, the AI-SUPERPFP team made some cultural modifications to the SF-36. Examples of modifications made to the measure include; climbing hills was used instead of climbing stairs and horseback riding was used instead of golf to measure physical activity with this AI population. These modifications were made based on recommendations made by focus groups reviews of the SF-36 and their suggested recommendations. The use of the SF-36 with the modifications made in the AI-SUPERPFP study is warranted as an adequate measure for use with AI populations. In a study examining the appropriateness of the SF-36 for use in an AI population, Beals, Welty, Mitchell, Rhoades, Ye, Henderson, Manson & Buchwald (2006) demonstrated that
the SF-36 and its two-factor model was appropriate for use in measuring health related quality of life in an older AI population.

**Sampling Design for Secondary Analysis**

In this secondary analysis of the AI-SUPERPFP study data, only the Southwestern tribe was studied. The participant sample for this secondary analysis was provided by the original AI-SUPERPFP study. This secondary analysis explored the factor structure between six concepts within AI culture and their relationship with psychological distress and health related quality of life in a Southwestern AI tribe.

The data are cross sectional. As mentioned above, a randomized sampling design was utilized in the original AI-SUPERPFP study to select the Southwestern tribal participants. Major demographic variables utilized in this secondary analysis were gender (M/F), age group in categories of 15-24, 25-34, 35-44, 45+, education (high school graduate and, marital status (married-cohabitating/unmarried). Descriptive frequencies of the demographic data on the Southwestern tribe are provided in Table 2. The age range for the Southwestern tribal participants was 15-54 years of age at time of sampling. Each participant had to either be living on or within twenty miles of their reservations at the time of data collection (1997-1999). Of the Southwest tribal participants that were located and found eligible for the original AI-SUPERPFP study, 73.7% (N=1,446) agreed to participate in the study. All Southwest tribal participants providing the needed data are included in this secondary analysis.
**Demographic Characteristics**

The total number of participants for this secondary analysis was 1,446 (n=1,446).

Demographic characteristics are presented in Table 2. A split sample strategy of 25% of the total n=1446, selected randomly was used to run the exploratory factor analysis (EFA) and the remaining 75% was used to run the confirmatory factor analysis (CFA).

Table 2

*Demographic Characteristics for Total Participants*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All</th>
<th>EFA</th>
<th>CFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total n</td>
<td>1446</td>
<td>374</td>
<td>1073</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male*</td>
<td>617 (42.6%)</td>
<td>139 (37.1%)</td>
<td>478 (44.5%)</td>
</tr>
<tr>
<td>Female</td>
<td>829 (57.3%)</td>
<td>235 (62.7%)</td>
<td>594 (55.4%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>361 (24.9%)</td>
<td>94 (25.1%)</td>
<td>267 (24.9%)</td>
</tr>
<tr>
<td>25-34</td>
<td>323 (22.3%)</td>
<td>95 (25.3%)</td>
<td>228 (21.2%)</td>
</tr>
<tr>
<td>35-44</td>
<td>353 (24.4%)</td>
<td>81 (21.6%)</td>
<td>272 (25.3%)</td>
</tr>
<tr>
<td>45+</td>
<td>409 (28.2%)</td>
<td>104 (27.7%)</td>
<td>305 (28.4%)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>862 (59.5%)</td>
<td>203 (54.1%)</td>
<td>659 (61.4%)</td>
</tr>
<tr>
<td>Not Married</td>
<td>579 (40%)</td>
<td>171 (45.6%)</td>
<td>408 (38%)</td>
</tr>
<tr>
<td>Missing</td>
<td>7 (.05%)</td>
<td>1 (0.3%)</td>
<td>6 (0.6%)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No HS or GED</td>
<td>567 (39.2%)</td>
<td>157 (41.9%)</td>
<td>410 (38.2%)</td>
</tr>
<tr>
<td>HS or GED</td>
<td>451 (31.1%)</td>
<td>111 (29.6%)</td>
<td>340 (31.7%)</td>
</tr>
</tbody>
</table>

n=1446; EFA n=374 (25% of sample); CFA n=1073 (75% of sample).  
* = significant difference between EFA sample and CFA sample; \( \chi^2 = 6.25, p<.05 \).

**Data Collection for Secondary Analysis**

The Centers for American Indian and Alaska Native Health (CAIANH) at the University of Colorado Anschutz Medical Campus has a data access process outlined for parties interested in obtaining the AI-SUPERPFP research data. The data access process
involves the submission of a formal application outlining the purpose of the request. Before the study was initiated, a formal application was submitted to the CAIANH along with the complete study proposal outlining all aspects of the proposed secondary analysis. The data access committee reviewed the application and approval for access to the data was granted to the principal investigator of this study.

Institutional Review Board and Tribal review board approvals were obtained for each participating tribe under the original AI-SUPERPFP study before data collection was initiated in 1997. The University’s institutional review board (Colorado Multi-Institutional Review Board, or COMIRB) was also involved in the approval process. Additional Tribal Review Board approvals were not required for this proposed secondary analysis as they were obtained under the original AI-SUPERPFP study, COMIRB protocol 94-157. An addendum to COMIRB protocol 94-157 was submitted to the COMIRB to inform them of the intent to conduct this secondary analysis on pre-existing data previously approved by the Colorado Multi Institutional Review Board (COMIRB). COMIRB responded to the addendum by requesting for submission of an exempt application, see Appendix C. An exempt application was submitted to COMIRB with approval to proceed with Non-Human Subject Research as proposed in this secondary analysis. Approval of COMIRB Protocol 13-3061 dated effective December 3, 2013 is attached, see Appendix D. During the original AI-SUPERPFP study, informed consent was obtained for all adult participants as well as parental consent for all minors participating in the study therefore, no consent forms were required for this secondary analysis.
Cultural Concept Selection Rational

The six concepts under review are the result of a concept analysis done by Kahn-John (2010) on the Diné (Navajo) concept “Hózhó”. Hózhó is a Diné concept which describes an overall state of wellness, health, and happiness. In the concept analysis, six attributes of Hózhó were identified. The six attributes are: spirituality, relationships, reciprocity, respect, thinking, and discipline. These six attributes embody some of the meaningful themes of protective factors shared among AI tribes, as supported by findings presented in the literature review. These items were selected because of their relevance and similarity to the inter-tribal themes of protective factors within AI tribes. Kahn-John (2010), along with her reading of other reflective literature suspected these themes in AI culture could be protective for the health and wellbeing of AI people. The principal investigator of this study explored whether these concepts as defined in AI culture, are related to physical or mental health in a Southwest AI tribe. This secondary analysis presents the factor structure of the six cultural concepts and their relationship with psychological distress and health related quality of life in a Southwest AI tribe. The items used to measure the six concepts of interest were part of the original AI-SUPERPFP study. Twenty-one items from the AI-SUPERPFP study were selected for this secondary analysis. The sources of the twenty-one items and the specific measures used to measure the culturally relevant psychosocial concepts in the original AI-SUPERPFP study are presented in Table 3. The table presents a list of twenty-one AI-SUPERPFP items alongside the concept the item was measuring. The source for each of the twenty-one items is also referenced in Table 3.
### Table 3

*Item, Associated Concept, Item wording, Source of item.*

<table>
<thead>
<tr>
<th>Item #</th>
<th>Concept</th>
<th>Item wording</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP01</td>
<td>Spirituality</td>
<td>How important is spirituality in your life?</td>
<td>Brim (1995)</td>
</tr>
<tr>
<td>SP02</td>
<td>Spirituality</td>
<td>How often do you spend time on religious or spiritual practices?</td>
<td></td>
</tr>
<tr>
<td>E3</td>
<td>Discipline</td>
<td>Have you ever attended any of the following?</td>
<td></td>
</tr>
<tr>
<td>17a</td>
<td>Discipline</td>
<td>Did you contribute to your household by hunting/fishing</td>
<td></td>
</tr>
<tr>
<td>17b</td>
<td>Discipline</td>
<td>Planting or farming?</td>
<td></td>
</tr>
<tr>
<td>17c</td>
<td>Discipline</td>
<td>Herding raising sheep or catle?</td>
<td></td>
</tr>
<tr>
<td>17d</td>
<td>Discipline</td>
<td>Craftwork such as beadwork, quiltwork, weaving, silversmithing</td>
<td></td>
</tr>
<tr>
<td>SP34</td>
<td>Discipline</td>
<td>I can do just about anything I really set my mind to.</td>
<td>Pearlin &amp; Schooler (1978); Turner, Lloyd, &amp; Roszell (1999)</td>
</tr>
<tr>
<td>SP36</td>
<td>Discipline</td>
<td>What happens to me in the future mostly depends on me.</td>
<td></td>
</tr>
<tr>
<td>SP30</td>
<td>Reciprocity</td>
<td>I give to others and receive from them in return.</td>
<td>Beals, Manson, Mitchell, Spicer, &amp; the AI-SUPERPFP Team (2003)</td>
</tr>
<tr>
<td>SP31</td>
<td>Respect</td>
<td>I am a person of integrity.</td>
<td>Beals, Manson, Mitchell, Spicer, &amp; the AI-SUPERPFP Team (2003)</td>
</tr>
<tr>
<td>SP32</td>
<td>Respect</td>
<td>I respect other people.</td>
<td></td>
</tr>
<tr>
<td>SP33</td>
<td>Respect</td>
<td>I respect Mother Earth.</td>
<td></td>
</tr>
<tr>
<td>SP41</td>
<td>Respect</td>
<td>I have a positive attitude about myself.</td>
<td>Rosenberg, M. (1979)</td>
</tr>
<tr>
<td>SP42</td>
<td>Respect</td>
<td>I feel that I have many good qualities.</td>
<td></td>
</tr>
<tr>
<td>SP41</td>
<td>Thinking</td>
<td>When I need to return to balance I know what to do.</td>
<td>Beals, Manson, Mitchell, Spicer, &amp; the AI-SUPERPFP Team (2003)</td>
</tr>
<tr>
<td>SP25</td>
<td>Relationship</td>
<td>I am in harmony with all living things.</td>
<td></td>
</tr>
<tr>
<td>SP26</td>
<td>Relationship</td>
<td>I feel connected with other people in life.</td>
<td></td>
</tr>
<tr>
<td>SL44a</td>
<td>Relationship</td>
<td>Among people you know, is there someone you can go with to play cards, or go to a bingo, pow wow, or community meeting?</td>
<td></td>
</tr>
</tbody>
</table>
Data Management

All data were protected as required by standard data protection measures. All data stored in computer based files were password protected and kept safe to ensure proper data protection and confidentiality. The data from the AI-SUPERPFP study were reviewed for fit and relevance of the study purpose, aims, and design. Because the original AI-SUPERPFP study was conducted with AI populations, the fit and relevance was ideal for this secondary analysis study design. Data received from the CAIANH data access committee were clean and did not require any recording or data transformation. All data obtained from the original study were de-identified prior to use by this investigator.

Secondary Data Analysis

The original AI-SUPERPFP study employed several psychosocial concept measures as part of their data collection strategy and thus collected rich information on beliefs, practices, and/or behaviors practiced by the AI study participants. In this secondary analysis, the Southwestern tribe is the primary focus. The original AI-SUPERPFP psychosocial concept measures measured some general psychosocial concepts that are closely related to the six concepts of interests (spirituality, relationship, reciprocity, respect, thinking, discipline). The original AI-SUPERPFP psychosocial measures were not originally intended for the purpose of measuring the six concepts of interest; however, their thematic similarity to the concepts under investigation indicated a reasonable fit between the existing AI-SUPERPFP data and the research design presented.
The six concepts (spirituality, discipline, respect, relationship, reciprocity, and thinking) were derived from the work done by Kahn-John (2010) on the attributes of Hózhó. The six concepts were thematically similar to findings from a literature review on resilience and protective factors within AI populations. The six concepts also were broad enough to incorporate and represent the common inter-tribal themes or concepts within AI culture that are valued and shared inter-tribally as suggested in the literature review on AI resilience and protective factors. Despite literature review findings that suggest AI inter-tribal themes and/or concepts such as spirituality, cultural knowledge, and family/tribal connectedness may be protective for psychological or physical health, limited empirical evidence that confirms the protective nature of these themes in AI populations is lacking (McMahon et al., 2013).

**Methods to Address Specific Aim 1**

Content validity is a process typically used in instrument or scale development to measure the relevance of each item on an instrument and the extent to which it covers the domain in question. In this secondary analysis, there was no existing tool to be evaluated for content validity. Instead, a set of related cultural concepts were explored to measure relevance of the AI-SUPERPFP items (questions) and their representation of the six concepts under investigation. One approach for establishing content validity involves a process recommended by several experts (Lynn, 1986; Streiner & Norman, 2008). This study slightly modified and implemented four relevant steps of the five step content validity process as outlined by Lynn (1986).
- Step one involves identification of the content domain. The content domain includes the six concepts of spirituality, relationship, reciprocity, respect, thinking, and discipline.

- The second step outlined by Lynn (1986) for instrument development is item development. This study is a secondary analysis; thus, items were established previously and are presented in the original AI-SUPERPFP study. For the purpose of this study, we modified step two by carefully selecting pre-existing items from the AI-SUPERPFP study based on relevance to the content domain (the six concepts) under investigation.

- In step three, Lynn (1986) recommends the items be further refined, reworded, organized, and arranged in a usable format. Because this study is a secondary analysis refinement and rewording of the items is not an option. Therefore, step three instead involved placing the pre-existing selected items in a usable format such as an assessment tool for expert reviewers to utilize in their expert analysis of the items and their relevance to the content domain. These first three steps have been completed as described above.

- Step four involves compiling a specific number of expert reviewers to review the items and determine whether each item is content valid in relation to the content domain being measured. The concept analysis conducted by a Diné tribal member, Kahn-John (2010) on Diné Hózhó was the source from which the six concepts under investigation were retrieved. The six attributes of Hózhó were originally derived and interpreted by Kahn-John (2010) from the
Diné perspective. Since the six concepts were retrieved through a concept analysis on the Diné concept *Hózhó*, it was determined that the expert reviewers for this content validity process would be American Indian, preferably AI experts with knowledge of Southwest AI tribes. Despite the vast diversity among AI tribes, there is also a significant overarching inter-tribal similarity of cultural practices and wellness philosophies among tribes, Croff et al. (2014). This inter-tribal similarity among cultural practices and wellness philosophies, supports the decision to utilize AI experts for this content validity process. It is presumed that there will be similarity of meaning of these six concepts if evaluated from the worldview of different AI tribes.

Other requirements for each expert reviewer included; must have a strong knowledge of Southwestern AI culture, must be literate in the English language, and must be at least 18 years of age. A four point scale (0: Not Relevant to 4: Very Relevant) was used by experts to rate the relevance of each item to the content domain.

- Step five is the overall determination by experts to decide whether the entire set of items (instrument) is content valid. For the purposes of this study, step five is modified to determine relevance of the items to the content domains. The expert suggestions were taken under consideration and reviewed by the principal investigator. Items were selected based on expert recommendation and theoretical relevance to the study aims as determined by the principal investigator.
**Results for Specific Aim 1**

**Item selection.** Items from the AI-SUPERPFP study were reviewed for the purpose of selecting items that measured the six concepts under investigation. Twenty items were selected from the original AI-SUPERPFP to establish content validity of each concept by determining the relevance between the six concepts and selected items. The items selected for analysis represent a compilation of various measurement tools utilized for data collection in the original AI-SUPERPFP study. Each item, the concept, and the source of the item were outlined in Table 3.

**Content validity for specific aim 1.** Lynn (1986) describes the assessment of content validity as a two-stage process. The first stage is the developmental stage involving three steps: domain identification, item generation, and instrument formulation. The second stage is the Judgment-Quantification that involves the consultation with a specific number of experts to determine if items are content valid and to determine if the entire instrument is content valid. Content validity measures the extent to which items on a scale measure the concept or the theory they are meant to assess. A specific number of experts must agree on content validity. The number of experts is determined by the standard error of the proportion by applying the index of content validity (CVI) Waltz and Bausell (1981, p. 71). The CVI is derived by developing an instrument that measures each individual item on a scale using a four point ordinal scale. Items are rated between a 1 and a 4 depending on relevance, 1 irrelevant and 4 extremely relevant. Lynn stated “a minimum of five experts would provide a sufficient level of control for chance agreement” (Lynn, p. 133). This study had seven AI expert
reviewers. The proportion of items rated 3 or four by the content experts determine the CVI. With seven expert reviewers, a CVI of 86% agreement among the experts was required for each concept relevance rating.

The content validity process for this secondary analysis of the AI-SUPERPFP data involved the steps of item identification by matching items to concepts under investigation. Items from the AI-SUPERPFP study were selected if they aligned with the definitions presented for the six concepts as determined by the principal investigator. Once the items were selected, seven AI experts of a Southwestern Tribe reviewed and rated the relevance of the selected items to the six concepts under investigation.

**Content validity expert demographics for specific aim 1.** Seven adult AI cultural experts from a southwestern tribe were consulted for the content validity process. Each expert was an adult at least 18 years of age who had knowledge or expertise in AI culture, preferably some familiarity with AI culture from the Southwestern region of the United States. The experts identified included four adult women and three adult men, all members of a Southwestern AI tribe. Each expert lived on or near a Southwestern AI reservation. Each adult AI expert agreed to participate in the content validity process and each expert confirmed their comfort with assessing the items and the item relevance based on their own individual Southwestern AI cultural knowledge.

Each expert received a letter of invitation to participate in the content validity process, see Appendix A. Six concepts were presented. Each concept was listed on the content validity reviewer tool, Appendix B. Each concept was defined by a Merriam Webster (2004) definition as well as a summarized definition presented in the concept
analysis of Diné (Navajo) Hózhó by Kahn-John (2010). The Merriam Webster (2004) definition was provided because each concept is of the English language. The definitions provided by Kahn-John (2010) provided a culturally informed definition of each English concept as understood from within the context of AI culture. All seven AI cultural experts agreed to participate. Each expert rated the individual items on a four point relevance scale. A content validity index score is presented for each item rated by the experts, see Table 4.

Results of content validity for specific aim 1. With seven content experts, each item had to demonstrate consensus among the experts at a CVI of at least 86% agreement between the relevance of each item measuring each concept. The content validity index for each item is presented in Table 4. Out of twenty-one total items, fifteen items had a CVI above 86%, six items had CIV scores below 86%. After review of the items determined content valid by the experts and careful theoretical consideration on decisions to retain or eliminate items, the principal investigator selected eleven items for further exploratory and confirmatory factor analysis.

The items retained after the content validity process are presented next along with rational explaining why each item was retained. Items SP1, SP2, SP34, SP36, SP30, SP31, SP41, SP42, SP28, and SP25 each had CVI scores ranging between 86% and 100%. Each item with a CVI score of at least 86% was again reviewed for theoretical relevance to each concept under investigation. Each of the above listed items was determined by the principal investigator to be theoretically relevant to each concept and each item also met the CVI score of at least 86%. Item, SP26, “I feel connected to other people in life”
had a CVI of 71%, well below the required CVI of 86%. Item SP26 was retained because five of the seven content experts rated the item relevance at a three or four and only two of the experts rated the item less relevant; thus, suggesting consensus among five of the seven experts on relevance of this item to the concept. The principal investigator also determined the theoretical relevance between item SP26 and the concept Relationship, remained quite strong and despite the low CVI score, the principal investigator opted to retain SP26.

The items eliminated after the content validity process are presented next with rationale explaining why items were eliminated. Two items, E3, “have you ever attended any of the following types of schools” and E03 “did you receive a degree or certificate from this school” had high consensus among the experts as adequate and relevant measures of the concept discipline. Both E3 and E03 had CVIs of 86% demonstrating expert consensus that academic pursuits and achievements were relevant measures of the concept discipline. The concept discipline, as defined by Kahn-John (2010) in the concept analysis had a broader definition encompassing various forms of self-discipline and it was determined by the principal investigator that the measure of academic pursuit or achievement did not encompass the culturally derived meaning of the concept discipline. The original culturally relevant meaning of discipline encompasses discipline of thought, speech, behavior, actions, and a determined work ethic. Despite consensus among the experts, items E3 and E03 were eliminated and determined not to be culturally relevant measures of discipline. Items E0317 “did you contribute to your household by hunting or fishing”, 17b did you contribute to your household by planting
or farming”, 17c “did you contribute to your household by herding or raising sheep or cattle”, 17d “did you contribute to your household with craftwork such as beadwork, quilt work, weaving, silversmithing”, were excluded because consensus among the experts indicated irrelevance with CVI ratings at 43% for items EO317, 17b, 17c, and 17d. SL2 “how much does your (husband/wife/partner) really care about you”, was selected to measure the concept relationship. Despite consensus among the experts with a CVI of 86%, SL2 was excluded primarily because it only measured the importance of a relationship with a significant other. The concept relationship, as defined by Kahn-John (2010) again was broader in describing relationships to encompass a broader span of relationships with not only family but also friends, relatives, tribe, nature, and the universe. Item SL2 was excluded; however, other items (SP25 “I am in harmony with all living things” and SP26 “I feel connected with other people in my life”) with greater relevance as measures of the concept relationship were retained. Item SL44a “among people you know, is there someone you can go with to play cards, or go to bingo, pow wow, or community meeting”, had a CVI of 43% and was excluded with expert consensus that SL44a was not a relevant measure of the concept relationship.

After the CVI, decisions had to be made about the inclusion of two items for further exploratory factor analysis. SP32 “I respect other people” and SP33 “I respect Mother Earth” both had CVI scores of 100% however, both SP32 and SP33 were each measured acts of respect that were directed externally (capturing broader and more external acts of respect). The principal investigator contemplated on whether to include items that measured both internally and externally directed respect. The principal
investigator was influenced about the importance of internally directed respect, ‘self-respect’ based on findings from the literature review on AI protective factors that internal skills and abilities may be protective. It was decided by the principal investigator to include both items SP32 and SP33 for the exploratory factor analysis. All twenty-one items submitted to the CVI process are listed in Table 4.

Table 4

*Content Validity Index Results of the 21 Originally Selected Items*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Item</th>
<th>CVI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirituality</td>
<td>SP1 How important is spirituality in your life?*</td>
<td>100%</td>
</tr>
<tr>
<td>Spirituality</td>
<td>SP2 How often do you spend time on religious or spiritual practices?*</td>
<td>100%</td>
</tr>
<tr>
<td>Discipline</td>
<td>SP34 I can do just about anything I really set my mind to.*</td>
<td>100%</td>
</tr>
<tr>
<td>Discipline</td>
<td>SP36 What happens to me in the future mostly depends on me.*</td>
<td>100%</td>
</tr>
<tr>
<td>Discipline</td>
<td>E03 Have you ever attended any of the following types of schools?</td>
<td>86%</td>
</tr>
<tr>
<td>Discipline</td>
<td>E03 Did you receive a degree or certificate from this school?</td>
<td>86%</td>
</tr>
<tr>
<td>Discipline</td>
<td>17 Did you contribute to your household by hunting /fishing?</td>
<td>43%</td>
</tr>
<tr>
<td>Discipline</td>
<td>17 b Planting or farming?</td>
<td>43%</td>
</tr>
<tr>
<td>Discipline</td>
<td>17 c Herding or raising sheep or cattle?</td>
<td>43%</td>
</tr>
<tr>
<td>Discipline</td>
<td>17 d Craftwork such as beadwork, quiltwork, weaving, silversmithing?</td>
<td>29%</td>
</tr>
<tr>
<td>Reciprocity</td>
<td>SP30 I give to others and receive from them in return.*</td>
<td>86%</td>
</tr>
<tr>
<td>Respect</td>
<td>SP31 I am a person of integrity.*</td>
<td>100%</td>
</tr>
<tr>
<td>Respect</td>
<td>SP32 I respect other people.*</td>
<td>100%</td>
</tr>
<tr>
<td>Respect</td>
<td>SP33 I respect mother earth.*</td>
<td>100%</td>
</tr>
<tr>
<td>Respect</td>
<td>SP41 I have a positive attitude about myself.*</td>
<td>86%</td>
</tr>
<tr>
<td>Respect</td>
<td>SP42 I feel that I have many good qualities.*</td>
<td>86%</td>
</tr>
<tr>
<td>Thinking</td>
<td>SP28 When I need to return to balance, I know what to do.*</td>
<td>86%</td>
</tr>
<tr>
<td>Relationship</td>
<td>SP25 I am in harmony with all living things.*</td>
<td>86%</td>
</tr>
<tr>
<td>Relationship</td>
<td>SP26 I feel connected with other people in life.*</td>
<td>71%</td>
</tr>
<tr>
<td>Relationship</td>
<td>SL2 How much does your [husband/wife/partner] really care about you?</td>
<td>86%</td>
</tr>
<tr>
<td>Relationship</td>
<td>SL44a Among people you know, is there someone you can go with to play cards, or go to bingo, pow wow, or community meeting?</td>
<td>43%</td>
</tr>
</tbody>
</table>

*Retained items after CVI
In conclusion, twenty-one items were analyzed during the content validity process and thirteen items were retained for further exploratory and confirmatory factor analysis. All 21 items, the wording of the originally selected items, and the CVI score for each item are listed in Table 4.

**Methods to Address Specific Aim 2**

Factor analysis is a useful statistical method to determine factors that explain variance among variables. Factor analysis is used for data reduction through the process of grouping variables that measure a concept (Mertler and Vannata, 2005). Principle component analysis (PCA) is a commonly used method to evaluate variability for each variable. The underlying factor structure between the identified six concepts was examined through the process of exploratory factor analysis (EFA). In EFA, there are no expectations and is exploratory in nature (Williams, 2012). The multivariate statistical approach of exploratory factor analysis was used to examine the factor structure of the concept variables spirituality, relationship, reciprocity, respect, thinking, and discipline.

The Statistical Program for Social Sciences (SPSS) was utilized to perform the analysis. Tabachnick and Fidell (2007) suggests a minimum requirement of at least 300 observations to perform factor analysis and with an n=1446 Southwestern tribal participants, the first rule for a recommended sample size in exploratory factor analysis was met. Data transformation was not required as the data set was de-identified, clean, and ready for analysis. In a split sample strategy, 25% of total number of participants resulted in a total of n=374 participants for the exploratory factor analysis. Descriptive statistics and demographics for the 25% sample size of n=374 are displayed in Table 2.
Data extraction is the reduction of a large number of items into a number of factors. Orthogonal and/or oblique rotation solutions were reviewed to maximize high item loadings and low item loadings, allowing for a simplified and interpretable result. Principal component analysis was the factor extraction method used to reduce the variables. PCA is usually exploratory, with a goal to extract the maximum variance for the purpose of discovering orthogonal (uncorrelated) components. Each variable is grouped or clustered through the principal component analysis and a factor loading for each variable is identified. Factor loadings are interpreted as Pearson correlation coefficients. Loadings range from -1 (indicating negative association) to 1 (indicating positive association) (Mertler and Vannata, 2005). It is recommended to use more than one method to determine factor extraction. The decision to retain factors is based on factor loadings and/or the eigenvalue. Eigenvalues greater than 1 (>1) are retained. Three factors were retained based on factor loadings and eigenvalues >1. The extracted factors were then labeled with appropriate theoretical labels that best reflect both the six original concepts under investigation and the newly assigned latent variable groups as discovered through the factor analysis process.

The results of the EFA are presented in the next chapter. The identified factor structure of the six concepts under investigation is presented. Factor loadings for each variable are presented. Appropriate theoretical labels (Harmony, Respect, and Spirituality) that reflect the theme of the factor clusters or the discovered latent variables are presented. A table summarizing the EFA results and factor loadings are presented in the following chapter; see Table 5.
Methods to Address Specific Aims 3 and 4

Structural equation modeling (SEM) utilizing confirmatory factor analysis and path analysis was employed after exploratory factor analysis to further test (confirm) the factor structure between the six concepts under investigation and to assess their relationships with health related quality of life and psychological distress outcomes in a Southwest AI tribe. Structural equation models were used to display the findings from the CFA and the PA, see Figure 1 for the CFA and Figure 2 for the PA results in the following chapter. To analyze the relationship between the identified factors and psychological distress as measured with the Kessler Screening Scale (K6) and health related quality of life, as measured with the SF-36, the statistical software MPLUS version 6 was used.

In this chapter, Specific Aims 1, 2, 3, and 4 were reviewed. Methods used to address Specific Aims 1, 2, 3, and 4 were presented. A brief summary of the original AI-SUPERPFP study and purpose were presented. Secondary analysis strategies were detailed including; sampling design, demographic characteristics of sample, data collection, rational for selection of cultural concepts under investigation, and data management. The results of the analysis for Specific Aim 1 were also presented as the content validity process with expert evaluators was completed prior to data analysis in the following chapter, the results of the factor structure and structural equation analyses are discussed.
CHAPTER IV

RESULTS

Chapter IV again provides an overview of the specific aims of this secondary analysis utilizing data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study (Beals, Manson, Mitchell, Spicer, and the AI-SUPERPFP Team, 2003). The results of the analysis for Specific Aims 2, 3, and 4 will be presented. The purpose of this study was to highlight existing concepts within AI culture and measure the relationship and factor structure among six concepts (spirituality, relationship, respect, thinking, discipline, and reciprocity) to determine whether the presence and practice of these concepts have any relationship with psychological distress and health related quality of life outcomes in a Southwest AI tribe.

Specific Aims

The results for Specific Aim 1 are presented in the previous chapter. The results of the analysis of Specific Aims 2, 3, and 4 are presented in this chapter and listed below:

2. To discover the factor structure of the concepts spirituality, relationships, reciprocity, respect, thinking, and discipline—as measured by the items determined to be content valid by the expert panel.
   a. What is the factor structure of the selected items?

3. To determine if there is a relationship between the detected concept factors and health related quality of life in a Southwest Tribe.
a. Is there a relationship between the detected concept factors and health-related quality of life in this population?

4. To determine if there is a relationship between the detected concept factors and psychological distress in a Southwest Tribe.

a. Is there a relationship between the detected concept factors and psychological distress in this a Southwest Tribe.

**Data Analysis**

**Summary Results Specific Aim 1**

Results for Specific Aim 1 were reported in chapter III of this manuscript.

American Indian cultural experts were consulted to determine relevance of the six concepts under investigation with pre-existing items extracted from the original AI-SUPERPFP study. The inclusion criteria for the AI cultural experts were: had to be AI adults at least 18 years of age or older, had to have AI cultural knowledge and expertise, preference was given to experts from a Southwestern AI tribe. The cultural experts assisted in validating the concept relevance of selected items. 13 of 21 original items were retained for further exploratory analysis.

**Results Specific Aim 2**

This secondary analysis utilizes existing survey data from AI-SUPERPFP (Beals, Manson, Mitchell, Spicer, and the AI-SUPERPFP Team, 2003). The AI-SUPERPFP data file included 1446 AI participants from a Southwest tribe. During the initial data analysis process, several test runs of exploratory factor analysis (EFA) were performed on the 13 retained items. The Statistical Package for the Social Sciences (SPSS: Version 21) was
used for EFA. Once the EFA structure was obtained a confirmatory factor analysis (CFA) was run using Mplus Version 6, a structural equation modeling software.

Exploratory factor analysis is used to reduce the number of variables into a small set of variables, establishes underlying latent constructs, and may aid in theory development or refinement (Williams, 2012). EFA was completed on thirteen items that were determined to be content valid by the seven AI cultural experts and after final review by the principal investigator to ensure theoretical and cultural relevance between the thirteen items and concepts.

The sample of 1446 Southwest Tribal participants was randomly split to perform EFA yielding 374 subjects (25%). No subjects were eliminated, as the data received were clean and complete. Data transformation was not required. Multiple runs of EFA with several different factor structures including 1, 2, 3, and 4 factor structures were performed. A 3-factor EFA structure had the best structural fit with the thirteen items under investigation and will be discussed below.

Each of the original concepts under investigation was linked with items from the AI-SUPERPFP data that were determined valid by seven AI expert reviewers. It’s important to note, despite consensus among experts on the relevance of each concept to the items, the exploratory factor analysis process assisted in determining whether the selected items actually measured the domain of the concept under investigation.

Principal component analysis (PC) was the extraction method used with varimax rotation and Kaiser normalization. Three criteria were used to determine how many factors to retain: the eigenvalues, the variance, and the scree test. An eigenvalue
accounts for the total number of variance explained by each factor (Mertler and Vennatta, 2005). The Kaiser normalization method involves retaining factors with eigenvalues greater than one. The Kaiser criterion is reliable as an indicator to retain factors when the number of variables is less than 30 and the number of participants is greater than 250 (Mertler and Vennatta, 2005).

The EFA model found to demonstrate the best fit with the proposed model was a 3-factor model. The eigenvalues for the three factors were: Factor 1-Respect= 4.025, Factor 2-Harmony= 1.645, and Factor 3- Spirituality = 1.238. Factors with eigenvalues greater than one were retained. Additional criteria that supported the decision to retain three factors include the scree test and the total variance explained. The scree test method is adequate when there are more than 250 participants. The scree plot findings supported a 3-factor model with the findings revealing three factors that plotted the eigenvalues against their original numbers (factor 1, 2, 3). The “knee” or bend in the scree plot indicated support for retaining a 3-factor structure. After rotation, Factor 1 accounted for 20.97% of the total variance in all thirteen variables, Factor 2 -17.84%, and Factor 3 -14.31% of variance. New latent variables were identified and appropriately labeled to reflect the conceptual themes reflected by the groups of items/concepts under investigation. The newly labeled latent variables include Factor 1- Respect, Factor 2-Harmony, and Factor 3-Spirituality. Latent variables are often named based on their theoretical meanings relevant to each domain being measured (Williams, 2021). The latent variables were labeled according to the domains they represented. The latent variable Spirituality measured spirituality. The latent variable Respect
measured the domains (concepts) self-respect and discipline. The latent variable
*Harmony* measured the domains (concepts) of relationships, reciprocity, and thinking.
The latent variable *Harmony* reflected three of the original six concepts and was changed to be reflective and representative of the concepts relationships, reciprocity, and thinking. It was determined that Harmony was a theoretical representation of the combined meaning of the concepts relationships, reciprocity, and thinking. Theoretically relationships are significant and the acts of thinking and reciprocity are important aspects of retaining and nurturing relations; thus, it was decided that *Harmony* would be the new label to represent those three concepts. All six original concepts were represented by these three new latent variables. The EFA process aided in data reduction and grouping of variables in to newly labeled latent variables and/or factors.

Factor 1- *Respect* was associated with seven items; SP36-“what happens to me in the future mostly depends on me”, SP34-“I can do just about anything I set my mind to”, SP42-“I feel that I have many good qualities”, SP32-“I respect other people”, SP31-“I am a person of integrity”, SP33-“I respect mother earth”, SP41-“I have a positive attitude about myself”. Factor 2- *Harmony* was associated with four items; SP30-“I give to others and receive in return”, SP28-“when I need to return to balance I know what to do”, SP26-“I feel connected with other people in life”, SP25-“I am in harmony with all living things”. Factor 3- *Spirituality* was associated with two items; SP1- “how often do you spend time on religious or spiritual practices”, SP2-“how important is spirituality in life”.

In the next section, this symbol “→” denotes times when the original concept was discovered to be actually be measuring another concept as determined through
careful deliberation of the meaning of each concept and findings from the EFA process.

For example, SP 36 was an item that was selected to measure discipline; however, after EFA, it was determined that it was actually measuring respect. Each of the variables, the wording of the item, along with the original measured concept is presented next.

Thirteen variables were examined: “What happens to me in the future depends on me”-SP36 (Discipline→Respect), “I can do just about anything I set my mind to”-SP34- (Discipline→Respect), “I have many good qualities”-SP42(Respect), “I respect other people”-SP32 (Respect), “I am a person of integrity”-SP31(Respect), “I respect mother earth”-SP33 (Respect), “I have a positive mood about myself”-SP41 (Respect), “I give to others and receive in return”-SP30 (Reciprocity→Relationships→Harmony), “I know what to do to return to balance”-SP28 (Thinking→Relationships→Harmony), “I feel connected with other people in life”-SP26 (Relationships→Harmony), “I am in harmony with all living things”-SP25-(Relationships→Harmony) “Amount of time spent on spiritual practices”-SP02 (Spirituality), “How important is spirituality in life”-SP01 (Spirituality).

The factor loadings for the seven items measuring Factor 1-Respect ranged between 0.51-0.70. The four items measuring Factor 2- Harmony had factor loadings ranging between 0.54-0.76. The factor loadings for the two items measuring Factor 3-Spirituality ranged between 0.78-0.81. The range of factor loadings for all variables ranged between 0.510-0.809, indicating moderately high factor loadings for all thirteen measured items. All factor loadings are presented in Table 5. Items with the highest factor loadings measured Spirituality. Item SP31 and SP33 had factors loading high in
Table 5

*Three-factor Solution: Exploratory Factor Analysis Loadings and Factor Labels*

<table>
<thead>
<tr>
<th>Description of Items</th>
<th>Factor I RESPECT (Respect, Discipline)</th>
<th>Factor II HARMONY (Relationships, Reciprocity, Thinking)</th>
<th>Factor III SPIRITUALITY (Spirituality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP36 What happens in the future depends on me.</td>
<td>.697</td>
<td>-.076</td>
<td>-.151</td>
</tr>
<tr>
<td>SP34 Can do just about anything set mind to.</td>
<td>.643</td>
<td>.131</td>
<td>.206</td>
</tr>
<tr>
<td>SP42 I have many good qualities.</td>
<td>.641</td>
<td>.235</td>
<td>.267</td>
</tr>
<tr>
<td>SP32 I respect other people.</td>
<td>.629</td>
<td>.223</td>
<td>-.008</td>
</tr>
<tr>
<td>SP31 I am a person of integrity.</td>
<td>.586</td>
<td>.474</td>
<td>.196</td>
</tr>
<tr>
<td>SP33 I respect mother earth.</td>
<td>.525</td>
<td>.371</td>
<td>-.275</td>
</tr>
<tr>
<td>SP41 Have a positive attitude about myself.</td>
<td>.510</td>
<td>.211</td>
<td>.503</td>
</tr>
<tr>
<td>SP30 Give to others and received in return.</td>
<td>.108</td>
<td>.761</td>
<td>-.129</td>
</tr>
<tr>
<td>SP28 Know what to do to return to balance.</td>
<td>.057</td>
<td>.701</td>
<td>.179</td>
</tr>
<tr>
<td>SP26 I feel connected w/ other people in life.</td>
<td>.146</td>
<td>.646</td>
<td>.193</td>
</tr>
<tr>
<td>SP25 I am in harmony w/all living things.</td>
<td>.257</td>
<td>.535</td>
<td>.048</td>
</tr>
<tr>
<td>SP02 Amount of time spent on spiritual practice.</td>
<td>-.112</td>
<td>.053</td>
<td>.809</td>
</tr>
<tr>
<td>SP01 How important is spirituality in life.</td>
<td>.164</td>
<td>.085</td>
<td>.784</td>
</tr>
</tbody>
</table>


two factor domains (double loading). It was decided by the principal investigator to eliminate SP 32 and SP33 for the subsequent confirmatory factor analysis process as they measured externally directed respect and the principal investigator was more interested in looking at internally directed respect, self-respect. Item SP 31 also loaded
high in two factors. SP31 was retained as it was considered to be a strong measure of self-respect. The findings of the EFA supported the decision for the CFA. With the elimination of SP32 and SP33, the confirmatory factor analysis results in the next section will present the factor structure of eleven items, not thirteen.

**Results Specific Aims 3 and 4**

For Specific Aims 3 and 4, Structural Equation Modeling (SEM) was the statistical method employed. CFA and path analysis (PA), both forms of SEM, were conducted using the software program Mplus, Version 6. The purpose for the CFA and the PA was to address Specific Aims 3 and 4. Specific Aims 3 and 4 were to determine relationships between the newly defined latent variables *Respect, Harmony, and Spirituality*, and their relationship with health related quality of life and psychological distress in a Southwestern AI tribe.

A strength of SEM is the ability to run factor analysis and regression analysis simultaneously, as well as to model more than one dependent variable (DV) within the same equations. It is a sound method to account for measurement error when working with multiple DVs. Specific Aims 3 and 4 set out to measure relationships between the original concepts under investigation (now reduced to three new latent variables) and health related quality of life and psychological distress. Mplus6 has a greater capability to run continuous and categorical data. The data collected was categorical; therefore, the CFA with the remaining participants (n=1073) was performed in Mplus6. The CFA was first run independently of path analysis to confirm adequate fit of a 3-factor model.
The fit of a model in CFA is determined by reviewing fit statistics. The $\chi^2$ statistic, degrees of freedom, comparative fit index (CFI), and root mean square error of approximation (RMSEA) are the statistics that determine fit of a model. Adequate model fit in CFA is represented by a CFI over .9 and a RMSEA under .05. The fit statistics for the CFA 3-factor model are: $\chi^2=1.4.299$, df=41, $p=0.000$, CFI=0.969, RMSEA=0.047.

As previously determined with the EFA process, a 3-factor model demonstrated adequate fit with the CFA. Figure 3 presents the 3-factor structural equation model confirmed by CFA with the factor loadings, observed variables, the three latent variables, and correlations between the latent variables (standardized results of the CFA), and the fit statistics. The correlations for the three latent variables are: Harmony with Spirituality 0.394, Harmony with Respect 0.847, and Spirituality with Respect 0.395.

To simultaneously address Specific Aims 3 and 4, both CFA and PA were performed in MPlus to test the relationship between the latent variables and health related quality of life and psychological distress in a Southwest AI tribe.

Psychological distress was measured in the original AI-SUPERPFP study utilizing the K6. Health Related Quality of Life was measured in the original AI-SUPERPFP utilizing the SF-36. The Physical Component Summary (PCS) and the Mental Component Summary (MCS) were the summary scores of the SF-36 that were used to perform the path analysis for the purpose of measuring relationships between the three latent variables (Respect, Harmony, and Spirituality) and the dependent variables (Health Related Quality of Life and Psychological Distress) in a Southwestern AI tribe.
The final confirmatory factor analysis analyzed the factor structure for the remaining eleven items (items SP32 and SP33 were eliminated after the EFA). The final SEM using CFA and PA (run simultaneously in MPlus) again confirmed adequate fit of a 3-factor model with the newly identified latent variables *Respect, Harmony, and Spirituality*. The final CFA and PA structural equation model is presented (see Figure 4.).
Figure 4. Final Standardized CFA with PA and fit statistics: $\chi^2=130.332$, df=65, $p<0.001$, CFI=0.974, RMSEA=0.038.

Standardized model results are reported. The factor loadings for the five items measuring Respect ranged between 0.60-0.84. The factor loadings for the four items measuring Harmony ranged between 0.66-0.72. The factor loadings for the two items measuring Spirituality ranged between 0.57-0.76. The Chi-Square ($\chi^2$) statistic indicates good fit when the value is nonsignificant with a $p<.05$. The $\chi^2$ for this final three factor model P-value was 130.332, indicating nonsignificance. However, the magnitude of this
statistic is dependent on sample size such that, with large samples, nonsignificance is unlikely. The root mean square (RMSEA) is indicative of a good fit when the RMSEA ≤ .05, the RMSEA at a 90% confidence interval was 0.038. The comparative fit index (CFI) should be ≥ .95 to indicate good fit, and the CFI for the final three factor model was 0.975. All fit statistics indicate good fit of the 3-factor structural model.

The path analysis between the latent variables Respect, Harmony, and Spirituality and their relationship with Psychological Distress, the Physical Component Summary of SF36, and the Mental Component Summary of the SF36 are discussed here. No significant relationships were found between the latent variable Harmony and Psychological Distress (HD Score) or either of the Health Related Quality of Life summaries: the Mental Component Summary (MCS) and Physical Component Summary (PCS). The latent variable Spirituality was found to have an inversely significant relationship with the physical component (PCS) of health related quality of life with standardized estimates β=0-0.091 (SE=0.04), t=-2.00, p=0.045. The latent variable Respect indicated significant relationships with all three DVs. Respect was shown to have a significant relationship with the physical component (PCS) of health related quality of life with β=0.310 (SE=0.137), t=2.26, p=0.023. Respect demonstrated significant association with the mental component (MCS) of health related quality of life with β=0.382 (se=0.147), t=2.60, p=0.009. Respect demonstrated an inversely significant relationship with Psychological Distress (HD Score) as indicated by a β=-0.392 (SE=0.132), t=-2.97, p=0.003. A high score on the K6 (psychological distress scale) indicates greater psychological distress; therefore, the inverse relationship between the
K6 and the latent variable *Respect* indicates that participants with high levels of respect had less psychological distress. The final $R^2$ values for the three DVs include; HDSCORE $R^2=0.06$, MCS $R^2=0.06$, and PCS $R^2=0.03$. Figure 4 presents the final SEM model depicting the results of both the CFA and PA.

In summary, chapter IV discussed the results of Specific Aims 2, 3, and 4. Results for Specific Aim 1 were presented in the previous chapter. Specific 2 two set out to discover the factor structure of the six cultural concepts under investigation. A 3-factor structure was discovered through EFA to be the best fitting model. During the EFA items SP31 and SP33 loaded high on two factors (double loading). There was justification to support the decision to retain item SP 31 (despite double loading) because of the theoretical significance and relevance of retaining an item that measured internally directed *Respect* (self-respect); see previous sections for details of the decision process to retain SP31 for the CFA. SP33 was eliminated because of theoretical inter-item inconsistency as a measure of the concept *Respect*. SP32 was also eliminated due to theoretical inter-item inconsistency between items that measured *Respect*. Elimination of SP32 and SP33 after the EFA resulted in the analysis of the eleven remaining items through the CFA process to address Specific Aims 3 and 4. Specific Aim 3 explored the relationship between the three latent variables and both the MCS and the PCS of health related quality of life in a Southwestern AI Tribe. Significant relationships were discovered between latent variable *Respect* and the PCS of health related quality of life and the MCS of health related quality of life. Significant relationships were discovered between the latent variable *Spirituality* and the PCS of health related quality of life. No
significant relationships were identified between latent variable *Harmony* and either of the PCS or the MCS of health related quality of life. Specific Aim 4 was aimed at discovering relationships between each of the three latent variables and psychological distress in a Southwestern AI tribe. Relationships between the latent variables and the dependent variables (psychological distress and health related quality of life) were explored through the CFA and PA process. *Respect* was the only latent variable that demonstrated a significant relationship with psychological distress in a Southwestern AI tribe. Results for Specific Aim 1 were presented in chapter III three. The results for Specific Aims 2, 3, and 4 were presented.

All fit statistics for the 3-factor model confirmed through CFA were presented. Beta coefficients for the path analysis between each latent variable and the dependent variables were presented. The variance ($R^2$) for each dependent variable are presented. Results for Specific Aims 2, 3, and 4 were presented and summarized in Chapter IV. Results for Specific Aim 2 were presented in Figure 3 in the form of a structural equation model depicting the 3-factor structure discovered by EFA and confirmed by CFA. Results for Specific Aims 3 and 4 were presented in Figure 4 in the form of a structural equation model depicting the path analysis between the three latent variables and the dependent variables (psychological distress [HD Score] and health related quality of life [MCS & PCS]). Chapter V presents further discussion pertinent to the results presented in Chapter IV, significance of the study, and implications of this research for nursing.
CHAPTER V

DISCUSSION

Chapter V presents discussion and interpretation of the study results, strengths and limitations of the study, significance for American Indian health, implications for nursing, and suggestions for future directions and further development of research on AI protective factors and resilience. A synthesis of the study findings and previous research and resilience models is followed by a summary of the entire study, and final conclusions. The following Specific Aims informed the study design and methods and now will guide the discussion of results.

1. To determine if cultural experts agree that selected items (from pre-existing AI-SUPERPFP data) theoretically reflect the definitions of the six concepts; spirituality, relationships, reciprocity, respect, thinking, and discipline.

2. To discover the factor structure of the concepts spirituality, relationships, reciprocity, respect, thinking, and discipline—as measured by the items determined to be content valid by the expert panel.

3. To determine if there is a relationship between the detected concept factors and health related quality of life in a Southwest Tribe.

4. To determine if there is a relationship between the detected concept factors and psychological distress in a Southwest Tribe.

Discussion of Specific Aim One

Specific Aim 1 evaluated the content validity of the six cultural concepts and the relevance of each concept to the 21 items selected from the AI-SUPERPFP data.
Limitations exist when using existing instruments to measure and/or assess diverse populations. Cultural validity of the instrument, cultural bias, the ability of the participants to comprehend items, potential cultural insensitivity of an item, and cross-cultural irrelevance are some potential considerations when using existing instruments to assess the AI population (Manson, 1997). The importance of assessing content validity is especially significant when interpreting meaning from the worldview of another culture (Feretich, Phillips, Verran, 1993). Feretich et al. (1993) emphasize the need to “examine new ways of assessing constructs that are relevant across cultures”, p. 228. The content validity process was a crucial process that established both content validity as well as cultural relevance of the items selected to test the six concepts under investigation. The original AI-SUPERPFP study also held focus groups with AI participants to develop some of the items that were used in this study (Beals, Manson, et al. 2003) Therefore, it’s imperative to note dual levels of content validity as well as cultural validity that were established in the original AISUPERPFP study and this secondary analysis.

Thirteen items were retained after the content validity process. Seven adult AI cultural experts with familiarity of Southwest AI tribes reviewed the six concepts as defined by Kahn-John (2010) and rated the relevance of each selected item on a four point scale. Items retained had content validity index scores ranging between 71%-86%. With seven cultural experts, a CVI of 86% was required for each item. The principal investigator did retain items with a CVI below 86% if strong theoretical relevance was identified between the concept and the item. One item with a CVI score of 71% had
consensus of relevance among five of the seven AI cultural experts; therefore, majority consensus among the AI cultural experts along with investigator concurrence aided in the decision to retain despite a CVI score of 71%. Refer to details of rationale for items retained in chapter three. Unexpected responses from the AI cultural experts with the CVI process were also presented along with suggestions for future inquiry.

The AI cultural experts did confirm relevance of the majority of the concepts with the selected items. Although the items measuring education were not retained in the study, an interesting observation among the experts was there was strong consensus on educational pursuit as a strong indicator of the presence of discipline. The pursuit of education is valued and supported in AI communities and has been shown to be a protective factor for AI youth. More traditional activities that may have been good measures of discipline in previous generations such as; hunting, farming, fishing, and crafts did not reach consensus among the cultural experts as a measure of the concept discipline. This finding was surprising as many AI communities are subsistence communities and daily routine activities include; hunting, farming, fishing, and crafts as a means of survival and may have been historically perceived as disciplined behaviors. Perhaps, these cultural activities are baseline requirements and not necessarily perceived as an extra level of discipline, as is education, per the opinion of the cultural experts. In the future, one might ask follow up questions with the AI cultural experts to explore the CVI scores for the traditional activities for the purpose of revealing insights on what activities (from an AI worldview) are considered baseline and routine versus those tasks that are considered to require much more discipline. This finding may be
representative of contemporary AI culture where there may be high regard for academic pursuit as a form of disciplined behavior.

In summary, Specific Aim 1 was fulfilled by consulting with AI experts with cultural knowledge on AI Southwestern Tribes. The AI experts reached consensus on which items were relevant to the concepts under investigation. The fit between the study design and the pre-existing AI-SUPERPFP data was exceptional; however, it is important to note that despite the good fit, a secondary analysis of data does have some drawbacks and caution is advised when interpreting results of a secondary analysis that attempts to match a study design with pre-existing data. The consultation with AI cultural experts through the structured CVI method further supports adequate fit between the study design and the pre-existing data. The extensive content validity process is outlined in chapter three of this manuscript and fulfilled the goal for Specific Aim 1. Thirteen of the original twenty-one items were retained after the content validity process. The decision to retain items was based on the consensus of the AI cultural experts along with careful deliberation by the principal investigator on the theoretical relevance between concepts and selected items. Both content and cultural validity was established with the items through the content validity process designed to address Specific Aim 1.

Discussion of Specific Aim 2

The original intent of Specific Aim 2 was to explore and discover the factor structure of the original six concepts under investigation. The six cultural concepts were extracted from the work done by Kahn-John (2010) in a concept analysis of the Diné
Hózhó wellness philosophy. This secondary analysis and the selection of the six concepts under investigation began with the original exploration of the Diné Hózhó wellness philosophy; therefore, the Hózhó philosophy will be used as a theoretical reference and framework for the discussion of the EFA and the CFA findings that were implemented to address Specific Aim 2. The discovered factor structure is presented next along with theoretical discussion describing the 3-factor structure and the newly applied labels for the three latent variables.

EFA and CFA confirmed a 3-factor structure. The original six concepts failed to factor into six independent factors. The six concepts may not have factored independently into six separate factors because the selected items may not have been the most adequate measure of each concept, a potential artifact of secondary analysis of data. Another reason the six concepts did not factor into six separate factors may be related to collective and overlapping meanings among the six concepts. For example, in the AI culture, the concept respect is often integrated into the concept spirituality; therefore, it would be very difficult to separate the two concepts of respect and spirituality because within the AI culture, both concepts are usually connected and mutually inclusive of the other. In other words, one concept would not exist without consideration of the other concept. The process of EFA is often intended for the purpose of data reduction. The original intent of Specific Aim 2 was to discover the factor structure of the six cultural concepts. Through the EFA process, the six original concepts were reduced to three latent variables. The newly identified latent variables reflecting the 3-factor structure model include: Respect, Spirituality, and Harmony.
While it may appear that the concepts *Discipline*, *Thinking*, and *Reciprocity* were lost or eliminated in the EFA process, rather, the discovered relationships and facture structure of the original six concepts distinguished the similarities between concepts resulting in the discovery of three new latent variables and a 3-factor structure. The concepts of *Discipline*, *Thinking*, and *Reciprocity* were not lost during the analysis. Instead, the concepts were incorporated into the three latent variables through the EFA process. The themes of the three latent variables remain relevant and reflect a condensed structure of the original six concepts under investigation. The three new latent variables also remain theoretically relevant to the original Diné concept of Hózhó. There is much similarity and overlap across the six original concepts; thus, the EFA and the CFA were critical steps to clarify the independence of each new discovered factor, to determine the overall factor structure, as well as to highlight the similarity between concepts. Further discussion on the discovered similarity among concepts continues.

The original six concepts had similar or overlapping definitions and meanings; therefore, some of the concepts clustered together and resulted in the final 3-factor structural model. A description of the shared similarity among concepts resulting in the reduced 3-factor structure is presented. The concepts of *Respect* and *Discipline* were similar in meaning and definition and evolved into independent factor category of *Respect*. Theoretically, the original definition of *Discipline* presented by Kahn-John (2010) pertained to disciplined thoughts, behavior, actions, and speech. The reasons for disciplined thoughts, behaviors, and speech within the Hózhó philosophy are for the purpose of maintaining a state of constant reverence or respect for self, others, and the
universe. Maintaining discipline in Hózhó philosophy requires a constant state of
discipline in ones thoughts, behaviors, and actions that requires consistent respect for
self, others, and the universe. The EFA and CFA confirmed the items measuring the
theoretically related concepts Respect and Discipline actually measured one
independent factor, now identified as the latent variable Respect.

An important discovery through the EFA process was the double loadings for two
items (SP31 and SP33) as well as an inter-item discrepancy of with the items measuring
Respect. Some items measured internally directed respect while others measured
externally directed respect. Because of the decision made by the principal investigator
to focus on internally directed respect (self-respect), item SP 31 was retained despite
high loadings on two separate factors. Items SP32 and SP33 were eliminated after the
EFA. This decision reduced the number of items to eleven for the final confirmatory
factor analysis and path analysis required to address Specific Aims 3 and 4.

The original concepts Reciprocity, Thinking, and Relationships factored into a
single latent variable. It was decided that this factor would be renamed Harmony. An
explanation of the collective meaning of the three concepts, and reasoning for the new
label follow. The concept Harmony collectively describes two of the original concepts
Reciprocity and Relationships. Relationships were defined by Kahn-John (2010) as all
relationships central to an individual including: a relationship with self, others, nature,
spirits, animals, the Creator, and the entire universe. The act of reciprocity (giving and
receiving) is often a requirement to maintain relationships. Kahn-John (2010) described
reciprocal relationships within AI culture as evidenced by literature review findings
suggesting consensus among AI tribes of the importance of making spiritual offerings, gift giving, and high reverence for the characteristic of generosity. The items measuring *Reciprocity* and *Relationships* measured connections to people, harmony with all living things, and the ability to give to others and receive in return.

Item SP28 measured knowing what to do to return to balance. SP28 was an item selected to measure the original concept *Thinking*. SP28 measured the act of “knowing” what to do to return to balance and was the single item selected to measure the original concept *Thinking*. *Thinking* was described by Kahn-John (2010) as a constant mindfulness, a disciplined thought process, and the ability to think, plan, and organize ones thoughts, behaviors, and activities as one was striving to maintain a state of Hózhó. In a secondary analysis of data, there may be incongruence between the original study intent and the available data. The efforts to extract and select items from the dataset that specifically measure the act of *Thinking* was a difficult task due to the unique cultural description of the concept *Thinking* as described by Kahn-John (2010). SP 28 was selected to measure *Thinking*; however, it also measured what one does to return to a state of balance or harmony. Thus, it was concluded that this item actually measured a cognitive process of ‘knowing’ that is specific to maintaining balance or harmony (maintaining external relationships).

From an AI worldview, a state of balance within one’s environment requires an acute awareness of ones surroundings inclusive of all relationships reflected by relationships with self, others, animals, spirits, nature, and the universe. It is concluded that SP28 actually was an accurate measure of balance, which can be further
interpreted from an AI worldview, as a measure of harmony with all relations. SP28 was not an adequate measure of the concept *Thinking*; thus, in future studies that intend to measure the process of *Thinking* or similar concepts such as *mindfulness* or *knowing*, more accurate measures will need to be developed to reflect concepts from the cultural worldview under investigation. The items that measured the latent variable *Harmony* adequately reflected harmonious relations, connections, balance, and reciprocity with oneself, others, nature, animals, spirits, and the universe. As such, the newly labeled latent variable *Harmony* was measured by items measuring relationships, reciprocity, and balance and reflects a more accurate and collective meaning of the three original concepts (thinking, reciprocity, and relationships).

The final latent variable was *Spirituality*. Spirituality was measured by items that measured the importance of spirituality as well as the amount of time spent on spiritual practices. The items measuring the factor *Spirituality*, adequately measured the concept of spirituality. Future development of measures to measure AI spirituality might consider designing items that measure additional aspects of spirituality; type of spiritual practice (ceremonies, church, Native American Church, Religion, spiritual rituals, meditation) amount of time spent on spiritual practice, frequency (how often one engages in spiritual practice), and duration (how many weeks, months, or years of spiritual practice) as more detailed ways to measure AI spirituality. The literature on protective factors in AIs suggests that Spirituality is an important aspect of AI culture; therefore, future research might consider developing measures and study designs to capture the significance of AI spirituality and its impact on overall health of AIs.
In summary, the intent of Specific Aim 2 was to discover the factor structure of the original six cultural concepts under investigation. Through the process of EFA, it was determined that the six original cultural concepts under investigation did demonstrate relationships as outlined in the newly confirmed 3-factor structure model; refer to Figure 3 in chapter four to review the 3-factor model. Despite confirmation of a 3-factor structure through the EFA and CFA process, it is important to mention the high correlations between the latent variables *Harmony* and *Respect*. Further CFA is recommended in future analysis to confirm whether *Harmony* and *Respect* could actually be one factor. It was decided by the principal investigator in this study to retain the 3-factor structure as confirmed by EFA and CFA acknowledging the high correlation between the latent variables *Harmony* and *Respect*. The three latent variables were labeled *Harmony*, *Spirituality*, and *Respect* based on their theoretical meanings relevant to the original six cultural concepts extracted from the concept analysis of Diné Hózhó by Kahn-John (2010).

**Discussion of Specific Aims 3 and 4**

Specific Aims 3 and 4 set out to determine if relationships existed between the six original concepts and psychological distress and health related quality of life in a Southwestern AI tribe. After the EFA and the CFA, path analysis was conducted between the newly identified latent variables *Harmony*, *Spirituality*, and *Respect* as measured by the eleven remaining items and the dependent variables psychological distress and health related quality of life.
The latent variable *Harmony* did not demonstrate any statistically significant relationships with psychological distress or health related quality of life. This is an interesting finding that requires more exploration. The literature review on AI protective factors consistently identified relationships with family, tribe, clan, teachers, and mentors as significant protective factors for AIs. The AI culture has consistently been shown to have high regard for the honoring of relationships. It is likely that the items selected to measure *Relationships* and *Harmony* were not culturally adequate measure of these concepts. Culturally relevant instruments that measure the significance and the presence of existing relationships that exist within AI culture (self, family, tribe, clan, spiritual, nature, Creator, universe, animals) may be more appropriate in future studies to explore the protective nature of *Relationships* and/or *Harmony* in relation to physical or psychological health in the AI population. *Spirituality* did demonstrate a significant relationship with the PCS of health related quality of life. *Respect* demonstrated statistically significant relationships with both psychological distress and health related quality of life. The significant relationships between *Spirituality* and *Respect* and the dependent variables are discussed next.

The K6 (HD Score) measured psychological distress; the SF-36 incorporated the Physical Component Summary (PCS), and the Mental Component Summary (MCS) to measure health related quality of life. A significant negative inverse relationship was found between *Spirituality* and the PCS. Path analysis does not measure causal relationships; therefore, no causal meaning is applied to the identified relationship between Spirituality and PCS. However, one conclusion is that spirituality in AI
populations is a significant component of physical health. Further research is recommended to determine exactly how spiritual practices relate to physical health.

The latent variable *Respect* demonstrated statistically significant relationships with all three dependent variables: HD score, MCS, and PCS. Again, path analysis is not able to determine any causal relationships between the multiple dependent variables and the multiple dependent variables. However, it has been confirmed that statistically significant relationships do exist between *Respect* and psychological distress and both the PCS and MCS of health related quality of life. In the final CFA and PA, the $R^2$ for the HD ($R^2=0.06$) Score, PCS ($R^2=0.04$), and the MCS ($R^2=0.06$) were low, demonstrating minimal explained variance for each of the significant findings. While results showed minimal variance explained, this finding remains significant and warrants further investigation in future studies.

In summary, Specific Aims 3 and 4 set out to determine if any of the original concepts had significant relationships with psychological distress and health related quality of life. It was determined through CFA and PA that cultural concepts and concepts such as *Respect* and *Spirituality* do have significant meaning when addressing psychological distress and health related quality of life components in a Southwestern AI tribe. Future research of cultural concepts and their relationship with psychological and physical health is supported by the findings from this study. Specifically, in the AI population cultural worldviews may have significant impact on the way health and wellness are perceived and integrated into health promoting activities.
Study Strengths and Limitations

An asset of this study is that it was conducted by an American Indian principal investigator. The cultural insights and knowledge from an AI worldview adds to the authenticity of this study when discussing AI health, AI history, and AI cultural concepts and their relationship with health outcomes. This unique exploration of AI cultural concepts adds to the emergence of scientific evidence that validates the significance of further exploration of AI cultural concepts and philosophies that exist within the AI culture that may be significant for health promotion.

A secondary strength of this study is that the study results supported and corroborated the findings from the literature review presented in chapter II. The results were congruent with the Gunnestad model of resilience (Gunnestad, 2006), the NAPS model (Kahn-John, 2011), and the Hózhó concept analysis and wellness philosophy (Kahn-John, 2010); thus, conclusions from previous similar works were supported. The importance of distinguishing and exploring culturally distinct categories of protective factors that may impact psychological and physical health in the AI population was a major strength of this study.

The generalizability of this study is limited to some extent because the study sample reflects data collected from an unidentified Southwestern Tribe. The findings from this study should not be generalized to represent tribes located in the Southwestern region of the United States nor any of the AI tribes in the U.S.

The original data from the AI-SUPERPFP were collected between 1997 and 1999. This secondary analysis was conducted approximately 17 years after the original data
collection. Changes or trends over time, while a natural occurrence, may contribute to natural clashes or incongruence between the theoretical perspective of this study design and the era in which data were collected. Mindfulness and consideration of the time lapse between data collection and secondary analysis findings is recommended when interpreting the findings from a secondary analysis.

A further limitation is that the original items used for data collection in the original AI-SUPERPFP study were not specifically designed to measure the concepts of interest in this secondary analysis. Therefore, the fit and relevance between the selected survey items and the six concepts of interest may not optimal. It is important to recognize that study findings may be a direct result of a potentially poor fit between the data and the secondary analysis design, although, the validity activity involving the panel of cultural experts may have partially ameliorated this potential discrepancy. These limitations will inform the development of subsequent studies to further explore this important topic.

Relevance for American Indian Health

A valuable contribution to AI health is the recognition of the distinct nuances found within AI culture that may have significance when evaluating health. It is these nuances that must be explored to better understand health from an AI worldview. Current healthcare measurement tools intending to measure aspects of AI health miss the essence of what AIs consider health and/or wellness. The findings from this study do reveal the importance of cultural concepts embedded within AI culture that may be helpful sources of measuring and promoting health with AI populations.
With nearly six hundred recognized AI tribes in the United States and each tribe distinct in its language, culture, attire, geographic location, customs, beliefs, and philosophies, one must honor the individuality of each tribe by being cognizant of the vast differences between tribes. Despite the differences between AI tribes, there exist overarching similarities of culture, beliefs, and philosophies that also must be recognized and highlighted as cultural characteristics that unite this population inter-tribally. Both tribe-specific research for AI tribes as well as general research for the entire AI population will aid in diminishing the existing gaps that contribute to the current state of AI health.

**Implications for Nursing**

Nursing as a discipline can benefit from the findings in this research study in the areas of education, research, practice, and policy development. Nursing knowledge is expanded with the findings from this study. The findings of this study support the development of coursework within academic nursing settings that introduce topics such as: culture, diversity, ethnicity, within nursing. The resultant educational experience for nursing students and educators is a well-rounded and culturally relevant nursing educational experience that will ultimately translate into the delivery of exceptional nursing care for individuals. The knowledge generated from this study will serve as a guidepost for future nurse researchers who are interested in the study of culturally relevant healthcare delivery and the study of culture as it relates to health promotion.

Nurses will benefit from the knowledge generated from this study by integrating this knowledge into their practice. All domains of nursing practice will benefit from the
knowledge presented through this study; although, those nurses specifically interested in the nuances of culture or who are working with culturally diverse populations will likely receive the greatest practice benefit. On a larger scale, policy makers have additional evidence to support the development of culturally specific policies that benefit the health of diverse populations. The findings from this study or similar studies may prompt payer sources such as the Centers for Medicare and Medicaid services to reimburse for culturally relevant health intervention strategies that are uniquely designed for culturally unique populations, such as the AI population.

**Future Research Recommendations**

The original intent of this study was to investigate the factor structure of six cultural concepts and measure their relationship with psychological distress and health related quality of life in an AI Southwestern Tribe. This work provides some groundwork, and revealed some theoretical underpinnings that emphasize the importance of cultural nuances when delivering healthcare to individuals from diverse cultures. This work also supports the need for further investigation of AI cultural philosophies, concepts, practices, behaviors, and beliefs that may impact psychological and physical health.

Although this work was not originally intended specifically for measurement tool development, the findings from this study are relevant and useful for the future development of tools that measure cultural concepts in AI culture such as harmony, spirituality, and respect and how these concepts may impact health. Instrument development is a significant need identified through the interpretation of the findings from this study.
The findings from this study also support the importance of unique and culturally relevant frameworks from which to observe, measure, explore, assess, and implement models of health promotion that incorporate existing cultural philosophies, beliefs, and worldviews from an AI perspective. Considerations need to be made to address the health needs of AI populations with culturally relevant measurement and effective health care delivery models. Without relevant models of care, gaps will remain in development of effective health promotion strategies with AI populations (Croff et al., 2014). Investigators conducting research in this area must hold true to the cultural essence of the population and explore ways to respectively bring forth the meaningful cultural values and wellness philosophies that promote health. An example of a culturally relevant wellness model that may demonstrate cultural relevance for the AI population is the Kahn-John (2010) Native American Protection Shield Model.

The origin of this study design began with exploration of the Diné Wellness Philosophy of Hózhó and the six resultant cultural attributes: spirituality, respect, relationships, discipline, thinking, and reciprocity. The findings from this study support some of the assumptions (the importance of exploring cultural concepts for the purpose of improving AI health through empowering AI populations with their inherent cultural wisdom) presented in the original concept analysis by Kahn-John (2010). The findings from this study also support the findings from the literature review presented in chapter two of this manuscript outlining AI protective factors that may be significant when evaluating AI resilience. The findings from this study also align well with the Native American Protection shield (NAPS) model of resilience by Kahn-John (2011).
assumptions in the concept analysis by Kahn-John (2010) implied that the Hózhó wellness philosophy may impact health of AIs are also supported by the findings in this study. The AI protective factors suggested in the NAPS model by Kahn-John (2011) are also supported by the findings presented in this study.

Specific directions for future research on AI protective factors and resilience include: development of culturally relevant instruments that measure domains of health significant to the AI population (Harmony, Spirituality, and Respect) and, development of culturally relevant models of health promotion specific for the AI population. Further, qualitative and quantitative exploration of tribe-specific cultural concepts and AI health and healing ceremonies would provide insights on the specific benefits of culturally derived models of health promotion and health interventions. Ethnographic studies would provide further knowledge of cultural specifics of health and healing percepts from an AI worldview. Openness and flexibility is also required when studying differing worldviews. Kovach (2009) recommends and supports the use of indigenous methodology when pursuing research endeavors with indigenous populations. Indigenous research requires specialized methodologies tailored to the population that enhances the collection of authentic knowledge allowing a glimpse into the worldview of the population being studied. Suggested study designs are limitless; however, any work with a culturally diverse population will require utmost cultural sensitivity and strict adherence to tribal research review board guidelines at the earliest point of research intent. Consultation with cultural experts is also strongly recommended when
study proposals are being designed to ensure the design and the areas of interest will be approved for study by the tribe.

**Synthesis of 3-Factor Structure, Hózhó, Native American Protection Shield Model, and the Gunnestad Model of Resilience**

An unanticipated result of this study is the congruence found between the Gunnestad Model of resilience (Gunnestad, 2006), the Diné Hózhó Concept Analysis (Kahn-John, 2010), the Native American Protection Shield (NAPS) (Kahn-John, 2011), and the 3-factor structure discovered in this secondary analysis, Table 6.

Table 6

**Synthesis of Four Models of Resilience**

<table>
<thead>
<tr>
<th>Hózhó</th>
<th>Gunnestad</th>
<th>NAPS</th>
<th>3-Factor Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respect</td>
<td>Respect</td>
<td>Respect</td>
<td>Respect</td>
</tr>
<tr>
<td>Thinking</td>
<td>Internal</td>
<td>Gifts of Self</td>
<td>Harmony</td>
</tr>
<tr>
<td>Discipline</td>
<td>External</td>
<td>Honored Relations</td>
<td></td>
</tr>
<tr>
<td>Relationships</td>
<td>Existential</td>
<td>Sacred Loyalties</td>
<td></td>
</tr>
<tr>
<td>Reciprocity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirituality</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each of these works was described in the literature review in chapter two. The congruence between each of these models underscores the significance of internal, external, and existential protective factors that contribute to resilience. The findings from this study also substantiate the need to recognize categories of unique (as supported by the 3-factor structure discovered through EFA) and culturally based protective factors that may contribute to resilience in the AI population. Gunnestads’ organization of protective factors into internal, external, and existential categories was helpful for conceptualizing each distinct category of the protective factors that may
promote resilience. Further, Gunnestad’s model is suitably aligned with AI culture. The findings from the literature review on AI protective factors were categorized using the same Gunnestad model categories (Gunnestad, 2006). The synthesis of the literature and the Gunnestad model of resilience resulted in the development of the NAPS model of resilience developed by Kahn-John (2011). Each Gunnestad category was re-labeled with a culturally relevant label seen in the NAPS model, see Figure 2 in chapter two.

All the themes found within these resilience models were theoretically congruent with the 3-factor structure discovered through the EFA and CFA process in this study. These findings are significant and support consistency among models of resilience that are specific for the promotion of AI health. This collective congruence speaks to a discovered consistency of themes among categories, concepts, concepts, and protective factors that may play a role in AI resilience. It is important to note each resilience model demonstrates congruence with an overarching theme of Respect in addition to the three distinct categories of internal, external, and existential categories of resilience outlined by Gunnestad (2006). The discovered congruence between models and the shared emphasis on Respect serve as important benchmarks that may guide future research on AI protective factors, resilience, and health.

The synthesis of these four models, as shown in Table 6, contributes to the theoretical clarification and refinement of the NAPS model (Kahn-John, 2011) and supports further exploration of the Hózhó wellness philosophy previously discussed by Kahn-John (2010).
This synthesis and process of clarification through the EFA, CFA, and PA process led to a preliminary development of the Hózhó Resilience Model, shown in Figure 5. The findings from this study did confirm a 3-factor structure identifying latent variables *Harmony, Spirituality,* and *Respect* as significant cultural concepts that may be measured as three independent factors or domains. Only *Respect* and *Spirituality* were shown to be significant to psychological distress and health related quality of life. It’s important to note that findings from this study did not reveal significant relationships between *Harmony* and psychological distress or health related quality of life; however, the literature review on AI protective factors consistently presented family and relationships (*Harmony*) to be an important for AIs (Hodge and Nandy, 2011; McMahon, Kenyon, D.B., Carter, 2013). Measurement of relationships in AI culture and how relationships are significant to health is an area that will require further exploration and validation. This is an early stage of development of the Hózhó Resilience Model and further work would be required to validate the significance of each of the three domains *Harmony, Spirituality,* and *Respect* presented in this model.

**Summary**

The purpose of this study was to highlight existing concepts within AI culture and discover the factor structure among six concepts (spirituality, relationship, respect, thinking, discipline, and reciprocity). The goal was to begin to determine whether the presence and/or practice of these concepts impact psychological distress and health related quality of life outcomes in a Southwest AI tribe.

The literature review in chapter II presented information on the AI health,
historical trauma of the AIs, resilience models (Gunnestad Model, [Gunnestad, 2006] and the NAPS model [Kahn-John, 2011]) that may be relevant to the AI population.

Findings from the literature review on AI protective factors and resilience summarized
available findings on AI protective factors. The findings from the literature suggested the need for the development of culturally relevant models of resilience through the exploration of culturally based wellness practices, beliefs, and philosophies.

Chapter III presented the methodology. A secondary analysis of data was employed utilizing pre-existing data from the American Indian Service Utilization, Psychiatric Epidemiology, Risk and Protective Factors Project (AI-SUPERPFP) study directed by Drs. Spero Manson, Janette Beals and colleagues (2003). This study provided an excellent opportunity to test the concepts in the Kahn-John models depicted in Chapter II.

This investigation had the following aims and associated research questions:

To determine if cultural experts agree that selected items (from pre-existing AI-SUPERPFP data) theoretically reflect the definitions of the six concepts; spirituality, relationships, reciprocity, respect, thinking, and discipline.

a. Do the items selected adequately reflect the six concepts (spirituality, relationships, reciprocity, respect, thinking, and discipline) as confirmed by AI cultural experts?

1. To discover the factor structure of the concepts spirituality, relationships, reciprocity, respect, thinking, and discipline—as measured by the items determined to be content valid by the expert panel.

a. What is the factor structure of the selected items?

2. To determine if there is a relationship between the detected concept factors and health related quality of life in a Southwest Tribe.
a. Is there a relationship between the detected concept factors and health-related quality of life in this population?

3. To determine if there is a relationship between the detected concept factors and psychological distress in a Southwest Tribe.

a. Is there a relationship between the detected concept factors and psychological distress in this population?

A detailed explanation of the methodology to approach each specific aim was presented. The original AI-SUPERPFP study was described to provide background of the original study and development of the instruments used in this secondary analysis. Data management for the secondary analysis was described. The Colorado Multi Institutional Review Board (COMIRB) approvals were also described, and appear in Appendix D.

Chapter IV presented the results of the study findings including: the content validity process (specific aim 1), the exploratory factor analysis and confirmatory factor analysis (specific aim 2), and the final confirmatory factor analysis and path analysis (specific aims 3 and 4). Structural equation models depicting the results were presented and summarized in Figures 3 and 4.

The thesis concluded with Chapter V providing a discussion of the study findings organized by Specific Aims. Strengths and limitations of the study were discussed, including the important perspective of the AI principal investigator. Chapter V also highlighted the significance of this study for AI health, implications for nursing, and suggestions of future directions of research on AI protective factors and resilience. A synthesis of the study findings and previous research and resilience models was also
presented with the unveiling of a new model titled the Hózhó model of resilience, shown in Figure 5.

Conclusion

This study underscores the importance of becoming aware of the unique culturally based protective factors in AI populations and their impact on psychological and physical health outcomes. This study validates the importance of future research on protective factors and resilience in AI populations. Findings from this secondary analysis support existing scientific literature on the existence of innate protective factors within AI communities and offer scientific evidence from which further research on AI protective factors may be developed and advanced. The study findings will also equip healthcare service providers with culturally relevant information likely to promote AI health. Most importantly, this proposed study is intended to empower the AI community by reminding them of the strength, protective, and healing nature of their innate cultural wisdom. This program of research has the potential to improve the health of present and future generations of AIs, restoring AIs to a state of Hózhó. Hózhó Nahasdiłíí (happiness, health, harmony, peace, wellness, beauty-restored).
REFERENCES


Steinman, E. (2012). Settler colonial power and the American Indian Sovereignty Movement: forms of domination, strategies of transformation. 117 (4)1073-130. DOI: 10.1086/662708


Dear Expert Reviewer,

Because of your knowledge and expertise on culture, diversity, and health within minority populations I am inviting you to participate as a content expert to review the fit between concepts/concepts and survey questions. Thank You for your willingness to participate and assist with this content analysis.

Attached is a table highlighting six concepts/concepts (spirituality, respect, reciprocity, thinking, discipline, relationships). Definitions from the Merriam Webster (2004) dictionary are provided along with written conceptualizations compiled from the work of a literature review on the concept of Diné Hózhó. Each concept is an attribute of the concept Hózhó. See the attached article by Kahn-John (2010) for additional descriptions of the individual concepts. Additional points to consider in your role as the expert reviewer are also posted. Please review each concept/concept, the definition of each concept/concept, and the survey question for fit between the concept and the question. Upon completion of the review, you will offer your expert recommendation by rating the question for goodness of fit as a measurement of the defined concept/concept (as I’ve defined).
Once completed, please email the completed form along with your recommendations to michelle.kahn-john@ucdenver.edu. If you have any questions I may be reached by email or telephone (928)-245-7327.

Thank You for your assistance.

Respectfully,

Michelle Kahn-John, PhD Candidate

University of Colorado

Anschutz Medical Campus

College of Nursing
APPENDIX B
CONTENT VALIDITY TOOL

Please review each item/question and rate its fit and relevance to the concept being assessed as outlined in the definition provided.

1. Assessing SPIRITUALITY: Kahn-John definition: Spirituality is the practice of religion, spirituality, prayer, ceremony. Hózhó philosophy describes a way of life that honors spirit through the practice of spirituality. Spirituality may be practiced in a range of ways including; ceremony, church, prayer, and ritual. It is acknowledged that American Indian spirituality often encompasses a continuous way of being as opposed to fragments of time where one engages in spiritual practice. To what extent do the items below measure the significance of spirituality and the frequency of spiritual practice?

<table>
<thead>
<tr>
<th>Items/Questions</th>
<th>Not Relevant</th>
<th>A little relevant</th>
<th>Relevant</th>
<th>Very Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPI1 How important is spirituality in your life?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SP2 How often do you spend time on religious or spiritual practices? Every day or almost everyday</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

2. Assessing DISCIPLINE: Kahn-John Definition: Discipline within Hózhó refers to a self-imposed expectation of a steadfast work ethic practiced daily from dawn until dusk as evidenced by daily or frequent participation (if one is physically/mentally able) in an activity that might be contributive to self or others. Perseverance, keeping busy, engaged in a work/study/craft/life skill. Discipline may be measured by engagement in education, occupation, arts/crafts, farming, important activities, planting/farming, tending to livestock. The discipline in Hózhó also refers to discipline not only in productivity but also in the way in which one carries himself/herself, how one speaks, and how one thinks. Self-discipline is exercised to maintain Hózhó and order in ones' life. To what extent do the items/questions below measure the practice of discipline?

<table>
<thead>
<tr>
<th>Items/Questions</th>
<th>Not Relevant</th>
<th>A little relevant</th>
<th>Relevant</th>
<th>Very Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP34 I can do just about anything I really set my mind to do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SP36 What happens to me in the future mostly depends on me</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>E3 Have you ever attended any of the following types of schools? And did you receive a degree or certificate from this school?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
17 Do you contribute to your household by
17a Hunting/fishing
<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
</table>
17 b planting or farming
| 1 | 2 | 3 | 4 |
17c Herding raising sheep or cattle
| 1 | 2 | 3 | 4 |
17d Craftwork such as beadwork, quiltwork, weaving, silversmithing
| 1 | 2 | 3 | 4 |

3. **Assessing RECIPROCITY**: Kahn-John definition: Reciprocity within Hózhó acknowledges an awareness of the need to gracefully give in generosity and respectfully receive. Reciprocity reflects ones’ ability and obligation to always give, offer, receive and practice generosity and receptivity. To what extent do the items/questions measure reciprocity as defined?

<table>
<thead>
<tr>
<th>Items/Questions</th>
<th>Not Relevant</th>
<th>A little relevant</th>
<th>Relevant</th>
<th>Very Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP30 I give to others and receive from them in return.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

4. **Assessing RESPECT**: Kahn-John Definition: Humility toward self, life, others. Within the philosophy of Hózhó, respect refers to respect and reverence for self, others, relations, universe, Earth, nature, animals. To what extent do the items/questions below measure relationships as defined?

<table>
<thead>
<tr>
<th>Items/Questions</th>
<th>Not Relevant</th>
<th>A little relevant</th>
<th>Relevant</th>
<th>Very Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP31 I am a person of integrity</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SP32 I respect other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SP33 I respect Mother Earth</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SP42 I have a positive attitude about myself</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>SP4 I feel that I have many good qualities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

5. **Assessing THINKING**: Kahn-John Definition: Within the philosophy of Hózhó, the attribute of ‘thinking’ is foundational for the implementation of the philosophy of Hózhó in ones’ life. Thinking encompasses problem solving and planning ability. Thinking, within the Hozho concept is knowing, or the ability to have thought, organize plan, and be constantly present/mindful of self and environment for the purpose of maintaining a state of Hozho. To what extent do the items/questions below measure relationships as defined?

<table>
<thead>
<tr>
<th>Items/Questions</th>
<th>Not Relevant</th>
<th>A little relevant</th>
<th>Relevant</th>
<th>Very Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP28 When I need to return to balance, I know what to do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

6. **Assessing RELATIONSHIPS**: Kahn-John Definition: Within the Hózhó philosophy, relationships refer to a sense of connectedness and belonging. Relationships are inclusive of self, relatives, family, community, tribe, global community, nature, universe, Earth, partners/spouses, special friends, Holy Ones, Creator, God, spirits. To what extent do the items/questions below measure relationships as defined?

<table>
<thead>
<tr>
<th>Items/Questions</th>
<th>Not</th>
<th>A little</th>
<th>Relevant</th>
<th>Very Relevant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Question</td>
<td>Relevant</td>
<td>relevant</td>
<td>1</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>---</td>
</tr>
<tr>
<td>SP25</td>
<td>I am in harmony with all living things</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>SP26</td>
<td>I feel connected with other people in life</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>SL2</td>
<td>How much does your [husband/wife/partner] really care about you</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>SL44a</td>
<td>Among people you know, is there someone you can go with to play cards, or go to bingo, pow wow, or community meeting</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
APPENDIX C

PROTOCOL AMENDMENT

Amendment Requires Minor Modifications

08-Nov-2013

Investigator: Spero Manos

Sponsor(s): National Institute of Mental Health/NIMH/OD

Subject: COMIRB Protocol 94-167 Amendment

Review Date: 01-Nov-2013

Title: MENTAL HEALTH CONCERNS AND THE USE OF HEALTH SERVICES WITHIN AMERICAN INDIAN COMMUNITIES

Amendment Requires Minor Modifications

Suggested changes in the Amendment are needed. These are described in the comments below. To expedite a timely review, please provide a cover letter forwarding your response to each issue the reviewer has asked you to address. Please provide an edited copy of the Protocol (if applicable) and/or Consent Form(s) if applicable, with highlighted changes and a clean copy of the Consent Form for the Co-Chair signature.

Implementation of this change may not begin until final approval is received.

Submission ID: PAM003-1

Amendment Description:

Protocol and Personnel change:

Protocol Amendment:
We amend the protocol to include a secondary-data analysis project, to be led by Ms. Michele Kahn-John, as her doctoral dissertation project.

Ms. Kahn-John's use of data for her doctoral dissertation being completed under this protocol. The data were collected between 1997 and 2000. Data provided to Ms. Kahn-John are completely de-identified. The data provide information about baseline characteristics, quality of life, and mental health symptoms. No other identifying information will be provided to Ms. Kahn-John. At no time will any identifiable information be sent to Ms. Kahn-John even if requested by her to address an unanticipated eventuality. As documentation for this protocol amendment, we provide a copy of Ms. Kahn-John's CITI, HIPS, and COI as well as highlighted and clean versions of the protocol (describing the project in detail) and a copy of the Coded Information Agreement detailing the sharing of data with Ms. Kahn-John.

Personnel Change:
We request adding Dr. Jan Heals as a faculty mentor for Ms. Kahn-John, and Ms. Kahn-John as an investigator for this secondary data analysis project.

Document electronically submitted.
- Protocol 9/16/13
- Coded Information agreement. Noted.
- Change form
- Section C

Comments:
APPENDIX D

NOT HUMAN SUBJECT RESEARCH DESIGNATION

Not Human Subject Research

04-Dec-2013

Investigator: Michelle Kahr-John
Sponsor(s):

Subject: COMIRB Protocol 13-3661 Initial Application

Effective Date: 03-Dec-2013

Title: Measurement of underlying relationship and factor structures of six concepts and their impact on psychological distress and health related quality of life outcomes in a Southwestern American Indian Tribe.

Not Human Research

Your research project submitted to COMIRB under protocol number 13-3661 has been reviewed and our determination is that it is not human research as defined by our policies and current regulations and in accordance with NIH and FDA guidelines.

Therefore, you may proceed with the project strictly following the protocol as submitted and reviewed by COMIRB. No continuing review of the project will be required, however, you must resubmit the protocol to COMIRB for approval if any substantive changes are made to the protocol in question.

Review Comments:

This protocol was submitted for Exempt review but determined to be Not Human Subject Research.

These documents were reviewed as part of this Not Human Subject Research:
Application Form, dated 11/20/2013
Protocol, no date
Responsibility of Faculty, no date
Responsibility of Student, no date
Confidential Information Agreement, dated 05/03/2013
Personal-Section C, no date
Cover Letter, dated 11/20/2013

Please note that COMIRB will no longer be e-mailing final documents. Stamped documents indicating a determination of Non-human subject research can be retrieved in the eRA (InfoEd) system. Please click here to access instructions on finding these stamped documents.

Sincerely,

UCD Panel B
APPENDIX E

APPROVAL EMAIL FROM DR. ARVE GUNNESTAD FOR USE OF RESILIENCE MODEL

Michelle,

I am pleased and will give you the rights to use my model. I need to know from what book or internet site you have found it. It would be good also that you send me a copy so that I can make sure it is the last issue.

Arve Gunnestad

From: Rebar-John, Michelle [Michelle.Rebar-John@johndeere.com]
Sent: Friday, March 02, 2018 11:04 AM
To: Arve Gunnestad
Subject: Re: Hello

Good Morning Dr. Gunnestad,

Wonderful! I will send you the information for your comment and review. I also wonder about copyright questions with your model. I would like to ensure that your work receives full credit and recognition. Let me know if you have any suggestions about the copyright issues as I have used your model as a foundation for my work.

The dissertation requires a few minor edits and I will send you the edited version in about a week. Talk soon. Thank you for agreeing to review my work.

Michelle

From: Arve Gunnestad [ArveGunnestad@mas.mn]
Sent: Thursday, March 02, 2018 1:13 PM
To: Rebar-John, Michelle
Subject: Re: Hello

Dear Michelle Rebar-John,

Thank you for your e-mail. It is interesting to hear about your dissertation on American Indian resilience. I will be willing to read something and then give some responses, within some time limits that I have. You may send the material with e-mail as I am not so often on LinkedIn.

Regards,

Arve Gunnestad

From: Rebar-John, Michelle [Michelle.Rebar-John@johndeere.com]
Sent: Friday, March 03, 2018 3:10 PM
To: Arve Gunnestad
Subject: Hello

Hello Dr. Gunnestad,

I'm not sure if you've received any of my messages via email or through LinkedIn. I'm writing in hopes that we may have a conversation at some point. I'm using your Resilience model in my dissertation work and was wondering if you would think it luck to send an email to Dr. Debra Phares or Dr. Richard Pelletier and your work in your program with the American Indian Casebook (I'm enrolled with you)