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*Virginia Commonwealth University*

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The Psychometric Properties of the Inner Strength Questionnaire for Women with  
Chronic Health Conditions

A dissertation submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy at Virginia Commonwealth University

By

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## **ABSTRACT**

By Kristi Leanne Lewis, Ph.D., M.P.H.

A dissertation submitted in partial fulfillment of the requirements for the degree of  
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Virginia Commonwealth University, 2004

Dissertation Director: James H. McMillan, Ph.D.  
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The purpose of this research was to develop and test an instrument to measure or quantify the construct of inner strength. Inner strength was synthesized into a theory based on twelve years of qualitative data from direct participant quotes, defined by Roux et al. (2002) as a central human resource that promotes well-being and healing. The inner strength questionnaire (ISQ) has undergone extensive psychometric evaluation which resulted in several versions. The third version had 37-items and was believed to have four subscales that mirrored the theoretical themes that emerged through the qualitative data.

The sample was composed of 281 women with a variety of chronic health conditions including breast cancer, multiple sclerosis, diabetes, and heart disease. Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were employed to assess the structure of the ISQ. Internal consistency was used to assess the reliability of each hypothesized subscale and the entire ISQ. Convergent and

discriminant validity, were analyzed using the multitrait-multimethod by Campbell and Fiske (1959). For convergent validity, the entire instrument and each of the subscales was correlated with similar theoretical subscales of the Mastery of Stress Instrument (Younger, 1993). For discriminant validity, the Center for Epidemiological Studies in Depression (CESD) was correlated with the entire ISQ.

Both the EFA and CFA revealed a four factor model. The four factors were labeled 1) mental, 2) connectedness, 3) knowing and searching, 4) physical. The reliability for all items on the ISQ was 0.91. The reliabilities for each of the subscales were 0.85 for mental, 0.96 for connectedness, 0.85 for knowing and searching, and 0.83 for physical. The multitrait-multimethod matrix revealed correlation coefficients for the relationship between the ISQ and MSI to be 0.55 and a correlation coefficient of -0.19 between the ISQ and the CESD.

A four factor model is supported by the statistical data. Through face-to-face interviewing and input from content expert reviewers, ten items were eliminated from the 37-item (version 3) instrument to form a new version of the instrument. The new instrument supports the metasynthesis generated by Roux (2002) except for the fifth theme, entitled “new normal”, which was found to be a consequence of having inner strength, not a component of inner strength.

## **Chapter 1**

### **INTRODUCTION**

#### **Inner Strength**

Roux, Dingley & Bush (2002) defined *inner strength* as a central human resource that promotes well-being and healing. According to Roux et al. (2002), the presence of a major life experience or event is the antecedent of inner strength. Inner strength exists prior to this event. It is the experience of a life-changing event that initiates tapping into the capacity of inner strength. Based on several qualitative studies that will be discussed and analyses of the literature, a consistent, brief, easy-to-recognize definition of inner strength was formulated. Dingley, Roux and Bush (2000) claimed that taxonomy or “name recognition” is a critical dimension of language that facilitates clarity of communication in theory, practice, and research. They go on to argue that this communication is especially crucial with complex health phenomena such as inner strength. Dingley et al. (2000) made the point that it is essential for health care providers to understand health-seeking behaviors, the experience of health as a life process, and personal meaning for quality of life. This provides support for the current study.

Inner strength is a gender-sensitive theory. According to Im and Meleis (2001), a gender-sensitive theory is one that does not limit the experiences of women’s health and illness, but rather incorporates gender sensitivity and gender-based explanations. According to Im and Meleis (2001), this experience “empowers women to effectively and adequately deal with their health and illness”. They also state that there are distinct points that are necessary in developing a gender-sensitive theory. They include 1) gender as the major variable, 2) the use of direct quotes of women, and 3) the detailing of the context and constraints of women’s experiences.

The term “inner strength” was first coined by Janet Rose from the University of Calgary in Western Canada, who studied the psychological well being and functioning of healthy women. According to Rose (1990), there is a clear gap in the research literature on the mental health or psychological well-being of women. One unexplored area of women’s health has been the healthy functioning of women’s psychological strength known as “inner strength”. Rose argues that research, descriptive and otherwise, that focuses on healthy psychological functioning of women has been limited. Voids also exist in knowledge relating to healthy functioning of women. The research literature by men portrays women as basically passive and dependent. There is also a scarcity of female perspectives in the literature and much of the development of psychological theories has been based on men’s lives. Research thus far has been deficient in providing instruments to measure such constructs that will produce valid and reliable scores (Rose, 1990).

Gayle Roux and colleagues (Dingley, 1997, 1999, Dingley, Roux, and Bush, 2000, Roux, Bush, and Dingley, 2001, Roux, Dingley, and Bush, 2002, Dingley & Roux, 2003) have conducted years of qualitative research to expand the meaning of inner strength in women with various chronic health conditions. Each study was discussed in detail in the next chapter. Roux et al. explored inner strength in a population that was enduring hardship and a major life-changing event. The researchers have purposefully focused on women with chronic illness instead of acute illness. Chronic illnesses such as osteoporosis and multiple sclerosis involve a life-long experience. Acute illnesses such as measles, the common cold, or influenza, for example, are short in duration and require

fewer life alterations to overcome or endure. Chronic illnesses can be characterized as debilitating, and in some cases can be life threatening or terminal.

Dingley (2003) stated that the concept of inner strength illustrates the “commonalities in the experiences that bridge the boundaries created by taxonomy or individual circumstances” (P. 11). There are many perspectives on inner strength from many different fields. This widespread exploration of the term helped to define and illustrate the meaning of inner strength. Rose (1990), however, has described inner strength as a component of psychological health. Bach and McDaniel (1993) described inner strength as an influencing factor of quality of life. Barker (1989) describes inner strength as a facet of spirituality. This is important to the current study since spirituality is a component of connectedness. Connectedness is believed to be a component of inner strength. The connectedness scale assesses a women’s ability to connect with family, friends, and with a greater being such as God or a higher power.

#### *Women and Chronic Illness*

While great strides have been made in the field of women’s health and research, much is still lacking. According to Roux (personal communication, 2004), researchers have left clear gaps in describing and relating to the manner in which women cope with their health. There is also a gap in the literature on how women adapt to living with and surviving a chronic health condition.

A World Health Report (1997) stated that millions of people are afflicted with chronic illnesses and a majority of them are women. O’Neill and Marrow (2001), reviewed 110 published studies on how women interpreted, coped with, and managed chronic illness in their daily life. The women in the studies reported more physical

ailments, more chronic health conditions, and had a poorer perception of their physical health than males with similar health conditions. The study also found that women use their symptoms as an indication or marker to determine their activity level and progress with the illness.

O'Neill and Marrow (2001) discussed the issue of coping among women with chronic health conditions. Coping is defined as the cognitive process where individuals learn to accept the effects of having an illness. There are two types of coping that include 1) problem-focused coping and 2) emotion-focused coping. According to O'Neill et al., problem-focused is used to manage or alter the source of stress. Emotion-focused is used to control the emotional response. Additional research has shown that coping can be conceptualized as either 1) active or confrontational coping or 2) passive or avoidance coping. Active or confrontational coping strategies are used to deal with the situation and involve acceptance of the problem. Passive or avoidance coping strategies involve denial. Denial is characterized when the individual begins to hope that the situation will change or that a miracle will evolve to solve the problem. Active or confrontational coping involves the individual engaging in activities and behaviors to deal with the issue, while passive or avoidance involves the individual focusing on wishful thinking.

According to O'Neill et al. (2001), confrontational coping involves "1) positive appraisal, 2) distancing, 3) seeking spiritual guidance, and 4) exerting self-control" (p. 261). Positive reappraisal is seen when the person has and maintains a positive outlook. It also involves rediscovering what is important in life. Distancing is seen when one strives to go through daily life as one did before the illness. Individuals who seek spiritual guidance in this study expressed the belief in a higher power. They also engaged

in prayer and faith-based activities. Self-controlling behaviors involve keeping one's feelings to oneself. Self-control also involves protecting others such as family members and loved ones by not describing or discussing the bad aspects of one's illness.

The findings by O'Neill et al. (2001) are important to this study in that the coping strategies used by women seem to mimic some of the research in inner strength. For example, seeking spiritual guidance is seen in the connectedness scale of the ISQ.

Since inner strength is a gender-specific theory that describes the psychological well-being of women, men were not included this study. Other theories that will be discussed later consider the issues related to the well-being of men.

#### *Defining Inner Strength: A Concept Analysis*

Dingley et al. (2000) felt that it was important to define the term inner strength since it is a new construct. They also acknowledge that the term can not be found in a dictionary. They acknowledged that the phrase "inner strength" must be broken down into two words (inner and strength) in order to properly defined the term. The American Heritage Dictionary defines the word "inner" as 1) "located or occurring farther inside" 2) "less apparent; deeper" 3) "relating to the mind or spirit". The word "strength" is defined by the American Heritage Dictionary of the English Language (1992) as 1) the state, property or quality of being strong 2) the power to resist attack, impregnability, 3) the power to resist strain or stress, durability 4) the ability to maintain a moral or intellectual position firmly 5) capacity or potential for effective action; a show of strength 6) the number of people constituting a normal or ideal organization, military capability in terms of personnel and material 7) a source of power or force, one that is regarded as the embodiment of protective or supportive power, an attribute or a quality of particular



worth or ability 8) degree of intensity, force, effectiveness, or potency in terms of a particular property, degree of concentration, saturation, potency 9) effective or binding force, efficacy. Webster's New World Dictionary (1978) defines strength as "the inherent capacity to act upon or affect something; to endure." The authors felt that this breakdown of terms was essential in order to lay the foundation for future studies in inner strength.

In a qualitative study conducted by Roux and colleagues (2000), the concept of inner strength was defined from the findings found in the limited amount of literature on inner strength. Dingley, Roux, and Bush (2000) defined the construct of inner strength in a concept analysis. A concept analysis is a detailed attempt to develop and define a theory or concept by examining the literature in all disciplines (i.e. nursing, business, psychology, etc.). Using the phenomenological approach, in-depth interviews were conducted on women with chronic health conditions. During these interviews, women with chronic illnesses such as cancer, multiple sclerosis, diabetes, heart disease, and osteoporosis revealed their inner most personal experiences. Many expressed the hardships of having a chronic illness. Others defined their relationship with God or a greater being. Some divulged their relationship with their families and loved ones including their spouse. Many articulated their need for time alone to heal physically and emotionally. Some women expressed their fears and anxiety about the future and even the reality of death.

The goal of this study was to define the term "inner strength" to set the foundation for further studies. It is important to take an interdisciplinary approach to examining and reviewing literature when developing a concept analysis. Dingley and colleagues (2000)

stated in the concept analysis article that the term “inner strength” was noted in the field of business, psychology, and nursing. According to Dingley et al. (2000), in the business and management field, Kim and Mauborgne (1992) noted inner strength as an essential element of leadership. In the field of business, inner strength is defined more as a precursor for successful leadership. The Kim et al. study is important in that it shows that other fields are acknowledging inner strength as a concept, but lack in being able to define it. It is also important because women who are experiencing chronic illnesses are their own “leaders” in the recovery process.

Dingley et al. (2000) noted in the concept analysis that in the field of psychology, Knapp and Karabenick (1985) studied the beliefs of undergraduate college students and found that inner strength is a factor in overcoming problems. This study is important because it shows that inner strength is a resource that is used for problem solving regardless of the life experience. Friedman and Pines (1992) studied inner strength and security in three age groups of Arabian woman (20-40, 45-55, and 60-80 years). They found that the youngest age group (20-40) scored the lowest in security and inner strength. This study is important to the current investigation in that it points to the possible need for studying women in this age group. The current study focused on women with chronic illnesses and women in this age group do not experience chronic illnesses to the degree as older women. Inner strength may be a resource that evolves as one matures in age.

A study conducted by Chester (1992), supports the concept analysis by Dingley, et al. (2000). Chester’s study focused on inner strength as a human resource that is used to cope with a life altering experience. Chester (1992) revealed that women may be able

to find their own individual inner strength through engaging in a support group with similar women enduring similar problems. Chester (1992) illustrated that women often seek support from others in times of need. This study showed how support groups allow women to gain strength from others.

Dingley, Roux and Bush (2000) based on the studies by Kim and Manborgne (1992), Knapp and Karabenick (1985), Friedman And Pines (1992), and Chester (1992), defined six attributes in the concept analysis. They include 1) growth and transition 2) confronting a life experience or event 3) deepening of self-knowledge 4) cognition of one's needs and sources to meet those needs 5) connectedness and 6) focused and balanced interaction with the environment. The six attributes were derived from extensive one-on-one interviews with women that had been diagnosed with a chronic health conditions. Four consequences of inner strength were revealed in the concept analysis by Dingley, et al. (2000). They include 1) having capacity 2) sense of control and self-determination 3) sense of mastery and positive self-concept and 4) psychological well-being. Having capacity is defined as healing, solving problems, facing diversity, and overcoming obstacles. Sense of control and self-determination is experienced when one overcomes obstacles or problems in their life. Sense of mastery and positive self-concept are seen in how one overcomes challenging life experiences. Psychological well-being is seen in how inner strength is perceived as a facet of spirituality and quality of life.

Finally, through researching the operational and conceptual definitions, Dingley and colleagues (2000) developed two definitions for the concept of inner strength. First, inner strength is the quality or state of being strong which involves protective and/or

supportive power as it relates to the mind and spirit. Second, the deeper, at times less apparent capacity or potential for effective action, durability, and endurance which is an essential part of the innermost being composed the working definition of inner strength.

### **Inner Strength and Other Theories**

#### *Comparison of Inner Strength, Locus of Control, and Resilience*

It is important to explore similar phenomenon that relate to inner strength. There are many theories that involve overcoming the hardships of being diagnosed with a chronic health condition. Two common theories that have emerged in the literature and have endured criticism over the years are locus of control and resilience. Locus of control and resilience differ greatly in meaning and application from inner strength. Inner strength as a concept is unique from other theories of psychological well-being including health locus of control and resilience. Inner strength, unlike locus of control and resilience, assesses the social, physical, and spiritual aspects of being diagnosed with and living with a chronic health condition.

The Health Locus of Control instrument was derived from the Social Learning Theory developed by Julian Rotter (Rotter, 1954). The Health Locus of Control is defined as the degree to which individuals believe that their personal health is controlled by internal or external factors. Internal factors are defined as behaviors or actions taken by the individual that effect their health, while external factors are events that can not be controlled by the individual that also affect their health.

Resilience is defined as one's ability to recover from or adjust easily to all the change and misfortunate one experiences in their daily life. While inner strength and resilience have similar underlying meaning, they differ in one specific way. Resilience

focuses on the mental aspects of recovery, but not the physical, spiritual, and initial anxiety. Inner strength is a composite of well-being that considers more than just the mental aspects of healing and recovery.

### *Inner Strength and Mastery*

Mastery of Stress (Younger, 1991) is another theory that closely mimics the theory of inner strength. In a study by Dingley, Bush, Roux (2000), mastery was stated as being similar theoretically to inner strength. According to Roux (personal communication, 2004) inner strength and mastery have some similar attributes. Similar attributes include 1) involve a human response when faced with a life challenging event, 2) a process that is developmental in nature involving change and adaptation 3) involve the development and initiation of self-management strategies and interventions, 4) can be quantified based on instruments that have undergone psychometric testing.

The subscales of the Mastery of Stress Instrument are closely related to some of the proposed subscales of the ISQ. The MSI is composed of four subscales that include certainty, change, acceptance, and growth. Certainty is described by Younger (1991) as “a state of having adopted a particular view of a situation that is free of troublesome doubts, constitutes the mastery of meaning” (p. 68). Change was defined by Younger as “directly affecting the demands or resources of the objective environment and reducing the impact of a stressor (p. 68). Characteristics associated with change include acknowledgement of what can be changed and having the skills to cope with stressors. Acceptance is the phase when an individual has come to accept that an event has occurred that is out of their immediate control. At this point, they must realize that they must deal or cope with the situation. Growth is a defined as the stage when the individual

begins to feel stronger. In the growth stage, subjects show awareness of life and knowledge of others begins to surface.

Three of the four subscales 1) change, 2) acceptance, and 3) growth are related to concepts seen in the theory of inner strength. One clear concept that is not present in inner strength, but is present in mastery, is the concept of certainty. Certainty was not seen in the qualitative data on inner strength, but was clearly present in the mastery analysis. Inner strength and mastery also differ in another significant way. Inner strength is a “gender-sensitive theory”. According to Im and Meleis (2001), gender-sensitive theories are “theories in women’s health that requires theoretical women’s health that requires theoretical bases which do not reduce a women’s health and illness experience into a disease or health problem, which incorporated gender sensitivity and gender-based explanations of health and illness, and which empower women to effectively and adequately deal with their health and illness”. The inner strength theory was developed through qualitative inquiry with women who have chronic health conditions. Mastery, unlike inner strength, was tested with both males and females. Other significant differences include the lack of a spirituality component in Mastery that is clearly and concisely demonstrated in the theory of inner strength.

### **Statement of the Problem and Purpose**

The health care field proposes a health focus and health care providers are encouraged to generate new knowledge for health-seeking behaviors that enhance quality of life. Knowledge about women that not only describes their unique health care needs, but also describes reality without gender bias is required in health care.

Modern medicine has made great strides in the survival of those with chronic health conditions. Health care providers focus attention on the physical ailments associated with a chronic condition, but neglect to acknowledge the emotional burden associated with a chronic condition. Research exists that supports the need for psychological health and well-being in the coping and recovery of those enduring life altering events such as being diagnosed with a chronic health condition. Studies have shown that having a good psychological foundation helps individuals prevail over physical ailments that exist with a chronic health condition. Women face challenges in coping and surviving obstacles that are common with a chronic health condition. This may also include possible treatment regimens or life alterations that are necessary for survival. For example, an individual diagnosed with diabetes must alter his or her daily routine including their diet to check their blood sugar and inject insulin if necessary. Other examples include eliminating a food product from one's diet such as salt for those who may have been diagnosed with high blood pressure or having to take medication for a specific health condition.

The aim of this study is to determine the psychometric properties of an instrument entitled the Inner Strength Questionnaire (ISQ). According to Roux, the ISQ is a unique instrument that measures women's inner strengths associated with social, emotional,

physical, and spiritual needs as they endure a potentially life altering chronic health condition (personal communication, 2004). Thus far research has lacked a quantifiable way to measure the construct of inner strength. The ISQ is hypothesized to assess inner strength in women with chronic health conditions. Proper psychometric analysis includes reliability, content validity, construct validity, concurrent validity and exploratory factor analysis. The instrument by Roux and colleagues has been developed, based on a theory derived from twelve years of qualitative data from in-depth phenomenological interviews. Wells, Bush, and Marshall (2001) emphasize the need for using a theory in the generating of an instrument. A need existed to quantify inner strength in women living with a chronic health condition in research and practice. Therefore, the ISQ was developed and tested.

#### *Applications for the Inner Strength Questionnaire (ISQ)*

According to Roux (personal communication, 2004) the ISQ can be used as an “outcome measure to test professional and self-management interventions that enhance the transition process of women living with chronic health conditions”. It is the goal of the researcher that the ISQ will be used as a clinical assessment tool. Clinical assessment tools (CATs), also known as rapid assessment instruments (RAI) are short, easy to administer and evaluate. They are often used to provide health care providers with information used for case management and treatment. CATs can be administered multiple times. Multiple applications of the same instrument are important in assessing the progress and continuation of treatment (Gilgun, 2003). The tool will be administered in a clinical setting to provide health care practitioners with valuable information on the



psychological health and well being of patients enduring chronic health conditions. The results of the ISQ may help guide clinical decision-making.

The ISQ may also serve as a clinical assessment tool that can be used in research including intervention studies. After completing the required psychometric testing of the instrument to ensure that it will provide valid and reliable values, the researcher hopes that the ISQ will be used to assess interventions that may help women deal with and overcome the psychological ramifications of their diagnosis.

### **Methodology**

The psychometric proprieties of the Inner Strength Questionnaire (ISQ) were analyzed. The study was conducted using a non-experimental design with survey methodology. The ISQ was self-administered. The questionnaire contained 37 items that deal with the construct of inner strength.

Within the questionnaire, it was hypothesized that there are four subscales based on the factor analysis from the pilot of version 2 (76-items) that compose the concept of inner strength. The subscales included 1) knowing and searching 2) connectedness 3) physical health and 4) emotional health. The knowing and searching scale captured the fear and anger experienced by women with chronic health conditions. The connectedness scale illustrated how women connect to family, friends and a greater being through spiritual connection. The physical health scale focused on how women engage in activities and rebound from their diagnosis in a physical manner. The emotional health scale focused on how women mentally handle and cope with their diagnosis and treatment.

Demographic data were obtained and included age, city and state of residence, highest level of education completed, employment status, relationship status, income, ethnic identity, and religious preference. The demographic data were used to describe the characteristics of the population including typing of chronic health conditions, ethnicity, age, etc. The data were not used to make any relationship or causal conclusions. The subjects were asked to identify all their chronic health conditions and the year that they were diagnosed with their condition(s).

### *Sample and Setting*

Criteria for inclusion in this study were, being 18 years of age or older, being able to understand the English language, and having a self-reported chronic illness. Data were collected in settings such as cancer centers, clinics for clients with chronic conditions, primary care settings and settings for the aging. Subjects were given a cover letter explaining the study, the instrument including the instructions, and the criteria for inclusion in the study. The women were given a detailed informed consent document approved by the Institutional Review Board (IRB) at Virginia Commonwealth University (VCU) to read and sign before completing the instruments.

### *Multitrait-Multimethod*

The multimethod-multitrait (MTMM) procedure illustrated by Campbell and Fiske (1959) was employed in this study. In this study, MTMM was employed to assess the convergent and discriminate properties of the Inner Strength Questionnaire. To assess convergent validity, the researcher correlated the scores on the ISQ with the scores on the Mastery of Stress Instrument. To assess discriminant validity, the researcher correlated the scores on the ISQ with the scores on the Centers for Epidemiological

Studies in Depression (CESD) scale (Radloff, 1977). MTMM is often used to examine construct validity in testing new instruments. According to DeVellis (1991), the MTMM procedure involves measuring more than one construct by means of more than one method so that a “fully-crossed” method-by-measure matrix is accomplished. MTMM allows partition of covariation into “method” and “trait” sources. Through this method, discriminate and convergent validity was assessed.

### **Research Questions**

- 1) What is the factor structure of the Inner Strength Questionnaire?
- 2) What is the evidence based validity of the Inner Strength Questionnaire?
- 3) What is the evidence based reliability of the Inner Strength Questionnaire?
- 4) What is the relationship of the Inner Strength Questionnaire with the Mastery of Stress Instrument?
- 5) What is the relationship of the Inner Strength Questionnaire with the Center for Epidemiological Studies in Depression?

### *Factor analysis*

Factor analysis was used for three main purposes. First, it helped to determine the number of latent variables that underlie a set of items or other variables. Second, it provided a means of explaining variation among relatively many original variables using relatively few newly created variables. Factor analysis works to condense information so that variation can be accounted for by using a smaller number of variables. Third, it helped to define the substantive content or meaning of the factors. The process of factor extraction involves identifying hypothetical latent variables that can account mathematically for the patterns of covariation among items. Guidelines will be set to

assist in deciding how many factors to extract during the analysis. Kaiser's eigenvalue rule (Nunnally, 1978) states that only factors that explain more variance than the average amount explained by one of the original items should be retained. For this study, only eigenvalues greater than one were considered in the analysis. Another factor extraction criteria that will be employed in this study is Cattell's (1966) scree plot test. DeVellis describes a scree plot as a vertical axis corresponding to eigenvalues, a horizontal axis corresponding to successive factors and numerical markers, plotted on these axes, that indicates eigenvalues that correspond to each factor. The scree plot will be examined for eigenvalues greater than one to determine the number of factors present.

### *Validity*

According to DeVellis (1991), validity concerns whether the variable is the underlying cause of item covariation. Validity refers to how a scale or instrument was constructed, its ability to predict specific events, and its relationship to measure other constructs. Three types of evidence for validity include content evidence, criterion-related evidence, and construct evidence. Content evidence concerns item sampling adequacy and the extent to which a specific set of items reflects a content domain. Criterion-related evidence (a.k.a. predictive validity) involves the association with some criterion or "gold standard". It is not associated with understanding a process but merely with predicting it and is therefore sometimes called predictive validity. Construct evidence is directly concerned with the theoretical relationship of a variable.

### *Reliability*

Internal consistency was employed in the study to assess reliability. Internal consistency is concerned with the homogeneity of the items comprising the scale. If the

items in the scale are highly intercorrelated, it is said to be internally consistent. Internal consistency is widely measured using the Cronbach's coefficient alpha (1951). A high correlation coefficient (  $r$  ) or strong correlations among items implies that a strong link exists between items and the latent variable.

### **Summary**

The focus of this study was to test the newly developed Inner Strength Questionnaire (ISQ). The instrument was evaluated for evidence of validity and reliability. The factor structure of the instrument was examined using both exploratory and confirmatory factor analysis techniques. Multitrait-multimethod technique devised by Campbell and Fiske was utilized to assess convergent and discriminant validity of the ISQ.

## **Chapter 2**

### **REVIEW OF LITERATURE**

This chapter will focus on the limited amount of literature on inner strength and the research techniques that were employed in the study. The goal of this chapter is to describe for the reader qualitative analyses conducted on the theory of inner strength and its importance to the development and psychometric testing of the Inner Strength Questionnaire (ISQ). It will also demonstrate that literature is lacking in quantitative measurements of inner strength, therefore providing rationale for this study. The content in this chapter will also define and explain the term *inner strength*. It will illustrate the importance of inner strength in healing and coping.

This chapter includes studies on inner strength and research techniques applicable to this study. In-depth details are given on studies conducted on inner strength. All of the studies have been qualitative in design. It is important to understand the qualitative studies since they are essential to the formation of the theory and the generation of items for the Inner Strength Questionnaire. The researcher explains in detail the concepts of reliability, evidence based validity, factor analysis and the multitrait-multimethod employed to determine discriminant and convergent validity for this study.

## Overview

### *Inner Strength: The First Study*

The concept of inner strength was a newly defined phenomenon when Janet Rose from the University of Calgary wrote the first journal article on inner strength. Rose (1990) stated that the psychological health of women had been neglected as a primary research objective. Rose defined the term *inner strength* as the healthy functioning of women's psychological strength.

The study conducted by Rose (1990) was a phenomenological study of nine women's personal experiences and their perceptions of inner strength. The purpose of the study was to evoke, describe, and elaborate on inner strength among women. Rose used rigid criteria when selecting the nine women that included purposeful sampling to ensure that the participants could express their daily life experiences. The women ranged in age from 25 to 53 years.

In-depth, unstructured face-to-face interviews were conducted with each of the nine women at a location of their choice. The women were asked two specific questions. The first question inquired about the woman's experience with inner strength as they experience it in their daily life. The second question asked the women to describe what inner strength was like to them.

The results revealed that the participants had many interconnected aspects of the concept of inner strength. Rose described the phenomenon as a "paradoxical coalescence of vulnerability with safety, tenacity with flexibility, resolution with ambiguity, movement with stillness, and emotion with logic" (p. 68).

Nine themes emerged that described the experiences of women in the study: 1) quintessencing 2) recognizing 3) becoming 4) accepting 5) being 6) centering 7) quiescencing 8) apprehending intrication 9) introspecting. The first theme labeled “quintessencing” was the fundamental concept in the study. It was the point where most women began to realize their own inner strength. Quintessencing was characterized when the women began to realize their own self and were able to accept it.

The “recognizing” theme was characterized by learning to listen to your inner strength. The third theme, “becoming” was experienced by many of the participants. This theme was illustrated when the woman began to make sense of their true selves. They had a better understanding of who they were and their purpose in life became clear. The next theme was identified as “accepting”. Acceptance by the woman was also aligned with them establishing or discovering their own values. Acceptance was compounded when the woman began to listen to her inner self, learned to respect herself, began to believe and trust, and learned to accept what she needed or wanted in life. “Being” was characterized through the woman’s daily life experiences. A participant described this theme as knowing who you are and what you want in life. “Centering” was illustrated as a process where one focuses and balances themselves with external activities or events. One participant described centering as a “great peace that comes over me” (Rose, 1990, p. 63).

“Quiescencing” was characterized by the woman finding strength during periods of rest. This period was illustrated as the women began to seek quiet time to reflect on their life. It was also seen when the women began to accept the reality and need for this mental and physical rest.



“Apprehending intrication” involved the women knowing, seeing and understanding complexity. From this they were able to evoke their inner strength them. “Introspecting” was seen when the women began to realize that they are their true selves and not just somebody’s daughter, mother or wife. By knowing their true self, they were able to acknowledge their inner strength.

A few other categories of interest emerged that were not labeled as themes by Rose (1990), but were essential aspects to the concept of inner strength. Rose discovered that for many participants humor was essential in their daily life. Interrelating was also seen and characterized by the women being able to relate to others. Two other ideas that emerged were that the women began to build capacity to deal with their condition and were able to embrace their vulnerability.

This study by Rose (1990) was the first to examine the construct of inner strength and therefore laid the foundation for future studies. Rose did an excellent job of analyzing the data. She gave a step-by-step breakdown of her methodological techniques. She used transcripts and audiotapes for criteria rigor purposes to strengthen the analysis. Rose also did an excellent job of capturing and defining each of the nine themes expressed by the participants.

Rose’s study is applicable to this study in that it provided a clear definition of inner strength in healthy women. It also provided the framework for studies conducted by Roux, Dingley and Bush (). Roux and colleagues focused their studies, however, on women with a variety of chronic illnesses since a hardship causes the need for women to search for inner strength.

In Rose's study (1990) women began to recognize and accept themselves. Accepting was seen as participants began to learn who their true self was by listening to and respecting themselves. It also involved believing in and trusting, and by acting according to what they needed and wanted. For many, this was an unbearable obstacle. In this process of self-growth, participants began to come to accept their own fears, morbidity, and mortality.

Roux, Bush, and Dingley (Dingley, 1997, 1999, Dingley, Roux, and Bush, 2000, Roux, Bush, and Dingley, 2001, Roux, Dingley, and Bush, 2002, Dingley & Roux, 2003) have conducted numerous qualitative studies since Rose (1990) to explore and develop a theory of inner strength. Investigations have been conducted on women with breast cancer, multiple sclerosis, coronary artery disease, and HIV. Studies have also been conducted on older Hispanic women and women with a variety of chronic health conditions.

#### *Defining Inner Strength – Women with Breast Cancer*

The next studies after Rose's study (1990) were conducted to examine inner strength among women with breast cancer. The qualitative analysis developed by Roux (1993), Roux and Keyser (1994), and Roux, Bush and Dingley (2001) on women with breast cancer generated four themes. These themes differ some from Rose's (1990) study. It is hypothesized that the themes from Roux (1993), Roux and Keyser (1994) and Roux, Bush and Dingley (2001) differed from Rose's themes, because the participants in Rose's were not dealing with a chronic health condition, but were healthy functioning women that had experienced a "life situation" but had recovered.

The four themes include “coming to know”, “spirit within she who knows”, “connection of she who knows”, and “movement of she who knows”. The first theme, “coming to know”, was characterized by the participant wanting to talk about the very moment that she suspected or was told about her diagnosis. During the interviews, many discussed a family member who had been diagnosed with the same illness. This was very common in women with breast cancer. Stories surfaced of fear and anxiety about their mortality as they started to face the reality of their own morbidity. Participants articulated their concerns regarding the way their diagnosis may affect all aspects of their lives. Many shifted their way of thinking about life. Others began to search for a new way of life (new normal). Some had to “reprogram” themselves to deal and cope with their new diagnosis. Many of the women described a development of inner strength as they began to focus on survival and living with their new chronic health conditions. Others began to describe being unafraid to learn or know about their condition. Being able to know and accept their situation enabled them to reframe their way of thinking and allowed them to grow.

For the first theme, “coming to know”, there were two subthemes that included fearful feelings of 1) knowing and 2) knowing and accepting. The first subtheme of “coming to know” was seen when the participants were “shocked” over hearing their diagnosis and the immediate feeling of foginess, uncertainty, and fear of death. Women who were interviewed stated that at the time of diagnosis they had many feelings that included numbness, devastation, and fear.

The second subtheme under “coming to know” is labeled as “knowing and accepting”. In knowing and accepting, women began to accept having a chronic and life

altering illness. They began to feel an appreciation for life and developed a new look on life. The experience that many stated included learning, accepting, questioning femininity, appreciating life and the new self, healing one's self, knowing one's self as well, finding a new self, finding and accepting a new self.

The second theme, "spirit within the she who knows" begins at the point of growth through the woman's knowing, accepting, and the coping with the pain of the diagnosis. Acceptance opens the passageway for the strong spirit of the woman. With acceptance, the women were allowed to learn important information about themselves. Confidence and understanding begins to develop from the knowing and the intuitive self.

The second theme, "spirit within she who knows", had three subthemes including, 1) the strong spirit 2) the positive, playful spirit and 3) the spirit. For the first subtheme, the "strong spirit" women reprogrammed themselves as women with a chronic health condition. By reprogramming themselves mentally, the women were able to embrace themselves for the fight to live. Women discussed fighting, internal power, fighting for one's life, being determined, reprogramming of self, doing what one has to do, and fighting desire to live. In the second subtheme, "the positive, playful spirit", the woman gets to know her inner self with the chronic illness. The woman has the ability to use laughter, playfulness, and zest for living as inner strength. Emotions expressed by women were that they appreciated time, loved living, became optimistic, visualized longevity, and saw humor as a coping mechanism. The third subtheme is labeled "spirit". In this subtheme, women get to know themselves with their new chronic illness. The women experienced the knowing of grief and loss in the form of inner strength. This

subtheme included participants engaging in various emotions and behaviors. Such behaviors include feeling bad, crying and being depressed and anxious about the future.

The third theme, “connection of she who knows”, is characterized by relationships with loved ones. Some women found or renewed their relationship with God. The participants also discussed relationships with family, friends, and with herself. The participants expressed the joy in having someone to experience and share the highs and lows in life. Many women began to value time and relationships more than they had before.

The “connection of she who knows” has three subthemes that include 1) connection with family and friends, 2) connection with self, and 3) connection with God. The first subtheme refers to the connection or bond that was formed when family and/or friends tried to embrace and understand what the woman was experiencing. Women in this study began to shift priorities in their life to include first their family and friends instead of their careers. They also began to feel adequate as a woman, started to experience more attention from their spouse, experienced support from loved ones, and began to feel needed.

The second subtheme, “connection with self”, was seen when the women began to come to understand themselves with a new chronic illness. Statements from participants included doing what one wants, learning to say no, putting one’s self first, taking time for self-image, laughing at one’s self, and being easier on myself. All statements reflected a true awareness for one’s self and need for time.

The third subtheme is “connection with God”. Participants stated how they began to express their feelings in prayer and formed a deeper spiritual connection. Many felt a

loss of control. Others stated that they would put control in the hands of God. The women verbally expressed going to hospital chapels, accepting their faith, trusting and finding strength in God, and getting courage through prayer.

The fourth theme, “movement of she who knows”, is demonstrated by the participants having to wander and search. The women that were involved in outside activities also allowed themselves to be engaged with their creative selves, their athletic and physical selves and their community. Many of the woman expressed renewed strength through athletic achievements. The women used inner strength as a resource to sharpen their inner instincts and to fulfill their needs. The women also described two distinct types of movement. They include physical activities and movement into harmony with the environment.

The fourth theme, “movement of she who knows”, has two subthemes including 1) physical activity and 2) harmony with environment. The first subtheme, physical activity, involves movement as a choice in the rhythmic expression of inner strength. Statements made by women to describe physical activity, include walking, playing tennis, full use of arm, physical activity, professional activity, gardening, and riding horses. Many moved away from dwelling on cancer and toward stillness and concentration. The second subtheme, “harmony and environment” had a meaning of movement in inner strength. This included statements such as resting of their mind, peace, making different choices for oneself, a new normal.

Roux et al. (2001) did an extensive study on inner strength in women with breast cancer. Through this analysis inner strength was further defined from Rose’s (1990) initial study and subsequent definition of inner strength in healthy functioning women.

This study was beneficial for the current research study in that it provided some foundation for theory construction. Foundation for the initial development of the theory describes the process of developing inner strength while living with a chronic health condition. The instrument items from the ISQ evolved from the theory constructed in this and other studies on inner strength.

#### *Inner Strength and Coronary Artery Disease*

After Roux and colleagues (1993, 1994) examined inner strength in women with breast cancer, Dingley (1997) described the inner strength of women with coronary heart disease. A grounded theory technique (Glaser, 1992) was selected to further develop an emerging theory on inner strength in women with chronic health conditions. Coronary artery disease was explored in the study since it is the leading cause of death among women in the United States. Most studies found in the literature focus solely on the recovery of men who have had coronary artery disease, this study contributed to the body of knowledge on women's health. A few recent studies have focused on the physical recovery of women, but none have examined how women live through the experience and develop strengths that help in recovery.

Dingley (1997) employed the grounded theory method by Glaser (1978, 1992) to capture how women define their own inner strength following a diagnosis of coronary artery disease. Eight women ranging in age from 67 to 83 years who had been diagnosed with coronary artery disease for at least six months were interviewed using a semi-structured format. The participants were asked to describe their personal experiences related to recovering from coronary artery disease. Results revealed that "living with a new normal" was the primary psychological problem for women recovering from

coronary artery disease. The women described a need for “adjustment and reorientation”. This concept was illustrated by the women engaging in new activities, new relationships, developing a new sense of purpose in life, and some renewing or finding a relationship with God or a Greater Being. Results also showed that inner strength was associated with 1) allowing for nurturance, 2) dwelling in a different place, 3) balancing the search, 4) healing in the present, 5) connecting with the future. As the theory evolved the above concepts were streamlined. Allowing for nurturance was relabeled “connectedness”. The dwelling in a different place became known as “new normal.” Balancing the search became “knowing and searching.” The healing in the present became known as “emotional spirit.” The “connecting with the future” became known as “physical spirit.”

The first theme of inner strength was “allowing for nurturance”. This was associated with the participants seeing their friends and family as sources of strength during their illness. Some of the women mention health care providers as a resource during their recovery period. Within the “allowing for nurturance” theme, there were three subthemes or categories that included 1) receiving support and accepting care 2) releasing control and relinquishing power and 3) reaching out to others. The first subtheme “receiving support and accepting care” was seen when the women acknowledged and accepted help from others during the most difficult times in their recovery. The second subtheme, “releasing and relinquishing” was seen when the women gave up control to allow others to help. The third category “reaching out to others” was seen when the women actively engaged in events to meet and socialize with others.



Another theme that emerged in the study was labeled “dwelling in a different place”. This theme was seen when the women began to not “dwell” or focus on their illness. They had and kept a positive outlook by finding strength in God or a Greater Being. The second theme was composed of two subthemes 1) choosing a dwelling and 2) finding the place within.

“Balancing the search” had three subthemes that included 1) searching for understanding 2) searching for meaning and 3) searching for direction. In this theme the women strived to balance and understand their life with coronary artery disease. The first subtheme “searching for understanding”, was seen when the participants discussed the medical aspects of their disease, the recovery process, and their knowledge and acceptance of having coronary artery disease. The second subtheme, “searching for meaning” was seen when the participants discussed of their recovery as a life miracle. They describe recovery as a “transformational experience”. The third subtheme, “searching for direction”, was noted when the participants discussed their decision to fight for their health. They also discussed how they focused on learning not to worry, yet grew from their past experience.

Participants discussed “Healing in the present” as a process of growth and recovery related to their own inner strength. The tense of the language during the interviews changed from the past to the present. Subthemes included 1) being active and playful today 2) being honest 3) releasing self from limitations and establishing new boundaries and 4) celebrating self.

In the study, the participants seemed to focus on the future, which led to the theme, “connecting with the future”. The subthemes of this theme included 1) helping

and hoping for others and 2) helping and hoping for self. The first subtheme dealt with the participants helping and supporting others during both the highs and lows of life. In the second subtheme, the participants were able to see their selves living a prosperous and healthy life filled with joy and hope. The field of nursing has contributed the most meaning to the concept of inner strength. Moloney (1995) discovered three patterns of inner strength in older women. These included surviving, finding strength, and gathering memories.

Dingley (1997) did an in-depth analysis of inner strength in women with coronary artery disease. One weakness, however, was that only eight women were interviewed about their experiences. The eight women only ranged in age from 67 to 83 years of age. It might have been more insightful to study women with coronary artery disease in their forties or fifties. This is the time when women are in the peak of their life, raising children and building careers.

This study did not provide a significant amount of new information to broaden the theory. It did provide support for previous studies in inner strength and the need for future quantitative research. It therefore served almost as a replication of previous studies. The study is beneficial to the current study in that it explored inner strength in women with one of the chronic illnesses of interest. It also helped to refine the emerging theory of inner strength in women. Different terms were revealed in this early study (1997) that have now been streamlined into four subthemes.

#### *Inner Strength and Multiple Sclerosis*

After inner strength was explored in women with breast cancer (Roux, 1993, Roux and Keyser, 1994, Roux, Bush, and Dingley, 2001) and in women with coronary

artery disease (Dingley, 1997), Koob and Roux (1999) investigated inner strength in women with multiple sclerosis (MS). Koob and Roux (1999) used Newman's Theory of Health as Expanding Consciousness and Heideggerian (1959, 1962) phenomenology to define the meaning of inner strength in women with MS. Koob and colleagues acknowledge that MS has been studied in detail, but research was lacking in the psychological aspects of living and coping with MS. This study was specifically conducted to examine, compare, and contrast the patterns of the theory of inner strength in women recovering from a condition that is often more visible and physically confining.

Koob and colleagues (1999) used the interpretive phenomenological techniques outlined by Heidegger (1953/1959; 1927/1962) to explore the concept of inner strength among five women who had been diagnosed with multiple sclerosis for at least 24 months. From this qualitative study, patterns and themes emerged. The pattern "knowing and searching" revealed the theme "seeking answers". The participants wanted to discuss their feelings during the first moments they learned about their diagnosis of multiple sclerosis. The participants also revealed their experiences from when they learned their diagnosis to the time they began to accept their condition (coming to know). The women described experiences of fear and worry regarding mortality, stress over how their diagnosis would affect their life including relationships, family and financial worries.

The second pattern was dwelling in a different place by recreating the spirit within. This pattern included the themes of 1) doing what must be done and 2) being abused and knowing the hurt. Once the women began to accept their illness, they were able to go through a period of personal growth and were able to gain knowledge about

their specific diagnosis. During this phase the women got to know themselves in a new way and by doing so became more resilient and intuitive. In the theme of “being abused – knowing that hurt”, the participants shared stories of having health care providers make decisions regarding their health without taking their input or feelings into consideration. The women also divulged their stories of enduring hostility and abuse within their places of employment.

The third pattern was “nurturing through connection” with the themes care of self and care of family. The participants revealed the need to nurture themselves, their partners and their children. The fourth pattern, “connection with the future by living a new normal”, had a theme of uncertainty with hope. In this pattern, the women were wandering and searching. The women were engaged in outside activities that allowed them to connect with their community and with themselves both athletically and creatively. During this phase, they were able to fight their disease, overcome barriers and obstacles within their health care management. The women shared the need to not take life, family, and time for granted.

A shift was made in how the women thought about their life on a daily basis. In previous studies, it was found that connection with others and nurturing one’s self led to healing and well-being. Similarly, in this study, women revealed that expanded consciousness was essential in having inner strength. Most women reported having more consciousness about their body as well as various emotional and spiritual aspects of their life.

Koob et al. (1999) defined inner strength in women with multiple sclerosis. This study like the study by Dingley et al. (1997) on coronary artery disease provided support

for previous studies in women with various chronic illnesses. The study focused only on five women, which limits the generalizability of the findings. It, however, provides additional support for item generation and testing in the current study.

In the multiple sclerosis study, researchers were trying to look for variation in the theory by applying it to various subgroups of women with chronic health conditions. They decided to pick multiple sclerosis because they felt that it was a life long condition resulting in many physical limitations not seen with some other chronic health conditions. The authors noted that women with multiple sclerosis have a “noticeable” chronic illness that may lead to discrimination.

#### *Inner Strength and HIV*

Haile and colleagues (2002) focused their research on investigating inner strength in women with human immunodeficiency virus (HIV). The study involved in-depth conversational interviews using grounded theory methods with 19 participants.

Each of the 19 women in the study was able to identify with the concept of inner strength. Many of the women were familiar with their own inner strength and were able to use this when they were diagnosed with HIV/AIDS. Each woman described inner strength in various manners. Some detailed it as a sense of stubbornness or willfulness and a pooling of resources. Many of the women relied on God or a Greater Being.

During the interviews, the participants were asked if health care providers were a source of inner strength. Most respondents stated that health care providers tend to be insensible or insincere to their needs and condition. One participant stated that health care providers should just listen when a patient is in distress not lecture. This is difficult since health care providers are taught to engage the patient into an intervention when a

patient presents with a problem. Most participants stated a need for privacy on how they acquired HIV/AIDS. They also expressed a need for better communication between patients and health care providers.

The study by Haile et al. (2002) was the first and only study to focus on a fatal infectious disease that can be prevented. The article had 19 participants, which is relatively large for a qualitative study involving one-on-one in-depth interviews. This study was significant in that Haile and colleagues did not work with Roux, Dingley, Bush, or Koob (1999) who had conducted all of the previous studies in inner strength. The findings from the study by Haile and colleagues resulted in similar findings seen in other studies on inner strength. This study, therefore, provides support for the studies conducted by Roux and colleagues (Dingley, 1997, 1999, Dingley, Roux, and Bush, 2000, Roux, Bush, and Dingley, 2001, Roux, Dingley, and Bush, 2002, Dingley & Roux, 2003) that were used to generate items for the ISQ.

### **Theory Construction and Refinement: Metasynthesis of Five Qualitative Studies**

The process of metasynthesis of research studies was conducted by Roux (2002) to establish a more comprehensive representation of inner strength and examine the connections between and among the dominant concepts and sub-concepts. Metasynthesis involves analyzing qualitative data to synthesize the information that has been presented in multiple studies. Synthesis of results from multiple studies generates a theory and conceptual framework that is broad in scope and more integrated than any single inquiry (Olshansky, 1996). Using the focal concept of inner strength as an entry point into the literature, a careful literature review was conducted. Five studies identifying inner strength as the central phenomenon of inquiry provided the richest theoretical insights

and proved more useful for the process of theory synthesis than the other studies (Knapp & Karabenick, 1985, Friedman & Pines, 1992, Kim and Mauborgne, 1992) in which inner strength was an emerging theme, but not the focal concept.

The five studies that were used to form the theory of inner strength will be described briefly. Following the descriptions of each study, a break down of the five themes that emerged from the metasynthesis of the five studies will be explained.

The first study was a study conducted by Rose (1990) where healthy, middle aged women were interviewed using the phenomenological approach to assess their meaning of inner strength. All of the women in Rose's study were healthy women that had had a previous life issue such as a mental health concern. Roux et al. (2001) conducted the second study among women with breast cancer using the phenomenological approach by Colaizzi (1978). In this study, the women were 35 to 72 years of age. Some had been diagnosed with breast cancer over 20 years ago, while others had only recently been diagnosed.

The third study by Moloney (1995) used the Heideggerian hermeneutical analysis technique (phenomenological) with low-income, rural women over 65 years of age with no direct health issues to explore their stories of strength. Based on the study by Moloney, Roux et al. (2003) gained insight into the study of the construct of "strength" in older women. The fourth article by Dingley (1997) explored inner strength using grounded theory techniques by Glaser (1978, 1992) among women between the ages of 67 and 83 years of age who had been recovering from coronary artery disease. The women in this study had been diagnosed with coronary artery disease for at least six months. The fifth study by Koob and Roux (1999) explored the experiences of women

living with multiple sclerosis including their journey in inner strength. This study was conducted using the phenomenological technique known as Heideggerian hermeneutical analysis. Participants in this study were all women between the ages of 38-55 who had been diagnosed with multiple sclerosis ranging from 2 to 30 years.

The following is a break down of the five themes that were formed based on the synthesis of the five studies in the metasynthesis by Roux et al. (2002). Through this metasynthesis, propositions were developed that articulate the meaning of the theme in one complete sentence. According to Roux (personal communication, 2004), a proposition is an if-then statement that is a prediction of the theory. Therefore, the proposition states that if the women do “this” then “this” happens. For example, if the women engage in a support group, then they grow in inner strength.

#### *Knowing and Searching*

The first theme that emerged from the synthesis of the five qualitative studies was labeled “knowing and searching” (Figure 1). In Dingley’s (1997) study, the women articulated a need to have a new understanding, a new meaning and new direction to their life as they learned to live with their diagnosis of heart disease. In Rose’s study, the women had a “sense of themselves and knew what they needed” in their life. In Roux (1993) and Roux and Keyser (1994) study with breast cancer patients, the women described the sense of coming to know and accepting their condition. They were able to accept their diagnosis and the hardships that may lie ahead of them with their new health condition. The women also tried to search for a reason or meaning for their diagnosis. They also expressed the desire to overcome their illness and move on. They were able to make plans for their future. Moloney (1995) found that through telling their personal



stories, the women in his study were able to reflect on their journey and find a meaning and through this meaning they were able to develop an understanding.

Roux and Koob (1999) in a study on women with multiple sclerosis found that the women faced the potential of having to live a debilitating life instead of ignoring or pretending the disease did not exist. By accepting their condition, they were able to draw on their strengths.

### *Nurturing through Connection*

The second theme that emerged from the metasynthesis was “nurturing through connection” (Figure 1). This became known as “connectedness” (Figure 2) from the metasynthesis. The women in the five studies illustrated an acceptance of both social and physical support from those who were concerned for their well-being. In Dingley’s study (1997) participants described the importance of having support from their friends and family. They described this support as an essential aspect of their recovery. This theme also illustrates how the women had to make a conscious effort to release control and allow others to help and support them in their time of need. For some, this may have meant having someone run errands or do household chores for them. Others may have needed help to care for their personal hygiene.

Another aspect of the “nurturing through connection” theme was seen in how the women began to actively connect with others or specific institutions that may provide help or support that could facilitate their coping and recovery. For example, some women joined support groups, while others volunteered for the American Heart Association. Dingley (1997) acknowledged that it was not enough to have support systems available and in place, but that the women had to accept and want the support.

Rose's (1990) study also supported this theme in that she labeled her findings as "embracing vulnerability". Rose described the women in her study as undergoing a process of accepting and acknowledging. This was similar to the study by Dingley (1997) in how the woman experienced a process of "letting go and trusting others". Rose also described a theme of "interrelating", which involved relating to, believing in, giving to, receiving from and being open to others. Roux and Keyser (1994) in a study on women with breast cancer also noted that the women expressed a need and desire to establish a connection with others.

In Moloney's (1995) study, the older woman described their relationships with others as an important aspect of their life. Moloney described two themes 1) "being close to others" and 2) "drawing strength from others" which relates to the themes seen in the studies by Roux and Keyser (1994), Dingley (1997), and Rose (1990).

In the study by Roux and Koob (1999) on women with multiple sclerosis, the participants described that after being diagnosed with multiple sclerosis, they were able to be who they were and could be accepted by others with their condition. They also described having close relationships with loved ones and a greater spirit or being. A proposition for this theme was therefore established by Roux et al. (2002), "If the woman experiences positive social support, then she is more likely to grow in inner strength".

### *Mental Self-Spirit*

The third theme that emerged from the metasynthesis was "Dwelling in a Different Place by Recreating the Spirit Within" (Figure 1). This theme became known as mental self-spirit (Figure 2). This theme was also formed from the findings of the five studies synthesized in the metasynthesis. In Dingley's (1997) study, the participants were

characterized as “not dwelling” on their illness, but rather focusing on the positive. The participants also described themselves as being strong, independent, self-preserving, and having inner peace.

In Moloney’s (1995) study the theme, “putting it behind you” emerged as the women put their illness behind them and began to move forward. In this study, a theme emerged that mirrored the themes seen in Dingley’s (1997) study. Participants in Moloney’s (1995) study like participants in Dingley’s (1997) study demonstrated the essence of having inner strength. The women, in a study by Roux (1994) on women with breast cancer, articulated that having a positive attitude was essential in their recovery.

Rose (1990) made a similar discovery and coined the term “quiescencing” in her study. Quiescencing was described by Rose (1990) as a process of becoming, seeking, and allowing one to be quiet and calm. In the study by Roux and Koob (1999) on multiple sclerosis, the participants grew by learning about themselves which required taking time for personal reflection. The proposition for this theme was derived as “When there is inner strength, the woman will move away from the illness mode to the wellness mode”.

### *Physical Self-Spirit*

Based on the synthesis of the five studies, the theme “Healing Through Movement in the Present” emerged (Figure 1). This theme was renamed to physical self-spirit (Figure 2). In Dingley’s (1997) study, this theme was characterized by the participant’s ability to recover through engaging in physical activity. The participants became active and playful, were honest in their emotions, removed self-limitations and set new boundaries based on their health condition. The proposition for this theme was

coined by Roux et al. (2002) as “If the woman is honest, active, and involved, then she is more likely to be moving toward healing”.

In Rose’s (1990) study, participants were described as having capacity. This was described as the participants recognized their own limitations, were able to set new goals and solve their individual problems. The finding from Rose’s study closely mimicked the findings from Dingley’s (1997) study. In Moloney’s (1995) study, the participants described “living today”. This was characterized in how the participants lived their lives and how they were involved with the outside physical world (i.e. community involvement).

In Roux and Keyser’s (1994) study on breast cancer, the women in the study engaged in physical activity, movement, and interaction within their environment. The women also expressed honesty in their fears and shock over their diagnosis. Like the other studies, Roux and Koob (1999) described the women in their study with MS as being able to heal through physical involvement, honesty with themselves and the appreciation for each new day.

### *New Normal*

The fifth theme to emerge from the synthesis of the five qualitative studies on inner strength was “Connecting with the Future by Living a New Normal” (Figure 1). This theme was renamed “new normal” (Figure 2). In Dingley’s (1997) study, the participants were characterized as focusing on the future. They were able to envision themselves as vibrant, healthy, and valued participants in the world. They expressed emotions of hope and anticipation for the future. Participants were also described as being able to support others during and through difficult situations.

Rose (1990) and Roux and Keyser (1994) illustrated how the participants in each of their respected studies “extended themselves” to support others. Roux and Keyser (1994) saw how the women connected with others who were experiencing the same issues and were able to grow from this union. Also in Roux’s (1993) study, on women with breast cancer, the women had a “connection with self”. This was reflected in how the women were excited about doing things for themselves and looking forward to their future with set plans.

In Moloney’s (1995) study, the women described the joy and sense of purpose received from helping others including loved ones. This included a relationship with God or a Greater Being. The participants reflected on the experiences that made them strong and allowed them to move forward. In Rose’s (1990) study, the participants described a need for “realignment” or an adjustment. This realignment may come in the experience of working with helping someone in need.

Roux and Koob (1999) in a study on women with multiple sclerosis found that all their participants were involved in events and activities that did not involve themselves or their illness (not a support group or foundation). Such activities usually involved reaching out in the community such as volunteering at a nursing home or delivering meals to those in need.

### *Conclusions of Metasynthesis*

The metasynthesis conducted by Roux et al. (2002) was beneficial to the current study in that the authors did an excellent job providing an overview of five significant studies on inner strength. It revealed that the phenomenon of inner strength was a broad theory. The synthesis also provides support for the theory of inner strength. Through the

synthesis, the five studies were scrutinized to reveal five emerging themes that crossed each of the studies. These themes composed the theory of inner strength as illustrated in Figures 1 and 2. Another important aspect of the study was that it gives readers a brief overview of the limited studies that have been conducted on inner strength. The study is beneficial to the current research since it gives a rationale for conducting a study to develop and assess an instrument to measure and assess the construct of inner strength. The proposition developed by Roux et al. (2002) for this theme was “If the woman is experiencing and sharing inner strength, she will have hope and vision for the future.”

#### *Cultural Variations in Inner Strength*

The most recent qualitative study in inner strength was explored after the formation of the metasynthesis. Dingley and Roux (2003) investigated inner strength in older Hispanic women with chronic illness. The goal of this study was to explore the cultural variations by investigating strategies Hispanic women use to develop strengths that help them cope with chronic illness. This population was chosen since chronic illnesses including heart disease, cancer, stroke, diabetes, and lung disease are leading causes of death among Hispanic women. In addition, research was lacking on the cultural meaning and variations on inner strength among Hispanic women. Dingley and Roux employed the use of grounded theory outlined by Glaser (1992) to study how older Hispanic women endure living with a chronic illness. Inclusion criteria included women who met the definition of Hispanic by the definition set by the United States Bureau of Census (2000). The Bureau defines Hispanic as having a Spanish surname, being Spanish speaking or born in a Spanish countries. This study encompassed five participants aged 60, 65, 78, 89, and 92. Of the five participants, four spoke English and

one spoke Spanish. One woman was widowed, one divorced, one single, and two were married.

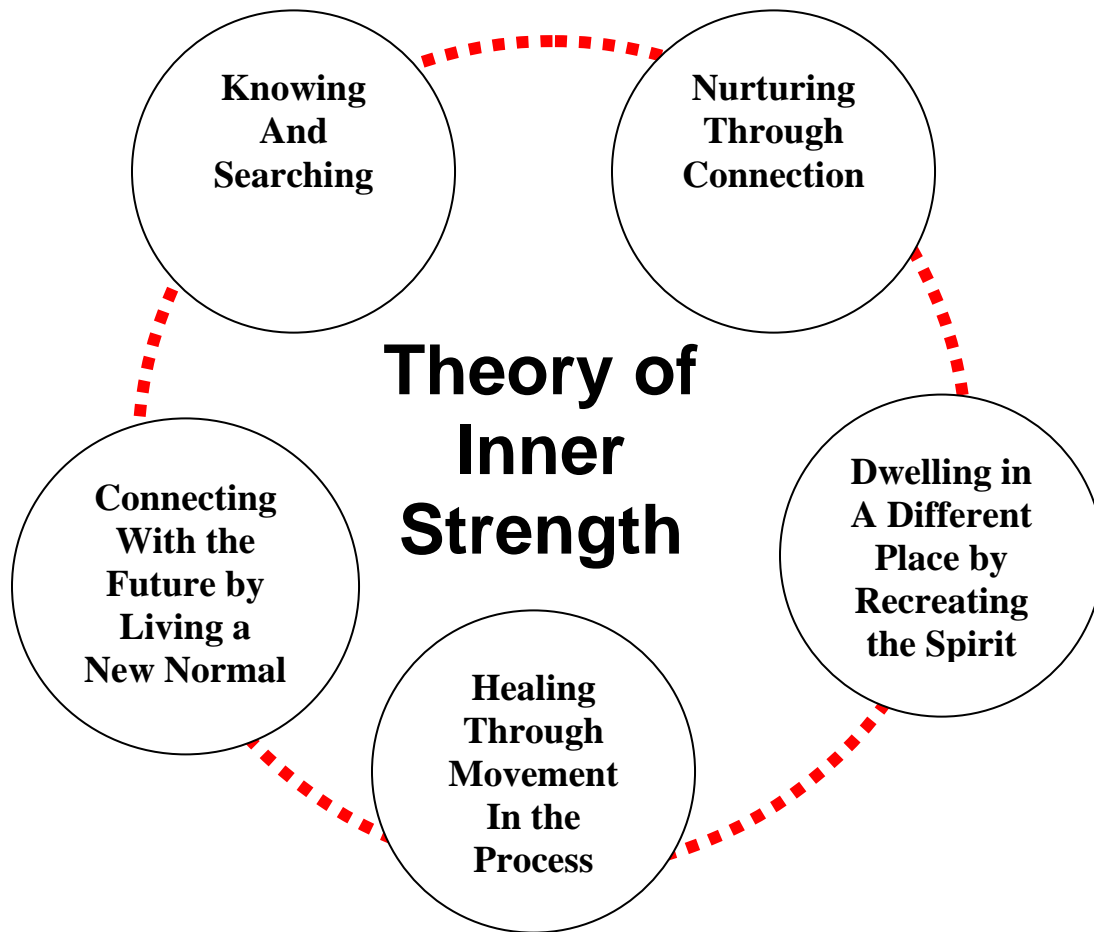
Data were obtained in one-on-one semi-structured interviews lasting an hour. The researcher took careful notes and reviewed the notes with each of the women at the end of the interview for clarification and accuracy purposes. During the interview, the women were asked to express their experiences with their specific chronic illness. The interviews were analyzed using the constant comparison method involving the comparison of each and every phrase and paragraph. Results yielded knowledge that inner strength among older ( $\geq 60$  years) Hispanic women was a process of growth that began early in life. This resource could be used in times of need such as during experiencing a chronic illness. Several themes that emerged from the data included 1) drawing strength from the past 2) focusing on possibilities 3) being supported by others 4) knowing one's purpose and 5) nurturing the spirit.

In the first theme, "drawing strength from the past", all five of the women expressed the loss of loved ones. They also expressed the need to stick it out and work through their problems. Other experiences included creating a home, which meant that the women tried to feel at home after experiencing the chronic illness. For some the experience involved living through past hardships or difficulties that impacted their life.

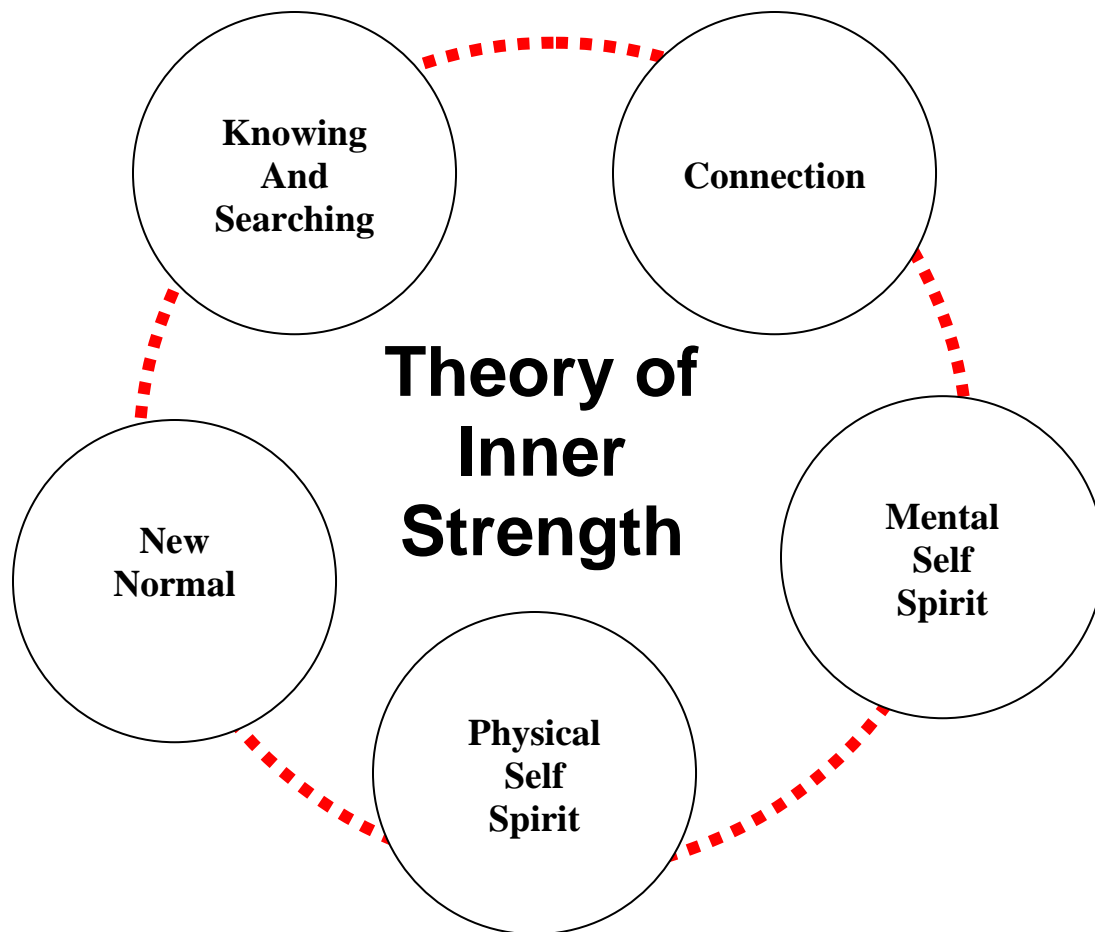
The second theme, focusing on possibilities, involved the participants focusing on positive approaches to their individual situation. One aspect was that each participant went through a phase where they decided to keep going regardless of the hardships that they may have to endure. At this point, the women began to describe a desire to survive.

“Being supported by others” was seen when the participants stated a feeling that they were cared for, had help, and was able to let go. The theme, “knowing one’s purpose”, was characterized by the participants having a strong purpose in life regardless of their health status. It was clear that by having a purpose in life, the participants also had a sense of meaning and therefore a clear direction. Many of the women posed a need to do for others. This was seen when the participants discussed their excitement in how they had engaged in activities such as volunteering that benefits the lives of others.





*Figure 1:* Themes that emerged from the metasyntesis of five qualitative studies on inner strength in women.



*Figure 2:* New labels for five themes that emerged from the metasynthesis of five qualitative studies.

#### *Theory-Based Instrument Development*

Recently, instrument development and testing commenced to address the possibility of defining quantifiable measurements based on the theory of inner strength that was based on the findings of previous qualitative studies (Dingley, 1997, 1999, Dingley, Roux, and Bush, 2000, Roux, Bush, and Dingley, 2001, Roux, Dingley, and Bush, 2002, Dingley & Roux, 2003). The items for the Inner Strength Questionnaire (ISQ) were initially developed based on the theoretical formulation found in the previous

studies, literature review, and clinical experience. The metasynthesis (2002) was used to aggregate the studies to develop a theory. Consistent with Fleury's (1993) recommendations, the items for the scales were created using participants' actual quotes or experiences of inner strength. The five scales of the ISQ were based on the major concepts derived from the theory and were considered to encompass the dimensions of inner strength. Extensive face and content validity techniques were completed that included input from professional experts in the fields of social work, gerontology, minority studies, and theology as well as community members and clients prior to administration.

The instrument items were formed by taking actual quotes and phrases from the transcripts of the qualitative analysis. The quotes were directly from women who expressed their inner most thoughts and feelings about their health condition. The first version of the Inner Strength Questionnaire had 96 items and through content expert review, 20 items were deleted that were either redundant or irrelevant to the construct of inner strength. Therefore, the second version of the ISQ, had 76 items and was administered to 154 women who had self-reports of a chronic health condition. Through exploratory factor analysis, 39 items were eliminated. The third version had 37 items and is the basis for this study.

### **Psychometric Analysis of the Instrument**

#### *Factor Analysis*

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were employed in this study to test the psychometric properties of the theoretically-based instrument, the Inner Strength Questionnaire. Factor analysis is a highly powerful

multivariate procedure (Polit and Hungler, 2001). According to Polit and Hungler, factor analysis is used to reduce or narrow a large data set during analysis. It also identifies which variables or items should be grouped together. It identifies interrelationships that exist between the given variables or items. Factor analysis groups items with similar constructs and forms “factors”. The researcher then labels the factors based on the theoretical underlying concept.

Exploratory factor analysis is conducted in two phases. The first phase is called factor extraction and it involves condensing the number of variables in the data set to a smaller number of factors. The factors are formed by the intercorrelation among the items seen in the correlation matrix. The objective of this phase is to remove or extract groups of highly interrelated variables within the correlation matrix. This allows the removal of items that measure the same construct and therefore are not needed.

There are several techniques for extraction of factors that vary based on how variables are assigned weights. Some common forms of techniques for extraction include image, alpha, centroid, maximum likelihood, and canonical techniques. The most common form of factor extraction is principal components. The product of the first step is the unrotated factor matrix. It contains the weights or coefficients for each item.

#### *Confirmatory Factor Analysis (CFA)*

Confirmatory factor analysis (CFA) is believed by many to be a superior method to exploratory factor analysis (EFA). Many feel that CFA is better because it tests hypotheses, while EFA does not (Kline, 1994). Since CFA uses highly complex algebraic equations, a program known as LISREL (Joreskog & Sorbom, 1984) must be used. In this study, CFA was used to provide additional information to support the

hypothesis of a four factor model. The researcher discussed the use of EFA and CFA with numerous methodologists to only discover that at this point in instrument testing, either method is applicable.

### *Reliability*

Polit and Hungler (2001) describe reliability based on classic measurement theory. According to Polit and Hungler, reliability is an essential measure of the quality and adequacy of the scores obtained from the instrument. Reliability is the degree of consistency in measuring the construct. The less the variation between measures the higher the reliability, therefore, a reliable score minimizes the amount of error.

According to the standards (2.1) relevant reliabilities must be reported for each total score, subscore, or combination of scores. There are three common ways to measure or assess reliability: stability, internal consistency, and equivalence. The first is stability. Stability involves administering an instrument several times to the same subjects and assessing the results. The hope is that the results do not vary. One technique for assessing the stability of an instrument is known as test-retest reliability. The test-retest reliability is done by giving the same sample of subjects the test or instrument twice at two distinct time periods (i.e. two weeks apart). The researcher then compares the results. Most researchers will compute a reliability coefficient using a correlation coefficient ( $r$ ). The correlation coefficient explains or describes the magnitude and direction of a relationship between two variables.

The correlation coefficients range from -1 to +1. A correlation that is from 0.00 to -1.00 represents a negative or inverse relationship. This means that as one variable increases, the other variable decreases. A correlation coefficient of 0.00 to +1.00 shows a

positive relationship. This means that as one variable increases, the second variable also increases. A correlation coefficient of 1.00 represents a “perfect relationship”. A correlation coefficient of 0.00 represents no relationship. In assessing test-retest reliability, the researcher assumes that the scores between the two administrations should result in a relatively high correlation (i.e. close to 1.00). Polit and Hungler (2001) state that the higher the correlation coefficient the more stable the scores.

The test-retest technique has several advantages and disadvantages. Some advantages of the test-retest reliability include that it is easy to manage and analyze. Test-retest can be done in studies when there is a self-reported instrument, observational data or when a researcher is assessing psychological measures. One disadvantage is that some traits among subjects may change over time even when there is a short time between the first and second administration of the instrument. Another problem is that the subjects may remember during the second administration of the instrument their responses from the first administration introducing response bias. Still, another problem is that the subject may change (i.e. gain knowledge for example) by being subjected to the first administration thus affecting the results on the second administration of the instrument.

Another technique for assessing reliability is called internal consistency. Internal consistency is the most popular and most utilized technique for assessing reliability. One advantage to internal consistency is that it is economical for the researcher since it only involves one administration of the instrument to the sample. It also assesses the sampling of items, which can be a source of measurement error in instruments especially ones that assess psychological phenomenon.

One technique for assessing internal consistency is the split-half technique. The split-half technique involves “splitting” the instrument into half. For example, if an instrument had 40 items, it would be split into two groups of 20 items each. While, there are many different ways to split an instrument, many researchers use the even and odd technique. This means that items 1,3,5,7,9, etc. are in one group while items 2,4,6,8, and 10 are in another group. A correlation coefficient ( $r$ ) is conducted between the two split halves of the instrument. The split-half technique has both advantages and disadvantages. One advantage is that the split-half technique is simplistic. It also eliminates some of the issues seen with the test-retest techniques used in stability. It measures the trait at one point in time, eliminates the possibility of response bias, and allows only one administration of an instrument. One disadvantage of the split-half technique is that the correlation coefficient will vary based on how the researcher splits the instrument and groups the items within the instrument.

There are two additional methods to assess internal consistency. These include Cronbach’s alpha and Kuder-Richardson 20 for both of those techniques, a coefficient alpha is generated that assesses the internal consistency of the instrument or test. The coefficient alpha technique has been the preferred method by many researchers since it gives an estimate of the internal consistency based on all possible splits of an instrument.

The third method used for assessing reliability is equivalence. Equivalence involves estimating consistency of a test or instrument by using trained observers or raters.

### *Validity*

Validity is another element to consider during the development of an instrument. While reliability and validity are essential in the development of an instrument, an instrument that is found to be unreliable cannot be valid. Therefore, the validity of an instrument relies on it being reliable.

According to the Standards (1999) established jointly by the American Educational Research Association (AERA), American Psychological Association (APA) and the National Council on Measurement in Education (NCME) evidence based on validity is the “most fundamental consideration in developing and evaluating tests” or for study, an instrument. The standards suggest that a researcher needs to consider construct underrepresentation and construct-irrelevant variance when developing an instrument. Construct underrepresentation involves the failure of the instrument to capture the entire construct being studied. This can happen when the content is not adequate to capture the phenomenon. This also happens when the instrument does not allow or prompt the subject to respond in a manner that would allow a response or the process needed to produce a response by the subject.

Construct-irrelevant variance involves extraneous events that occur that cause an effect on the scores from the instrument, therefore affecting the construct. Such extraneous effects include emotional reaction to completing the instrument or a recent event that may have just occurred prior to taking the instrument, knowledge or familiarity with the instrument. Factors such as reading level also affect the response from subjects (Standards, 1999).



There are several forms of validity. Face validity refers to whether the instrument “looks” at a glance like it is measuring what it intends to measure. It is the weakest form of validity. Another form of validity is content validity. According to Polit and Hungler (2001), content validity involves the sampling adequacy of items to measure the construct under investigation.

#### *Evidence Based on Content Validity*

The evidence based on content validity of an instrument is often evaluated by having experts or individuals that are knowledgeable in the field of study to review and provide feedback on the instrument. There are several ways to evaluate an instrument for content validity. The experts are often asked to evaluate each item and the entire instrument including the layout, instructions and format.

One of the main objectives in content validity is for the researcher to assess whether the items are appropriate for the construct under study. The second objective is that the researcher must evaluate the items to ensure that they will measure the entire phenomenon.

With instruments there are some reviewers who feel that there are some elements that have been left out that need to be incorporated in order to accurately capture the underlying construct, while the instrument may contain items that some reviewers feel are not necessary to measure the phenomenon (Standards, 1999).

According to the Standards (1999), validating an instrument involves narrowing the possibility of any misconceptions to the meaning in both the instructions for completing the instrument and the individual items. Other issues that may affect

responses from the subject include the format or layout of the instrument, how and when the instrument is administered, and the language or content of the instrument.

#### *Convergent and Discriminant Evidence*

Convergent evidence of validity was demonstrated by assessing the instrument with an instrument that intends to assess a similar construct. Discriminant evidence for validity was done by correlating the new instrument with an instrument that measures a different construct.

Multitrait-multimethod model by Campbell and Fiske (1959) is used to examine convergent and discriminant validity. The model produces a matrix correlation that separates the variance in trait from the variance in the method. There are guidelines for establishing convergent and discriminant validity. For convergence the guidelines state that the correlations of the same trait by different methods must be high in relation to the reliability estimates. For discriminant validity, the same trait measured by a different method should exceed the correlations of that seen between different traits measured by different methods (Goldsmith, 1991).

Based on the current literature and need for additional psychometric evaluation of the ISQ version 3, the following research questions were proposed.

#### **Research Questions**

1. What is the factor structure of the Inner Strength Questionnaire?
2. What is the evidence based validity of the Inner Strength Questionnaire?
3. What is the evidence based reliability of the Inner Strength Questionnaire?

4. What is the relationship of the Inner Strength Questionnaire with the Mastery of Stress Instrument?
5. What is the relationship of the Inner Strength Questionnaire with the Center for Epidemiological Studies in Depression?

## **Chapter 3**

### **METHODOLOGY**

This chapter describes the study design, the sample population, and the instrumentation. The methodology for the study and the data analysis for each procedure will also be discussed with regard to each of the research questions. This chapter also describes the delimitations of the study.

#### **Study Design**

This study was conducted using a quantitative, nonexperimental, correlational design. The goal of the study was to examine the psychometric properties of an instrument that assesses inner strength in women with chronic health conditions. It should be noted that the instrument may have multiple uses among a multitude of populations. Psychometric properties included validity and reliability analysis. Various forms of validity evidence were tested, including content, discriminate, convergent, and construct validity.

#### *Instrumentation*

An instrument was designed to assess the construct of inner strength. The instrument was developed based on in-depth qualitative interviews on women with chronic health conditions such as cancer and multiple sclerosis. The participant's direct statements were used to form the instrument items for the Inner Strength Questionnaire.

Studies have included inquiry into inner strength among women with breast cancer, coronary artery disease, multiple sclerosis, HIV and healthy women. The initial draft of the instrument consisted of 96 items and was hypothesized to have five subscales, based on themes that emerged from the qualitative studies. The five subscales hypothesized from the 96-item instrument were knowing and search, physical self-spirit, mental self-spirit, connectedness, and new normal (Figure 2). The responses for the survey are on 5-point Likert scale of agreement (Strongly Agree, Agree, Slightly Agree, Disagree, and Strongly Disagree). The 96-items were derived from direct participant quotes. After elimination of the 20 items, the second version of the instrument had 76 items. This version of the Inner Strength Questionnaire (ISQ) was also theorized to have five subscales which include 1) knowing and searching 2) connectedness 3) mental self-spirit 4) physical self-spirit and 5) a new normal.

#### *Pilot of Inner Strength Questionnaire (Version 1)*

The 96-item instrument (version 1) underwent extensive psychometric testing. The instrument was reviewed for reliability and validity purposes. First, the instrument was given to a panel of experts to review for content validity. The expert panel included representatives from the field of nursing, faith-based organizations, and community members. Each of the expert panelists was given the instrument and a list of questions to answer regarding the instrument including a section for additional comments. Panel experts were asked to identify specific areas where the instrument lacked in content. They were also asked to evaluate the instructions and items for clarity, ease of completion and readability. The group was also asked to review for gender and cultural sensitivity issues. Using Lynn's (1986) method for assessing content validity, each panel

expert was given a form that had each of the 96 items. The panel of experts was asked to rate each of the items. They were given a four point scale which included 1) not relevant 2) unable to assess relevance without item revision or item is in need of such revision that it would no longer be relevant 3) relevant, but needs minor alteration and 4) very relevant and succinct. From this feedback, an index of content validity (CVI) was obtained.

Based on the theoretical evaluation of the instrument, 20 items were removed from the first version of the ISQ. Therefore, the second version of the ISQ was composed of 76 items and became known as the ISQ version two. The instrument was administered to 154 women with chronic health conditions. The ISQ was theorized to have five subscales based on the themes that emerged in the qualitative data from Roux and colleagues (Dingley, 1997, 1999, Dingley, Roux, and Bush, 2000, Roux, Bush, and Dingley, 2001, Roux, Dingley, and Bush, 2002, Dingley & Roux, 2003). The first scale was labeled “knowing and searching”. Knowing and searching was defined as “the transitions from the point of shock and fear to one of knowing and accepting”. This part of the construct was illustrated by establishing meaning out of an event such as being diagnosed with a chronic health condition, making choices that will be beneficial to their recovery and in the healing process. This scale has eight items and was found to have a reliability of 0.83 and a variance explained of 10%. The second scale was labeled “connectedness”. Connectedness was defined as “a sense of support and nurturance from self, family, friends, and a spiritual being or power”. The connectedness scale has eight items and a reliability of 0.89 with an explained variance of 14%. The third scale was labeled “mental self-spirit”. The mental self-spirit was defined as having a positive attitude and outlook. It was illustrated by being able to refocus negative thoughts and

reframing bad circumstances or events in one's life. This scale was composed of 11 items and had a reliability of 0.87 with an explained variance of 14%. The fourth scale was labeled "physical self-spirit" and had 10 items. The physical self-spirit was defined as the movement and the facilitation of desired change. This was seen in how the women engaged in silent reflection and athletic activities. It had a reliability of 0.87 and 12% of the variance explained. The fifth scale did not load onto a factor and therefore was theorized to not be a component of inner strength, but a consequence. The four scales composed a total variance explained of 50%. The four scales composed a total of 37 items and were named "mental self-spirit, connectedness, knowing and searching, and physical self-spirit". Each subscale was composed of a differing amount of items. Mental self-spirit was composed of eleven items, connectedness had eight items, knowing and searching had eight items, and physical self-spirit had ten items.

*The Center for Epidemiological Studies in Depression: Discriminant Scale*

The Center for Epidemiological Studies in Depression (CESD) scale developed by the Center for Epidemiologic Studies of the National Institute of Mental Health was used in this study. The CESD scale is unidimensional. This means that it measures one construct, depression.

This scale will be used in this study as a discriminant measure for evaluating the Inner Strength Questionnaire. The goal of the CESD scale is to assess depression in the general population. The CESD scale is a widely used scale for assessing depression in a clinical setting. It was developed in 1977 and has been used in both research studies and in the clinical setting.

The CESD scale is composed of 20-items that assess how individuals have felt during the past week. The scale has four responses to each question that include 1) rarely or none of the time which equals less than one day 2) some or a little of the time (1-2 days) 3) occasionally or a moderate amount of time (3-4 days), and 4) all of the time (5-7 days). Four of the items (numbers 4, 8, 12, and 16) are measuring positive experiences, not negative experiences. In this case, the scale must be reversed for items 4, 8, 12, and 16. The score on the CESD scale will range from 0 to 60.

The CESD scale has undergone extensive psychometric evaluation and has been administered to a variety of populations including many with chronic health conditions. It is widely used because it is easy to complete and evaluate. Radloff (1977) administered the CESD scale to the general population. Internal consistency was done using Spearman-Brown, split-halves. The coefficient alpha for the entire instrument was found to be 0.85.

Mann (1999) used the CESD scale to assess depression in cancer patients. Internal consistency using Cronbach's alpha revealed a coefficient alpha of 0.89 in the patient group and a 0.87 in a healthy comparison group. Mann also assessed reliability using the stability reliability approach. In the cancer patient group, the reliability was found to be 0.57. In a healthy comparison group, the reliability was found to be 0.51.

#### *Mastery of Stress Instrument: Convergent Scale*

Dr. Janet Younger (1993) developed and conducted psychometric testing on the Mastery of Stress Instrument (MSI). The MSI is used to assess mastery. Mastery is defined by Younger as a "human response to a difficult or stressful circumstance in which a person gains competence" (p.68).



The MSI contains four subscales with 30 total items with responses for each item being on a 5-point Likert scale of agreement (strongly agree, agree, undecided, disagree or strongly disagree). The subscales include 1) certainty 2) change 3) acceptance and 4) growth. Certainty is described by Younger as “a state of having adopted a particular view of a situation that is free of troublesome doubts, constitutes the mastery of meaning” (p. 68). Change was defined by Younger as “directly affecting the demands or resources of the objective environment and reducing the impact of a stressor (p. 68).

Characteristics associated with change include acknowledgement of what can be changed and having the skills to cope with stressors. Acceptance is the phase when an individual has come to accept that an event has occurred that is out of their immediate control. At this point, they must realize that they must deal or cope with the situation. Growth is defined as the stage when the individual begins to feel stronger. In the growth stage, subjects show awareness of life and knowledge of others begins to surface.

Younger has conducted extensive psychometric testing on the MSI (1993). In an initial study, 801 subjects were recruited between 1988 and 1991. The standardized alpha was 0.97, which suggests that there is a normal distribution of items covering the construct of interest. The alpha reliabilities for the score for each scale include 0.89 for certainty, 0.84 for change, 0.92 for acceptance, and 0.94 for growth. The scores on the instrument were also assessed for validity purposes.

### *Study sample*

In this study, the researcher wanted to explore the role of inner strength in women with chronic health conditions. It was decided that the population would be gender

specific due to the gender specific theory of inner strength and therefore only include women.

The population of interest will be women who have been diagnosed by a licensed health care professional with a chronic health condition for at least six months or more before completing the instrument. This decision was made based on the instrument deriving from qualitative inquiry only among women.

Froman (2001) states that a researcher can find a recommendation for sample size to fit any accessible sample. She states that Gorsuch (1983) finds that five subjects per item or a minimum of 100 subjects is acceptable. Guilford (1952) claims that when conducting factor analysis on a new instrument that there should be five subjects per item with a minimum of 200 subjects. Cattell (1978) feels that three to six subjects per item is acceptable with a minimum of 250 subjects. Since this is the second testing of the instrument that researcher aims to obtain a minimum of 74 and a maximum of 185 subjects. Since the first research question requires the researcher to assess factor structure, the researcher will need to use exploratory factor analysis. Based on guidelines from Tabachnick and Fidell (2001), at least 150 subjects are required to obtain proper factor extraction and rotation.

#### *Institutional Review Board (IRB)*

A research proposal was submitted and approved by the Institutional Review Board (IRB) at Virginia Commonwealth University prior to data collection and analysis. A detailed content form was developed that outlined any possible risks that may occur to the subject. The researcher worked closely with Dr. Gayle Roux, faculty member in the School of Nursing at Virginia Commonwealth University. The proposal was submitted

initially in July 2002 for the pilot study of the 76-item ISQ (version 2). The 76-item instrument was piloted on 154 women with chronic health conditions. Through exploratory factor analysis techniques, 39 items were eliminated from version 2 (76 items) to form version 3 (37-items).

An amendment was submitted to the board that included the 37-item ISQ (version 3) and use of the MSI and CESD. The researcher received approval since no new items were added to the third version (37-items) of the instrument. All subjects remained anonymous to the researcher. Subjects were asked to not include any identifying information on the surveys.

#### *Procedures and Sample Size Requirements*

The ISQ was administered to subjects along with the Mastery of Stress instrument and the Center for Epidemiological Studies in Depression scale. The four scales in the ISQ were correlated with the scales in the MSI to assess convergent validity. The overall scores of the ISQ and the CESD scale were correlated to assess discriminant validity.

The researcher distributed the research packets to clinics at Virginia Commonwealth University's Medical Center. The clinics included the transplant clinic, cancer center, heart center and the osteoporosis clinic. The packets included a letter from the principal investigator describing the study in detail, an informed consent form clearly stating the associated risks of the study, the Inner Strength Questionnaire, the Mastery of Stress Instrument, and the Center for Epidemiological Studies Depression Scale. The subjects were asked to complete all three questionnaires, sign the consent form, and return all three questionnaires and the informed consent in the packet. Each instrument was labeled with an "A", "B", or a "C" to vary the instrument that is taken or completed

first to reduce any response bias from the subject. At each clinic, a nurse was designated as the “site coordinator”. The site coordinator was responsible for distributing and collecting the packets. Once the subject had completed the packet and returned it, the site coordinator gave them a \$25 gift certificate incentive to Wal-Mart. If the subjects had specific questions related to the study, they were instructed by the site coordinator to contact the principal investigator.

The researcher checked with the site coordinators on a weekly basis for status on completed packets. The packets were picked up from each site coordinator on a regular basis. A number was placed in the top right hand corner to assist in data entry. As the packets were completed and returned, the researcher entered each instrument into the Statistical Program for the Social Sciences (SPSS). Each row within SPSS represented one subject. Each column represented a single variable or item.

#### *Missing Data*

The researcher examined the data for missing values especially those that have a pattern. The data was also examined for outlier, linearity, normality (skewness and kurtosis), and finally for multicollinearity. Multicollinearity involves examining for looking at the interaction of the two independent variables in the study. If the variables were too highly correlated ( $r > .90$ ) then the researcher would make some adjustments (Tabachnick and Fidell, 2001).

#### *Delimitations of the Study*

Two delimitations exist in this study. One, the researcher limited the gender of the study to only women with chronic health conditions. The researcher felt that based on the 12 years of qualitative data that focused on only women with chronic health

conditions, it was important to focus the instrument development on women with chronic health conditions. Another delimitation of the study is that the subjects were only recruited from the clinics at Virginia Commonwealth University's Medical Center.

### **Research Questions and Data Analysis**

The researcher used the Statistical Program for the Social Sciences (SPSS) Version 11.5 for data analysis. Descriptive statistics were used to identify the population for demographic variables. Variables of interest included age, type of chronic illness, geographical residency, marital status, educational level, and economic status will be evaluated. The researcher examined the mean, standard deviation, range, and frequency for each demographic variable.

#### *Analysis for Question Number One*

The first research question assesses the factor structure of the Inner Strength Questionnaire (ISQ). To assess the factor structure, exploratory factor analysis was used. Factor analysis has two phases that include extraction and rotation. Principal component analysis was used in this study for extraction purposes. Varimax (orthogonal) was used for the rotation phase. According to Tabachnick and Fidell (2001), to minimize multicollinearity and to maximize parsimony eigenvalues greater than 1.0 were retained. A scree plot was analyzed to assess factor loading. Each of the scales was analyzed to ensure that they loaded accordingly. The researcher evaluated the amount of variance explained by each subscale and by the entire instrument (ISQ).

The goal of factor analysis was to capture simple structure. Simple structure occurs when an item or variable loads high on one factor or component (0.6 or greater) and low on other factors or components. Simple structure signifies that the item loads to

one and only one factor. The researcher examined each of the factor loadings. The researcher labeled the factor based on the loading of the items. The labeled factors were reviewed on a theoretical basis to see if they correspond to the previous qualitative research.

#### *Analysis for Research Question Number Two*

The second research question explored the reliability of the scores from the Inner Strength Questionnaire. There are several techniques to assess reliability. They include stability, equivalence, and internal consistency. Researchers who use stability employ test-retest. Test-retest involves administering the instrument or test twice at two distinct time points (e.g. two weeks apart). For equivalence, most researchers will use interrater reliability. Interrater reliability involves having two or more trained researchers observe an event or experience. The trained researchers make independent observations at the same time. A reliability coefficient can be computed to demonstrate the strength of the relationships between the researchers and their documented observations.

While stability and equivalence are often used, most researchers use internal consistency. Internal consistency is often used because only one administration of the instrument is needed for assessing reliability, therefore reducing the cost. Techniques to assess internal consistency include split-half, Kuder-Richardson 20, and Cronbach's alpha.

For this study, the researcher used internal consistency to evaluate the reliability of the scores for the ISQ. Cronbach's alpha was used as the type of internal consistency to assess reliability. A coefficient alpha was produced for each of the four predicted scales and for the entire instrument.

### *Analysis for Research Question Number Three*

Several forms of validity were assessed in this study. The third research question involved assessing the face and content validity of the scores from the Inner Strength Questionnaire. First, content validity of the instrument was explored by recruiting a panel of content experts to review version three of the ISQ (37 items). The panel experts were asked to assess the instrument for clarity, readability, and the relevance of each item based on Lynn's (1986) criteria. The researcher gave the experts a form with each of the 37-items and asked them to rate the relevance of each item from one to four using Lynn's (1986) method. Based on the input of the panel experts, modifications were made to the ISQ.

A second form of content validity testing required recruiting actual women with chronic health conditions since they were the target population. Seven women with a chronic health condition were recruited. The women were given the 37-item (version 3) ISQ to complete (See appendix). Once they had completed the instrument, the women were interviewed face-to-face by the researcher. While there are clear bias involved in this method, the researcher felt it was important to obtain feedback on specific aspects of the instrument including the format, layout, wording, directions, and specifics on each of the 37-items. The women were asked 14 open ended questions about the instrument not their health condition (See appendix).

### *Analysis for Research Question Number Four and Five*

Campbell and Fiske (1959) developed a method to assess convergent and discriminant validity known as multitrait-multimethod (MTMM). The basis of the MTMM method is that when developing and testing a new instrument, the instrument

should be given with another instrument that measures a similar construct as the new instrument. A simple correlation was conducted to assess a possible relationship between the two similar instruments. This is called convergent validity since the two instruments converge on the same trait. The second part involved assessing the new instrument with an instrument that measures a dissimilar construct. Again, a simple correlation was conducted between the two instruments to assess a possible relationship. This technique was coined as discriminant validity. The fourth research question evaluated the relationship of the Inner Strength Questionnaire to the Mastery of Stress Instrument. The researcher explored the convergent validity between the two instruments. The items in each proposed subscale (mental, connectedness, physical, and knowing) of the ISQ were correlated with subscales of the Mastery of Stress Instrument. The connectedness scale of the ISQ were correlated with the growth subscale in the Mastery of Stress Instrument, the knowing and searching subscale were correlated with the certainty subscale, the physical self-spirit subscale were correlated with the change subscale, and the mental self-spirit subscale were correlated with the acceptance subscale. A simple bivariate correlation was used to evaluate the relationship between the subscales of the two instruments. An overall correlation was assessed between the total score of the MSI and ISQ.

The fifth research question inquired about the relationship between the Inner Strength Questionnaire and the Center for Epidemiological Studies Depression Scale (CESD). Both instruments were correlated to see if there was a divergent relationship between the two constructs being measured. A simple bivariate correlation will be used to evaluate the relationship between the ISQ and the CESD scale.



### **Summary**

This study investigated the psychometric properties of the Inner Strength Questionnaire. Exploratory and confirmatory factor analysis was employed to examine the factor structure of the ISQ. The ISQ was correlated with the Mastery of Stress Instrument to assess convergent validity. It was also correlated with the Center for Epidemiological Studies in Depression scale to assess discriminant validity. The researcher examined the content validity, clarity, and readability of the instrument by allowing experts to critique the ISQ and by conducting face-to-face interviews with women diagnosed with a chronic health conditions.

## **Chapter 4**

### **FINDINGS**

This chapter will provide the reader with findings from the prescribed study. The researcher has several goals in this chapter. The first goal is to provide in-depth description of the study population. The second goal is to examine validity with findings from one-on-one interviews with women who have been diagnosed with a chronic illness and with input from content experts. The third goal is to provide extensive psychometric findings including the factor structure and reliability of the Inner Strength Questionnaire (ISQ). A summary concludes the chapter.

### **DATA ANALYSIS**

#### *Data Cleaning*

The researcher entered each instrument into the Statistical Package for the Social Sciences (SPSS). After all of the instruments had been entered the researcher examined the data for any errors or missing data. For accuracy purposes, the researcher reviewed every fifth case. The data set contained a total of 281 cases. The only variable that had a high amount of missing data was in the demographic data. The item that inquired about whether the subject lived in a town, city or suburb had 36.3% of missing values. This variable was not considered valuable in the analysis.

For the demographic data and for each instrument item, frequencies were conducted to examine each variable. The researcher also conducted box plots for each item on the ISQ and demographic data to identify possible outliers. The researcher also

examined minimum values, maximum values, means, and standard deviations of each item for possible extremes or outliers.

Based on Tabachnick and Fidell (2001), the amount and patterns of missing data were examined. The researcher was interested in missing data that had a pattern. For example, if there was a certain item that had a large number of no responses, the researcher would examine that item to see if it had any language that may be inappropriate or if the question was irrelevant or maybe difficult or too personal. This provided the researcher with insight into the specifics of each item. The researcher also examined the theoretical importance of each response for each of the 37-items.

#### *Sample Population Demographics*

The study sample was composed of 281 women with varying social demographics (Table 1). The subjects ranged in age from 19 to 93 years of age, with a mean age of 51 years. The majority (43.8%) of the women in this study were married. Over half of the subjects (54.6%) reported having an adequate income, yet over a third (37.7%) reported having less than an adequate income. Most subjects were employed full-time (41.9%), yet over a fourth (27.2%) were retired. The subjects also varied greatly in their level of education. Almost half (41.7%) of the subjects reported having a college degree, yet almost a quarter (23.9%) had a high school diploma or less. The ethnicity of the sample was composed of Caucasians (53%) and African Americans (44.4%).

The sample was composed of women with chronic health conditions. It should be noted that the women were asked to report all chronic health conditions. This resulted in many more diagnoses of chronic diseases than the number of subjects (N=281). Of the 281 subjects in the sample, 424 diagnoses were listed (Table 1). This averages to be

almost 1.5 conditions per subject. Many of these were listed as “other conditions” meaning that there may be many “other conditions” and not just one. Over a quarter (26.4%) of the total number of self-reported diagnoses of chronic illness (424) was labeled as “other conditions”. Other conditions included asthma, lupus, chronic fatigue syndrome, allergies and chronic pain to name just a few. High blood pressure composed almost a fifth (18.9%) of illnesses reported in the sample. Other illnesses included breast cancer, diabetes, and osteoporosis.

**Table 1**  
*Sociodemographics of the Study Sample*

Variable	N	Percent
<b>Gender</b>	<b>281</b>	
Female	281	100
Male	0	0
<b>Age</b>	<b>276</b>	
< 15 years	0	0
15-24	18	6.5
25-34	40	14.5
35-44	37	13.4
45-54	58	21.0
55-64	62	22.5
65-74	39	14.1
75-84	17	6.2
85-94	5	1.8

Table 1 continued

Variable	N	Percent
<b>Level of Education</b>	<b>276</b>	
Less than High School	21	7.6
Completed High School	45	16.3
Associate Degree	25	9.1
Trade school or Business School	39	14.1
College Degree	115	41.7
Graduate Degree	31	11.2
<b>Ethnicity</b>	<b>279</b>	
Caucasian	148	53.0
African American	124	44.4
Hispanic	3	1.1
Asian	1	0.3
Others	3	1.1

Table 1 continued

Variable	N	Percent
<b>Relationship Status</b>	<b>276</b>	
Married	121	43.8
Divorced	58	21.0
Single	40	14.5
Living with a Partner	16	5.8
Widow	41	14.9
<b>Income</b>	<b>272</b>	
Less than Adequate	103	37.7
Adequate	149	54.6
More than Adequate	20	7.3
<b>Employment Status</b>	<b>272</b>	
Full-Time	114	41.9
Part-Time	43	15.8
Unemployed	41	15.1
Retired	74	27.2

Table 1 continued

Variable	N	Percent
<b>Health Condition</b>	<b>424</b>	
Breast Cancer	51	8.3
Diabetes	53	8.0
High Blood Pressure	80	18.9
Osteoporosis	26	6.1
Other Cancers	11	2.6
Depression	45	10.6
Transplant	7	1.7
Obesity	39	9.2
Other Conditions	112	26.4



The following describes the findings in each of the five research questions described in chapter one of this study.

**Research Question One: What is the factor structure of the Inner Strength Questionnaire (ISQ)?**

Exploratory and Confirmatory Factor Analysis techniques were used to answer the question. Exploratory Factor Analysis (EFA) was used to identify the number of factors or components that composed the instrument. Based on Tabachnick and Fidell (2001), factor analysis is used to see if a set of variables will form a coherent subset or subsets that are independent of one another. These subsets are labeled “factors” or “components” and usual are a grouping of instrument items that have an underlying meaning.

It was hypothesized based on the pilot of the 76-item (version 2) ISQ and the theoretical model, that the instrument would have four independent factors or subscales. The EFA of the 76-item ISQ revealed a four factor structure. The findings from the pilot (76-item) and the literature on factor analysis led the researcher to examine both the total variance explained and the scree plot for the 37-item instrument (version 3) (Figure 1). The researcher had set the criteria based on Tabachnick and Fidell (2001) to include eigenvalues above one. Eigenvalues are best explained by Kline (1994). Kline states that “the sum of squares of the factor loadings of each factor reflects the proportion of variance explained by each factor. This total amount of variance is the characteristic root or eigenvalue for the factor.

The total variance explained in the 37-item instrument (version 3) revealed seven components or factors that had initial eigenvalues above one. The total variance explained within the four factor structure was 54.9%. This means that nearly 55% of the

variance is explained by these four factors. The scree plot revealed that there was either a three or four factor structure. Based on the hypothesis from the pilot of the second version (76-item) instrument and findings from the scree plot, the researcher set the number of factors to four in the statistical software. The researcher forced a four factor structure and examined the rotated component matrix (Table 2).

The first factor was composed of twelve items with loadings that ranged from 0.51 to 0.70. This factor had eight items that were previously named “mental” from the 76-item pilot. Such items included 1) “I can keep a positive attitude”. 2) “I tell myself I can do this.” 3) “I can change my attitude when I need to.” 4) “I believe I am a strong person.” 5) “I am determined to get well.” 6) “I do what I have to do.” 7) “I believe I have inner strength.” and 8) “I can decide what to do.” One item, “I have at least one person close to me”, loaded on the factor that had been previously named “connectedness” in the second version of the ISQ. This first factor also had three items that had been previously labeled “physical” in the pilot of version 2 (76-items). These items included 1) “I can live with my limitations”, 2) “I enjoy activities” and 3) “I am understood by my friends.”

The second factor was composed of six items with factor loadings that ranged from 0.78 to 0.89. All six items that loaded on the second factor were all previously labeled “connectedness” from the pilot of version 2. All six of the items dealt with God or a Greater Being as source of strength.

The third factor had seven items that loaded with items ranging from 0.54 to 0.81. All seven items had been hypothesized in the second version (76-items) to be a subscale

that described the aftermath of learning about a diagnosis and the immediate reaction. This concept was labeled “knowing and searching” for version 2.

The fourth factor had four items load that were all previously labeled “physical” in the pilot of version 2 (76-items). The four items had factor loadings that ranged from 0.52 to 0.87. The “physical” subscale had been hypothesized from the pilot of version 2 (76-items) to contain ten items.

Eight of the 37- items did not load on any of the four factors. Three items from the previously known “mental” factor did not load to any of the factors. These items include 1) I am able to change to positive thoughts when I am worried, 2) I focus my thoughts on good things, and 3) I am a positive person.

One item from the previously named factor “connectedness” scale did not load to any of the four factors. This item was “I have a person close to me who is a source of strength. For the third component factor, only one item “I feel like I am a different person than I was before diagnosis”, did not load to any factor. For the fourth factor, labeled “physical” from the pilot of version 2, three items did not load to any of the four factors. These items include 1) I know how much I can do, 2) I stay in contact with family and friends who live at a distance, and 3) I find it easy to share my feelings.

#### *Acceptance of the Four Factor Model*

Based on findings from the exploratory factor analysis of the three, four, and five factor models, the researcher felt that the four factor model was a better fit and support the theoretical aspects of inner strength. Ten items were deleted (Table 8) from the 37-item instrument (version 3) to form the 27-item instrument (version). The ten items were

deleted based on the exploratory and confirmatory factor analysis, content expert evaluation, and input from the participants.

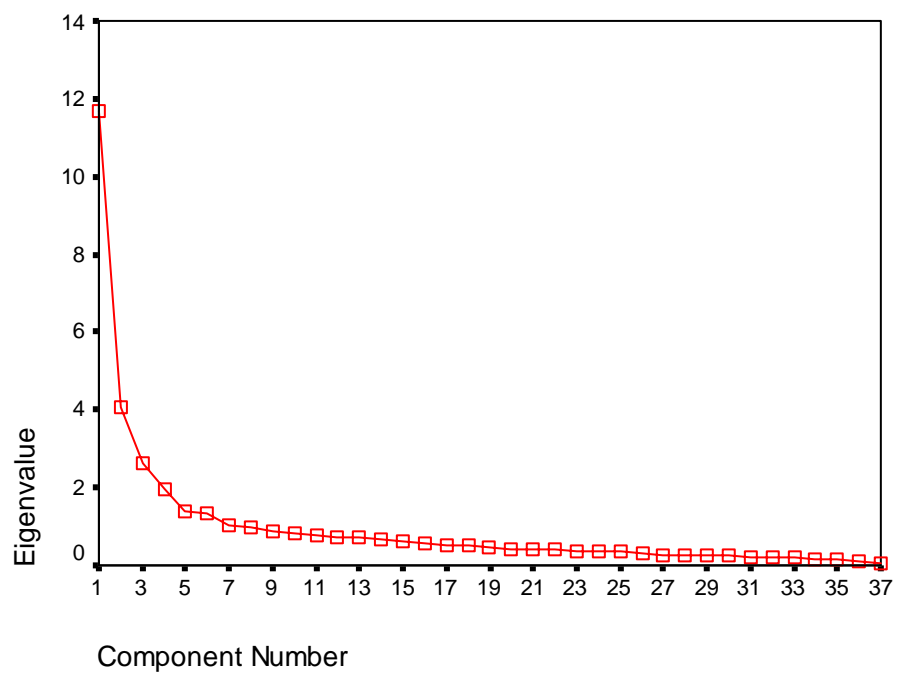


Figure 3. Scree plot for the Inner Strength Questionnaire Version 3 (37-items)

**Table 2**

*Factor Loadings for the Four Factor Model of the Inner Strength Questionnaire for Version 3 (37-items)*

Item	Mental	Connect	Knowing	Physical
I can keep a positive attitude.	.51			
I tell myself I can do this.	.68			
I can change my attitude when I need to.	.60			
I can change my attitude when I am worried	—			
I focus my thoughts on good things	—			
I believe I am a strong person.	.70			
I am determined to get well.	.70			
I do what I have to do.	.55			
I am a positive person.	—			
I believe I have inner strength.	.68			
I can decide what to do.	.63			
I have a person close to me who is a source of strength.	—			
I have at least one person close to me.	.58			
I feel the presence of God or a Greater Source of Strength.		.86		
I put control of my life in God's or a Greater Power's hands.		.88		
I feel close to God or a Greater Source of Strength.		.88		
I pray for strength.		.84		
I express my fears to my God.		.89		
I pray for others.		.78		

Table 2 continued

Item	Mental	Connect	Knowing	Physical
I feel like I am a different person than I was before diagnosis.			—	
I worry about my health.			.73	
I am scared about the future.			.78	
When I first learned about my health problem, I was afraid of dying.			.81	
There are many times when I am afraid of dying.			.78	
I feel my situation is out of control.			.54	
I dwell on my illness.			.60	
When I first learned about my health problem, I felt afraid.			.72	
I can live with my limitations.	.58			
I know how much I can do.			—	
I enjoy activities.	.57			
I stay in contact with family and friends who live at a distance.			—	
I am understood by my friends.	.54			
I try to balance work and play.				.52
I take time for myself.				.86
I try to rest my mind periodically.				.79
I set aside time to relax.				.87
I find it easy to share my feelings.				—

— item did not load to a factor or loaded < 0.50

### *Examination of the Three and Five Factor Model*

Further analysis should examine a model that contains one factor more and one factor less than the hypothesized model. In this study, the hypothesized model is a four factor structure based on both the qualitative findings and the pilot of version 2 of the ISQ (76-items). Based on Tabachnick and Fidell (2001), the researcher examined a three and a five factor structure of the ISQ. The three factor structure (Table 3) had several items that did not load including “I am able to change to positive thoughts when I am worried” and “I do what I have to do”. These two items previously loaded to the mental subscale in the pilot of version 2 (76-items). Two other items that had been hypothesized to load to the connectedness did not load to any of the three factors. These items included “I have a person close to me who is a source of strength” and “I have at least one person close to me”. The item “I feel like I am a different person than I was before diagnosis” did not load and had been hypothesized to load to the knowing and searching scale from version 2 (76-items). The only other attribute that differed from the three factor model from the four factor model was that the mental and physical subscales were combined to form the first factor. None of the items from the mental or physical subscales loaded to the other two factors in the four factor model.

The five-factor model (Table 4) had four factors that mimicked the four factor structure. Four of the five factors described the spiritual connectedness, the mental self-spirit, knowing and searching, and the physical self-spirit. The other factor in the five factor model seemed to describe a different phenomenon. The main difference is that one of the five factors had five items that seem to deal with resilience and overcoming one’s illness. These items included, “I am determined to get well”, “I do what I have to do”, “I



have at least one person close to me”, “I can live with my limitations”, and “I know how much I can do”. The second factor that seems to differ from the four factor structure had four items that included “I try to balance work and play”, “I take time for myself”, I try to rest my mind periodically”, and “I set aside time to relax”.

Items that did not load to the five factor structure include, “I can decide what to do”, “I have a person close to me who is a source of strength”, “I enjoy activities”, “I stay in contact with family and friends who live at a distance”, “I am understood by my friends”, and “I find it easy to share my feelings”.

### *Confirmatory Factor Analysis*

Confirmatory factor analysis (CFA) was found to be beneficial in this study as a support for confirming the factor structure of the Inner Strength Questionnaire.

According to Kline (1994), exploratory factor analysis is the most widely used, however, some argue that confirmatory factor analysis is superior to exploratory because it tests hypotheses.

The researcher used LISREL 8.20 (Joreskog and Sorbum, 1984) software to run the program. The entire instrument (27-items) and the four subscales were examined for factor structure. To evaluate a confirmatory factor analysis, the goodness of fit statistic was evaluated. Two goodness of fit statistics used in this study were the comparative fit index (CFI) and the Root Mean Square Error of Approximation (RMSEA). According to Tabachnick and Fidell (2001), the CFI and RMSEA are the most frequently reported fit indices. The CFI has a range of values from 0.0 to 1.0. According to Bentler (1988), the higher the CFI value, the better the fit. Therefore a value of 0.90 is considered a good fit. It should also be noted that the CFI is good for the estimating of fit for the model even

when the sample size is small (Bentler, 1989). Boomsma (1993), however, states that a sample size of 200 is adequate for CFA.

The root mean square error of approximation (RMSEA) is used to estimate the lack of fit for a model. According to Hu and Bentler (1999), values of the RMSEA that are 0.06 or less indicate that the model is a “good-fit”. If the RMSEA values are larger than 0.10, the model is said to be a “poor-fit” (Brown & Cudeck, 1993). Hu and Bentler (1999) warn that for small sample sizes the RMSEA can overreject the true model fit.

The mental subscale of the ISQ had a CFI value of 0.98. According to Hu and Bentler (1999), this shows a good fit. The RMSEA value for the mental scale was 0.061. This value also shows that the proposed model is a good fit. The completely standardized solution had factor loadings that ranged from 0.51 to 0.79. The error variances for the mental scale ranged from 0.38 to 0.74.

The CFI value for the connectedness scale showed a value of 0.93. The RMSEA had a value of 0.25. The completely standardized solution had factor loadings that ranged from 0.77 to 0.94. The error variances for the connectedness scale ranged from 0.12 to 0.41.

The knowing scale has a CFI value of 0.78 and a RMSEA value of 0.22. The completely standardized solution had factor loadings that ranged from 0.55 to 0.79. The error variances for the knowing scale range from 0.37 to 0.72.

The physical scale had a CFI value of 0.81 and a RMSEA value of 0.21. The completely standardized solution had factor loadings that ranged from 0.36 to 0.86. The error variances for the physical scale ranged from 0.26 to 0.87.

The entire instrument with all four scales was also examined. The CFI value for the entire instrument was 0.76 and the RMSEA value was 0.07.

**Table 3***Factor Loadings for the Three Factor Model of the Inner Strength Questionnaire for Version 3*

Item	<u>Subscale Name</u>		
	Mental/ Physical	Connect	Knowing
I can keep a positive attitude.	.57		
I tell myself I can do this.	.57		
I can change my attitude when I need to.	.56		
I can change my attitude when I am worried	—		
I focus my thoughts on good things	.56		
I believe I am a strong person.	.57		
I am determined to get well.	.58		
I do what I have to do.	—		
I am a positive person.	.54		
I believe I have inner strength.	.56		
I can decide what to do.	.57		
I have a person close to me who is a source of strength.		—	
I have at least one person close to me.		—	
I feel the presence of God or a Greater Source of Strength.		.88	
I put control of my life in God's or a Greater Power's hands.		.88	
I feel close to God or a Greater Source of Strength.		.89	
I pray for strength.		.84	
I express my fears to my God.		.89	
I pray for others.		.78	

Table 3 continued

Item	Mental/ Physical	<u>Subscale Name</u>	
		Connect	Knowing
I feel like I am a different person than I was before diagnosis.			—
I worry about my health.			.73
I am scared about the future.			.78
When I first learned about my health problem, I was afraid of dying.			.81
There are many times when I am afraid of dying.			.78
I feel my situation is out of control.			.54
I dwell on my illness.			.60
When I first learned about my health problem, I felt afraid.			.72
I can live with my limitations.	.57		
I know how much I can do.	.57		
I enjoy activities.	.56		
I stay in contact with family and friends who live at a distance.	.54		
I am understood by my friends.	.67		
I try to balance work and play.	.67		
I take time for myself.	.69		
I try to rest my mind periodically.	.69		
I set aside time to relax.	.63		
I find it easy to share my feelings.	.53		

— item did not load to a factor or loaded < 0.50

**Table 4**

*Factor Loadings for the Five Factor Model of the Inner Strength Questionnaire for Version 3 (37-items)*

Item	Mental	Connect	Knowing	Physical	????
I can keep a positive attitude.	.69				
I tell myself I can do this.	.58				
I can change my attitude when I need to.	.52				
I can change my attitude when I am worried	.62				
I focus my thoughts on good things	.69				
I believe I am a strong person.	.71				
I am determined to get well.					.62
I do what I have to do.					.62
I am a positive person.	.59				
I believe I have inner strength.	.60				
I can decide what to do.	—				
I have a person close to me who is a source of strength.		—			
I have at least one person close to me.					.60
I feel the presence of God or a Greater Source of Strength.		.85			
I put control of my life in God's or a Greater Power's hands.		.87			
I feel close to God or a Greater Source of Strength.		.87			
I pray for strength.		.84			
I express my fears to my God.		.89			
I pray for others.		.78			

Table 4 (continued)

Item	Mental	Connect	Knowing	Physical	????
I feel like I am a different person than I was before diagnosis.			-.50		
I worry about my health.			.71		
I am scared about the future.			.76		
When I first learned about my health problem, I was afraid of dying.			.83		
There are many times when I am afraid of dying.			.79		
I feel my situation is out of control.			.53		
I dwell on my illness.			.58		
When I first learned about my health problem, I felt afraid.			.74		
I can live with my limitations.					.66
I know how much I can do.					.60
I enjoy activities.				—	
I stay in contact with family and friends who live at a distance.				—	
I am understood by my friends.				—	
I try to balance work and play.				.51	
I take time for myself.				.85	
I try to rest my mind periodically.				.79	
I set aside time to relax.				.86	
I find it easy to share my feelings.				—	
___ item did not load to a factor or loaded < 0.50					

**Table 5**

*Factor Loadings for the Final Model of the Inner Strength Questionnaire for Version 3 (37-items)*

Item	Mental	Connect	Knowing	Physical
I can keep a positive attitude.	Deleted			
I tell myself I can do this.	.68			
I can change my attitude when I need to.	.62			
I can change my attitude when I am worried	Deleted			
I focus my thoughts on good things	Deleted			
I believe I am a strong person.	.72			
I am determined to get well.	.72			
I do what I have to do.	Deleted			
I am a positive person.	Deleted			
I believe I have inner strength.	.70			
I can decide what to do.	.67			
I have a person close to me who is a source of strength.	Deleted			
I have at least one person close to me.	.50			
I feel the presence of God or a Greater Source of Strength.		.86		
I put control of my life in God's or a Greater Power's hands.		.88		
I feel close to God or a Greater Source of Strength.		.88		
I pray for strength.		.86		
I express my fears to my God.		.90		
I pray for others.		.79		



Table 5 continued

Item	Mental	Connect	Knowing	Physical
I feel like I am a different person than I was before diagnosis.			Deleted	
I worry about my health.			.73	
I am scared about the future.			.79	
When I first learned about my health problem, I was afraid of dying.			.83	
There are many times when I am afraid of dying.			.79	
I feel my situation is out of control.			.55	
I dwell on my illness.			.61	
When I first learned about my health problem, I felt afraid.			.73	
I can live with my limitations.	.58			
I know how much I can do.				Deleted
I enjoy activities.	.58			
I stay in contact with family and friends who live at a distance.				Deleted
I am understood by my friends.	.55			
I try to balance work and play.				.55
I take time for myself.				.87
I try to rest my mind periodically.				.80
I set aside time to relax.				.87
I find it easy to share my feelings.				Deleted

**Deleted = removed by researcher based on the Four-Factor Model.**

**Analysis for Research Question Number Two: What is the evidence based validity of the Inner Strength Questionnaire (ISQ)?**

Two methods were used to assess this question. First, individual interviews were conducted by the researcher with eight women to get feedback on their impressions of the readability of both the 37-items and the instructions. The researcher probed to assess what the participant thought the item meant. The researcher also inquired about the feasibility of completing the survey in a medical office setting, the use of bubble sheets to capture answers, and the need for modifying or eliminating any of the 37-items.

The second source of evidence for validity included inquiring about the content validity of the instrument from experts in the field. Each reviewer was sent a letter from the researcher, detailed instructions, the IRB and the content review with the four options for assessing relevancy and some follow-up questions to answer (See Appendix). Content reviewers were asked to assess each of the 37-items for relevancy to the underlying construct of inner strength. Each of the experts was asked to rate each item from 1 to 4 (1= not relevant, 2=unable to assess relevancy, 3=relevant, but needs minor changes, and 4=very relevant). The reviewers were also asked six specific follow-up questions on the instrument (See Appendix).

*In-depth Probing*

Seven women with a variety of chronic health conditions were interviewed one-on-one to provide specific feedback on the instrument. Participants were given a letter from the researcher and faculty principal investigator, an IRB explanation and consent, a demographic sheet and the ISQ. Each person was timed during completing the demographic form and ISQ. After reading the letter from the researcher and the IRB

consent, the participant was given the demographic sheet and ISQ. After completing the demographic sheet and ISQ, the researcher asked fourteen specific questions to probe for information regarding the format and content of the ISQ. The researcher also asked the participants to go back and review each of the 37 items to see what the participant was interrupting to be the meaning of each statement. The researcher took extensive field notes in preparation for using the feedback to integrate into the final analysis of the instrument.

The first participant was a Caucasian female from New Jersey with a doctorate degree in nursing. She had recently been diagnosed with nonhodgkins lymphoma and was undergoing treatment at Virginia Commonwealth University's medical center at the time of the interview. Participant one met the researcher at a convenient and comfortable location. The participant completed the instrument in about eight minutes. She found the instrument to be easy to complete and did not find the instructions to be difficult to interpret. She stated that as she was reading the questions, she rekindled her thoughts of being ill. Participant one stated that she did see a redundancy in the letter from the researcher and the Institutional Review Board forms. She understood, however, the need for clarity for subjects participating in a research study that was approved by a University. The participant stated that she did not have to reflect hard to answer the questions. She did mention that question number 20 did require some thought process. When asked about whether the instrument gave the participant insight into her illness or condition, she responded that it did validate her feelings that she was currently experiencing. When asked if there is anything that should be changed or modified in the instrument, the respondent stated that for question number one, the researcher should

remove the word “can”. After asking fourteen specific questions regarding the instrument, the researcher asked each of the participants to review each of the 37-items. After reviewing each item, the researcher asked the participant if there needed to be modifications made to the item or if they had difficulty interpreting the items or instructions. Participant one suggested that the researcher move question 13 before question number 12, since it should be asked first if the subject has someone close. The next item, should ask if the individual is a source of strength for the subject completing the instrument. The participant agreed that questions number 12 and 13 were important and varied significantly in their meaning. The participant also stated that question number 18 needed to have the words “Greater Source of Strength” follow the word “God” for consistency purposes to match the other spirituality items.

The second participant was a 36 year old Caucasian female with Systemic Lupus Erythmatocis. The participant was diagnosed with Lupus three years age. She has a master’s degree and works part-time. The second participant stated that the instrument was extremely straight forward, easy to read and interpret, and was appropriate for the construct of interest (i.e. inner strength). The participant stated that completing the instrument made her “realize some things that I do that I was unable to put into thoughts”. One suggestion made by the participant is that there should be a category in the demographic section of the instrument that says “autoimmune illnesses/disorders”. Since Lupus was not listed, she had to list it under “other condition/illness”. When asked about each item and her thought process when completing the survey, she stated that she had to think the longest for question number 35. She said that her thinking was “What do I personally consider resting my mind?”

The third participant was a 40 year old Caucasian with a master degree that works full-time. The participant was diagnosed with Chronic Fatigue Syndrome 12 years ago. She stated that there was a need to capture other chronic health conditions that may exist. She stated that the “time for yourself” questions were thought provoking. When asked if completing the instrument, gave her insight into her illness or condition, she stated that it “makes you think or reflect about how you need to listen to your body”. The participant was asked if she had any suggestions to improve the instrument. She stated that it might be easier if the answers (A=Strongly Agree, etc.) was at the right of each of the items so that the subjects need to only circle the corresponding answer instead of having to look back up to the top to see that what each letter equals and then have to write a letter in the blank. She stated that this may also help prevent any confusion over how to complete the instrument.

The fourth participant was a 49 year old Caucasian high school graduate with multiple health conditions including diabetes, high blood pressure, heart disease and depression. She had been diagnosed with these conditions ten years ago. The participant also stated that she had been battling obesity for 30 years.

The participant stated that the instrument including both the items and the instructions flowed well. She stated that it was very easy to read and comprehend. She also stated that the instrument was not wordy, but “very direct and to the point”. The participant also stated that the instrument was “thought provoking”. She also stated that she had to “give some thought to the answer”. She stated that item 37 was the hardest to answer.

The fifth participant was a 48 year old Caucasian high school graduate diagnosed eight months ago with multiple sclerosis. The participant stated that the directions and the items were easy to read. She stated that three of the items were difficult to interpret the meaning and therefore difficult to answer. She stated that questions number 2, 3 and 12 were confusing. Item number two, "I tell myself I can do this" can be interpreted in many different ways. She stated "do you mean or does the answer mean, can I do this survey or can I deal with my illness". The researcher noted this observation. Question number three, "I can change my attitude when I need to" can be also have multiple interpretations. Item number 12, "I have a person close to me who is a source of strength" was hard for her to interpret, because she considers God the closest person to her and she is not sure if God can be labeled as a person. The researcher probed to clarify that there were questions that were asked specifically about God or a Greater Being.

The sixth participant was a 48 year old Caucasian who had been diagnosed with breast cancer ten years ago, heart disease 15 years ago, osteoporosis a year ago, and depression for two years. The participant is a college graduate with a degree in nursing.

The participant stated concerns stated by participant number five. She stated that some of the items were hard to determine an answer, because the instructions state "answer how you feel today". The participant stated that the instructions should read "answer how you feel today about your health". She said that people can interrupt the instrument to mean how you feel in general today. The researcher did remind the participant that the information regarding the inquiry of the study was health and that this was clearly stated in both the cover letter and the IRB consent.

She did state that the instructions and items were easy to read from a word selection focus. She meant that there were no words that she was not familiar with or had questions about. The participant also stated that the instrument made her think again about how she felt in the beginning and then now 10 to 15 years after her initial diagnosis. Participant six stated that completing the instrument “brought back feelings”.

The seventh participant was a 60 year old Caucasian high school graduate. The participant has had diabetes for over four years, high blood pressure for 18 years and heart disease for 10 years. According to the participant, the instructions for completing the instrument were easy and straightforward. Participant seven’s responses corroborated the responses of the previous six participants regarding the ease of reading and completion of the instrument.

Overall, all seven participants stated that they felt that the instructions for completing the instrument were easy to understand and were not confusing. They also stated that the ease of reading proved to not be an issue when interpreting the items. They did not feel the instrument to be overly wordy or to have very complex word structure. The participants all felt that the font was appropriate and large enough to read even in a location that may not have adequate lighting. All respondents completed the instrument in about five to ten minutes. Most of the respondents did not have any specific items that they had difficulty with in regards to being able to interrupt the meaning. Each participant stated that they did not find any items that may be inappropriate or may make an individual embarrassed to answer.

The participants were also asked about the ease of completing the instrument. They all responded that they preferred filling in a blank as compared to having to

complete a bubble sheet. Each participant stated that the Likert-style responses were appropriate for the item. They felt that the possible responses could be used to answer the item. The information from the participants was used in conjunction with the statistical information (factor analysis and convergent validity testing) to examine each item to determine if the item was needed and if the item needed to be modified. The goal was to ensure that all items included in the final version (version 4) would form a basis for measuring the construct of inner strength.

The content expert reviewers were chosen based on their work experience and educational background. Many of the experts had a medical background and had worked with women diagnosed with chronic illness. Four of the six had a doctorate degree. Five of the six were also registered nurses (RN). One of the expert reviewers was a minority and had a background in developing survey instruments for the social sciences. Another expert assisted in the development of the theory of inner strength and had published a few articles on inner strength and therefore was thought to be versed on the topic. The third content expert had a wealth of experience working with chronically ill patients including many with chronic heart failure. The fourth expert reviewer had a clinical background in oncology and had worked with cancer patients. The fifth expert had a significant background in qualitative research and had never reviewed any work on inner strength before reviewing the third version of the ISQ. The sixth expert reviewer was not a nurse, but had a background in social work and had worked with patients living with disabilities.

One content expert reviewer rated 28 of the items to be very relevant (rating score of 4). She rated several items to be not relevant (rating score of 1). These items include



“I pray for others”, “There are many times when I am afraid of dying”, “I enjoy activities”, “I stay in contact with family and friends who live at a distance”, “I am understood by my friends”, “I try to balance work and play”, and “I find it easy to share my feelings”. One item, “When I first learned about my health problem, I was afraid of dying” was rated as “relevant, but needs minor changes”. The item, “I dwell on my illness was rated as “unable to assess”. It should be noted that three of the items that received low ratings (not a score of 4) did not load on a factor during EFA. These items include “I stay in contact with family and friends who live at a distance”, “I try to balance work and play” and “I find it easy to share my feelings”. The reviewer claimed that these items measured “social support” and not inner strength.

The reviewer provided additional information based on some follow-up questions developed by the researcher. The reviewer was asked to list all items that were difficult to interpret or that may need to be modified to increase clarity. The items include “I tell myself I can do this”, “I am able to change to positive thoughts when I am worried”, and “I do what I have to do”. The reviewer also stated that none of the 37-items would be insensitive to minorities. She did state that if a subject was ill or in despair, that answering the questions may be a bit too long.

The second content reviewer found the instrument to be easy to read. The reviewer stated that “the items were short and succinct with nothing extraneous”. The reviewer felt that a few items were hard to interpret. One item, “I stay in contact with family and friends who live at a distance”, caused concern for the expert reviewer. She stated that the item really doesn’t capture the essence of how one is nurtured by relationships. The expert reviewer also felt that the items, “I have a person close to me

who is a source of strength” and “I have at least one person close to me” were redundant. She also felt that the item, “I worry about my health” may need to be quantified for the subject. She supported her response by stating that there is a “process” that an individual goes through when diagnosed with a chronic illness. The reviewer suggested that a time qualifier should be added such as “when I was first sick” or “at time”. The next item of concern for the reviewer was the item, “I am understood by my friends”. According to the reviewer, “and or family” could be added to make the item more comprehensive to include consideration of the subject’s family.

The third expert reviewer stated that the items were easy to read. They were brief and succinct, yet allowed the reader to ponder their inner thoughts about the questions. The reviewer had a few suggestions on ways to improve the items in the instrument. For the item, “I tell myself I can do this”, the reviewer suggested clarifying the word “this” to the illness. The item, “I can decide what to do” should be modified to state “I am able to make daily decisions” according to the reviewer.

The fourth reviewer agreed that the instrument was very easy to understand and to read. The reviewer stated that “I feel the presence of God or a Greater Source of Strength”, “I put control of my life in God’s or a Greater Power’s hands”, and “I feel close to God or a Greater Source of Strength” were listed as items that may be confusing to the subject since they have very close meaning. The reviewer also stated that there may be too many items that have the term “God or Greater Source of Strength”.

The fifth reviewer stated that the instrument was concise and had straight-forward language. The reviewer also stated that the item, “I tell myself that I can do this” is awkward. The item, “I do what I have to do” had the reviewer confused on the exact

meaning. The reviewer also was unsure about the meaning of the word “limitations” in the item, “I can live with my limitations”. Three other items were noted as a concern by the reviewer that could lead to potential problems. The item, “I feel like I am a different person than I was before diagnosis” was found to be not relevant to the construct according to the reviewer. The second item, “I worry about my health”, was found to be ambiguous with the term “health”. According to the reviewer, the term, “health” could mean “mental”, “physical”, or “spiritual” health. The third item, “I enjoy activities” is not relevant to the underlying construct of inner strength and does not related to the other items in the instrument. The reviewer also expressed concern over the use of the term “God” in some of the items.

The sixth expert reviewer provided similar responses as the previous reviewers. The expert stated that the item, “I enjoy activities” was relevant, but needs minor alterations. A valid point was made by the reviewer that the item could have multiple meanings. The reviewer stated “is the item trying to get at the enjoyment or the participation in the activities”. Concerns from the reviewer were also expressed about the item, “I have at least one person close to me”. The reviewer felt that this item could be misinterpreted by some subjects to mean as geographically close and not psychological or socially close to the individual. It was suggested that the item be reworded to reflect the true meaning. The reviewer suggested, “I have at least one person I am close to”. All other items were rated by the reviewer as “very relevant”.

The information gained from the expert reviewers was used in conjunction with the data from the factor analysis and the construct validity (convergent and discriminant

validity) and the input from the six participants with chronic illnesses to make decisions on the elimination and modification of instrument items.

**Analysis for Research Question Number Three: What is the evidence based  
reliability of the Inner Strength Questionnaire?**

This question was answered by conducting reliability analysis using SPSS (Table 6). Based on the 37-item instrument (version 3), the Cronbach alpha for internal consistency of the ISQ was 0.93. The reliability of each of the four hypothesized scales was 0.89 for mental, 0.92 for connectedness, 0.76 for knowing and searching, and 0.86 for physical. The reliability was then assessed after the eight items that did not load or loaded  $< 0.50$  to any of the four factors and the two items that were found to be irrelevant to the construct of inner strength were eliminated from the analysis. The overall or total reliability for the entire instrument after elimination of the ten items leaving 27-items (version 4) was 0.91. The reliabilities for each factor or subscale include 0.85 for mental, 0.96 for connectedness, 0.85 for knowing and searching, and 0.83 for physical.

*Reliability and CFA*

According to Tabachnick and Fidell (2001), assessing reliability in CFA involves using the squared multiple correlations for x-variables. This value is the same as squared value of the factor loading. The reliability of the entire scale involves calculating the composite. The reliability for each scale includes 0.85 for mental, 0.95 for connectedness, 0.85 for knowing and 0.82 for physical (Table 6). The researcher calculated the reliabilities by summing each of the factor loadings then squaring the total. This value was used as the numerator. For the denominator, the summed value of the factor loadings is added to the sum of the error variances for each item. The equation

reads (sum of factor loadings) squared / (sum of factor loadings) squared + sum of error  
variances = reliability.

**Table 6**

*Comparison of Reliabilities Between the Different Versions of the Inner Strength Questionnaire*

Scale	Number of items 76 to 37 items (Version 2)	Reliabilities Version 2	Variance Explained	Number of items 37 to 27 items (Version 4)	Reliabilities Version 4	Variance Explained	Reliability from CFA Version 4
Mental	11	0.87	14%	7	0.85	19%	0.85
Connectedness	8	0.89	14%	6	0.96	19%	0.95
Knowing	8	0.83	10%	7	0.85	14%	0.85
Physical	10	0.87	12%	7	0.83	11%	0.82
Total	37	0.86	50%	27	0.91	63%	0.80

**Analysis for Research Question Numbers Four and Five: What is the relationship of the Inner Strength Questionnaire (ISQ) with the Mastery of Stress Instrument?**

The fifth research question asked, “What is the relationship of the Inner Strength Questionnaire with the Center for Epidemiological Studies in Depression Scale (CESD)?” To answer questions four and five, the researcher employed the use of correlation analysis using SPSS. Based on Campbell and Fiske (1959) a Multitrait-Multimethod (MTMM) approach was used to assess the convergent and discriminate validity of the Inner Strength Questionnaire.

*Creation of New Variables for MTMM*

In order to conduct bivariate correlations of the subscales, the items of each subscale had to be computed to form a new variable. Therefore, four new additional variables were formed for each of the hypothesized factors of the ISQ. The four new variables were formed and labeled “connect”, “knowing”, “physical” and “mental” based on the hypothesized subscales from the pilot of version two (76-items). The four new variables were formed in SPSS, by doing a compute statement that added all of the items that were hypothesized to compose that construct. For example, the new variable “connect” had the eight items that were hypothesized and therefore labeled “connectedness” in the pilot of version 2 (76-item). The four subscales of the Inner Strength Questionnaire were then computed to form a variable known as “innstrn”. This variable was the composite of all the four subscales that included “connect”, “knowing”, “physical”, and “mental”.

Another variable, labeled “mastery” was formed by computing the sum of the four individual scales of the Mastery instrument. These subscales include certainty, change, acceptance, and growth. A new variable labeled “depress” was formed by computing the 20 items of the CESD.

#### *Convergent Validity*

Once the new variables were formed, the researcher used bivariate correlations to assess the relationship between the subscales of the Inner Strength Questionnaire (ISQ) and the subscales of the Mastery of Stress Instrument (MSI). The connect scale from the Inner Strength Questionnaire was correlated with the growth scale of the Mastery of Stress Instrument and was found to be moderately correlated at 0.37 ( $p=0.01$ ). The researcher had predicted a high correlation between the subscale “connect” of the ISQ and the subscale “growth” of the MSI. The growth scale shows how a person begins to flourish after learning and accepting their condition. The connect subscale of the ISQ is similar to growth in that the individual has already accepted their condition and has focused on the future by engaging in life activities and events that they may have avoided in the beginning.

The knowing scale of the ISQ was correlated with the certainty scale of the MSI and found to be 0.17 ( $p=0.05$ ). The knowing scale is characterized by the individual learning about their condition and dealing with the stress and anxiety of having such a condition.

The physical subscale of the ISQ was correlated with the change subscale of the MSI. The correlation revealed a positive relationship of 0.40 ( $p=0.01$ ). The change



subscale of the MSI, shows how the individual has adapted to having been diagnosed with a new health condition and has moved past acceptance to deal with the life changes that may be associated with having such a condition. For example, a woman diagnosed with multiple sclerosis may have certain physical limitations and may eventually be confined to a wheelchair. This subscale illustrates how a woman with such a diagnosis can accept the reality of her condition and move past the anxiety and uncertainty that may plague her and prevent her from living a near normal life. The change subscale of MSI addresses this concept of having to may life alterations. The physical subscale of the ISQ also addresses this concern, but approaches it by a physical aspect.

The mental subscale of the ISQ was correlated with the acceptance subscale of the MSI. The correlation revealed a positive relationship of 0.65 ( $p=0.01$ ). It was hypothesized by the researcher that there would be a high correlation between the two subscales since both measure a feeling after an individual has come to accept their condition. Both subscales address the mental aspects of coping with a chronic life altering health condition.

Finally, the entire ISQ and the entire MSI were correlated. The correlation revealed a positive relationship of 0.55 ( $p=0.01$ ). This high correlation was anticipated since the MSI and the ISQ measure a similar trait of recovery and with a life-threatening or life changing event.

#### *Discriminant Validity*

Based on Campbell and Fiske (1959), discriminant validity is used to assess that the instruments are measuring different traits and therefore will be characterized by

having low correlation coefficients ( $r$ ). To assess a relationship between the Inner Strength Questionnaire (ISQ) and the Center for Epidemiological Studies in Depression Scale (CESD), bivariate correlations were calculated. The items ( $n=20$ ) of the CESD were computed to form a new variable labeled “depress”. The items for the ISQ ( $n=27$ ) were computed to form a new variable labeled “innstrn”. The two new variables were correlated to see if the two instruments were theoretically measuring different constructs. The correlation was found to be  $-0.19$  ( $p=0.01$ ).

**Table 7**

*Multitrait-Multimethod Matrix of the Inner Strength Questionnaire, Mastery of Stress and Centers for Depression Scale*

Subscales	Inner Strength				Mastery of Stress					CESD		ISQ	Mastery
	Mental	Connect	Knowing	Physical	Accept	Growth	Certainty	Change	Stress	Depress			
Mental													
Connect	<i>.57</i>												
Knowing	.19	.07											
Physical	.60	.41	.24										
Accept	<b>.63</b>	<b>.44</b>	<b>.24</b>	<b>.55</b>									
Growth	<b>.60</b>	<b>.37</b>	<b>.18</b>	<b>.55</b>	.64								
Certainty	<b>.65</b>	<b>.39</b>	<b>.17</b>	<b>.52</b>	.57	.55							
Change	<b>.54</b>	<b>.28</b>	<b>.18</b>	<b>.40</b>	.39	.46	.65						
Stress	<i><u>-.45</u></i>	<i><u>-.16</u></i>	<i><u>-.54</u></i>	<i><u>-.40</u></i>	-.47	-.30	-.43	-.37					
Depress	<i><u>-.18</u></i>	<i><u>-.06</u></i>	<i><u>-.18</u></i>	<i><u>-.15</u></i>	-.26	-.10	-.31	.26	.28				
ISQ	.76	.68	.64	.75	<b>.65</b>	<b>.59</b>	<b>.59</b>	<b>.47</b>	<i><u>-.54</u></i>	<i><u>-.19</u></i>			
Mastery	<b>.62</b>	<b>.43</b>	<b>.04</b>	<b>.51</b>	.70	.83	.74	.67	-.05	-.25	<b>.55</b>		

Note: Convergent coefficients are denoted in bold, while discriminant coefficients are denoted in italics and underlined.

**Table 8**

*Factor Loadings for the Final Model of the Inner Strength Questionnaire for Version 3 (37-items) using Confirmatory Factor Analysis*

Item	Mental	Connect	Knowing	Physical
I can keep a positive attitude.	Deleted			
I tell myself I can do this.	.65			
I can change my attitude when I need to.	.64			
I can change my attitude when I am worried	Deleted			
I focus my thoughts on good things	Deleted			
I believe I am a strong person.	.79			
I am determined to get well.	.69			
I do what I have to do.	Deleted			
I am a positive person.	Deleted			
I believe I have inner strength.	.77			
I can decide what to do.	.66			
I have a person close to me who is a source of strength.	Deleted			
I have at least one person close to me.	.51			
I feel the presence of God or a Greater Source of Strength.		.88		
I put control of my life in God's or a Greater Power's hands.		.91		
I feel close to God or a Greater Source of Strength.		.94		
I pray for strength.		.88		
I express my fears to my God.		.91		

Table 8 continued

Item	Mental	Connect	Knowing	Physical
I pray for others.	.77			
I feel like I am a different person than I was before diagnosis.			Deleted	
I worry about my health.			.66	
I am scared about the future.			.75	
When I first learned about my health problem, I was afraid of dying.			.79	
There are many times when I am afraid of dying.			.76	
I feel my situation is out of control.			.53	
I dwell on my illness.			.55	
When I first learned about my health problem, I felt afraid.			.66	
I can live with my limitations.	.36			
I know how much I can do.				Deleted
I enjoy activities.	.37			
I stay in contact with family and friends who live at a distance.				Deleted
I am understood by my friends.	.51			
I try to balance work and play.				.86
I take time for myself.				.80
I try to rest my mind periodically.				.84
I set aside time to relax.				.87
I find it easy to share my feelings.				Deleted

**Deleted = removed by researcher based on the Four-Factor Model.**

## **Chapter 5**

### **DISCUSSION AND CONCLUSIONS**

#### ***Conclusions for Each Research Question***

The following describes conclusions based on an analysis of the results reported in the previous chapter. Based on the analysis, results and interpretations of the five research questions for psychometric testing of the inner strength questionnaire are addressed.

#### ***Significance of Findings***

The purpose of this study was to refine and test the psychometric properties of the Inner Strength Questionnaire (ISQ). Based on 12 years of qualitative inquiry, items were generated to form a questionnaire to quantify the construct of inner strength. Women with chronic health conditions served as the target population for this study. The instrument has undergone numerous revisions. The first version had 96-items and through content expert review, 20 items were eliminated. The second version had 76-items and through a pilot of 154 subjects, 39 items were eliminated. Therefore, the third version had 37-items and was subjected to rigorous testing for this study. The culminating product of this study is version 4 (27-items) of the ISQ.

#### **Conclusions for Research Question Number One**

The first research question deals with “What is the factor structure of the Inner Strength Questionnaire (ISQ)?” Based on Tabachnick and Fidell (2001), three, four and

five factor models were examined. A four factor model was hypothesized to be appropriate based on the theorized model and previous pilot studies. The exploratory factor analysis revealed a four factor structure. The scree plot clearly (Catell, 1979) supported the hypothesis of a four factor model.

The first factor, called the mental scale in version 2, had twelve items that loaded. Eight of the items that loaded to the factor had been hypothesized to load to this factor based on the pilot of version 2 (76-items). Because the subscales should have a comparable number of items to provide for easy scoring and allow for congruency among subscales, only six of the eight items were retained for this subscale. The six items were chosen based on their loadings on the factor and the theoretical meaning of each item. The six items that were retained for this subscale include “I tell myself I can do this”, “I can change my attitude when I need to”, “I am a strong person”, “I am determined to get well”, “I believe I have inner strength”, and “I can decide what to do”.

Two items that loaded to the first factor were eliminated because their loadings were lower and theoretically the items did not give additional information to support the underlying construct of inner strength. The first item, “I can keep a positive attitude”, was very weak in identifying the construct of inner strength. This item can be interpreted by the subject to mean many different things. Also, during the qualitative probing some individuals had concerns and had to ask the researcher if the item was asking about their “positive attitude” about general life or about their condition. Since other items loaded higher and seemed to cause less conflict for the subjects, this item was eliminated. The

second item, “I do what I have to do”, was eliminated since it loaded lower than the other items that were needed to answer the question of mental health.

A seventh item was retained for the “mental” subscale which had been previously hypothesized in version 2 to be in the “connectedness” scale. This item “I have at least one person close to me” was retained for theoretical purposes. The researcher felt that it was important to retain this item to assess social support. Social support is believed to be essential in the management of a chronic illness. For example, it is important to know if a patient has someone that can support her when they are undergoing chemotherapy for cancer. It is also important from a clinical aspect to know if a patient has support when having to make life altering decisions and possibly changes such as having to lose weight or having to quit smoking.

Three additional items loaded to the first factor (currently labeled “mental”) that had previously (pilot of version 2) loaded to the “physical self-spirit” scale. These items include 1) “I can live with my limitations”, 2) “I enjoy activities”, and 3) “I am understood by my friends”. However, the researcher has concluded that the three items do not sufficiently differentiate between the mental and physical self-spirit for the individual completing the instrument. The items can have both a mental and/or a physical meaning for some individuals and therefore load on separate factors. This was clearly seen by the researcher during the discussion with the seven participants. They said that some items can be interpreted as both physical and mental depending on how you look at the item. Therefore, the three items based on the EFA need to be revised to reflect the assessment of physical aspects of having an illness.



The first item, “I can live with my limitations”, caused concern for some of the participants. For some women, limitations may be either physical or mental depending on the individual and their specific situation and for others it can be both mental and physical. The researcher has decided to modify the item to include the word “physical”. The item will therefore read as “I can live with my physical limitations”. The second item, “I enjoy activities” can also have multiple meanings. For some women, the word “enjoy” may have signaled a response that requires cognitive thought rather than a physical response. This was clearly demonstrated by input from both the seven participants (women with chronic health conditions) and the six content experts. Both groups stated that the word “enjoy” could mean physical enjoyment or mental enjoyment. Most participants and reviewers agreed that it may be hard to differentiate which meaning the subjects are contemplating when completing the instrument. This could explain why the item loaded to the previously labeled “mental” scale and not the “physical” scale as hypothesized based on the pilot of previous versions. The researcher recommended that the item be modified to include the verb “do” instead of “enjoy”. The verb “do” shows more action causing a physical response and not a mental response. The item will read “I do activities”. The third item, “I am understood by my friends” is also a mental concept. The researcher felt that this item would be difficult for the subject to assess, however the subject may have an emotional response to the item. It would be difficult for an individual to be able to truly assess whether they are understood by their friends. The researcher therefore decided to change the item to read “I feel understood by my friends”. The first factor, labeled “mental” contained ten items, six that previously

loaded in version 2 (76 items) and four items that previously loaded to other scales (one on connectedness and three on physical).

For the second factor, all six items were retained since the factor loadings were high (0.78 to 0.89) and the items fit the theoretical model. In version 2, this factor was labeled “connectedness”. One item, “I have at least one person close to me”, which also loaded onto the first factor previously labeled “mental” was retained for theoretical purposes and for assessing a patient’s ability to call on someone in a time of need. This item will remain on the mental subscale even though it had previously been hypothesized to reside on the connectedness subscale. This leaves six items on the second subscale labeled “connectedness”.

The third factor, labeled “knowing and searching” had high loadings (0.56 to 0.81). Seven of the eight hypothesized items were retained for version 4 of the ISQ. The seven items retained included, 1) “I worry about my health”, 2) “I am scared about the future”, 3) When I first learned about health problem, I was afraid of dying”, 4) “There are many times when I am afraid of dying”, 5) “I feel my situation is out of control” 6) “I dwell on my illness”, 7) When I first learned about my health problem, I felt afraid”. One of the eight did not load to any of the four factors and therefore was eliminated in version 4.

The fourth factor, labeled “physical” had four of the original eight items load, but as previously stated three of the eight items loaded onto the first factor. Therefore, the four items retained for this factor include, 1)“I try to balance work and play”, 2)“I take time for myself”, 3)“I try to rest my mind periodically”, 4)“I set aside time to relax”.

Three items that loaded to the first factor (mental) will be revised based on input from content experts so that they will load to the physical subscale in future studies.

#### *Omitted Items*

Ten items were eliminated from the instrument. Eight of the ten items did not load to any of the four factors or loaded  $< 0.50$ . Two of the ten items were found to be redundant or lacking in providing support for the construct of inner strength. The two items include, 1) “I can keep a positive attitude” and 2) “I do what I have to do”. Based on the EFA and information gained from the qualitative probing of the participants with chronic illnesses and content expert reviewers, it was decided that the 10 items did not measure the construct of inner strength.

The items that did not load to any of the four factors and therefore were eliminated include, “I am able to change to positive thoughts when I am worried”, “I focus my thoughts on good things”, and “I am a positive person”, “I have a person close to me who is a source of strength”, “I feel like I am a different person than I was before diagnosis”, “I know how much I can do”, “I stay in contact with family and friends who live at a distance”, “I find it easy to share my feelings”.

#### *Conclusions Based on Confirmatory Factor Analysis*

The confirmatory factor analysis revealed similar findings to the exploratory factor analysis. It showed that the three items that had loaded to the mental subscale instead of the physical subscale had low factor loadings. Again, these items will be modified to reflect a physical aspect of inner strength and psychological well-being

instead of a mental aspect. Therefore, the confirmatory factor analysis results supported the findings found based on the exploratory factor analysis.

Based on examination of the three, four and five factor models, the four factor model was supported. This model has 27 items. The items include seven for the mental subscale, six for connectedness, seven for knowing and searching, and seven for the physical subscale.

### **Conclusions for Research Question Number Two**

The second research question inquired about the reliability of the instrument and each of the hypothesized subscales. The reliability of the overall instrument increased in the pilot of version 3 (37 items) to 0.93 from 0.86 in the pilot of version 2 (76 items). After eliminating items to form version 4 (27 items) the reliability was 0.91. The scores were found to show a high internal consistency of the items. According to McMillan and Schumacher (2001) internal consistency is the most common form of reliability since it can be assessed by giving a test or instrument once. Due to time and cost constraints it was decided that internal consistency using Cronbach Alpha would be used to assess reliability. For this study, Cronbach Alpha was used as the form of internal consistency since the items in the ISQ were not scored right or wrong, but used a Likert scale of agreement.

Reliabilities were also calculated based on the confirmatory factor analysis using LISREL software. The reliabilities of each of the four subscales were greater than 0.80 and closely mirrored the reliabilities found by using Cronbach's alpha for internal consistency purposes.

The researcher concluded that based on the internal consistency of the overall instrument and each of the four subscales, the instrument will produce scores that are reliable. This is essential in providing a product that will assist health providers and clinicians in making treatment decisions for their clients.

### **Conclusions for Research Question Number Three**

The third research question addressed the content validity of the instrument. To answer this question, the researcher disseminated the question to content experts to gain input on the relevance of each of the 37 items in answering the underlying construct of inner strength. Several items that were found to be less than “very relevant” (rating of 4) by the content reviewers also did not load on a factor during exploratory factor analysis. Such items include, 1) “I stay in contact with family and friends who live at a distance” and 2) “I find it easy to share my feelings”. One reviewer thought that the items, “I have a person close to me who is a source of strength” and “I have at least one person close to me” were redundant. Based on this input and the EFA, the item “I have a person close to me who is a source of strength” was eliminated from the instrument.

Some items were modified based on the EFA and content reviewer feedback of version 4. One item, “I can decide what to do” was modified to “I can decide what do about my health”. Another item, “I tell myself I can do this” was not modified since the instructions now state that the subject is to answer the items based on their health condition. The item, “I do what I have to do” was modified to “I do what I have to do for my health”. It was decided by all of the content review experts that the instrument was not insensitive to minorities or could cause any potential embarrassment by inquiring

about sensitive information. Again, these modifications were done based on the statistical data from the 281 subjects, the input from the six content reviewers, and the input from the seven women (participants) with chronic health conditions.

The researcher also asked input from seven women who had been diagnosed with a chronic health condition. The researcher asked each participant to complete the survey. Once the women had completed the instrument, each was interviewed on a one-on-one basis. The interview involved open-ended questions relating to the ISQ and not the women's health condition(s). This information was used to modify and to eliminate items that were difficult or confusing for the subject. It was also used to modify the format of the ISQ including the instructions. This information gained from the women was used in conjunction with the statistical data. Changes that were made to the ISQ based on subject feedback include adding "about your health condition" to the instructions in the beginning where it had previously read "answer how you feel today". In the revised ISQ, the instructions now read "Answer how you feel today about your health condition" (See Appendix). The researcher has also modified the instrument so that the possible responses are to the right of the item. This eliminates the subject having to write in a letter corresponding to a response (i.e. A=Strongly Agree). Bubble sheets had been discussed as a possible future tool to help capture the data for easy data entry, but based on subject feedback, bubble sheets would not be appropriate and may not be completed correctly if used in future studies.

### **Conclusions for Research Questions Number Four and Five**

To support the theory and underlying concept of each scale and the entire instrument (ISQ), multitrait-multimethod (MTMM) techniques by Campbell and Fiske (1959) were employed. To assess convergent validity, the four predicted subscales of the ISQ were correlated with the four subscales of the MSQ. Based on the high correlation coefficient ( $r = .60$ ), the ISQ and the MSQ were found to be convergent. This means that the two instruments closely measure similar underlying constructs as predicted. Four subscales from the ISQ and four subscales from the MSQ were correlated to examine the relationship of the subscales. The acceptance, growth and change subscales of the MSQ were found to be convergent with the mental, connectedness, and physical subscales of the MSQ. The knowing and certainty subscale were found to be discriminant and not convergent as hypothesized.

For discriminant validity, the ISQ was correlated with the CESD. The correlation between the two instruments was found to be negative in direction and had a low correlation coefficient ( $r = -0.19$ ). This means that the relationship between the two instruments was inverse and low. Therefore, based on this finding, it can be stated that the ISQ and the CESD measure different underlying constructs as hypothesized.

### **Findings Related to the Literature**

Based on the metasynthesis by Roux (2002), the theory of inner strength was supported by the quantitative findings. It should be noted that while Roux (2002) claimed that there were five themes that emerged from the qualitative findings. The quantitative data from the pilot of version 2 (76 items) and version 3 (37 items) supported

the four factor model with the elimination of the “new normal” subscale. New normal was hypothesized to be a subscale based on the qualitative inquiry and the generation of theme that emerged from the data. Through quantitative analysis of the 76-item version (version 2), it was found that the subscale “new normal” was a consequence of having inner strength and not a component of inner strength.

The pilot of the version 3 (37 items) instrument supports the findings from the pilot of version 2 (76 items) (Roux, Lewis, Dingley, Younger, 2003). The themes that emerged in the qualitative findings on women with breast cancer (Roux, 1993), Roux and Keyser (1994), and Roux, Dingley, and Bush (2001) and coronary artery disease (Dingley, 1997), multiple sclerosis (Koob and Roux, 1999) support the quantitative findings from the development of the inner strength questionnaire.

### **Limitations of the Study**

This study has several limitations. One limitation is that the study included women who had a self-report of a chronic health condition. Most people would argue that since the study population was captured in a clinical setting that most subjects probably had a health condition. One alarming limitation in the study was the high social economic status of the sample. The study sample had a relatively high level of education (41.7% college degree) and reported a moderate to high income level (54.6% adequate income). Having a population with a relatively high level of education restricts the variability and lowers the reliability. This may mean that the reliability could be higher if there was more variability among the sample. Another limitation of the study was that the study was evaluating the psychometric properties of a newly developed instrument.



Therefore, no causal inferences can be made with the data. One main limitation discussed earlier in the study was that only women with chronic health conditions were examined. The rationale for this decision was based on the fact that all the qualitative research was done with women and that the theory of inner strength is gender-sensitive. The researcher felt it to be important to note that the concept of inner strength may involve more than the subgroup of women with chronic health conditions. This will be discussed more in the future research section of this chapter.

Sample size may be considered a limitation. While many experts argue about the appropriate sample size for conducting factor analysis, Tabachnick and Fidell (2001), feel that a sample size of 150 is the minimum for conducting exploratory factor analysis. Catell (1979) stated that having three to five subjects per item (111 to 185 for this study of 37-items) was acceptable. Others argue that there should be close to 10 subjects per item (N for this study would have to be 370). Boomsma (1993), however, states that for conducting confirmatory factor analysis, there should be a minimum of 200 subjects. In this study, the minimum of 200 was achieved.

### **Validity and Reliability**

The Inner Strength Questionnaire has undergone several revisions. Each revision has been piloted. The first version (96-items) underwent some examination by content expert reviewers and through this process 20 items were eliminated. The second version (76-items) was given to 154 women with chronic health conditions and through exploratory factor analysis, a four factor model was revealed. This disproved the five factor model hypothesized from the theory derived from the qualitative data. The third

version (37-items) was examined to assess the validity and reliability of scores from the instrument. Based on the data presented in the previous chapter, decisions were made to eliminate items and modify some existing items to form the fourth version (27-items). Solid evidence exists based on the psychometric testing of version 3 (37-items) to support the validity and reliability.

### **Use of the Inner Strength Questionnaire**

The Inner Strength Questionnaire was developed using direct quotes from qualitative findings among women with a variety of chronic health conditions including breast cancer, heart disease, and multiple sclerosis. The findings from a metasynthesis (Roux, 2002) of five qualitative studies did not support the findings from version 2 (76-items) and version 3 (37-items) of the ISQ. The metasynthesis synthesized the five studies on inner strength to find the common thread. The common threads that emerged were five themes. Four of the themes correspond with the subscale of the ISQ. The fifth theme was (“new normal”) was found in the pilot of version 2 to be a consequence of having inner strength and not a component of inner strength. The findings from the pilot of version 2 (76-items) support the findings and conclusions made based on version 3 (37 items). Based on the qualitative and quantitative findings, the target population for use of the ISQ would be women with chronic health conditions. This does not eliminate the possible need for future studies in other populations. However, it should be noted that the ISQ was developed based on qualitative findings of women with chronic health conditions and the instrument has only been tested in that population. The researcher can

support the likelihood of the instrument producing reliable and valid scores for only this population.

The four subscales of the Inner Strength Questionnaire can be used as an entire entity or on a separate basis. For example, the knowing and searching subscale can be used to assess the initial anxiety, fear and anger experienced when first diagnosed with a chronic health condition. The mental subscale can be used to assess and monitor the mental component of enduring and recovering from a chronic health condition. The physical subscale should be used to assess and monitor the physical component of having and recovering from a chronic health condition. The connectedness subscale can be used to assess the spiritual connectedness experienced by an individual when coping with a chronic health condition.

#### *Inner Strength Questionnaire in Research*

The ISQ can be used in research with women who are living with a chronic health condition since it was piloted on this specific population. It should be noted that while other populations may be used the instrument has only been tested on women with chronic health conditions. Other populations may produce scores that lack reliability and validity. One area of research that should be investigated is the development and use of interventions to increase inner strength in women with a life altering health condition. The ISQ can be used in many studies that may have used the resilience scale. Since the ISQ assesses a composite of strengths (i.e. mental, physical, spiritual, and knowing) unlike the resilience scale, it may be found to provide more in-depth information on the patient.

When the instrument was first developed the researcher anticipated it to be used by health care providers to assess the inner strength of women who were diagnosed with a life altering health condition. The ISQ was also intended to be used to assess the needs (mental, physical, spiritual, and social) of women who are undergoing treatment for their condition. For example, the instrument can be used to assess a women's tolerance for chemotherapy or radiation therapy. The ISQ would be used multiple times throughout the treatment process to see if changes occur that may warrant medical intervention. For example, if a woman who recently received a diagnosis of multiple sclerosis completed the ISQ and scored low on the "knowing and searching" subscale, her health care provider could make some recommendations based on her low score. Scoring low on this scale could mean that the woman is having a difficult time accepting her illness. The woman's health care provider may suggest that she join a support group or see a counselor to deal with her anxiety or depression related to the diagnosis. By providing this intervention, the health care provider can assist the women through the initial difficult times to overcome her anxiety so that she can focus on the future.

The ISQ was designed with the intent to be easy to administer, easy to take, and easy to score. With this intent, there are no specific qualifications for administering, taking or scoring the instrument. It is suggested by the researcher, however, that at least a master's level practitioner (i.e. nurse practitioner, physician assistant, physician) should assess the findings since they will need to make recommendations to the patient based on the results of the ISQ.

### *Future Research*

The construct of inner strength can be applied to numerous populations. For example, inner strength can be examined among patients of serious illness children or children with a severe disability. Other studies may include assessing the inner strength of individuals who live with chronic pain. Inner strength can be examined in people with substance abuse disorder that are undergoing therapy and rehabilitation. Inner strength has not been examined among men based on the lack of qualitative data.

Other applications for the ISQ include assessment of intervention studies to increase inner strength. For example, the intervention of participating in a support group can be assessed. The ISQ can be given to subjects who must make a life alteration (i.e. quit smoking, lose weight) for health conditions.

The researcher has also proposed that the ISQ be used in conjunction with the Health Belief Model Instrument. The Health Belief Model proposes that an individual will be more likely to change her behavior or engage in activities to prevent illness if she is aware of the risk she is taking by continuing that behavior. This theory supports the idea that when an individual is educated or informed about the risk that they may have a better understanding for the outcomes that may arise from engaging in such behaviors. The ISQ can be used to gauge whether an individual has enough “strength” or “endurance” to make the necessary modifications needed to change their behavior. For example, an individual who has a poor diet and is experiencing high cholesterol may be persuaded to change to a healthier diet if they feel that having high cholesterol puts them at a greater risk for having heart disease and subsequent health problems.

The researcher also feels that more research needs to be conducted on developing another subscale to the ISQ that deals with social support. The social support would focus on support from friends, family and health care providers. The researcher and the principal investigator plan to disseminate version 4 for other researchers and clinicians to test. Further minor revisions to the instrument will be made based on results found in other studies.

While inner strength is believed to be a gender-sensitive theory that applies to the process of recovery in women enduring hardship, the theory has not been explored in men. Future studies should explore the theory of inner strength in men recovering from a hardship such as enduring a chronic illness. To verify inner strength as a gender-sensitive theory, men must be examined.

#### *Scoring of the ISQ*

To obtain a complete understanding of inner strength, all four subscales (knowing and searching, physical self-spirit, mental self-spirit, and connectedness) must be taken into consideration. Since the instrument employs a 5-point Likert scale from 1 to 5, the range of scores for each item also ranges from 1 to 5 (1-Strongly Agree) to (5-Strongly Disagree). For three of the four subscales, mental self-spirit, connectedness, and physical self-spirit a high score is considered desirable. This means that the individual is experiencing a positive recovery. A high score on the fourth scale, knowing and searching, indicates that the individual is experiencing anxiety and stress over their diagnosis and health condition. For mental self-spirit, knowing and searching, and physical self-spirit, a score of 35 is possible since each of these subscales has 7 items

each. A high range for each subscale equals 24 to 35, mid-range is 12-23 and a low range is 11 or less. For the connectedness subscale, which has only 6 items, a total score of 30 is possible. The range includes 20 to 30 for high, 10-19 for medium, and less than 10 for low. Since the instrument has a total of 27 items, a total score of 105 is possible. High range is equal to 80 to 105, medium range is 60 to 80 and a low range is less than 60.

### **Summary of Conclusions**

The psychometric properties of the Inner Strength Questionnaire (version 3) were evaluated in this study. Reliability, construct and content validity were examined. The instrument was found to produce reliable and valid scores. Based on the findings from both the exploratory and confirmatory factor analysis, ten items were removed from version 3 (37 items) of the ISQ. The ISQ had an overall reliability using Cronbach's alpha of 0.91. Each of the four subscales produced reliabilities greater than 0.80, respectively. The multitrait-multimethod also provided support to show convergent validity with the Inner Strength Questionnaire and the Mastery of Stress instrument. Discriminant validity was also supported between the Inner Strength Questionnaire and the Center for Epidemiology Studies in Depression scale.

## **Definition of Terms**

### **Chronic Health Conditions**

Of long duration or frequent recurrence; persistent, prolonged, continuing lingering.

### **Confirmatory Factor Analysis**

Maximum likelihood method of analysis using a software program known as LISREL.

Uses highly complex algebraic methods to determine the construct

### **Convergent Validity**

Used to assess the relationship of two instruments that measure similar traits.

### **Discriminant Validity**

Used to assess the relationship of two instruments that measure dissimilar traits.

### **Exploratory Factor Analysis**

Process used to explore the field and to discover the main constructs or dimensions

### **Factor analysis**

A highly powerful multivariate statistical procedure used to reduce a large data set and grouping of similar items or concepts.

### **Health Locus of Control**

The belief by individuals that the health is ultimately controlled by internal and/or external factors

### **Inner Strength**

A human resource used by women for healing illustrated by Roux, Dingley, and Bush ((Dingley, 1997, 1999, Dingley, Roux, and Bush, 2000, Roux, Bush, and Dingley, 2001, Roux, Dingley, and Bush, 2002, Dingley & Roux, 2003).



**Multitrait-Multimethod**

Method developed in 1959 by Donald Campbell and Donald Fiske to assess convergent and discriminant validity for construct validity purposes.

**Reliability**

The degree of consistency or accuracy with which an instrument measures the attribute it is designed to measure.

**Social Learning Theory**

Reinforcement of a particular behavior that will result in a beneficial situation for the individual.

**Validity**

The degree to which an instrument measures what it is intended to measure.

## **List of References**

### List of References

1. American Heritage Dictionary of the English Language (3<sup>rd</sup> ed.). (1992).  
Philadelphia: Houghton Mifflin.
2. Bach, C.A. & McDaniel, R.W. (1993). Quality of life in quadriplegic adults: A focus group study. *Rehabilitation Nursing*, 18 (6), 364-428.
3. Barker, E. R. D. (1989). Being whole: Spirituality well-being in Appalachian women, a phenomenological study. Unpublished doctoral dissertation.  
University of Texas, Austin.
4. Bentler, (1988). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238-246.
5. Boomsma, A. (1993). On the robustness of LISREL (maximum likelihood estimation) against small sample size and nonnormality, Ph.D. Thesis,  
University of Groningen, the Netherlands.
6. Browne, M.W. and Cudeck, R. (1993). Alternative ways of assessing model fit.  
Testing Structural Models. Newbury Park: Sage Publications.
7. Burkhardt, M. A., (1993). Characteristics of spirituality in the lives of women in a rural Appalachian community. *Journal of Trans-cultural Nursing*, 4(2), 12-28.
8. Campbell, D.T. & Fiske, D.W. (1959). Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix. *Psychological Bulletin*, 56(2), 81-101.

9. Cattell, R. B. (1966 or 1978). *The Scientific Use of Factor Analysis*. New York: Plenum.
10. Chester, B. (1992). Women and political torture: Work with refugee survivors in exile[CD-ROM]/*Women & Theory*, 13(3), 209-220. Abstract from: Ebsco File: PsycLIT Item: 80-26379.
11. Colaizzi, P. F. (1978). Psychological research as the phenomenologist views it. In R. Valle & M. King (Eds.), *Existential phenomenological alternatives for psychology* (pp. 48-71). New York: Oxford University Press.
12. Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16, 297-333.
13. DeVellis, R. (1991). *Scale Development: Theory and Application*. Newbury Park, CA: Sage.
14. Dingley, C. E. (1997). Inner strength in women recovering from coronary artery disease. Unpublished master's thesis, Midwestern State University, Wichita Falls, Texas.
15. Dingley, C. E., Roux, G., & Bush, H.A. (2000). Inner strength: A concept analysis. *Journal of Theory Construction & Testing*, 4 (2), 30-35.
16. Dingley, C., & Roux, G. M. (2003). Inner Strength in Older Hispanic Women Living with Chronic Illness. *Journal of Cultural Diversity*, 10(1), 11-23.
17. Fleury, J. (1993). Preserving qualitative meaning in instrument development. *Journal of Nursing Measurement*, 1(2), 135-144.

18. Friedman, A., & Pines, A. (1992). Increase in Arab women's perceived power in the second half of life [CD-ROM]. *Sex Roles*, 26(1-2), 1-9. Abstract from; PsycLIT Item: 79-31021.
19. Froman, R. D., (2001). Elements to Consider in Planning the Use of Factor Analysis. *Southern Online Journal of Nursing*, 2(5). www. snrs.org.
20. Guilford, J. P. (1952). When not to factor analyze. *Psychological Bulletin*, 49, 26-37.
21. Glaser, B.G. (1978). Theoretical sensitivity. Mill Valley, CA: Sociology Press.
22. Gorsuch, R. L. (1983). Factor analysis (2<sup>nd</sup> edition). New Jersey: Erlbaum.
23. Glaser, B.G. (1992). Basics of grounded theory analysis. Mill Valley, CA: Sociology Press.
24. Goldsmith, H. H., Rieser-Danner, L. A., & Briggs, S. (1991). Evaluating convergent and discriminant validity of temperament questionnaires for preschoolers, toddlers, and infants. *Developmental Psychology*, 27(4), 566-579.
25. Haile, B. L., Landrum, P. A., Kotarba, J. A., & Trimble, D. (2002). Inner Strength Among HIV-Infected Women: Nurses Can Make a Difference. *Journal of the Association of Nurses in AIDS Care*, 13(3). 74-80.
26. Jernigan, H. L. (1976). Bringing together psychology and theology: Reflections on ministry to the bereaved [CD-ROM]. *Journal of Pastoral Care*, 30(2), 88-102. Abstract from: Ebsco File: PsycLIT Item: 57-08862.
27. Kim, W. C., & Mauborgne, R. A. (1992). Parables of leadership. *Harvard Business Review*, 70(4), 123-128.

28. Kline, P. (1994). *An easy guide to factor analysis*. New York: Routledge.
29. Knapp, J. R., & Karabenick, S. A. (1985). Overcoming problems: The perceived importance of willpower and other contributors [CD-ROM]. *Cognitive Theory & Research*, 9(3), 343-354. Abstract from: Ebsco File: PsycLIT Item: 72-31301.
30. Koob, P. & Roux, G. (1999). Women living with multiple sclerosis: Journeys in inner strength. Proceedings of the Tenth International Critical and Feminist Perspectives in Nursing Conference.
31. Moloney, M. (1995). A Heideggerian hermeneutical analysis of older women's stories of being strong. *Image. Journal of Nursing Scholarship*, 27(2), 104-109.
32. Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3<sup>rd</sup> edition). New York: McGraw Hill.
33. Olshansky, E. F. (1996). Theoretical issues in building a grounded theory: Application of an example of a program of research on infertility. *Qualitative Health Research*, 6(2), 394-405.
34. O'Neill, E.S. & Marrow, L.L. (2001). The symptom experience of women with chronic illness. *Journal of Advanced Nursing*, 33(2). 257-268.
35. Polit, D.F., & Hungler, B.P. (2001). *Essential of Nursing Research*. (5<sup>th</sup> edition). Philadelphia: Lippincott.
36. Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
37. Rose, J, F. (1990). Psychological health of women: A phenomenological study of women's inner strength. *Advances in Nursing Science*, 14(1), 1-6.

38. Rotter, J.R. (1954). *Social Learning and Clinical Psychology*. New York: Prentice-Hall.
39. Roux, G. M. (1993). Phenomenologic study: Inner strength in women with breast cancer. Doctoral dissertation: Texas Woman's University, Denton, TX.
40. Roux, G. M. & Keyser, P. K. (1994). Inner strength in women with breast cancer. *Illness, Crises, & Loss*, 4(2) 1-11.
41. Roux, G. M. & Bush, H., & Dingley, C. (2001). Inner strength in women with breast cancer. *Journal of Theory Construction & Testing* 5(1), 19-27.
42. Roux, G., Dingley, C., & Bush, H. (2002). Inner strength in women: Metasynthesis of qualitative findings in theory development. *Journal of Theory Construction & Testing*, 4(2), 36-39.
43. Roux, G., Lewis, K., Younger, J., Dingley, C. (2003). Development and Testing of the Inner Strength Questionnaire. *Journal of Cultural Diversity*, 10(1), 4-5.
44. Standards for Educational and Psychological Testing. (2001). AERA.
45. Tabachnick, B. G. & Fidell, L. S. (2001). *Using Multivariate Statistics*. (4<sup>th</sup> edition). New York: Harper Collins.
46. United States Census Bureau. (2000). *Census 2000: Redistricting data summary file geographic area: Colorado (2000 PL 94-171)*. Washington, D.C.: U.S. Government Printing Office.
47. Webster's New World Dictionary (2<sup>nd</sup> ed.). (1978). New York: World Publishing.
48. Wells, J. N., Bush, H. A., & Marshall, D. (2001). Psychometric evaluation of breast health questionnaire, Spanish version. *Cancer Nursing*, 24(4), 320-327.

49. World Health Report. (1997). *Conquering Suffering, Enriching Humanity*. Office of World Health Reporting, World Health Organization, Geneva, Switzerland.
50. Younger, J.B. (1991). A Theory of Mastery. *Advances in Nursing Science*, 14(1), 76-89.



## **Appendices**

Please read the enclosed letter explaining this survey and study.

**PURPOSE:** The purpose of this study is to develop a survey on women’s recovery process that can be used to improve care for women living with chronic health conditions.

**Instructions:** If you choose to complete the survey, please note the following...

1. Use the pen in the packet to circle one of the choices (5, 4, 3, 2, or 1) that corresponds with strongly agree, agree, slightly agree, disagree or strongly disagree.
2. DO NOT put your name or any identifying information on this form.
3. Keep the enclosed consent form for future reference.

Answer how you feel today....

	Strongly Agree	Agree	Slightly Agree	Disagree	Strongly Disagree
1. I can keep a positive attitude.	5	4	3	2	1
2. I tell myself I can do this.	5	4	3	2	1
3. I can change my attitude when I need to.	5	4	3	2	1
4. I am able to change to positive thoughts when I am worried.	5	4	3	2	1
5. I focus my thoughts on good things.	5	4	3	2	1
6. I believe I am a strong person.	5	4	3	2	1
7. I am determined to get well.	5	4	3	2	1
8. I do what I have to do.	5	4	3	2	1
9. I am a positive person.	5	4	3	2	1
10. I believe I have inner strength.	5	4	3	2	1
11. I can decide what to do.	5	4	3	2	1
12. I have a person close to me who is a source of strength.	5	4	3	2	1
13. I have at least one person close to me.	5	4	3	2	1
14. I feel the presence of God or a Greater Source of Strength.	5	4	3	2	1
15. I put control of my life in God's or a Greater Power's hand.	5	4	3	2	1

	Strongly Agree	Agree	Slightly Agree	Disagree	Strongly Disagree
16. I feel close to God or a Greater Source of Strength.	5	4	3	2	1
17. I pray for strength.	5	4	3	2	1
18. I express my fears to my God.	5	4	3	2	1
19. I pray for others.	5	4	3	2	1
20. I feel like I am a different person that I was before diagnosis.	5	4	3	2	1
21. I worry about my health.	5	4	3	2	1
22. I am scared about the future.	5	4	3	2	1
23. When I first learned about my health problem, I was afraid of dying.	5	4	3	2	1
24. There are many times when I am afraid of dying.	5	4	3	2	1
25. I feel my situation is out of control.	5	4	3	2	1
26. I dwell on my illness.	5	4	3	2	1
27. When I first learned about my health problem, I felt afraid.	5	4	3	2	1
28. I can live with my limitations.	5	4	3	2	1
29. I know how much I can do.	5	4	3	2	1
30. I enjoy activities.	5	4	3	2	1
31. I stay in contact with family and friends who live at a distance.	5	4	3	2	1
32. I am understood by my friends.	5	4	3	2	1
33. I try to balance work and play.	5	4	3	2	1
34. I take time for myself.	5	4	3	2	1
35. I try to rest my mind periodically.	5	4	3	2	1
36. I set aside time to relax.	5	4	3	2	1
37. I find it easy to share my feelings.	5	4	3	2	1

Please read the enclosed letter explaining this survey and study.

**PURPOSE:** The purpose of this study is to develop a survey on women’s recovery process that can be used to improve care for women living with chronic health conditions.

**Instructions:** If you choose to complete the survey, please note the following...

1. Use the pen in the packet to circle one of the choices (5, 4, 3, 2, or 1) that corresponds with strongly agree, agree, slightly agree, disagree or strongly disagree.
2. DO NOT put your name or any identifying information on this form.
3. Keep the enclosed consent form for future reference.

**Answer how you feel TODAY about YOUR HEALTH....**

	Strongly Agree	Agree	Slightly Agree	Disagree	Strongly Disagree
1. I tell myself I can do this.	5	4	3	2	1
2. I can change my attitude when I need to.	5	4	3	2	1
3. I believe I am a strong person.	5	4	3	2	1
4. I am determined to get well.	5	4	3	2	1
5. I believe I have inner strength.	5	4	3	2	1
6. I can decide what to do.	5	4	3	2	1
7. I have at least one person close to me.	5	4	3	2	1
8. I feel the presence of God or a Greater Source of Strength.	5	4	3	2	1
9. I put control of my life in God’s or a Greater Power’s hand.	5	4	3	2	1
10. I feel close to God or a Greater Source of Strength.	5	4	3	2	1
11. I pray for strength.	5	4	3	2	1
12. I express my fears to my God or a Greater Source of Strength.	5	4	3	2	1
13. I pray for others.	5	4	3	2	1
14. I worry about my health.	5	4	3	2	1
15. I am scared about the future.	5	4	3	2	1

	Strongly Agree	Agree	Slightly Agree	Disagree	Strongly Disagree
16. When I first learned about my health problem, I was afraid of dying.	5	4	3	2	1
17. There are many times when I am afraid of dying.	5	4	3	2	1
18. I feel my situation is out of control.	5	4	3	2	1
19. I dwell on my illness.	5	4	3	2	1
20. When I first learned about my health problem, I felt afraid.	5	4	3	2	1
21. I can live with my physical limitations.	5	4	3	2	1
22. I stay active.	5	4	3	2	1
23. I spend time with my friends or family.	5	4	3	2	1
24. I try to balance work and play.	5	4	3	2	1
25. I take time for myself.	5	4	3	2	1
26. I try to rest my mind periodically.	5	4	3	2	1
27. I set aside time to relax.	5	4	3	2	1

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### Center for Epidemiological Studies in Depression Scale

The following items ask you to look back at how you managed your chronic health condition. Your response may have changed from time to time, however, please answer the questions in terms of the view you hold today.

Instructions: For each statement below, please circle the number (5, 4, 3, 2, or 1) that corresponds to the best answer that best describes **HOW OFTEN you felt or behaved this way DURING THE PAST WEEK.**

	Rarely or none of the time (Less than 1 day)	Some or little of time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	4	3	2	2
2. I did not feel like eating, my appetite was poor.	4	3	2	2
3. I felt that I could not share off the blues even with help from my family or friends.	4	3	2	2
4. I felt that I was just as good as other people.	4	3	2	2
5. I had trouble keeping my mind on what I was doing.	4	3	2	2
6. I felt depressed.	4	3	2	2
7. I felt that everything I did was an effort.	4	3	2	2
8. I felt hopeful about the future.	4	3	2	2
9. I thought my life had been a failure.	4	3	2	2
10. I felt fearful.	4	3	2	2

	Rarely or none of the time (Less than 1 day)	Some or little of time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
11. My sleep was restless.	4	3	2	2
12. I was happy.	4	3	2	2
13. I talked less than usual.	4	3	2	2
14. I felt lonely.	4	3	2	2
15. People were unfriendly.	4	3	2	2
16. I enjoyed life.	4	3	2	2
17. I had crying spells.	4	3	2	2
18. I felt sad.	4	3	2	4
19. I felt that people disliked me.	4	3	2	2
20. I could not get "going".	4	3	2	2

Radloff, L.S. (1997). Applied Psychological Measures, 1, 385-401.

## Mastery of Stress Instrument

**The following items ask you to look back at how you managed your chronic health condition. Your response may have changed from time to time, however, please answer the questions in terms of the view you hold today.**

Please note the following directions:

1. Read the questions and circle a number (5,4,3,2, or 1) that corresponds with one of the answers (strongly agree, agree, undecided, disagree, or strongly disagree).
2. **DO NOT** put your name or any other identifying information on the survey. After completing the surveys, please place your answer sheet in the box in the waiting room or return it in the envelope to the physician, nurse, or researcher.
3. Keep the consent letter for your records and future reference should you have a question.

	Strongly Agree	Agree	Un decided	Disagree	Strongly Disagree
38. Through my influence, the situation becomes more manageable.	5	4	3	2	1
39. I remained alert to opportunities to influence events.	5	4	3	2	1
40. Memories of this experience interrupt my thoughts.	5	4	3	2	1
41. I carefully evaluated my plans.	5	4	3	2	1
42. I cannot concentrate.	5	4	3	2	1
43. My actions in this situation were effective.	5	4	3	2	1
44. I influenced this situation directly.	5	4	3	2	1
45. I used information to help me plan things.	5	4	3	2	1
46. I know what is really important in this situation.	5	4	3	2	1
47. I feel helpless in this situation.	5	4	3	2	1
48. I am definite about my understanding of the situation.	5	4	3	2	1
49. I am clear on the meaning of this situation.	5	4	3	2	1
50. I am sure of my view of the situation.	5	4	3	2	1
51. I clarified my view of what was possible.	5	4	3	2	1
52. I feel numb.	5	4	3	2	1
53. I feel a sense of panic at times.	5	4	3	2	1



	Strongly Agree	Agree	Un decided	Disagree	Strongly Disagree
54. I have a good understanding of the situation.	5	4	3	2	1
55. I am in a state of grief.	5	4	3	2	1
56. I have accepted what I could not change.	5	4	3	2	1
57. I reconciled the good and the bad.	5	4	3	2	1
58. I made the best of things.	5	4	3	2	1
59. I developed an inner peace with what happened.	5	4	3	2	1
60. I accept what has happened.	5	4	3	2	1
61. I accept what has happened.	5	4	3	2	1
62. I gained new competencies.	5	4	3	2	1
63. I have more wisdom.	5	4	3	2	1
64. I understand others better.	5	4	3	2	1
65. I have gained better judgment.	5	4	3	2	1
66. I have more insight.	5	4	3	2	1
67. I am more self-determined.	5	4	3	2	1

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Kristi L. Lewis, MPH  
Doctoral Candidate  
Virginia Commonwealth University  
School of Education  
January 15, 2003

Dear Content Expert/Reviewer:

My name is Kristi Lewis and I am a doctoral student at Virginia Commonwealth University in the School of Education. I am currently working with Dr. Gayle Roux in the School of Nursing to complete my dissertation. I have been working with Dr. Roux for two years to develop and pilot an instrument that will measure inner strength in women with chronic health conditions. The purpose of the study is to understand the recovery process that is unique to women and to develop a survey that can be used to improve care for women living with chronic health conditions.

I am writing this letter to inform you about the study and to ask for your participation as a content reviewer. The study has been approved by the VCU Human Subjects Review Committee. As a content reviewer, your role will be to complete the survey and provide feedback on the content including the clarity and layout of the instrument. It should not take more than 40 minutes to complete the questionnaire and the content evaluation form.

I can assure you that your privacy will be protected. You do not need to put any identifying information on any of the forms. I would appreciate both positive and negative comments on each item including the instructions. I will describe the use of expert reviewers in my dissertation and later in a journal publication, but will not reveal any names.

By completing and returning the enclosed information, you are consenting to participate in this study. Please read the detailed instructions in the packet before completing the forms. If you have any questions or concerns, please feel free to contact me or Dr. Roux.

With many thanks,

**RESEARCHER:**  
Gayle Roux, Ph.D., RN  
gmroux@vcu.edu  
Phone: 804-828-0433  
Phone: 804-828-0868

**OFFICE for RESEARCH SUBJECTS**  
Virginia Commonwealth University  
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Richmond, VA 23298

Kristi L. Lewis, MPH  
[kllewis@vcu.edu](mailto:kllewis@vcu.edu)  
804/706-9449

### Feedback from Participant Experts

Participant	Comments/Suggestions
Participant #1	<p>I feel like I am a different person than I was before diagnosis. – had to think hard on this one            I can keep a positive attitude. Remove the word “can”            Move I have at least one person close to me. To be #12 instead of #13 I have a person close to me who is a source of strength.            I express my fears to my God. (Need to add “or Greater Source of Strength” for consistency.</p>
Participant #2	<p>I try to rest my mind periodically.</p>
Participant #3	<p>I take time for myself. – thought provoking            Put answers to the right of each item so the person completing the form does not have to look up</p>
Participant #4	<p>Very direct and to the point            Thought provoking            Have to give some thought to the answers              I find it easy to share my feelings. Hard to answer. Had to think about it.</p>
Participant #5	<p>I tell myself I can do this. – confusing/can have multiple meanings            I can change my attitude when I need to. – confusing            I have a person close to me who is a source of strength. – confusing/had issues since God is the one</p>
Participant #6	<p>Answer how you feel today – need to change to include the term “health”            Brought back feelings</p>
Participant #7	<p>No comments/suggestions</p>

# Inner Strength Questionnaire

153

Instructions: Please **CIRCLE** the rating for **EACH** item.

4= Very relevant and succinct

3= Relevant, but needs minor alterations

2= Unable to assess relevance without item revision or item is in need of such revision that it would no longer be relevant

1= Not relevant

	Very relevant	Relevant needs minor changes	Unable to assess	Not relevant
1. I can keep a positive attitude.	4	3	2	1
2. I tell myself I can do this.	4	3	2	1
3. I can change my attitude when I need to.	4	3	2	1
4. I am able to change to positive thoughts when I am worried.	4	3	2	1
5. I focus my thoughts on good things.	4	3	2	1
6. I believe I am a strong person.	4	3	2	1
7. I am determined to get well.	4	3	2	1
8. I do what I have to do.	4	3	2	1
9. I am a positive person.	4	3	2	1
10. I believe I have inner strength.	4	3	2	1
11. I can decide what to do.	4	3	2	1
12. I have a person close to me who is a source of strength.	4	3	2	1
13. I have at least one person close to me.	4	3	2	1
14. I feel the presence of God or a Greater Source of Strength.	4	3	2	1
15. I put control of my life in God's or a Greater Power's hands.	4	3	2	1
16. I feel close to God or a Greater Source of Strength.	4	3	2	1
17. I pray for strength.	4	3	2	1
18. I express my fears to my God.	4	3	2	1
19. I pray for others.	4	3	2	1
20. I feel like I am a different person than I was before diagnosis.	4	3	2	1
21. I worry about my health.	4	3	2	1
22. I am scared about the future.	4	3	2	1
23. When I first learned about my health problem, I was afraid of dying.	4	3	2	1
24. There are many times when I am afraid of dying.	4	3	2	1
25. I feel my situation is out of control.	4	3	2	1
26. I dwell on my illness.	4	3	2	1
27. When I first learned about my health problem, I felt afraid.	4	3	2	1
28. I can live with my limitations.	4	3	2	1
29. I know how much I can do.	4	3	2	1
30. I enjoy activities.	4	3	2	1
31. I stay in contact with family and friends who live at a distance.	4	3	2	1
32. I am understood by my friends.	4	3	2	1
33. I try to balance work and play.	4	3	2	1
34. I take time for myself.	4	3	2	1
35. I try to rest my mind periodically.	4	3	2	1
36. I set aside time to relax.	4	3	2	1
37. I find it easy to share my feelings.	4	3	2	1

## Instructions for Content Reviewers

Please find the following information in your packet.

1. Cover letter from Doctoral student
2. Instruction sheet
3. Inner Strength Questionnaire (ISQ)
4. Follow-up questions to Instrument

### Inner Strength Questionnaire (ISQ):

The Inner Strength Questionnaire was developed in 2002. The items were derived from twelve years of qualitative data (one-on-one interviews) with women who were enduring a chronic health condition such as cancer, multiple sclerosis, or heart disease. The items are direct quotes taken from these studies that overlapped from women to women that formed a theme. The second version (76-items) was piloted on 154 women during the fall of 2002. Based on statistical data, the instrument was revised to 37-items for version 3. Now, for a dissertation study, the 37-item instrument is being tested to assess the validity and reliability of scores produced by the instrument.

### Tasks for the reviewer:

Please review the 37-items to assess the readability, layout and meaning of each item. Circle 1, 2, 3, or 4 to correspond with the relevance of the item in determining the underlying construct labeled "inner strength". In other words, ask your self does this item assist the researcher in assesses the inner strength of a patient with a chronic health condition. After rating each question, answer the enclosed follow-up questions on the readability and ease of completing the instrument.

Since I am planning to graduate in the spring of 2004, please return the evaluation form and the follow-up questions by February 20, 2004. I appreciate your help and effort in this matter.

Thank you again for your help. If you have any questions, please feel free to contact me.

Kristi L. Lewis, MPH  
[kllewis@vcu.edu](mailto:kllewis@vcu.edu)  
804/706-9449



- 8. Were there any questions in the survey that did not make sense to you when you read them? If so, which ones?**
  
  
  
  
  
  
  
  
  
  
- 9. Did the survey have any questions that you felt were inappropriate or made you feel embarrassed to answer?**
  
  
  
  
  
  
  
  
  
  
- 10. Was the survey easy to complete (i.e. filling in the blanks)?**
  
  
  
  
  
  
  
  
  
  
- 11. If we had given you a bubble answer sheet would the survey have been easier to complete?**
  
  
  
  
  
  
  
  
  
  
- 12. Did the survey give you some insight into your illness or condition?**
  
  
  
  
  
  
  
  
  
  
- 13. Were the responses (e.g. A= strongly agree, etc) appropriate for the questions that were asked in the survey?**
  
  
  
  
  
  
  
  
  
  
- 14. Is there anything that you can suggest to make the survey easier for subjects to complete or do you have any additional comments?**

Follow-up Questions on the Inner Strength Questionnaire (ISQ) for Expert Reviewers

1. Please comment on the READABILITY of the ISQ.
2. Please list any/all the items on the ISQ that you found to be hard to interrupt. Please provide recommendations on how to modify the item to increase clarity.
3. Please list any/all items on the ISQ that may have multiple meanings or may not assist in defining the underlying construct of inner strength.
4. Please list any/all items that may be insensitive to minorities or may make the subject completing the instrument uncomfortable or embarrassed.
5. Please list any concerns or issues that you see as a barrier to this study and to the questionnaire.
6. Please suggest any questions or items that should be added to the instrument.

Thank you again for your help.



## Mean and Standard Deviations for Inner Strength Questionnaire Items

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Item	n	Mean	Standard Deviation
I can keep a positive attitude.	274	4.2	.79
I tell myself I can do this.	275	4.27	.65
I can change my attitude when I need to.	275	4.07	.75
I can change my attitude when I am worried	275	3.75	.88
I focus my thoughts on good things	274	4.11	.74
I believe I am a strong person.	275	4.39	.70
I am determined to get well.	275	4.49	.64
I do what I have to do.	276	4.46	.67
I am a positive person.	275	4.28	.75
I believe I have inner strength.	274	4.46	.68
I can decide what to do.	275	4.23	.72
I have a person close to me who is a source of strength.	275	4.34	.88
I have at least one person close to me.	276	4.57	.67
I feel the presence of God or a Greater Source of Strength.	276	4.58	.71
I put control of my life in God's or a Greater Power's hands.	275	4.42	.86
I feel close to God or a Greater Source of Strength.	276	4.48	.79
I pray for strength.	276	4.53	.78
I express my fears to my God.	275	4.45	.85
I pray for others.	276	4.55	.74

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Item	n	Mean	Standard Deviation
I feel like I am a different person than I was before diagnosis.	267	3.65	1.22
I worry about my health.	274	2.76	1.09
I am scared about the future.	275	3.25	1.15
When I first learned about my health problem, I was afraid of dying.	268	3.24	1.39
There are many times when I am afraid of dying.	273	3.47	1.25
I feel my situation is out of control.	275	4.02	1.00
I dwell on my illness.	269	4.09	1.02
When I first learned about my health problem, I felt afraid.	264	2.66	1.28
I can live with my limitations.	268	4.14	.75
I know how much I can do.	273	4.23	.68
I enjoy activities.	274	4.34	.75
I stay in contact with family and friends who live at a distance.	273	4.35	.82
I am understood by my friends.	274	4.05	.80
I try to balance work and play.	273	4.04	.75
I take time for myself.	274	3.89	.99
I try to rest my mind periodically.	273	4.02	.82
I set aside time to relax.	274	3.89	.93
I find it easy to share my feelings.	273	3.77	.99
Mental Subscale	270	4.36	.50
Connectedness Subscale	274	4.50	.71
Knowing and Searching	261	3.35	.86
Physical	266	4.05	.59
Total ISQ	250	2.95	.34

## VITA

Kristi Leanne Lewis was born on January 9, 1973, in Richmond, Virginia. She graduated from Prince George High School, Prince George, Virginia in 1992. Kristi received her Bachelor of Science in Biology from Virginia Commonwealth University, Richmond, Virginia in 1996. She received a Master of Public Health degree from the Medical College of Virginia, Virginia Commonwealth University in Richmond, Virginia in May 1998. Kristi has worked in public health since 1997. She started in 1998 in the Division of Immunization at the Virginia Department of Health working for the Vaccines for Children Program. In 1999, she took a position at Virginia Commonwealth University as an Education Coordinator/Faculty Instructor for the Lead Poisoning Prevention Program. She began the doctoral program in the spring of 2000. In 2003, she took a position as a District Epidemiologist for the Virginia Department of Health and was assigned to the Crater Health District in Petersburg, Virginia. Kristi will be an Assistant Professor in the Department of Health Sciences at James Madison University in Harrisonburg, Virginia beginning in the fall of 2004.