THE EFFECT OF SENSE OF COHERENCE ON PERCEIVED HEALTH STATUS: THE ROLE OF LIFE-CHANGING EVENTS

by

Renata Betulah Alexandre

A Dissertation Submitted to
the Faculty of the Graduate School at
Middle Tennessee State University
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Murfreesboro, Tennessee
December 2008

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

ProQuest LLC
789 E. Eisenhower Parkway
PO Box 1346
Ann Arbor, MI 48106-1346

APPROVAL PAGE

THE EFFECT OF THE SENSE OF COHERENCE ON PERCEIVED HEALTH STATUS: THE ROLE OF LIFE CHANGING EVENTS

Committee Chairs

Dr. Norman Weatherby

Dr. Gloria Hamilton

Committee Members

Dr. Franco Zengaro

Dr. Minsoo Kang

Dr. Cheryl Ellis

HHP Department Chair

Dr. Dianne Bartley

Dean of Graduate Studies

Dr. Michael D. Allen

DEDICATION

To Ray C. Howland, my husband and my best friend. You were my sounding board, my most fervent encourager, and you believed in me when I could not believe in myself. You put as much of your energy in me reaching this goal as I did, which helped me to understand and perceive its importance. This document is as much yours as it is mine.

ACKNOWLEDGMENTS

I would like to express my deepest thanks and appreciation to all who supported me in the planning, execution and analysis of this study. To Dr. Gloria Hamilton, co-chair of my committee, I am so indebted to you for your patience, kindness and support in this process. You always had time for me when I needed it most, and I look forward to continuing our work together. To Dr. Norman Weatherby, co-chair of my committee, your statistical expertise and your encouragement throughout the analysis has helped me to recognize the wonders of statistical analysis. To Dr. Franco Zengaro, I am so thankful for your suggestions and your encouragement throughout this process. To Dr. Minsoo Kang, I appreciate your persistence and your help with the measurement aspects of this study. To Dr. Cheryl Ellis, whose door has always been open and who has encouraged me from the beginning. If it had not been for you, I may not have considered this degree. In addition, I would like to thank all the professors in the HHP department for sharing their expertise and wisdom. I have learned a great deal from all of you.

I would like to extend a special thank you to all of those who assisted in data collection, and all those who completed the survey. Without you, this study would not have taken place. Personally, I would like to thank Christine Ackerson for her encouragement and support. You became my greatest cheerleader after Ray died. To my friends Shana Hammaker and Kurt Schreiber, who have encouraged me throughout this process, pointing out where I have grown and giving insight into possible applications of my talents. To all my friends at MTSU and Vanderbilt Divinity School, you have all been so supportive in this difficult yet productive time, and I am so appreciative.

Finally, I would like to thank my family. To Ray, my beloved husband, who was always quick with words of encouragement and fresh ideas. To my son, Brandon, who is beginning his academic journey and I hope will find as much pleasure and reward in his study as I have in my own. To Joni, who has always been very supportive, and who became a surrogate support for me after her father died. To Melissa, who is always checking in to seen how this process is going. And to Miles and Amelia, who I love to watch grow and change as their worlds become larger. Thank you all for your encouragement and support throughout this process.

ALEXANDRE, RENATA BETULAH, PhD. The Effect of Sense of Coherence on Perceived Health Status: The Role of Life-Changing Events (2008).
Directed by Dr. Norman Weatherby and Dr. Gloria Hamilton. 145 pp.

ABSTRACT

Aaron Antonovsky (1987) theorized that individuals who had been raised with support and encouragement and exposed to appropriate life experiences would develop greater coping skills, thereby perceiving their own health status positively. His theoretical construct is the "Sense of Coherence" (SOC). Antonovsky postulated that life changing events moderated the relationship between SOC and perception of health status. The primary purpose of this study was to estimate the effect of SOC on perception of health status in a sample of adults in the United States aged 40 and older. Other factors considered included age, gender, occupation, marital status, socioeconomic status, and presence of chronic disease. Instrumentation included the Orientation to Life Questionnaire to measure SOC, the Perceived Quality of Life Questionnaire to measure perceived quality of life, and a Demographic Questionnaire to measure demographics and life changing events.

Hierarchical regression analysis was used to test the research hypothesis and answer the research question. The contribution of each variable was assessed by analyzing R^2. The fit of the regression models was assessed using the Levene's Statistic and the Kolmogorov-Smirnov Test. The sample size used in these analyses was 261.

The parsimonious model resulting from hierarchical regression found that SOC was positively and strongly related to perception of health status. The experience of trauma, the experience of disability, the impact of disability, and the impact of the death

of someone close were also related to perception of health status. The residuals in these analyses were normally distributed and the homoscedasticity assumption was confirmed.

Researchers concluded that other avenues of health promotion could be implemented in light of these findings. Health professionals could teach parents positive parenting practices, providing children with positive learning experiences. Addressing weaknesses in services for the disabled through programs raising awareness of the issues surrounding disability could be initiated. Antonovsky (1987) highlights several processes that can empower maturing individuals. Current literature suggests other possible methods for encouraging development of skills that will aid individuals throughout their lives (Feldt, Kokko, Kinnunen & Pulkkinen, 2005; Read, Aunola, Feldt, Leinonen & Ruoppila, 2005;. Veenstra, Moum & Roysamb, 2005).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Page

CHAPTER I

INTRODUCTION

Overview

A projection of future disease spread using data from 1990 suggests that more deaths will occur due to non-communicable disease (chronic illness such as heart disease and diabetes) and fewer deaths due to communicable disease (Mathers & Loncar, 2006). This projection of increased deaths from chronic illnesses increases the pressure on public health educators to educate individuals about behavioral choices that support a healthier lifestyle. According to the European health theorist, Aaron Antonovsky (1979), the traditional focus of Western allopathic medical practice on disease rather than health is not adequate to address the health issues of the twentieth century.

The Salutogenic Model

The model proposed by Antonovsky (1979), has been termed Salutogenesis: *saluto*, the Greek word for health and *genesis*, Greek for origins. The basic assumption in the salutogenic model is that the normal state of humanity is entropy (Antonovsky, 1979). Entropy is defined as the process of degeneration marked by increasing degrees of uncertainty, disorder and chaos (Accent Software International, 1998). According to Antonovsky, human existence complies with the second law of thermodynamics: the tendency toward entropy, or in health terms, disruption of homeostasis (Antonovsky, 1984). Persons are constantly assaulted with stressors for which they may or may not

have resources to cope. Because stressors are ubiquitous, the truly relevant question pertaining to maintenance of health is: how does the human remain healthy? The key element separating Salutogenesis from the medical model is the focus on maintenance of health—moving individuals from the disease end to the healthy end of the "health-ease/dis-ease continuum" (Antonovsky, 1987, p. 3). The salutogenic model adds to the current body of literature on health information by changing the question asked in the medical model from What keeps one from getting sicker? to the salutogenic question, What facilitates one's becoming healthier? (Antonovsky, 1987).

The salutogenic model presupposes that individuals' life experiences either strengthen or weaken their ability to cope with the stressors of life. These life experiences, collected from the time of birth, can either become resources for coping or for buffering the negative bodily responses to stress, or hindrances to mental and physical growth. Life experiences as resources, or what Antonovsky (1979) calls generalized resistance resources (GRRs), are developed through the ability to cope with difficult life events. Most of these GRRs are banked through child-rearing patterns and social role complexes. The more positively and successfully we have coped with "crisis" situations, the more GRRs go into our self-confidence/self-esteem bank, and the better able we will deal with future stressors. When a stressor arises, one of three selections is made: 1) avoid the stressor, 2) define the stressor as a non-stressor, or 3) develop a state of tension. Often this final decision is made at the unconscious or subconscious level, as learned from past experience. If one develops a state of tension, one must also construct a way to manage the stressor. Successful management of the stressor places more GRR credits in

one's self-confidence/self-esteem bank. Unsuccessful management of the stressor moves individuals to the disease side of what Antonovsky calls, the "health-ease/dis-ease continuum" (Antonovsky, 1979). The "health-ease/dis-ease continuum" will be discussed next.

The Health-ease/Dis-ease Continuum

Most current health research has focused on why individuals contract specific diseases. If the understanding that the normal human condition is that of entropy, it is not surprising that individuals do contract disease. Rather, it is expected that they will. The more pertinent question is, how do we explain why people stay healthy? (Antonovsky, 1979).

Departure from health, termed as breakdown, can theoretically be conceptualized using four critical facets: presence of pain, functional limitation, prognostic implication and action implication (Antonovsky, 1972, 1979). Pain may be seen as either a phenomenon moving one toward the healthy end of the continuum, as is the case with growing pains, or the disease end of the continuum, as in pain related to some pathological process in the body. Similarly, functional limitation may lead one toward the healthy end of the continuum if the limitation has been recognized by the social world, and appropriate socialization of the individual has occurred. This is often the case with individuals labeled as blind, mentally deficient, or tone deaf. On the other hand, functional limitation in which no socialization is available, and health issues prevent the carrying out of one's social role responsibilities may shift the individual toward the disease end of Antonovsky's (1972, 1979) continuum.

Regarding prognostic implication, depending upon the severity of the illness, whether it is a chronic or acute illness, and whether it is considered a degenerative illness may influence movement toward either end of Antonovsky's (1972, 1979) "health-ease/dis-ease continuum." For instance, successful coping with a mild to moderate acute condition that is not degenerative, or a mild chronic illness that does not cause a great deal of self limitation may move one toward the healthy end of the continuum. On the other hand, inability to cope due to the seriousness of a chronic, degenerative illness in which many life changes must be made due to pain or other limitations may move an individual closer to the disease end of the continuum.

Action implication refers to the therapeutic routine adopted when an illness or condition has been discovered. The action taken for the condition of obesity is quite different from that of a breast lump or diabetes. Yet, if the prescribed regimen is successful in dealing with the condition, the capacity to move an individual from the disease end to the healthy end of the continuum can be attained (Antonovsky, 1972, 1979).

Salutogenesis is not concerned with achieving an ideal health state, but rather, with understanding the factors involved in moving individuals toward the healthy end of the "health-ease/dis-ease continuum" (Antonovsky, 1979). Many individuals, on any given day, are likely not in perfect health. Many have conditions that place them outside of the category of "normal." For instance, many people do not have 20/20 vision or perfect hearing, or they may exhibit dental caries, paper cuts, ingrown toenails, or any other number of minor health problems that are not included in the ideal health state.

Yet, most individuals suffering from these minor complaints would consider themselves in excellent health and fully capable of dealing with any health crisis which may occur. This knowledge of one's ability to deal with these minor (or perhaps major) stressors is primarily gained through life experiences. Accurate self-perception is the key to developing this knowledge base. Self-perception of life experience becomes the basis of Antonovsky's (1979, 1987) concept of the sense of coherence.

Sense of Coherence

The key feature of the salutogenic model is the "sense of coherence" (SOC), or a focus on success in coping with stressful situations. SOC was originally defined as:

> A global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected. (Antonovsky, 1979, p 123)

The SOC is composed of three major components: comprehensibility, manageability and meaningfulness. The definition of each is below:

> *Comprehensibility* . . . refers to the extent to which individuals perceive the stimuli that confront them as making cognitive sense, as information that is ordered, consistent, structured, and clear—and hence, regarding the future, as

> predictable—rather than as noisy, chaotic, disordered, random, accidental and unpredictable. (Antonovsky, 1987, p. 16)
>
> *Manageability* . . . refers to the extent to which people perceive that resources are at their disposal that are adequate to meet the demands posed by stimuli. (Antonovsky, 1987, p 17)
>
> *Meaningfulness* . . . is . . . the emotional counterpart to comprehensibility. . . People who are high on meaningfulness feel that life makes sense emotionally, that at least some of the problems and demands posed by living are worth investing energy in, are worthy of commitment and engagement, and are challenges that are welcome rather than burdens that they would much rather do without. (Antonovsky, 1987, p. 18)

Measurement of the Sense of Coherence.

The Orientation to Life Questionnaire (OLQ) was developed by Antonovsky (1987) to measure the sense of coherence. The questionnaire is designed to be flexible enough to use in an interview setting or as a self-report to assess an individual's ability to cope with adversity. The original questionnaire consisted of 29 items. In this study, a shorter 13 item questionnaire was used.

Development of the Sense of Coherence

Characteristics that lead to a strong sense of coherence.

Antonovsky (1984) suggested that the SOC emerges as a result of childhood and adolescent life experiences. By approximately the age of 30, an individual's SOC will vary little with ensuing life experiences, particularly if SOC is relatively strong. Generalized resistance resources (GRRs), factors associated with the development of the SOC, will be discussed in more detail on page 11. They are introduced here because GRRs have three characteristics in common that may lead to the construction of a strong ability to cope with life's experiences. These characteristics include: consistency, underload-overload balance, and participation in decision making. Consistency refers to the extent to which a specific life experience conforms to previous or current life experiences. For instance, if life experiences are largely consistent, and a child is exposed to few life events that are surprising or that do not fit prior experience, the child will conclude that life is predictable. This concept closely aligns with the comprehensibility component of the SOC (Antonovsky, 1984).

Underload-overload balance refers to the extent to which we are capable of managing the life experiences we encounter (Antonovsky, 1984). Overload occurs when we become overwhelmed with the tasks in our every day experience, whereas underload refers to those instances in which we have nothing to manage. Success during times of overload raises our self-confidence and self-esteem because, with practice, we have proven our ability to rise to the demand of the experience and overcome the anxiety often caused by our fear of failure. Success at underload, the ability to manage life in the

absence of challenges, also raises our self-confidence by demonstrating an ability to manage boredom without sacrificing personal identities. This concept is closely related to the manageability component of the SOC (Antonovsky, 1984).

Participation in decision making is the third characteristic that GRRs have in common with the meaningfulness component of SOC (Antonovsky, 1984). Choosing to participate in life experiences can raise one's SOC as well. For example, if a parent chooses the life experience for a child, taking responsibility for the rules followed and the outcome of the experience, the event remains foreign and the experience remains vicarious to the child. In other words, the child has no active role in the experience and feels little investment in it. However, when children are allowed to choose their experiences, to take responsibility for completing the tasks set before them, and when their actions affect the outcome, the experience becomes meaningful (Antonovsky, 1984).

Life experiences that lead to development of a strong sense of coherence.

The SOC is primarily developed in childhood, strengthened or weakened by adolescent experiences, and by the time the first decade of adult life has passed, is relatively stable for life (Antonovsky, 1987). Antonovsky likens the experience of infancy and childhood to an experiment in which children test a hypothesis stating that there is consistency, continuity and permanence in their lives (Antonovsky, 1987). Over time, children perceive whether or not their world contains these elements. This perception translates into the extent to which a strong or weak SOC begins to grow and exist within the child. Not only do children discover these elements in their worlds, they

also have the power to bring out these elements in their worlds by their response or lack of response to stimuli (Antonovsky, 1987).

Comprehensibility is found in children's ability to perceive that their environment is stable, has enough routine so that daily life makes sense, and that even when parents disappear for a time they can be counted on to reappear (Antonovsky, 1987; Erickson, 1963). Meaningfulness becomes evident through the attitude of authority figures, such as parents and teachers, toward the child. In addition, meaningfulness can be found in the quality of authority figure's responses to children's needs. Infants must learn that they matter to those who care for them (Antonovsky, 1987). Manageability is discovered primarily through parental guidance. If children are given tasks that suit their abilities and challenge them to grow, they are more likely to develop a strong SOC. Children who are given tasks that are overwhelming, and who lack the tools to deal with the task will likely fail, resulting in the development of a weaker SOC. Likewise, children who are not given challenges with which to deal are also more likely to develop a weaker SOC. Often, the stronger the parents' SOC, the more aware they will be of their child's experience to provide events that raise the child's SOC (Antonovsky, 1987).

When children are young and have fewer outside influences in their lives, the SOC may be steadily built with positive childhood experiences. However, as children age, their worlds become larger through increased social activities. This may allow more individuals to influence their SOC through positive or negative experiences (Antonovsky, 1987). In other words, as children age and their world expands, the more likely they will

experience more varied experiences that have the potential to either raise or lower their SOC (Antonovsky, 1987).

During adolescence, transformation from childhood to adulthood must occur. During this difficult time, tough choices must be made and decision making is often overwhelming. When a child has support from family and community, education is often seen as more valuable and family resources are mobilized for the child to use when necessary. These lessons allow adolescents to learn that their world is coherent, meaningful and manageable (Antonovsky, 1987). They can cope with the issues presented through life experience, and failures are seen as an opportunity to learn.

Finally, approximately 10 years after reaching adulthood, at approximately age 30, the strength or weakness of one's SOC is generally set. Through commitment to persons, social roles, and work experiences, the lessons of childhood and adolescence are either reinforced or reversed (Antonovsky, 1987). Through positive experiences in all of these areas, the SOC remains strong or may be strengthened. However, usually the gains or losses in the strength of the SOC by this time are relatively small. One exception may be among those who have job positions that are not socially valued, such as the housewife. Though a housewife may perceive coherence, manageability and meaningfulness in her work, the fact that the social world does not credit her for having a "job" may actually lower her SOC. Social validation of one's work is necessary, even if one's family places value in housework. The influence of the social world is extremely important to one's perception of achievement and meaningfulness of work (Antonovsky, 1987).

Generalized Resistance Resources

At the heart of the salutogenic model are generalized resistance resources (GRRs). According to Antonovsky (1979), the primary sources of GRRs include the following: material, knowledge, coping strategies, social support, ego identity, ability to make commitments, cultural stability, religion/philosophy/art, and preventive health orientation. GRRs are not associated with disease or a specific illness, rather, they arise from human experience. These are resources that an individuals feel they can call upon to use at any time to facilitate successful coping with the ubiquitous stressors in life (Antonovsky, 1979). Though individuals may not have direct access to these resources, if they know someone who is willing to share those resources should they be needed, they are likely to exhibit a stronger SOC.

The use of GRRs is not predicated on a specific type of coping, but it is common to those factors known to all cultures as successful mechanisms for coping with stressors (Antonovsky, 1993). These common factors, listed above, are combined in the SOC scale to measure that which is universally meaningful to individuals. The measurement of SOC attempts to eliminate differences in coping strategies across gender, social class, religion and culture (Antonovsky, 1993).

Antonovsky (1987) also provides an instrument for measuring the SOC that is considered valid and reliable (Eriksson & Lindstrom, 2006). This instrument, used to assess the sense of coherence (SOC), attempts to eliminate the differences in coping strategies across culture, religion, social class and gender (Antonovsky, 1993, Eriksson & Lindstrom, 2006). In the cultural diversity of the US, Antonovsky's Salutogenesis

Theory appears to be an ideal proposal to utilize in determining the effect of the SOC on perceived health status.

Summary

Antonovsky (1979, 1987) views health on a "health-ease/dis-ease continuum," based on the assumption that all individuals are not totally healthy, nor totally diseased. Key to Antonovsky's theory is the sense of coherence (SOC) which is defined as a global orientation leading toward a specific view about one's place in the environment and the perception of environmental effects on the individual (Antonovsky, 1979). The SOC consists of three major components termed comprehensibility, manageability, and meaningfulness . The more one views the world as making sense, as manageable and the tasks one sets out to do as meaningful, the stronger one's SOC. Inversely, the less one sees the world as comprehensible, manageable, and meaningful, the weaker one's SOC. Regardless of where an individual is located on the "health-ease/dis-ease continuum", the stronger the SOC, the more likely one is able to maintain health and if necessary, improve health status (Antonovsky, 1979). Antonovsky (1987) provides a theoretical model that can be utilized to explain how stressful situations evolve into either increased or decreased ability to cope resulting in a higher or lower sense of coherence (SOC). In addition, a valid and reliable instrument that assesses SOC is provided by the author of the theory (Eriksson & Lindstrom, 2006).

Purpose Statement

The purpose of this study was to determine the extent to which the sense of coherence (SOC) effects an individual's perception of health status among those aged 40 and over when other variables that are known to affect SOC are controlled. The dependent variable in this study design was perception of health status. The control variables include gender, age, marital status, presence of chronic disease, occupation, and socioeconomic status. Life changing events have also been postulated as having an effect on the perception of health status. This study also determined the extent to which life changing events have a moderating effect on the relationship between SOC and perception of health status.

Research Question

This study examined the effect of individuals' sense of coherence (SOC) on their perceived health status. Antonovsky (1987) theorized that individuals with a strong SOC would perceive their health status positively, and those with a weak SOC would likely perceive their health status more negatively. The effect of SOC on one's perception of health status may be moderated by the extent to which life changing events have occurred in one's life. A person's sense of coherence evolves through experience and the development of coping resources. Therefore, many variables present in persons' culture can evoke varied perceptions of their health status. These variables were controlled in the analysis and include age, gender, marital status, occupation, socioeconomic status, and the presence of chronic disease (as defined on page 17).

Life changing events such as death of a close family member, severe trauma, severe disability, divorce, being fired or laid off from a job, the addition of a new family member, an outstanding personal achievement, and retirement were also hypothesized as having an effect on perceived health status. Potential effects occur by providing additional challenge to one's life, or by adding one or more difficulties with which one cannot cope. It was viewed as a possibility that the effect of sense of coherence on perceived health status would differ according to the incidence, intensity and timing of life changing events that individuals have experienced. Thus, my research question was as follows:

> To what extent is perceived health status determined by SOC, and do life changing events moderate this relationship when controlling for age, gender, socioeconomic status, marital status, occupation and the presence of chronic disease?

Research Hypothesis

When controlling for age, gender, marital status, occupation, socioeconomic status, the presence of chronic disease and the occurrence, intensity and the amount of time that has passed since life changing events have occurred, individuals' sense of coherence is directly related to their perception of health status.

Definition of Terms

The following terms have been defined for the purposes of this study.

1) Sense of coherence indicates the ability of an individual to avoid physical or psychological illness due to accrual of psychological, social and interpersonal coping

methods unique to the person. According to Antonovsky (1987), the operational definition of the sense of coherence is as follows:

> A global orientation that expresses the extent to which one has a pervasive enduring though dynamic feeling of confidence that (1) stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable; (2) the resources are available to one to meet the demands posed by these stimuli; and (3) these demands are challenges, worthy of investment and engagement (p. 19).

In this study, the sense of coherence was operationalized through the score obtained on the Orientation to Life Questionnaire (Antonovsky, 1987).

2) Perceived health status is defined as an individual's evaluation of subjective health based on the ability to normally function cognitively, socially and physically. This definition is based on individual "perceptions of her/his position in life in the context of her/his particular culture and value systems and in relation to her/his personal goals, expectation, standards and concerns" (Patrick, Kinne, Engelberg, & Pearlman, 2000). In this study, perceived health status was operationalized through the score obtained on the Health Quality of Life Questionnaire (Patrick, Danis, Southerland, & Hong, 1988).

3) Life-changing events, for the purposes of this study, will include death of a close family member, severe trauma, severe disability, divorce, being fired or laid off from

a job, addition of a new family member, an outstanding personal achievement, and retirement.

This study measured life changing events in three different ways. The incidence was measured by simply asking respondents if they had ever experienced each of the life changing events in the course of life. The intensity of life changing events was measured via a self-reported assessment of the severity of the event. Finally, the time in one's life the event occurred was measured by asking individuals to record the number of months since the life changing event had last occurred. The incidence was recorded as a categorical variable, and intensity and the time that had elapsed since the most recent occurrence of life changing events were recorded as continuous variables.

4) Occupation, in this study, will be recorded as either blue collar or white collar work. Blue collar workers include those in industrial and manual labor. White collar workers include those skilled in a particular area and generally work in salaried positions. Occupation was operationalized by asking individuals about their occupation on the demographic questionnaire.

5) Chronic disease includes those ailments that have a long course of illness, lasting three months or more, and are rarely cured by medication or treatment (CDC, 2007). For the purposes of this study, we will question respondents about the name of the chronic disease they purport to have contracted, and also ask how long they have been suffering from the ailment. Chronic disease is operationalized by asking one question about chronic disease on the demographic questionnaire.

Basic Assumptions

The following assumptions were made by the researcher:

1) Participants will provide reliable responses to the questions asked in the instruments.

2) Instruments used in this study are valid and measure the concepts of interest.

Delimitations

1) This study was limited to individuals aged 40 and older in the geographical area of Nashville and Murfreesboro, Tennessee, who were asked to send the survey link to individuals they knew who were aged 40 and older throughout the country.

2) The sampling procedure, snowball sampling, potentially limits the generalization of results to a broader sample because this type of sampling does not result in a probability sample of the population.

Significance of the Study

The ability to cope with stressful situations is of great importance to one's ability to maintain or improve one's health status. The accumulation of quality resources to cope with the stressors one encounters is also of paramount importance. Of greatest importance are individuals' perceptions of their ability to cope with the circumstances they face. This study aimed to discover whether life-changing events moderate the relationship between SOC and perception of health status. The literature suggests that one's positive perception of life events will positively correlate with one's sense of coherence (SOC) score which positively correlates with one's perception of health status,

whereas, a negative perception of life events leads to a negative correlation with SOC and therefore a negative correlation with one's perception of health status reducing one's resistance to disease. The aim of this investigation is to determine whether persons' level of SOC effects their perception of health status. Understanding the dynamic between SOC and perception of health status, as well as the effect of life-changing events could lead to more public health emphasis on building generalized resistance resources from the beginning of life, therefore leading to greater perception of health status. It may also be beneficial to provide more support for those experiencing life-changing events.

CHAPTER II

LITERATURE REVIEW

Antonovsky's (1979, 1987) claim that the "sense of coherence," the dominant focus of his theory, is a determinant of perceived health status will be examined in this chapter. The current model in place is the medical model. The medical model has limited use because the focus of health has changed from eradication of acute bacterial and viral disease to the restoration of optimal health in chronic illness. Antonovsky introduces a novel approach to viewing and understanding health and prevention of disease. This chapter begins by examining the medical model, and compares this model with Antonovsky's model, Salutogenesis.

The Medical Model

Early models of health were developed based on germ theory. Discovered by Louis Pasteur in 1862, the theory posits that microorganisms cause disease in our bodies. This discovery placed the emphasis of health care in the United States (US) on controlling the growth and spread of microorganisms thought to transmit contagious disease (Cottrell, Girvan, & McKenzie, 2006). The current medical model stems from this early discovery. In this model, individuals are seen as either healthy or diseased. Those who are healthy are assumed to be "normal," and those who are diseased are viewed as deviant (Antonovsky, 1984).

The components of the medical model are as follows: 1) the individual presents with a problem or complaint, 2) there is an explanation available for the complaint/problem, 3) theory and/or knowledge of the condition are sufficient to posit a resolution to the problem, 4) a therapy is designed to resolve the problem, and 5) the individuals' symptoms are reduced and their health brought back to homeostasis (Wampold, Ahn, & Coleman, 2001). Those using the medical model perceive the body as a finely tuned, functioning mechanical structure with interlocking systems (Hewa & Hetherington, 1995). During healthy times, the body is designed to maintain a certain level of balance, and all systems function properly. Disease, as defined by those using the medical model, is caused by either some type of organism outside the body that gains entrance and causes illness, or by bodily machinery that wears out and fails to function properly (Weick, 1983). In addition to disease originating from outside the body, particularly in the case of germs, treatment is also implemented from outside the body, often ordered and performed by an expert whose judgment of the problem confers meaning to both the disease process and the treatment (Weick, 1983). The interactions in this set of circumstances are primarily one-on-one discourse between patients and their health care practitioner. In addition, practitioners are primarily observing the disease and symptomatology of the patient, often not concerning themselves with the context of the patient's circumstances.

The medical model has served humanity well over the years as the primary tool used to discover disease causing organisms, create vaccines for contagious disease, and provide sterile techniques so that surgery and other procedures are safer and free of

infectious processes (Cottrell et al., 2006). In other words, the medical model works well in acute disease processes, however it falls short on the diagnosis and care of those with chronic disease (Henderson & Scutchfield, 1989; Herz, 1979; Reed & Watson, 1994).

By approximately 1950, the negative impact of chronic disease became a public health issue and efforts at reducing chronic disease began (Derryberry, 2004). Rather than looking at a single criterion for health, health workers began to observe health in a more holistic fashion. The World Health Organization (WHO) defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946). This definition has since been expanded to include spiritual health and environmental health, and has also extrapolated two major types of mental health: intellectual health and emotional health (Donnatelle, 2007).

Because of the recent discoveries about health and health maintenance, the medical model no longer fits the current state of the nation's health well. External organisms may not cause heart disease, type II diabetes, or most cancers. Lifestyle issues have been cited as the primary cause of these problems (CDC, 2004; Peto, 2001). Increasingly, the medical community is becoming dissatisfied with the medical model since it only addresses biological issues and lacks attention to sociological, environmental, community, interpersonal, and behavioral influences on health (Allan & Hall, 1988; Barney, 1994; Engel, 1977; Henderson & Scutchfield, 1989; Hewa & Hetherington, 1995; Leigh, Price, Ciarcia, & Mirassou, 1982; Reed & Watson, 1994; Wampold et al., 2001; Weick, 1983; Westwood & Westwood, 1999). In addition, adherence by health practitioners to the medical model has taken the responsibility of

individuals' health out of their hands by suggesting that an expert is necessary in order to give meaning to physical ailments. Antonovsky's (1979) theory, Salutogenesis, emphasizes the importance of health promotion attempts to return the control of health back to individuals so that they can make meaningful and informed decisions about their health care and maintenance (Henderson & Scutchfield, 1989). Indeed, subjective assessment of the health issue is interpreted as a primary source of information when dealing with disease processes. This approach places the responsibility for health with individuals in concert with their physician and health care team, rather than solely relying on the advice or recommendation of a physician. In other words, individuals have a voice regarding their health care treatment.

Models used in Research with the Medical Model

There are many theories which focus on individual perception of health status and are closely related to, or use concepts formally introduced in Aaron Antonovsky's theory of Salutogenesis (1987). A theory that closely mirrors that of Salutogenesis is Transactional Model of Stress and Coping (Lazarus, 1993). This theory includes emotional assessment of events and closely aligns with Salutogenesis in all instances other than emotional appraisal. First, an individual appraises the stressor. Next, the individual determines the controllability of the stressor and the resources available to cope with the issue. Then the individual copes with the stressor, either by managing the problem or emotionally changing one's feelings about the stressor. Finally, one copes successfully or unsuccessfully resulting in either a positive sense of well being, or a negative sense of the ability to cope with stressful life issues (Lazarus, 1993).

The instrument designed to measure methods of coping according to Lazarus' (1993) model has been used occasionally (Folkman & Lazarus, 1988), though not always to test Lazarus' (1993) model (Chan, 2003). Many different measures have been used to assess the Transactional Model of Stress and Coping making it difficult to observe the theory's usefulness across different populations. For instance, surveys constructed specifically for Glacier National Park were used in a study which found that cognitive adjustments were more likely to evoke a lower stress level (Miller & McCool, 2003). In another related study, the Perceived Risk of Cancer Scale and the Spiritual Well-Being Scale were administered to test the Transactional Model of Stress and Coping. Results of this study found that spirituality was associated with less distress and a greater quality of life regardless of perceived life threat in cancer patients (Laubmeier, Zakowski, & Bair, 2004). The assessment of factors affecting antiretroviral adherence among African Americans was completed through instrumentation constructed specifically for that study. Results showed that only perception of efficacy of antiretroviral therapy and forgetting to take medication (as a barrier) were related to adherence to antiretroviral therapy (Harzke et al., 2004). The Collective Self-Esteem scale, the Rosenberg Self-Esteem scale and the Hospital Anxiety and Depression scale were used to estimate the relationship between perceived ethnic discrimination and psychological distress in a sample of ethnic young people (Cassidy, O'Connor, Howe, & Warden, 2004). This study found that both forms of self-esteem mediated the relationship between ethnic discrimination and psychological distress for men, but not for women. There appears to be no one instrument to measure the Transactional Model of Stress and Coping.

Much of current research using the Transactional Model of Stress and Coping tests its ability to fit situations against other models (Cassidy et al., 2004; Gooding, Organista, Burack, & Biesecker, 2006), or at least in conjunction with other models (Gall et al., 2005). Lazarus' (1993) theory has been used often in the US and Canada. Little research using this model has occurred outside that geographical area.

Another theory focusing on perception of health status is that of the Hardy Personality Theory (Kobasa, 1979). The definition of hardiness includes a strong commitment to oneself, an attitude of vigor toward one's environment, a sense of meaningfulness in life, and an internal locus of control. Kobasa (1979) tested the stressfulness of life events among a group of middle and upper level executives by having them complete a questionnaire regarding various events that had occurred in their lives over the past three years. Based on responses, participants were placed in either the high stress/high illness group, or the high stress/low illness group. Within 3 months of testing, the two groups were mailed another questionnaire consisting of personality tests. Data from approximately half of each group were used to test hypotheses regarding hardiness in each group. The remaining data from each group were used to cross-validate the results. Kobasa (1979) found that individuals with high stress/low illness were more likely to be hardy than were high stress/high illness participants.

Kobasa's (1979) model has been used in various studies internationally. In the US and Canada, women, undergraduates and adults were studied to determine their coping strategies in stressful situations and resistance to stress-induced illness (Allred & Smith, 1989; Crowley, Hayslip, & Hobdy, 2003; Foster & Dion, 2003). This model has

been successfully used in Hong Kong to assess teacher burnout (Chan, 2003), and in Australia to examine nurse stress levels in dealing with aggressive dementia patients (Rodney, 2000). These studies show that it is possible that the Hardy Personality Theory can be applied to cross-cultural boundaries. Unfortunately, this theoretical approach tends to measure only cognition, without the benefit of measuring social interaction affects and the impact of personal meaning in context (Allred & Smith, 1989; Chan, 2003; Crowley et al., 2003; Rodney, 2000). Similar to research done in Lazarus' (1993) theory, many different instruments are used to measure hardiness, such as the Chinese Hardiness scale (Chan, 2003), the Personal Views Survey (Crowley et al., 2003; Foster & Dion, 2003), and those produced specifically for the intended study. All of the instruments listed were not produced by Kobasa (1979) nor her colleagues in research.

Bandura's (1977) theory of Self-Efficacy also measures stress and one's perception of health status(Bandura, 1977). Bandura's (1977) theory is more focused on behavioral change than are the others (Geyer, 1997). This theory states that self-efficacy is derived from 4 major sources: performance accomplishments (mastery), vicarious experience, verbal persuasion, and physiological states.

Bandura's (1977) model has been used a great deal in behavioral studies in which performance is influenced by Self-Efficacy (Brosnan, 1998; Sanna, 1992; Vancouver, Thompson, & Williams, 2001). Other studies have tested components of the theory to determine its role in particular contexts (Berry & West, 1993; Whyte, Saks, & Hook, 1997). Examples of instruments which measure Self-Efficacy include the Jenkins Self-Efficacy Expectation Scales (Carroll, 1995) and an Occupation Questionnaire specifically

constructed for a particular study (Church, Teresa, Rosebrook, & Szendre, 1992). The Self-Efficacy model has been used successfully in many areas of study, particularly in the US. One criticism has been directed at the imprecise operationalization of Self-Efficacy theory which limits its potential use, particularly in HIV prevention studies (Forsyth & Carey, 1998).

Wallston (2007) has extended Bandura's (1977) theory of Self-Efficacy and Kobasa's (1979) Hardiness theory to develop the theory of Perceived Health Competence. This theory adds to previous research by calculating the amount of control individuals have in the health care choices they make in conjunction with health care providers. Wallston's (2007) model is a more clinical approach to measuring control, self-efficacy, and hardiness than either Kobasa (1979) or Bandura's (1977) approaches, and has been used primarily in the clinical setting. Two studies, which examine health competence among diabetics, use a specific instrument for measurement (Elasy et al., 2000; Wallston, Rothman, & Cherrington, 2007). This theoretical base, similar to Bandura's (1977) theory of Self-Efficacy, is geared primarily toward health behaviors (Christensen, Weiebe, Benotsch, & Lawton, 1996; Marks & Lutgendorf, 1999)

The Transactional Method of Stress and Coping formulated by Lazarus (1993), the Hardy Personality constructed by Kobasa (1979), the Theory of Self-Efficacy structured by Bandura (1977), and Wallston's (2007) Perceived Health Competence theory have primarily been used in research conducted in the United States (US). Antonovsky's theory of Salutogenesis, however, has been studied in at least 32 different countries worldwide, and the instrument used to determine the key element of this theory,

the sense of coherence (SOC), has been translated into 33 different languages (Antonovsky, 1993; Eriksson & Lindstrom, 2006). The use of Antonovsky's (1987) model has been utilized in many different countries with positive results. It makes sense that this instrument would be useful in a multicultural population such as the U.S.

Salutogenesis: A New View of Health

Antonovsky's (1987) model, Salutogenesis, which focuses on staying healthy, and places individuals on a "health-ease/dis-ease continuum", is a more effective model given the present state of health in the U.S. and worldwide populations. Rather than observing the relative health of individuals, the medical model focuses more on those who are diseased. Further, absence of disease is defined with relatively narrow parameters that fit an ideal perception of health an ideal that cannot be sustained by most persons for any length of time. The medical model is termed the pathogenic paradigm (Antonovsky, 1987). Research based on the pathogenic model continues to be used in medical research today since most medical research concerns itself with discovering why individuals become diseased, rather than how they maintain their health. Antonovsky's model has been used, with varying degrees of effectiveness, in research using the pathogenic paradigm.

Antonovsky's model has often been applied in cases where disease processes are already present in individuals, giving a somewhat biased perception of the data. It is unclear if the stress of chronic disease reduces an individual's SOC or if a lower SOC prior to prognosis of a chronic disease increased susceptibility to the disease. Some examples include the following: elders receiving psychiatric care were studied to

determine whether depression, hope, and integrity were linked with SOC (Chimich & Nekolaichuk, 2004), social support has been shown to restore SOC in depression (I. Skarsater, Langius, Agren, Haggstrom, & Dencker, 2005), and vitiligo patients with visible lesions have a lower SOC than do those with lesions that are easily covered by clothing (Schmid-Ott et al., 2007).

Other studies have been conducted in which an individual's health is the focus of the study. However, within these studies, vestiges of the pathogenic paradigm remain. Rather than discovering factors that keep people healthy, factors that cause disease were studied. In one of these studies, a link between low SOC and the receipt of disability pensions was suggested (Suominen et al., 2005). In another related study, a high SOC was correlated with delayed risk of obtaining cancer in men aged 55 and over (Poppius, Virkkunen, Hakama, & Tenkanen, 2006).

The movement toward changing personal behavior to maintain health is gaining strength. Unfortunately, the principal focus of health care remains centered on why individuals become diseased. Aaron Antonovsky's (1987) salutogenic model looks at health and wellness from the standpoint of health rather than disease, and attempts to determine why people remain healthy (Antonovsky, 1984).

Generalized Resistance Resources (GRRs) and Sense of Coherence

A study of 320 Finnish elders investigated how well GRRs facilitate one's SOC and thereby sustain health (Read, Aunola, Feldt, Leinonen, & Ruoppila, 2005). The GRRs investigated were family income, marital status, cognitive function, physical

activity, and years of formal education. A strong SOC was associated with increased cognitive functioning and high levels of physical activity among the entire sample. Marital status was associated with a strong SOC in men.

A study of 20,579 individuals aged 41–80 suggested that the ability to adapt to stressful life events was associated with SOC. Subsequent deaths of those involved in the study were obtained from the UK Office for National Statistics (Surtees, Wainwright, Luben &Khaw, 2006). SOC was found to be strongest among those 60-69 years of age. Women had lower SOC scores and reported more adverse events than did men, and the ability to adapt to stress was associated with mortality. Adjusting for age and gender, for every standard deviation increase in adaptation, a 6% decrease in mortality rate was seen after adjusting for age and gender (Surtees et al, 2006).

Coping mechanisms were measured in a population that consisted of adult children who had been raised by parents with at least 3 risk factors for mental and behavioral disorders. Interviews focusing on life crises of 148 persons were conducted. Subjects were then asked to fill out questionnaires (SOC, Health Sickness Rating Scale, Quality of Life scale, self ratings of Mastery and Locus of Control). SOC was associated with combined coping mechanisms, and the most used coping skills were problem solving, support networks and optimism (Cederblad, Dahlin, Hagnell, & Hansson, 1995).

Mortality from any cause and its relationship with SOC was observed for 6 years in 20,579 participants in the Norfolk, UK study (Surtees et al, 2003). Researchers found that a strong SOC may confer some resilience to risk of death due to chronic disease. In summary, GRRs, accumulated from the time of birth, are resources upon which

individuals may draw to cope with stressful events in life. These resources have been shown to confer some resilience to the stressors individuals encounter in daily life.

Sense of Coherence and Gender

The sense of coherence was proposed as a global orientation that cuts across lines of gender, social class, region and culture (Antonovsky, 1993). However, gender differences in SOC have been reported in several studies. Some studies report only frequency data for gender (Chimich & Nekolaichuk, 2004; Poppius, Virkkunen, Khakama & Tenkanen, 2006; Skarsater, Langius, Agren, Haggstrom & Dencker, 2005; Tagay, Herpertz, Langkafel, & Senf, 2005). Other studies control for gender making conclusive findings difficult to interpret (Cederblad et al, 1995; Suominen, Gould, Ahvenainen, Vahtera, Uutela & Koskenvuo, 2005). The consensus of studies focused on gender is that males have a stronger SOC than do females when controlling for age (Axelsson, Andersson, Hakansson, & Ejlertsson, 2005; Surtees, Wainwright, Luben, & Khaw, 2006; Surtees, Wainwright, Luben, Khaw, & Day, 2003). Results of a single study suggested that gender has no effect on SOC (Schmid-Ott, Kunsebeck, Jecht, Shimshoni, Lazaroff, & Schallmayer, 2007). In a meta analysis of the sense of coherence scale and its use in studies worldwide, the authors concluded that generally males have a stronger SOC than do females, though the differences may be minor (Eriksson & Lindstrom, 2005).

A longitudinal study exploring the stability of SOC over time was completed by Nilsson et al (2003). The findings of this study showed that women who had experienced psychosocial changes in the previous five-year time period scored significantly lower on

their SOC than men who had experienced psychosocial changes. Additionally, women who had experienced psychosocial changes had a weaker SOC than both men and women who had not experienced psychosocial changes (Nilsson, Holmgren, Stegmayr, & Westman, 2003). In summary, when controlling for age, most studies have shown that males have a stronger SOC than do females, though the differences may not have statistical significance.

Sense of Coherence and Age

According to Salutogenesis, the SOC has been relatively well established by age 30, and changes which occur after that age are slight. Larger changes that do occur after the age of 30, generally occur for those who have an initially low SOC (Antonovsky, 1987), and most often the result is that of a decreasing SOC (Antonovsky, 1987; Poppius, Virkkunen, Hakama, & Tenkanen, 2006). These studies have primarily been done to determine the stability of the SOC with age. Most of these findings have been among European populations. The US population may be considerably different due to the differences in health care policy.

These divergent results can be seen in other research that has been done to study disease processes and SOC. A study of the Finnish population has reported that SOC improved with age at all age levels, yet those aged 56 and over had the strongest SOC (Poppius et al., 2006). In one 5 year longitudinal study of the Swedish population, SOC showed the greatest decrease in the oldest group, aged 45-74 (Nilsson et al., 2003). A United Kingdom study reported SOC was strongest among those aged 60-69 years (Surtees, Wainwright, Luben, Khaw, & Day, 2006).

A meta analysis showed that the SOC tends to increase with age among European populations, particularly when using the 29-item scale (Eriksson & Lindstrom, 2005). Those who are the oldest tend to have the highest SOC, and the inverse is also true—those who are youngest have the lowest SOC. Eighteen year old college students in the United States (US) reported an SOC of 131 (Hittner, 2000), 37 year old French adults reported an SOC of 133.60 (Gana, 2001), 76 year old women in the US reported an SOC of 157.21 (Nesbitt & Heidrich, 2000), and 81 year old US citizens reported an SOC of 158.90 (Lewis, 1996). In summary, though Antonovsky theorized that SOC is stable by age 30, current studies indicate that it may increase with age. Therefore, it may be wise to control for age in research on this topic as in the current dissertation study.

Sense of Coherence and Socioeconomic Status

Antonovsky (1979, 1987) theorized that individuals with a low socioeconomic status would be more likely to have a weak SOC, primarily because they do not have the same resources as those with more income and education (Antonovsky, 1979, 1987). A study of a Canadian population supports Antonovsky's (1979, 1987) claim in the finding that those with a lower household income had weaker SOCs (Smith, Breslin, & Beaton, 2003). In summary, previous studies of individuals with low socioeconomic status tend to show a correlation with weaker SOC.

Sense of Coherence and Marital Status

The results of studies regarding differences in SOC and marital status have demonstrated that generally, those who are married or partnered have a stronger SOC

than those who are unmarried (Jahnsen, Villien, Stanghelle, & Holm, 2002; Read, Aunola, Feldt, Leinonen & Ruoppila, 2005; Soskolne, 2001). Among Soviet women immigrating to Israel, single mothers had a significantly lower SOC than did married mothers, primarily due to lack of social support within the community (Soskolne, 2001). In a study of Finnish people aged 65-69, men who were married or partnered had a significantly higher SOC than those who were single (Read et al., 2005). Even among individuals with chronic disease, differences in SOC have been found among those who are and are not partnered. Norwegians with mild to moderate cerebral palsy who were married or partnered had a higher SOC than those who were single (Jahnsen et al, 2002). In summary, studies show that being married or partnered tends to increase an individual's SOC.

Sense of Coherence and Occupation

Differences in SOC among white collar and blue collar workers have been found in previous studies. In an 8-year longitudinal Finnish study of 23,531 men who were 40-55 at the time of recruitment, white collar workers with a strong SOC were found to be less likely to succumb to disease than were other occupational groups (Poppius et al, 2006). In addition, blue collar workers were more likely to have a weak SOC . In this same study, the health benefits of a strong SOC were found to be significant among white collar workers, but not blue collar workers (Poppius et al, 2006). A 4-year longitudinal study of 6,790 Canadians demonstrated that a weak SOC had health implications for unskilled laborers, but there were no significant health benefits for those with a strong SOC (Smith et al., 2003). In summary, studies demonstrate that the effect of

occupational level on SOC demonstrates that white collar workers generally have a stronger SOC with positive, though insignificant, health benefits. However, more in depth study is required to determine occupational factors that may influence the relationship.

Sense of Coherence and Chronic Disease

Chronic disease is endemic to the populations of the world, which supports Antonovsky's theoretical view that the normal state of the world is entropy (Antonovsky, 1979, 1987). Entropy has been defined as the process of degeneration marked by increasing degrees of uncertainty, disorder and chaos (Accent Software International, 1998). The instant a stressor is introduced into an individual's life, entropy becomes a part of the equation of possible responses to the stressful event. In other words, if the response to the stressor is reduction of the sense of coherence (SOC), the possibility that an individual contracts illness is theoretically higher (Antonovsky, 1987). Chronic disease places stress on individuals' lives, and the lives of those close to them. The illness itself often entails a change in lifestyle, thereby placing more stress on individuals and their families. It seems logical, then, that those with chronic illness are likely to have a lower SOC than those who do not.

One study highlights the relationship between chronic disease and SOC. This longitudinal study demonstrated that chronic illness does indeed reduce one's SOC over the course of time. This study, exploring the stability of the SOC over 5 years found that 1,254 Swedish individuals in the 45-74 age group who had contracted a chronic illness

had a greater decrease in SOC than those who had not contracted such an illness (Nilsson et al., 2003).

Chronic disease leads to disability in many cases. A Finnish study of 2,196 subjects found that for every point of reduction in SOC among those under age 50 at the inception of the study, the odds of later obtaining a disability pension were 1.56:1. In other words, individuals who had a weak SOC were significantly more likely to become disabled than those who had a high SOC (Suominen et al., 2005).

The previously reviewed studies focused on physical illness and disability. Reduction in SOC over time has also been discovered in cases of mental illness. Elderly individuals without depression had a stronger SOC than those who were depressed (Chimich & Nekolaichuk, 2004). In summary, previous studies indicate that SOC tends to be lower for individuals who suffer from chronic illness, whether physical or mental, than those who do not have chronic health struggles.

Stability of the Sense of Coherence over Time

Antonovsky theorized that an individual's sense of coherence (SOC) would be fully developed and stabilized by age 30 (Antonovsky, 1987). After this point, Antonovsky postulated that changes in the SOC would be no greater than 10%, and would return to the original level once the crisis had subsided (Karlsson, Berglin, & Larsson, 2000). In addition, Antonovsky determined that the adults whose sense of coherence (SOC) was lower initially would see a greater variation in SOC over time (Antonovsky, 1987).

Longitudinal studies have shown mixed results regarding Antonovsky's theoretical position on the influence of time on SOC. There has been a consensus concerning the level of stability of the SOC. Though it remains stable, there is more than 10% variance of the SOC over time (Eriksson & Lindstrom, 2005). An analysis of studies using the SOC found that it is relatively stable for up to 10 years for those who have an initially strong SOC (Eriksson & Lindstrom, 2005). Antonovsky's (1987) proposal that those with an initially weak SOC would have a greater variation in SOC has also been found to be accurate through additional research. A 4-year longitudinal study of 6,790 Canadians, engaged in unskilled labor, had greater variation in SOC than did those engaged in skilled labor (Smith et al., 2003). The same study also showed that the SOC for 58% of the sample fluctuated more than 10% over the time of the study. In summary, though most studies agree that the SOC is stable over time, it is possible that the SOC is not as stable as originally theorized.

Perception of Health Status

Antonovsky (1984) proposed that the Sense of Coherence (SOC) would be predictive of an individual's health status. Perceived quality of life may be defined as an individual's evaluation of subjective health based on the ability to normally function cognitively, socially and physically. This definition is based on individual "perceptions of their position in life in the context of their particular culture and value systems, and in relation to their personal goals, expectations, standards and concerns" (Patrick, Danis, Southerland & Hong, 2000). The model, proposed by Patrick, addressing the perception of health status, includes all aspects of one's environment. Components of the perception

of health status model would therefore include one's personal values and preferences, cultural values, the impact of stress on one's perception of health, and the opportunity one has to change or correct the situation (Patrick et al., 2000). In other words, the perception of health status is a subjective evaluation of one's own health and life circumstances that can only be expressed by the individuals themselves.

Perception of health status has been studied using various health quality of life instruments with varying results. Some of these include the Health Index used in a Swedish study (Klang, Bjorvell, & Clyne, 1996), a questionnaire developed specifically for a study of psychotropic drug use in France (Empereur, Baumann, Alla, & Briancon, 2003), the Health Related Quality of Life scale used for measurement among a Spanish sample (Almenar-Perejo et al., 2006), the Philadelphia Geriatric Center Morale Scale employed in a study in Germany (Schneider, Driesch, Kruse, Neben, & Heuft, 2006), through the placement of a single item in a questionnaire (Nyamathi et al., 2004) and the Perceived Health Competence Scale in a study conducted in the US (Samuel-Hodge, DeVellis, Ammerman, Keyserling, & Elasy, 2002). As with many constructs, some researchers have ignored standard instrumentation and elected to test using self-generated items or questionnaires. Most of these studies have focused on populations in which participants are likely found closer to the disease side of Antonovsky's "health-ease/dis-ease continuum".

One example of those found closer to the disease end of the continuum includes a study of diabetic US women (McCollum, Hansen, Ghushchyan, & Sullivan, 2007). In this study of 3,640 participants, women were more likely to have mental and physical

limitations than were men. In addition, these participants self-rated their health status significantly higher than did men despite having higher body mass indexes, being older, and having more co-morbidities than men (McCollum et al., 2007).

Quality of life, before and after disease diagnosis, has also been studied. Patients with heart failure, warranting heart transplantation, were found to have significantly impaired health-related quality of life prior to surgery, compared with 3 months, 6 months and 12 months post surgery scores (Almenar-Perejo et al., 2006). Seventy percent of lung cancer survivors who were disease free for a minimum of 5 years reported having good to excellent health (Evangelista, Sarna, Brecht, Padilla, & Chen, 2003). Non-insulin-dependent diabetics rated their health related quality of life lower than controls who were not insulin dependent diabetics (Caldwell, Jaxter, Mitchell, Shetterly, & Hamman, 1998). In a mental health study regarding use of medications, researchers found that individuals who perceive their health status as poor are more likely to use psychotropic drugs than are those who perceive their health status more positively (Empereur et al., 2003).

Perception of health status has also been studied among populations who are closer to the healthy end of the "health-ease/dis-ease continuum." Included in these studies is a population of homeless men. Among a sample of 331 participants, nonveterans were more likely to report fair or poor perceptions of health status than were veterans. This finding likely reflects the ability of veterans to obtain medical care as opposed to reliance on Medicaid or other charitable organizations for health care support. In addition, those who did report a poor or fair perception of health status were also twice

as likely to have experienced depressive symptomatology (Nyamathi, Sands, Pattatucci-Aragon, Berg, leake, & Hahn, 2004).

Those who are disabled do not necessarily perceive themselves as being unhealthy. A qualitative study of 153 disabled persons was conducted to determine what factors influence a disabled individual's perception of health status, and how this view different from those who perceive disability as a problem. In this study, participants' perceived quality of life and health status was affected more by the level of pain they experience or the amount of fatigue they suffer than by perception of the disability as a threat to survival or a challenge to overcome (Albrecht & Devlieger, 1999).

In summary, perception of health status has been measured using various instruments. Though many studies have focused on the perception of health status among those closer to the disease end of the "health-ease/dis-ease continuum," some studies have been conducted among those who perceive their health status quality as high. Those with disease or disability may perceive their subjective health status more positively than do external observers of these individuals' health.

Life-Changing Events

Antonovsky identified several life-changing events which, depending upon how an individual chooses to perceive the issue, may temporarily change one's level of sense of coherence (SOC). When one sees crises as challenges, one's SOC is increased through experiencing the event. On the other hand, when these life experiences are perceived as truly distressful, there is an increased likelihood that one's SOC will decrease, albeit

perhaps temporarily. The life-changing events identified by Antonovsky (1987) include cultural marker events that cause transitions in life: marriage, the birth of a child, death of individuals to whom one is close, loss of a job and severe trauma. Other researchers have identified additional life-changing events.

Wheaton (1990) identifies job loss, divorce, retirement, and attaining recognition or a job promotion as other transitions that can cause uncertainty in one's life. Retirement has been affirmed as a life changing event among Holocaust survivors in Israel (Sagy & Antonovsky, 1992). A qualitative content analysis was performed with two women whose life stories were very similar—both had survived the Holocaust, were born the same year, and neither were the first or last born of four children. Their life histories and perceptions of life were different, which accounted for their weak and strong SOC. A comparison of their life stories highlighted that despite highly destructive experiences, the woman who perceived life as challenging was able to maintain her SOC into her retirement years, whereas the woman who was defeated by the crises in her life experienced a weakening SOC over her life course (Sagy & Antonovsky, 1992).

Disability presents individuals with challenges that are often objectively considered negative. Aging is also viewed as negative in the US social sphere (Barrett, 2003). Disability tends to be associated with age, as it is well known that functional limitation incidence increases with age (Dunlop, Manheim, Sohn, Liu, & Chang, 2002). The social aspect of the SOC, in which individuals must feel appreciated in their social role, is disrupted by aging and disability since both are considered deviant in US culture (Antonovsky, 1987). The presence of disability may increase stress due to increased

dependence on others, or the necessity of making major changes in routines and activities of daily living (Dunlop, Manheim, Song, Lyons, & Chang, 2005). In addition, disability may increase the likelihood of depression, which increases the likelihood of further disability (Dunlop et al., 2005). Antonovsky (1987) theorizes that severe disability is a life changing event.

In summary, theorists have defined many potentially life-changing events, both negative and positive. For instance, having a child or getting married are both considered positive events in an individual's life, though both cause a great deal of stress. Severe disability or divorce may be considered negative events, yet some individuals may be challenged by these life experiences and show an increase in their SOC because they are able to cope with the stressors successfully. For the purposes of this study, life-changing events will include death of a close family member, severe trauma, severe disability, divorce, being fired or laid off from a job, addition of a new family member, an outstanding personal achievement, and retirement.

A great deal of research has been done regarding SOC and its association with the control variables in this study. There are fewer studies regarding SOC and the life changing events variables. The research done thus far indicates that it may be wise to control for these variables. In addition, life changing events variables may have some affect on SOC as Antonovsky (1987) proposed.

CHAPTER III

METHODOLOGY

The purpose of this study was to examine the effect sense of coherence (SOC) on perceived health status. Specifically, the strength of an individual's SOC is theorized to have an effect on one's perception of one's health status. This effect may be different depending upon the occurrence, impact, and timing of life changing events individuals have experienced over the course of their lives. The relationship between SOC and perceived health status was first examined. After this was established, the effect of life changing events on this relationship was observed.

Study Design

This investigation was a cross-sectional study using self-report questionnaires to measure SOC, perceived health status, life changing events, age, gender, marital status, socioeconomic status, occupation, and the presence of chronic disease. Self-report studies have the advantage of providing a one-time glimpse of how individuals perceive their situation on a given day at a given time. However, the status of persons completing a self-report changes as they gain life experiences (Timmereck, 2002). Studies extracting information about past events have an increased disadvantage as recall accuracy of the information provided may be lacking. Individuals may not remember past events accurately, or fail to consider these events as important enough to disclose. In other instances, the events themselves may be too embarrassing to reveal, even in a

questionnaire when responses are anonymous (Timmereck, 2002). In spite of these disadvantages, this study has the potential to provide valuable information to the health field by highlighting a model more applicable to the current health situation in the US. Potential findings may offer information for health promotion programs, and may offer support for how positive life experiences for individuals from the time of birth can serve as a health benefit through the course of life.

First, data was analyzed to determine the effect of SOC on perceived health status. After this initial phase of analysis was completed, data was again analyzed to observe changes in SOC with respect to the number and impact life changing events have had on an individual. The researcher expected life-changing events to have a moderating effect on SOC and perceived health status.

Participants

A total of 275 completed questionnaires from individuals aged 40 and over were obtained through internet and individual solicitation. Individuals were contacted within churches, mental health organizations, venues offering medical or alternative medical treatments, non-traditional college students and service organizations such as the local city councils, police departments, and local manufacturing plants. The snowball sampling procedure was used by first contacting individuals, then asking them to forward the survey link to anyone they knew aged 40 and older.

Instrumentation

Three questionnaires were completed by participants.

1) Demographic and life events questionnaire

The demographic questionnaire assessed each participant's age, gender, marital status, socioeconomic status, occupation and the presence of chronic disease. In addition, both closed and open-ended questions about life-changing events were asked to determine the impact these occurrences had on the individual. By asking open-ended questions, the researcher attempted to determine if there are factors about the event or the available resources that determine how individuals cope with these experiences. In addition, valuable information about how life changing events were perceived and defined was obtained through this question. The life-changing events studied include: death of a close family member, severe trauma, severe disability, divorce, being fired or laid off from a job, addition of a new family member, an outstanding personal achievement, and retirement.

This study measured life changing events in three different ways. The incidence was measured by simply having the respondent record whether or not the particular event had ever occurred in his/her life. The intensity of life changing events was measured via a self-reported assessment of the severity of the event. Persons who did not experience a life changing event were assigned a score of 5 (neutral) for the impact of this event on their lives. Finally, the amount of time that had elapsed since the most recent occurrence of the event was also measured. The incidence of life changing events was recorded as a

categorical variable, and intensity and timing of life changing events were recorded as continuous variables.

The final question in the demographic and life changing events questionnaire was a qualitative question. It read, please describe each experience you have had (death of a close family member, severe disability, being fired from a job, addition of a new family member, outstanding personal achievement, severe trauma, divorce, being laid off from a job, and retirement) to the extent you are comfortable sharing. A copy of the questionnaire can be seen in Appendix B.1.

2) Sense of coherence.

The Orientation to Life Questionnaire (Antonovsky, 1987) measured the degree to which life situations were perceived as comprehensible, manageable and meaningful, therefore comprising a sense of coherence (SOC). The OLQ is a 13-item self-report questionnaire. Participants were asked to indicate level of agreement with statements using a 5-point Likert scale. Scoring was obtained by simply summing the results of all 13 items and dividing by 13, with a total score range of 1 to 5. Of the 13 questions, 5 are reverse coded to obtain the OLQ score, and these include the following questions: do you have the feeling that you don't really care about what goes on around you?, has it happened in the past that you were surprised by the behavior of people whom you thought you knew well?, has it happened that people whom you counted on disappointed you?, doing the things you do every day is a source of deep pleasure and satisfaction or a source of pain and boredom?, and many people sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past? A low score on the

OLQ indicates a weak SOC, whereas a high score indicates a strong SOC. The OLQ consists of 3 subscales measuring comprehensibility, manageability and meaningfulness. Of the 13 questions in the scale, 4 measure meaningfulness, 5 measure comprehensibility, and 4 measure manageability. For regression analysis, an index was created to increase the accuracy of the results. This index was treated as a unidimensional index.

A pilot study of 142 participants using the OLQ was completed to determine the survey's effectiveness on a US population. Of this group, 102 (72%) were female and 40 (28%) were male. The age ranged from 31-92 years with a mean age of 58.6 years. The internal consistency of the Orientation to Life Questionnaire was tested. The Chronbach's Alpha statistic, used to test for reliability of the scale, was .85 which indicates that this scale is a reliable tool for this population.

Subsequent to the pilot study, an analysis of the results was done using Rasch Modeling. This analysis indicated that a 5 point response scale would more effectively measure participant response. As a result, rather than a 7 point response scale used in the pilot study and proposed by Antonovsky, a 5 point response scale was used in this study. A copy of the scale can be observed in Appendix B.2.

The OLQ has proven psychometrically sound (Antonovsky, 1993; Eriksson & Lindstrom, 2005; Feldt et al., 2007). The internal consistency of the 13-item scale used in cross-sectional research, measured by Chronbach's alpha has ranged from 0.70 to 0.92 (Antonovsky, 1993; Eriksson & Lindstrom, 2005; Feldt et al., 2007). The questionnaire tends to be more valid and reliable among those over age 30 (Feldt et al., 2007). Internal consistency, again measured by Chronbach's alpha, with longitudinal data using the 13-

item scale ranges from 0.77 after 18 months to 0.54 after 10 years (Eriksson & Lindstrom, 2005).

The criterion validity of the OLQ indicates high negative correlations with anxiety and depression (-0.65 or lower), and high positive correlations (0.65 or higher) with optimism, self-esteem, and high quality of life (Eriksson & Lindstrom, 2005). Moderate correlations (0.35 – 0.65) with life events have been found, and slight correlations (0.20-0.35) with attitudes and behaviors have been shown (Eriksson & Lindstrom, 2005). The OLQ shows a comparatively high predictive validity in most studies (Eriksson & Lindstrom, 2005).

Face validity of the scale has also been found to be acceptable. Respondents generally find the questionnaire easy to complete (Eriksson & Lindstrom, 2005; Lee, Jones, & Mineayama, 2002). In Japan and China, some items concerning comprehensibility and manageability caused some problems, however, in studies involving Swiss Pentecostalists, these issues did not arise (Eriksson & Lindstrom, 2005; Langius & Bjorvell, 2001).

Construct validity of the scale seems somewhat vague. Antonovsky's intention was to use the OLQ as a whole, thereby not examining the three subscales separately (Eriksson & Lindstrom, 2005). Some testing has been done on the three original factors Antonovsky proposed for the scale. Factor analysis in some studies has confirmed only one factor (Eriksson & Lindstrom, 2005; Klepp, Asa, Sorensen, Sandanger, & Kleiner, 2007). A study on Finnish employees has confirmed the three factor model (Feldt et al., 2007). Factor analysis in a study of Swedish students confirmed a five factor model in e

Study Model

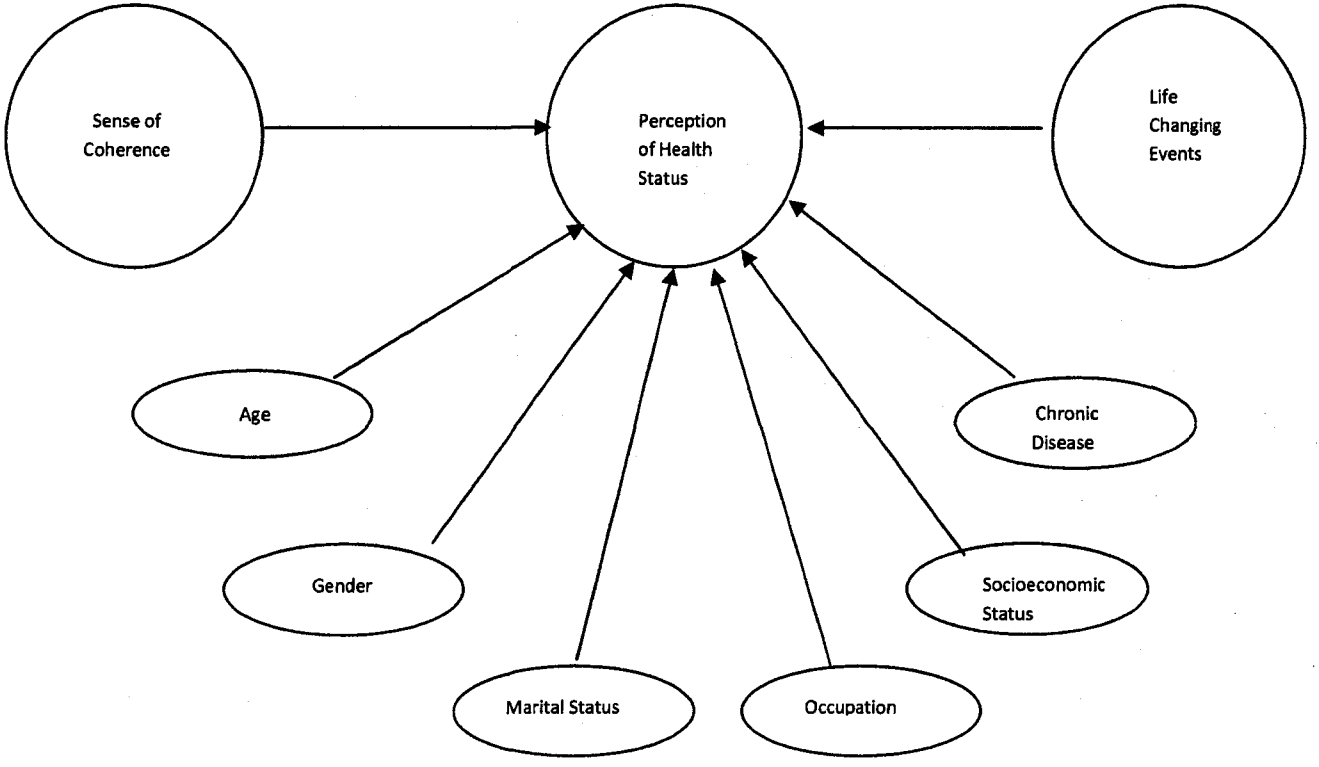


Figure 1

which only the meaningfulness subscale from the original three factor model was included (von Bothmer & Fridlund, 2003).

Consensual validity of Antonovsky's original scale, the agreement of experts that a measure is valid, is moderate as well Erikkson & Lindstrom, 2005). Though most studies use either the 29-item or 13-item versions, currently, at least 15 versions of thOLQ exist with instruments that are specially designed to measure families (Sagy & Antonovsky, 1992), children (Margalit, Raviv, & Ankonina, 1992), and school coherence (Nash, 2002). Reasons for the construction of new scales vary. The original 29-item scale is often too long, or researchers want the scale to better cohere with other scales they used in their studies (Eriksson & Lindstrom, 2005).

The predictive validity of the OLQ scale is generally high. The OLQ scale indeed predicts the future outcome of health or disease among many different populations including post-traumatic stress victims, patients suffering from obesity, orthopedic injuries, schizophrenic patients and victims of disability (Eriksson & Lindstrom, 2005).

3) Health Quality of Life Questionnaire

In this study the Perceived Quality of Life Questionnaire (PQoL) was used to measure an individual's perceived health status. The questionnaire is relatively new and has been used successfully in a few studies (Caldwell et al., 1998; Patrick et al., 2000). Those researchers who developed the scale were also instrumental in the development of the 100 item scale approved for global use by the World Health Organization (Bonomi, Patrick, Bushnell, & Martin, 1999).

This 20-item scale measures perceptions of physical health (6 items), cognitive health (2 items) and social health (12 items). To date, there have been no known published tests of validity of this scale. It was originally introduced to determine the perceived quality of health status among individuals who were discharged from intensive care treatment (Patrick et al., 1988). Each item is answered on a scale of 0-10, 0 being extremely dissatisfied and 10 being extremely satisfied with life.

Perception of health status was recorded as a continuous variable. A low score on the PQoL indicates a negative perception of health status and a high score indicates a positive perceived health status. For regression analysis, asummated index was created to increase the accuracy of the results. This index was treated as a unidimensional index. A copy of the scale can be seen in Appendix B.3.

Procedures

Permission to conduct this study was obtained from the Internal Review Board (IRB) of Middle Tennessee State University. Individuals were given an informed consent form and were asked to complete the questionnaires. Participants were recruited by electronic mail informing them of the online survey and asking for their participation. Participants were then asked to forward the link to the survey to others aged 40 and older to complete the survey. IRB forms and approval letters can be seen in Appendix A.

Power Analyses

Prior to data collection, a power analysis was completed to determine the sample size needed to obtain at least 80% power in this study. The model includes 8 independent and control variables and 1 dependent variable. The model can be seen in Figure 1.

To control for Type I error, alpha was set to .05. Multiple regression analyses were employed with the cross-sectional data to assess the effects of SOC on perceived health status. Power Analysis and Sample Size (PASS) software was used to determine adequate sample size (Cohen, 1988). A sample size of 240 was expected to achieve 99% power to detect an R^2 increment of .22 attributable to the independent variable (SOC). The variables tested were adjusted for an additional 7 covariates (age, gender, marital status, occupation, socioeconomic status, presence of chronic disease, and life-changing events) with an R^2 of .25.

A subsequent power analysis was completed to determine if the power in the sample was adequate. The parsimonious model had a power > 99% to predict perception of health status. The two live event occurrence covariates in the model explained 2% of the variance in perceived health status, and SOC explained 57% of the variance, for an overall R^2 of .59.

Data Entry

Data were entered and converted to SPSS for analysis. To assist in the data entry process, computerized data entry screens were created that simulate the hard-copy data forms. The screens were developed using an Internet Windows-based data entry program

called Survey Monkey. Data entry programs identify and prohibit entry of data that are inconsistent with related responses or are out of the acceptable response range. Missing values were also specified and entered despite being outside the acceptable range. To minimize error due to missing data, data entry programs take into account skip patterns within the instruments and automatically record missing data for items that are skipped. Data entry logs track instruments. These logs allow tracking of each step in the data collection, data cleaning, or the data entry process that each instrument is in at any point in time. After data entry, quality control programs were run to check for internal consistency of related variables. Once the data were relatively clean, they were exported to SPSS for analysis. A code guide was developed for the qualitative assessments allowing for conversion of qualitative data into quantitative data for further analysis.

Data Analysis

SPSS version 16 for Windows software was used to analyze the data. General Linear Models including regression and correlation were used to answer the research question and test research hypotheses. Independent variables were entered in an hierarchical fashion in the regressions predicting perceived health status. First, the index representing sense of coherence (SOC) was entered. Then main effects of other variables were entered. Finally, selected interaction terms were entered. At each step, the extent to which the R^2 of the model was improved was observed. If an entire set of interaction terms did not significantly improve the R^2, then that set was eliminated from consideration. Parsimonious models were developed by selectively dropping

insignificant variables. The final model for each hypothesis included only independent variables with significant effects on perceived health status.

For the qualitative portion of the data analysis, constant comparative methodology was used to inform the results of the quantitative assessment. Using Goffman's Dramaturgical theory, backstage and front-stage notions of personal interpretation of crisis situations was analyzed (Charon, 2004). It appears that backstage reactions and responses to an initial crisis can be divulged after reflection and time has passed. Several categories and themes that emerged in respondent's experiences of life changing events were revealed. Two major themes emerged related to the quantitatively significant variables: 1) in crisis situations, many deaths in a short period of time were observed by respondents as traumatic; and 2) disability was seen differently when first diagnosed than upon reflection, after coping mechanisms were in place and individuals had returned to a new homeostasis. Triangulation of qualitative data with quantitative data was used where possible to determine accuracy of statements.

CHAPTER IV

RESULTS

The purpose of this study was to determine the extent to which the sense of coherence (SOC) effects an individual's perception of health status among those aged 40 and over when other variables that are known to affect SOC are controlled. In this study, SOC was the independent variable. The dependent variable was the perception of health status. Control variables included age, gender, socioeconomic status, marital status, occupation and the presence of chronic disease. An additional purpose of this study was to determine whether life-changing events moderated the effect of SOC on the perception of health status. This chapter presents the results of the statistical analysis utilized to answer these research questions through testing of the research hypothesis. The total sample in this study was 261 which provided power equal to .99 to detect a moderate effect of SOC on perception of health status at the .05 level of significance. The results are presented as follows: a) descriptive statistics, b) reliability analyses, c) Rasch modeling results, d) correlation analyses, e) regression analyses and analysis of residuals.

Selection of Participants

Participants in this study were 261 adults aged 40 and older, who were solicited through the snowball sampling technique. Participants were initially solicited from the middle Tennessee area and asked to forward a link for the electronic survey to friends and family. Acquaintances of this original group completed surveys from all over the

Table 1A

Demographic Characteristics of Participants (n = 261)

Characteristic	*n*	%
Gender		
Female	193	73.95
Male	68	26.05
Marital Status		
Partnered	175	67.05
Non-partnered	86	32.95
Race/Ethnicity		
Caucasian	244	93.49
Non-caucasian	17	6.51
Work Position		
White Collar	79	30.50
Blue Collar	180	69.50
Presence of Chronic Disease		
Yes	90	34.48
No	171	65.52
Socioeconomic Status		
Middle Class	114	43.67
Upper Middle Class	85	32.95

Table 1B

Means and Standard Deviations of Demographic Characteristics of Participants (n = 261)

Characteristic	*M*	*SD*
Age	54.55	9.46
Education	16.30	1.68
Sense of Coherence Index	3.82	0.61
Perceived Health Status Index	6.74	1.68

United States. Participation was voluntary and confidential, and thus the researcher is unable to determine a more precise geographical location of all respondents. The resulting sample is not a probability sample.

Description of Participants

Demographic information on the data set can be found in Table 1. The age of respondents ranged from 40 years to 89 years. The mean age was 54.55 (*SD* = 9.46). This group is comprised of 193 females (73.95%) and 68 males (26.05%).

Within this group, 175 reported having partnered living arrangements (67.05%), and 86 reported living alone (32.95%). The majority of the sample was highly educated with a mean education of 16.3 years (*SD* = 1.68) and a range of 10-18 years of education.

Regarding race/ethnicity, 244 (93.49 %) claimed to be Caucasian while 17 (6.51%) reported being of another race/ethnicity. Seventy-nine (30.50%) were white collar workers and 180 (69.50%) were blue collar workers at the time of survey collection. Socioeconomic status was measured on a scale of lower class (1) to upper class (7) with a middle class value of 4. The two largest socioeconomic groups are reported here. Those in the middle class numbered 114 (43.67%) There were 85 (32.95%) in the upper middle class. Those reporting a chronic illness numbered 90 (34.48%).

Description of Life Changing Events

Descriptive statistics for the occurrence of life changing events can be seen in Table 2. The majority of respondents had not experienced being disabled (81.78%), being fired from a job (72.87%), severe trauma (63.18%), divorce (56.98%), being laid off from a job (77.52%) or retirement (76.36%). Most of the sample had experienced the remainder of the life changing events which included the death of someone close (88.37%), the addition of a new family member (63.18%), and an outstanding personal achievement (76.36%).

Reliability Analyses

The Orientation to Life Questionnaire (OLQ) was utilized to measure the independent variable, sense of coherence (SOC). For accuracy in computing the SOC score, an index was created. Total SOC scores were divided by the total number of answers given on the 13 questions in the questionnaire. The total possible score on the SOC index was 5. In this population, scores on the SOC ranged from 1.62 – 4.92

Table 2
Descriptive Characteristics for the Incidence of Life Changing Events (n = 258)

Characteristic	*n*	*%*
Experiencing Death of Someone Close		
Yes	228	88.37
No	30	11.63
Experiencing Severe Disability		
Yes	47	18.21
No	211	81.78
Experiencing Being Fired from a Job		
Yes	70	27.13
No	188	72.87
Experiencing the Addition of a New Family Member		
Yes	163	63.18
No	95	36.82
Experiencing an Outstanding Personal Achievement		
Yes	197	76.36
No	61	23.64

Table 2 (continued)
Descriptive Characteristics for the Incidence of Life Changing Events (N = 258)

Characteristic	*n*	%
Experiencing Severe Trauma		
Yes	95	36.82
No	163	63.18
Experiencing Divorce		
Yes	111	43.02
No	147	56.98
Experiencing Being Laid Off from a Job		
Yes	58	22.48
No	200	77.52
Experiencing Retirement		
Yes	61	23.64
No	197	76.36

(M=3.82, SD = 0.61). Higher scores represent a stronger SOC whereas lower scores represent a weaker SOC. Internal reliability for the OLQ was high with a Chronbach's

Alpha statistic of .85. A factor analysis was conducted to determine how many factors were represented by the 13-item SOC scale. The first factor measured 37.31% indicating that the scale could be treated as unidimensional.

An Exploratory Factor Analysis was completed to determine the reliability of the OLQ in this population (Antonovsky, 1987). Using the Oblimin Rotation Method, analysis revealed a pattern matrix of three factors, consistent with Antonovsky's (1987) hypothesized components of comprehensibility, manageability and meaningfulness. As stated in Antonovsky's (1987) model, the four questions theorized as representing meaningfulness loaded appropriately onto one factor. The four statements requesting degree of agreement include: until now, your life has had clear goals and purposes, how often do you have the feeling that there is little meaning in the things you do in your daily life, do you ever feel as though you don't care what goes on around you, and is doing the things you do every day a source of deep pleasure and satisfaction or a source of boredom and pain? One question representing comprehensibility in Antonovsky's model loaded onto the manageability factor. This item read, has it happened that people you counted on disappointed you? Three questions representing manageability loaded onto the comprehensibility factor: how often have you felt like a sad sack in the past, how often do you have feelings that you're not sure you can keep under control, and do you have the feeling that you're being treated unfairly? There is some confusion, in this population, about manageability and comprehensibility as defined by Antonovsky (1987). Considering this lack of conformity to the theoretical construct, the factor measuring meaningfulness explained 37.31% of the variation in the index. Therefore, the model can

be statistically considered reliable, and can be considered a unidimensional measure of SOC.

Perception of Health Status was assessed using the Perceived Quality of Life Questionnaire (PQoL). For accuracy in computing the PQoL score, an index was created. Total PQoL scores were divided by the total number of answers given on the 20 questions in the questionnaire. The total possible score on the SOC index was 10. Scores on the PQoL ranged from 1.80-9.95 ($M = 6.74$, $SD = 1.68$). Higher scores represent high satisfaction with one's perceived quality of life as measured by health related variables. Internal reliability for the PQoL was high with a Chronbach's Alpha statistic of .93. A factor analysis was conducted to determine how many factors were represented by the 20-item PQoL scale. The first factor measured 44.97% of the variation indicating that the scale could be treated as unidimensional.

An Exploratory Factor Analysis was completed on the responses to this instrument revealing a four factor structure. The original theory presents three major factors for the PQoL: social health, physical health and cognitive health. In this sample, the four factors measured can be best described as follows: 1) social factors including questions about job satisfaction (theorized as social), meaning and purpose of life (theorized as social), happiness (theorized as social), satisfaction with variety in life (theorized as social), satisfaction with sleep (theorized as physical), satisfaction with income (theorized as social), satisfaction with respect received from others (theorized as social) and satisfaction with recreation and leisure (theorized as social); 2) physical factors included questions about satisfaction with the amount of walking one does,

satisfaction with physical health, satisfaction with ability to physically care for oneself, satisfaction with food and satisfaction with thinking and memory skills (theorized as cognitive); 3) interpersonal factors included questions about satisfaction with help received from friends and family, satisfaction with help one gives to friends and family, satisfaction with frequency of seeing friends and family and satisfaction with frequency of getting outside of the house (theorized as physical); and 4) private factors included questions about satisfaction with sex life (theorized as social), satisfaction with communication with others (theorized as cognitive) and satisfaction with contribution to community (theorized as social). Social factors explained 44.97% of the variation in the index. Despite this lack of conformity to the theoretical construct, the model was statistically reliable and can be considered a unidimensional measure of perceived health status.

Rasch Modeling for Orientation to Life Questionnaire

After the first 100 participants had completed the Orientation to Life Questionnaire, a Rasch Modeling test was completed to determine whether a 5 point response scale or the original 7 point response scale was effective for this sample (Smith, Wakely, deKruif & Swartz, 2002). Results indicated that a 5 point response scale was more effective than the original 7 point scale. The remaining responses were gathered and again tested. Findings indicate that the 5 point response scale had an outfit mean-square of less than 2.0 in all categories making it a more reliable measure for the Orientation to Life questionnaire.

Correlation Analyses

Table 3 represents the results of correlations of the independent variable, sense of coherence; the dependent variable, perception of health status; control variables, age, gender, marital status, socioeconomic status, occupation and the presence of chronic disease and the life changing event variables of experiencing death, experiencing disability, experiencing being fired from a job, experiencing adding a new family member, experiencing an outstanding personal achievement, experiencing trauma, experiencing divorce, experiencing being laid off from a job, and experiencing retirement. Perception of health status was significantly positively correlated with sense of coherence (SOC), age, socioeconomic status, the presence of chronic disease, having experienced disability and being laid off from a job. Results showed four significant negative correlations with perception of health status: work position, having experienced the addition of a new family member, having experienced an outstanding personal achievement and having experienced retirement.

SOC was significantly positively correlated with age, socioeconomic status, presence of chronic disease, having experienced being fired from a job, and having experienced trauma. Negative significant associations with SOC included work position, having experienced the addition of a new family member, having experienced an outstanding personal achievement, and having experienced retirement. Age was significantly negatively associated with having experienced the death of someone close and negatively associated with having experienced retirement.

Table 3
Means, Standard Deviations and Correlations for Adults Aged 40 and Older (n=261)

Variable	PHSI	1	2	3	4	5	6	7	8	*M*	*SD*
Pcpn. of Hlth Status Index	1.00	0.76**	0.14*	-0.09	-0.08	0.11	-0.18**	0.34**	0.22**	6.74	1.68
Predictor Variables											
1. Sense of Coherence		1.00	0.14*	-0.09	-0.12	0.12	-0.17**	0.32**	0.17**	3.81	0.61
2. Age			1.00	-0.01	-0.04	0.02	0.07	0.10	-0.07	54.55	9.46
3. Gender				1.00	0.00	0.03	-0.13*	0.01	0.08	1.26	0.44
4. Marital Status					1.00	0.14*	0.01	-0.22**	-0.09	1.33	0.47
5. Education Level						1.00	-0.11	0.12	0.09	4.15	0.84
6. Work Position							1.00	-0.17**	-0.18**	1.69	0.46
7. Socioeconomic Status								1.00	0.20**	4.46	0.98
8. Presence of Ch. Disease									1.00	1.66	0.48

Table 3 (continued)
Means, Standard Deviations and Correlations for Adults Aged 40 and Older (n=261)

Variable											
Life Changing Events	LCE1	LCE2	LCE3	LCE4	LCE5	LCE6	LCE7	LCE8	LCE9	*M*	*SD*
1. Death of Someone Close	1.00	0.11	-0.04	0.04	0.02	0.03	0.17**	-0.03	0.18**	1.12	0.32
2. Disability		1.00	0.14*	0.01	-0.02	0.28**	0.06	0.11	0.30**	1.82	0.39
3. Being Fired			1.00	0.16*	0.11	0.33**	0.07	0.36**	0.09	1.73	0.45
4. Addtn of Fam. Mem.				1.00	0.33**	0.15*	0.06	0.18**	0.14*	1.37	0.48
5. Outst. Pers. Achvmt.					1.00	0.18**	0.32**	0.10	0.07	1.24	0.43
6. Trauma						1.00	0.13*	0.17**	0.10	1.63	0.48
7. Divorce							1.00	0.11	0.05	1.57	0.50
8. Being Laid Off								1.00	0.16*	1.78	0.42
9. Retirement									1.00	1.76	0.43

Table 3 (continued)
Means, Standard Deviations and Correlations for Adults Aged 40 and Older (n=261)

Variable	LCE1	LCE2	LCE3	LCE4	LCE5	LCE6	LCE7	LCE8	LCE9
Pcpn. of Hlth Status Index	0.19	0.14*	0.11	-0.15*	-0.19**	0.03	-0.06	0.15*	-0.13*
Predictor Variables									
1. Sense of Coherence	-0.02	0.06	0.19**	-0.18**	-0.17**	0.13*	-0.05	0.12	-0.14*
2. Age	-0.28**	-0.01	0.05	-0.08	0.01	0.05	-0.06	0.05	-0.50**
3. Gender	0.01	-0.04	-0.12	-0.01	-0.06	0.03	-0.00	-0.06	-0.07
4. Marital Status	0.10	-0.03	-0.09	0.10	0.02	-0.10	-0.18**	0.02	0.12
5. Education Level	0.05	0.11	0.05	0.00	-0.06	0.12	-0.03	0.08	0.11
6. Work Position	-0.02	-0.11	0.08	0.07	0.18**	-0.03	0.11	0.05	-0.14*
7. Socioeconomic Status	-0.05	0.11	-0.02	-0.09	-0.05	0.13*	0.03	0.06	-0.06
8. Pres. of Chrc Disease	0.04	0.12*	-0.22**	-0.34**	-0.46**	-0.06	-0.10	-0.16*	-0.08

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2 tailed).

Other demographic variables showed some associations as well. Work position showed a negative significant association with gender. Marital status was significantly positively associated with education level. Marital status was significantly negatively associated with socioeconomic status and divorce. There were no significant associations with level of education. Work position was significantly positively associated with having experienced an outstanding personal achievement, and negatively correlated with socioeconomic status, presence of chronic disease and having experienced retirement.

Socioeconomic status was positively significantly correlated with chronic disease and having experienced trauma. Presence of chronic disease was positively significantly correlated with having experienced disability, and significantly negatively associated with having experienced being fired from a job and having experienced the addition of a new family member, having experienced an outstanding personal achievement, and having experienced being laid off from a job..

Several of the life changing events had additional significant correlations. Having experienced the death of someone close was significantly positively correlated with having experienced divorce and having experienced retirement. Having experienced disability was significantly correlated with having experienced being fired from a job, having experienced trauma and having experienced retirement. Being fired from a job was significantly positively correlated with having experienced the addition of a new family member, having experienced trauma and having experienced being laid off from a job.

Addition of a new family member was significantly positively correlated with having experienced an outstanding personal achievement, having experienced trauma, having experienced being laid off from work and having experienced retirement. In addition, having experienced an outstanding personal achievement was significantly positively correlated with having experienced trauma and having experienced divorce. Having experienced trauma was significantly positively correlated with having experienced divorce and having experienced being laid off from a job. Finally, having experienced being laid off from work was significantly positively correlated with having experienced retirement. Next we will look at regression analysis of these variables.

Regression

The hypothesis tested in this study was as follows: when controlling for age, gender, marital status, occupation, socioeconomic status, the presence of chronic disease and the occurrence, intensity and the amount of time that has passed since life changing events have occurred, individual's sense of coherence is directly related to her/his perception of health status. This hypothesis statement is essentially three hypotheses in one statement. The three hypotheses are shown below:

- When controlling for age, gender, marital status, occupation, socioeconomic status, the presence of chronic disease and the occurrence of life change events, an individual's sense of coherence is directly related to her/his perception of health status.

- When controlling for age, gender, marital status, occupation, socioeconomic status, the presence of chronic disease and the intensity of life change events, an individual's sense of coherence is directly related to her/his perception of health status.

- When controlling for age, gender, marital status, occupation, socioeconomic status, the presence of chronic disease and the amount of time that has passed since life change events have occurred, an individual's sense of coherence is directly related to her/his perception of health status.

Table 4
Summary of Hierarchical Regression Analysis for Predicting Perception of Health Status (n = 261)

Variable	*B*	*SE B*	*β*	*p*
Step 1				
(Constant)	6.74	0.07		<.001
SOC Index	2.09	0.11	0.76	<.001

Note: $R^2 = .58$ for Step 1 ($p < .001$)

In the following pages, the results of the analyses of each of the hypotheses will be presented.

Hypothesis #1.

To test the first hypothesis, five hierarchical regression analyses were completed on the data. The first step regressed SOC, measured as a deviation from its mean, on perception of health status without controlling for other variables. This model can be seen in Table 4. Analysis of residuals was performed to test the regression analyses assumptions. The Studentized Deleted Residuals were utilized to test the assumption that the residuals for perception of health status were normally distributed. The Kolmogorov-Smirnov Test confirmed that the residuals of the dependent variable, perception of health status, were normally distributed (KS Test: $z = .92, p = .370$).

Additionally, to test the homoscedasticity of the residuals among the independent variables, the Levene's Test was utilized. This test examines the extent to which the variables in the residuals remain constant across the categories of the independent variables. The results indicated that the variation in the residuals is not constant across the categories of the independent variable (Levene Test = 3.34, $p = .006$). A significant p value indicates that the homoscedasticity assumption among the residuals was not met, perhaps because of a misspecification of the model. More variables were added in the ensuing steps to correct this deficiency.

In this model, SOC had a significant positive effect on perception of health status, $F(1, 254) = 346.06, p < .001$, R^2=.58. This indicates that SOC explains 58% of the variation in perception of health status in this population. Persons with an average SOC had an average perceived health status index of 6.74, which is approximately the overall average of the index itself.

The ensuing four steps, discussed in the following paragraphs, included groups of main effects and interaction terms. The model summary can be seen in Table 5. Step 2 added the subset of life changing events to the model. These main effects included experiencing death, experiencing disability, experiencing being fired from a job, experiencing adding a new family member, experiencing an outstanding personal achievement , experiencing trauma, experiencing divorce, experiencing being laid off from a job, and experiencing retirement. Adding these variables to this model significantly increased the explanatory power of the model, R^2 change = .04, F (9, 245) = 2.28, p = .018, overall R^2=.61. This indicates that SOC and life changing events explain 61% of the variation in perception of health status in this population.

Step 3 added demographic main effects to the equation. These variables included age, sex, level of education, socioeconomic status, marital status, the type of job one had and presence of chronic disease. These variables did not improve the model, R^2 change = .01, F (7, 238) = 1.18, p = .317, overall R^2=.62. This indicates that SOC, life changing events and demographic main effects explain 62% of the variation in perception of health status in this population.

Steps 4 and 5 added interaction terms to determine whether they significantly strengthened the relationship between the main effect independent variables and perceived life status. Step 4 added terms measuring the interaction of life changing events and SOC. These interaction terms included SOC and experiencing death, SOC and experiencing disability, SOC and being fired from a job, SOC and addition of a new family member,

Table 5
Model Summary for Hierarchical Regression (n = 256)

Variable	R^2	ΔR^2	*p*
Step 1			
SOC Index	0.58	0.58	<.001
Step 2			
Life Changing Event Variables	0.61	0.03	.018
Step 3			
Demographic Variables	0.62	0.01	.317
Step 4			
SOC*Life Changing Event Variables	0.64	0.01	.453
Step 5			
SOC*Demographic Variables	0.64	0.01	.485

SOC and experiencing an outstanding personal achievement, SOC and experiencing trauma, SOC and experiencing divorce, SOC and being laid off from and job and SOC and experiencing retirement. The addition of these interaction terms did not significantly improve the model, R^2 change = .01, F (9, 229) = 0.99, p = .453, overall R^2=.64. This indicates that SOC, life changing events, demographic variables and the terms

representing the interaction of SOC and life changing events explain 64% of the variation in perception of health status in this population.

The final step added the terms measuring the interaction of SOC with demographic main effects to the equation. These terms included SOC and age, SOC and gender, SOC and education, SOC and socioeconomic status, SOC and marital status, SOC and the type of work the individual did, and SOC and presence of chronic disease. The addition of the interaction terms in step 5, did not improve the model, R^2 change = .01, F (6, 223) = 0.92, p = .485, overall R^2=.64. This indicates that SOC, life changing events, demographic main effects, the terms representing the interaction of SOC and life changing events and the terms representing the interaction of SOC and the demographic main effects explain 64% of the variation in perception of health status in this population.

After the model was complete, removal of insignificant variable groups ensued. The group of variables that was least significant in the full model, and removed first, was the interaction terms of SOC and demographics. The interaction terms of SOC and life changing events were removed from the model next as they continued to be insignificant. Finally, the demographic main effects were removed from the model.

Life changing events remained significant as a group, R^2 change = .03, F (9, 247) = 2.17, p = .025, overall R^2=.60. Therefore, life event main effects were removed from the equation according to their individual significance. The main effects were removed in the following order according to their lack of significance: having experienced the addition of a new family member, having experienced divorce, having experienced being fired from a job, having experienced the death of someone close, having experienced an

outstanding personal achievement, having experienced retirement and last, having experienced being laid off from a job. The parsimonious model included the SOC index, having experienced disability and having experienced trauma. According to this model, having experienced disability is inversely related to perception of health status. Interestingly, having experienced trauma is positively related to perception of health status. The effect of SOC on perception of health status ($B = 2.09$) was unchanged from the initial model shown in Table 4. The parsimonious model can be seen in Table 6.

Table 6
Summary of Parsimonious Model for Predicting Perception of Health Status (n = 256)

Variable	*B*	*SE B*	*β*	*p*
Step 1				
(Constant)	6.70	0.09		<.001
SOC Index	2.09	0.11	0.76	<.001
Experienced Disability	-0.53	0.18	-0.12	.004
Experienced Trauma	0.36	0.15	0.10	.014

Note: $R^2 = .59$ ($p < .001$)

An analysis of residuals was again performed to test the regression analyses assumptions. The Kolmogorov-Smirnov Test confirmed that the residuals of the dependent variable, perception of health status, were normally distributed (K-S Test: $z =$

0.92, $p = .370$). The test for homoscedasticity of the residuals, the Levene's Test, was also completed. The results indicated that the variation in the residuals was homogeneous (Levene statistic = 1.56, $p = .171$). An insignificant p value indicates that the homoscedasticity assumption among the residuals was met.

Additional Analysis of the Model

Because of an error in the internet program used to obtain data, additional testing of the model was necessary to determine if chronic disease interactions were a significant factor in the analysis. An error in the program used to collect surveys prompted a skip for the page asking about time since life changing events if an individual marked that they did not have a chronic disease. This mainly affected the third hypothesis, however, to be sure the results were accurate, additional analyses were completed to determine whether this had an effect on the first and second hypotheses as well.

To test for this, interaction terms with the demographic variable, chronic disease, were created with each of the life changing events main effects and each of demographic main effects excluding chronic disease. The parsimonious model was split by gender. The main effects significant for females ($n = 191$) included the following: SOC index, having experienced disability, having experienced trauma, and chronic disease, $F(5, 185) = 52.56$, $p < .001$, $R^2 = .59$. For women, having a chronic disease was negatively related to perception of health status, as was disability. Having experienced trauma was positively related to perception of health status. For males ($n = 67$), the significant main effects included only the SOC index. None of the other variables remained significant in the male model.

Summary of Analyses for Hypothesis #1

In summary, the results support the first hypothesis. In addition, two life changing events improved the model of SOC and perception of health status: having experienced disability and having experienced trauma. Having experienced disability is inversely related to perception of health status when controlling for SOC, whereas having experienced trauma is positively related to perception of health status when controlling for SOC. The evidence from the additional analysis of chronic disease indicates that these issues may be more predominant in women. Further study must be done to verify this issue.

Hypothesis #2.

To test the second hypothesis, five hierarchical regression analyses were completed on the data. Respondents were asked to rate the intensity of life changing events in the questionnaire by indicating their experience from very negative (1) to neutral (5) to very positive (9). In this regression, results were measured from the neutral value for each question regarding the intensity of life changing events. The first step regressed SOC on perception of health status without controlling for other variables. This step can be seen in Table 4 as the results are the same as those in Hypothesis #1 for the first step. In this model, SOC had a significant effect on perception of health status, $F(1, 254) = 346.06$, $p < .001$, $R^2 = .58$. As a result, SOC explains 58% of the variation in perception of health status.

The ensuing four steps included groups of main effects and interaction terms. The model summary can be seen in Table 7. Step 2 added the subset of the impact of life changing events main effects to the model. These main effects included the impact of death of someone close, the impact of disability, the impact of being fired from a job, the impact of adding a new family member, the impact of experiencing an outstanding personal achievement, the impact of trauma, the impact of being laid off from a job, the impact of divorce and the impact of retirement. Adding these to this model did not significantly improve perception of health status, R^2 change = .02, F (9, 245) = 1.58, p = .121, overall R^2=.60. This indicates that SOC and life changing events explain 60% of the variation in perception of health status in this population.

Step 3 added demographic main effects to the equation. These main effects included age, sex, level of education, socioeconomic status, marital status, and the type of job an individual performed. These main effects did not improve the model, R^2 change = .01, F (7, 238) = 1.24, p = .278, overall R^2=.61. This indicates that SOC, life changing events and demographic main effects explain 61% of the variation in perception of health status in this population.

Step 4 added terms measuring the interaction of life changing events and SOC. These interaction terms included SOC and the impact of the death of someone close, SOC and the impact of disability, SOC and the impact of being fired from a job, SOC and the impact of addition of a new family member, SOC and the impact of experiencing an outstanding personal achievement, SOC and the impact of experiencing trauma, SOC and the impact of experiencing divorce, SOC and the impact of being laid off from and job

and SOC and the impact of experiencing retirement. The addition of these interaction terms did not improve the model, R^2 change = .02, F (9, 229) = 1.49, p = .153, overall R^2=.64. This indicates that SOC, life changing events, demographic main effects and the terms representing the interaction of SOC and life changing events explain 64% of the variation in perception of health status in this population.

The final step added the terms measuring the interaction of SOC with demographic main effects to the equation. These terms included SOC and age, SOC and gender, SOC and education, SOC and socioeconomic status, SOC and marital status, SOC and the type of work the individual did, and SOC and presence of chronic disease. The addition of the interaction terms in step 5 did not improve the model, R^2 change = .01, F (6, 223) = 0.86, p = .529, overall R^2=.64. This indicates that SOC, life changing events, demographic main effects, the terms representing the interaction of SOC and life changing events and the terms representing the interaction of SOC and the demographic main effects explain 64% of the variation in perception of health status in this population.

After the model was complete, removal of insignificant variable groups ensued. The group of variables that was least significant in the full model was the interaction terms of SOC and demographics, and it was removed first. The interaction terms of SOC and life changing events were removed from the model next as they continued to be insignificant. Finally, the demographic main effects were removed from the model because they were insignificant.

Table 7
Model Summary for Hierarchical Regression: Impact of Life Changing Events (n = 258)

Variable	R^2	ΔR^2	*p*
Step 1			
SOC Index	0.58	0.58	<.001
Step 2			
Life Changing Event Main Effects	0.60	0.02	.121
Step 3			
Demographic Main Effects	0.61	0.01	.278
Step 4			
SOC*Life Changing Event Main effects	0.64	0.02	.153
Step 5			
SOC*Demographic Main effects	0.64	0.01	.529

Though the life changing events remained insignificant as a group, because these are the concepts being studied, the researcher, in collaboration with her major professor, chose to keep them in the model and remove each variable according to level of insignificance. This was done primarily because of the significance found in the life changing events variables in the analysis of the first hypothesis. The main effects were

removed in the following order: first removed was the impact of divorce, then the impact of retirement, the impact of trauma, the impact of the addition of a new family member, the impact of being laid off from work, the impact of being fired, and removed last was the impact of an outstanding personal achievement.

Table 8
Parsimonious Model for Predicting Perception of Health Status Impact of Life Changing Events(n = 258)

Variable	*B*	*SE B*	*β*	*p*
(Constant)	5.72	0.34		<.001
SOC Index	2.05	0.11	0.75	<.001
Impact of Experiencing Death	0.06	0.03	0.08	.043
Impact of Experiencing Disability	0.16	0.07	0.10	.019

Note: $R^2 = .59$ for Step1 ($p < .001$)

The parsimonious model can be seen in Table 8. The variables included in the model were the SOC index, the impact of experiencing the death of someone close, and the impact of experiencing disability. The results from this regression found that SOC explained 59% of the variation in perceived health status ($p < .001$). The impact of experiencing death and/or disability both are positively related to perception of health status when controlling for SOC. As in the first hypothesis, the addition of variables

representing the impact of life changing events did not substantially change the effect of SOC on perception of health status, and therefore cannot be considered moderator variables.

An analysis of residuals was again performed to test the regression analyses assumptions. The Kolmogorov-Smirnov Test confirmed that the residuals of the dependent variable, perception of health status, were normally distributed (KS Test: $z = 0.74, p = .639$). The test for homoscedasticity of the residuals, the Levene's Test, was also completed. The results indicated that the residuals were homogeneous (Levene statistic = $1.77, p = .119$). An insignificant p value indicates that the homoscedasticity assumption among the residuals was met.

Additional Analysis of the Model

Additional testing of the second hypothesis was completed, similar to that done with the first hypothesis. The interaction terms for chronic disease and the demographic main effects (other than chronic disease) and life changing events main effects were created, and two additional steps were added to the original analysis. When this full model was complete, insignificant groups were removed from the model. The parsimonious model included the following variables: SOC index, the impact of experiencing disability, gender, chronic disease and the interaction of chronic disease and gender, $F(5, 252) = 75.76,\ p < .001,\ R^2 = .60$.

An analysis of residuals was performed to test the regression analyses assumptions. The Kolmogorov-Smirnov Test confirmed that the residuals of the

dependent variable, perception of health status, were normally distributed (KS Test: $z = 0.99, p = .284$). The test for homoscedasticity of the residuals, the Levene's Test, was also completed. The results indicated that the residuals were not homogeneous (Levene statistic = 2.57, $p = .027$). This model was not adequate as determined by the failure to meet the homoscedasticity assumption.

Summary of Analyses for Hypothesis #2

In summary, the second hypothesis was supported by the results of this study. SOC is positively related to perception of health status. In addition, the impact of the death of someone close, and the impact of disability improved the model. Both life changing event main effects were positively related to perception of health status when controlling for SOC. The evidence from the additional analysis of chronic disease was inconclusive as the model was not adequate. Further study must be done to verify this issue.

Hypothesis #3.

The results of the third hypothesis are somewhat tenuous due to the small sample size. There was an error in the internet program used to obtain data causing the program to skip the page asking about time since life changing events if an individual marked that they did not have a chronic disease. The sample size, therefore, for this analysis was 90 and was composed of 71women (79%) and 19 men (21%).

Regression analysis was completed in a similar manner as the first two hypotheses. The first group to be removed from the regression model due to

insignificance was the interactions of SOC and demographic main effects. The second group removed was the interactions of SOC and life changing events. The main effects in the remainder of the model, though the groups remained insignificant, were removed from the equation, one variable at a time. They remained insignificant throughout the extraction. In this sample, time since life changing events was not a significant factor in predicting perception of health status and the parsimonious model included only SOC and perception of health status, $F(1, 88) = 154.89, p < .001, R^2 = .64$.

Summary of Analyses for Hypothesis #3

In summary, the analysis of the third hypothesis supports that SOC is positively related to perception of health status. However, none of the time since life changing events main effects or interactions improved this relationship. Future study will be necessary to confirm this due to the problem experienced with data collection in this study.

Summary

In summary, hierarchical regression was utilized to test the effects of SOC, age, gender, marital status, socioeconomic status, work position, education level, and the presence of chronic disease on perception of health status. The life changing events main effects were measured and analyzed in three ways: incidence, the impact of the experience and the time that had elapsed since experiencing death, experiencing disability, experiencing being fired from a job, experiencing the addition of a new family member, experiencing an outstanding personal achievement, experiencing trauma,

experiencing divorce, experiencing being laid off from work and experiencing retirement. The parsimonious model measuring the frequency of life changing events indicated that SOC explains 58% of the variation in perception of health status. Combined with experiencing trauma and disability, the three independent variables explain 59% of the variation in perception of health status. The incidence of experiencing trauma and disability improve the model of SOC and perception of health status.

Regarding the impact of life changing events, the parsimonious model indicated that SOC can explain 58% of the variation in perception of health status. Combined with the impact of experiencing death and disability, the three independent variables explain 59% of the variation in perception of health status. The impact of experiencing death and disability improve the model of SOC and perception of health status.

The time elapsed since life changing events had no significant effect on the relationship between SOC and perception of life changing events. The parsimonious model indicated that SOC can explain 64% of the variation in life changing events. This particular hypothesis had fewer respondents than did the other two and should be observed with caution.

CHAPTER V

DISCUSSION

The purpose of this study was to determine the extent to which the sense of coherence (SOC) effects an individual's perception of health status among those aged 40 and over when other variables that are known to affect SOC are controlled. The research question examined in this study was: To what extent is perceived health status determined by sense of coherence (SOC), and do life changing events moderate this relationship when controlling for age, gender, socioeconomic status, marital status, occupation and the presence of chronic disease? Results of this study demonstrate that SOC does have a significant impact on perceived health status. Four specific life changing events improve the models but do not moderate the relationship between SOC and perception of health status. In this chapter, the reader will encounter 1) the summary of variables, 2) discussion about the findings, 3) the final study model, 4) limitations of this study, 5) conclusions, and 6) suggestions for future study.

Summary of Variables

Sense of Coherence (SOC).

In this study, the strength of the SOC was measured using a 5 item response scale which is different from what has been used in previous studies. Most studies use the original 7 item response scale, which allows for comparison of findings between studies more readily, assuming demographics are similar. In this study, the summated SOC

score was 49.61 out of a possible score of 65, with a higher score representing a stronger SOC. Previous studies using the 29 item Orientation to Life Questionnaire (OLQ) with a 7 point response scale have reported SOC scores of 157.21 in 76 year old U.S. women (Nesbitt & Heidrich, 2000), and 158.90 in 81 year old US citizens (Lewis, 1996) out of a total possible score of 203. A pilot study done on individuals aged 30 and older on U.S. citizens examining 132 U.S. citizens yielded a mean SOC of 65.94 using a 7 item response scale and the 13 item OLQ (Alexandre, Hamilton & Weatherby, 2007).

Perception of Health Status.

Respondents' average score on the Perceived Quality of Life Questionnaire (PQoL) was 134.76 out of a total possible score of 200. A higher score represented greater perceived quality of health status. The regression analysis revealed that SOC is positively related to perception of health status. In addition, four life changing events significantly improved this model. These included the occurrence of trauma, the occurrence of disability, the impact of disability and the impact of the death of someone close.

Demographic Variables.

Despite the research showing a close relationship between SOC and the demographic for which we controlled, none of the demographic main effects had a significant effect on perceived health status in this study. This could be a reflection of the disparity in the sample itself. First, there were a large number of female respondents. The age range of nearly half the respondents was 50 and 59 years. Over three quarters of

the respondents were college educated. The majority was Caucasian, nearly one third were white collar workers and nearly half considered their socioeconomic status as higher than middle class. Further study with an equivalent number of males and females, more non-Caucasians, and fewer college educated respondents is needed to determine if these demographic variables are factors affecting perceptions of health status. This potential influence could also reflect the disparity in health care policy for U.S. citizens, as previous studies have been done primarily in countries where universal health insurance coverage is available to citizens. When access to health care is not a concern, other issues may take on significance for individuals.

Death of Someone Close.

The impact of the death of someone close was a significant factor in predicting perception of health status, though the occurrence of experiencing death was not a significant predictor of perception of health status. This is especially interesting since out of 187 respondents who answered the qualitative question at the end of the survey, 140 discussed death. This may indicate that death was a significant factor in their lives, albeit a strengthening factor. The request read: Please describe each experience you have had with each life changing event to the extent you are comfortable sharing. Many individuals expressed how difficult the death experience had been, while others commented that it was "part of life to deal with these things." A few commented that the death of a loved one had occurred at a time in their lives when they had many other responsibilities to fulfill, and once those had been eliminated, they "have become aware that just now, [they] are allowing [themselves] to grieve." Another respondent lost 5

family members to death in 1 year and described it as "by far, the most *trauma* that we have had to deal with on a large scale." Perhaps when individuals are faced with a series of events, common coping strategies are no longer sufficient to deal with the issues at hand, thereby the prolonged experience of several deaths is interpreted as traumatic.

Severe Trauma.

Severe trauma yielded a positive relationship with perception of health status. In other words, as trauma increases, perception of health status improves when controlling for SOC. Apparently, those issues considered traumatic strengthen an individual's ability to cope with ensuing traumatic events in life.

As stated above, the distinction between death and severe trauma is somewhat blurred by the interpretations of a traumatic event. In some cases, the trauma discussed was purely emotional. One woman discussed her husband's career as an entrepreneur, interpreting much of her life as a gamble. She states, "it does seem to get better with enormous rewards." Others discussed the physical and emotional fallout from rape, with and without a weapon. One care-taker was traumatized by her son losing his life to cancer. Others discussed financial difficulties as traumas, marriage as traumatic, divorce as relief from that trauma, and physical trauma such as being severely injured in a car accident. Watching a loved one suffer prior to death was also frequently mentioned as being traumatic. Here again, the distinction between trauma and death is somewhat blurred as far as the subjective interpretation of the events.

Severe Disability.

The occurrence and the impact of severe disability were factors which were related to perception of health status in the both hypothesis #1 and hypothesis #2. Few individuals discussed disability in the qualitative question. One individual commented on the emotional impact of becoming disabled, as this person had been unable to continue normal daily life activities for 4 years prior to being formally diagnosed disabled. The issue, in this case, dealt with the individual being seen by others as a "sick" or disabled person. Two respondents discussed the difficulties in caring for a parent and a child who were disabled. The limitations placed on caregivers of disabled persons became evident through the qualitative responses. On the other hand, those who were recipients of care discussed how heartwarming it felt to know that friends and family were willing to care for them in their time of need. One individual discussed how, through loss of vision and the ensuing inability to drive and work, his self-worth and identity were tested. However, these trials have "made me a more patient and more understanding person, learning what is really important in life, ie: those we love and spending time with them as well as never losing sight of our dreams and goals, just finding another way to reach them." Disability, for this man, forced him to create an alternate route to reach his goals while at the same time reviewing his priorities in life, thereby placing him in a self-proclaimed better life situation.

The remaining life changing events variables.

Experiencing the remaining life changing events such as the death of someone close, divorce, being fired from a job, the addition of a new family member, an

outstanding personal achievement, being laid off from work, and retirement had no significant effect on perception of health status. Nor did the impact of divorce, being fired from a job, the addition of a new family member, trauma, an outstanding personal achievement, being laid off from work and retirement have a significant effect on perception of health status. Of these variables, the one mentioned most frequently, and with positive remarks, was the addition of a new family member. Interestingly, when divorce was mentioned, it was generally discussed as difficult yet resulting in a positive outcome. For many of these variables, respondents stated that these issues were simply a part of life, implying further that everyone had to deal with them at some point. Perhaps the idea that this is simply part of everyone's life leads to positive coping with little concern with the difficulty of the event. In other words, the assumption is that it will be difficult, and it is simply a part of life that must be overcome.

Another factor influencing these life events could be that adequate support is available when experiencing these events. The experience of the death of someone close is supported through grief counseling and group therapy. Divorce support groups are also available. Being laid off or fired from a job is socially supported through unemployment benefits in most instances. The incidence of trauma is supported by the initial health care individuals receive through crisis intervention and medical services. Most positive life events are supported by family, special interest groups, and community groups. All of these support systems tend to improve one's sense that the social world is aware of what is occurring in life, whether one is dealing with a positive or negative stressor.

Discussion

The hypothesis that sense of coherence is positively and strongly related to perception of health status was supported by the data. This relationship was originally postulated by Antonovsky (1987). This indicates that the interpretation of personal experience, the environment to which we are exposed in childhood, and the tools we acquire from dealing with the issues we encounter have an effect on how we further interpret our physical and mental health. These learned tools then become coping mechanisms that we continue to cultivate throughout our lives to help us perceive, interpret, and respond to the situations in which we find ourselves. If we have the appropriate tools and the practice to cope with difficulties in life, we are more likely to perceive our health status positively.

In concert with previous research, the findings in this study suggest that perception of health status is subjective (Saevareid, Thygesen, Nygaard & Lindstrom, 2006; Volanen, Suominen, Lahelma, Koskenvuo & Ventoinen, 2006; Pinquart, 2001). Individuals encounter life with their own experiences, interpretations of those experiences, and the abilities to manage those same experiences. Though we can attempt to persuade others about how to properly deal with their health issues, if the message does not fit with that individual's experiences and ability to manage life, the message will be lost. The results of this study demonstrate that the best way to help someone is not necessarily to give them tasks to complete (i.e.: eat breakfast every day, exercise every day, etc), but rather to educate them about their choices so that they have the opportunity to determine what coincides with their experience and ability. In addition, it may be

necessary to provide individuals with experiences for personal growth and coping with crises during the educational process. Health education might be more profitable if it were geared toward options made available to deal with health issues as well as practice in dealing with crisis situations. In addition, environmental issues, those factors that increase generalized resistance resources (GRR's), must be strengthened at very young ages to promote positive subjective health interpretations. This has been corroborated by a previous longitudinal study in which positive parenting practices that strengthen a child's GRR's also lead to increased adult SOC scores (Feldt, Kokko, Kinnunen & Pulkkinen, 2005; Read, Aunola, Feldt, Leinonen & Ruoppila, 2005). Health professionals may wish to consider empowering individuals in an attempt to increase SOC, as SOC is a major determinant of perception of health status (Veenstra, Moum & Roysamb, 2005).

Experiencing trauma and disability were related to perception of health status. Interestingly, the experience of trauma had a positive relationship with perception of health status when controlling for SOC and experiencing the death of someone close. These results indicate that trauma tends to strengthen one's ability to cope with the difficulties in life, perhaps by adding various coping strategies through the experience. Trauma, as defined by respondents in the qualitative question, may be a series of events that gradually wears down one's ability to cope. However, when the trauma has subsided, there is often a reduction in stressors and a strengthening of one's ability to cope.

An inverse relationship was found between the experience of disability and perception of health status when controlling for SOC and the experience of trauma. This may reflect ongoing stressors that occur in conjunction with disability. Once disabled, maintaining a healthy lifestyle becomes much more difficult (Hardy, Dublin, Holford & Gill, 2005). In addition, the difficulty may result from inadequate support that those who are disabled receive in this society (Dunlop, Manheim, Song, Lyons & Chang, 2005; Cole, 2007). Antonovsky (1987, 1979) alludes to the fact that if the disability is socially accepted and there are various ways of dealing with the disability in the social world, adjustment to disability is relatively rapid. Unfortunately, in the U.S, though there are many services available for disabled individuals, there are also many that are still inadequate, at best. The poor perception of health status among those who are disabled may be a reflection of society's lack of acceptance of those who are disabled and the failure to provide adequate services for them.

Public health policies regarding the disabled and services for them must be constantly reviewed and changed according to need. Perhaps those who have experienced disability or who are currently disabled could assist in helping with such policies. Often, those who have had an experience, such as living with disability, can offer the best perspective on those issues that need further attention.

The impact of experiencing the death of someone close and the impact of disability were related to perception of health status. The impact of the death experience was discussed frequently in the qualitative responses. Many respondents were surprised at how long and how difficult mourning the death of someone close was in their

experience. Interestingly, the impact of death had a positive effect on perception of health status when controlling for SOC and the impact of disability. Even though the process of dealing with death is long and difficult, individuals may tend to learn greater coping skills that strengthen their ability to deal with future life events.

The impact of disability was positively related to perception of health status when controlling for the impact of death and SOC. Perhaps this finding reveals the devastation of being labeled disabled after a long-term fight for regained health as opposed to the impact that disability has on one's life after having lived with the disability and having learned to cope with its effects. For instance, one response to the qualitative question discussed being distraught after a long fight to maintain health only to be labeled disabled in spite of her best efforts. On the other hand, a positive relationship between the impact of disability and the perception of health status may point to the idea that once disabled, and having learned coping skills to deal with the disability, the experience actually strengthened them. This finding correlates with those of a previous study which found that disabled individuals do not see their disability as negative, but rather, as a source of strength (Albrecht & Devlieger, 1999).

Time since the occurrence of life changing events was not a factor in this study. The results of the final analysis regarding the time since life changing events were determined using a subset of the complete data set. Even among this small group, sense of coherence was a significant predictor of perception of health status.

Final Study Model

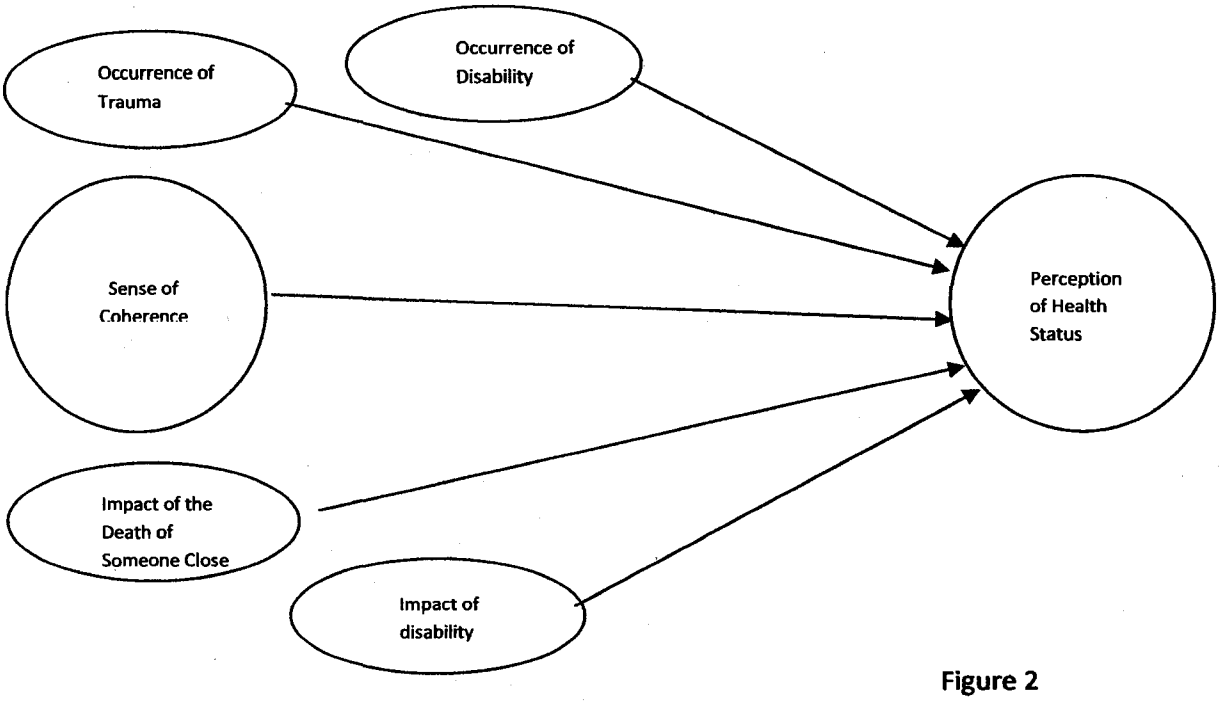


Figure 2

Figure 2 presents a summary of significant findings from this investigation. The experiences of disability, trauma and death have effects on perception of health status that are independent of SOC. Though the incidence of disability was negatively related to perception of health status in the first hypothesis, the impact of disability was positively related in the model for the second hypothesis.

Limitations

Limitations of this study include interpreting the results of the third hypothesis with caution because of the small sample size. The additional analyses of the chronic disease interactions for hypothesis two must be considered carefully since in the parsimonious model, the residuals were not normally distributed. Also, regarding the

sample, because of the non-probability snowball sampling, it is difficult to determine to what population this sample can be generalized. Finally, the demographics of the sample do not fit the general demographics of U.S. society well. This sample consisted of over two-thirds women, nearly all Caucasian, and most college educated. This does not match the general demographic distribution of the U.S. population. Further study is necessary to determine if a sample with demographics more representative of the U.S. population would be similar to the findings in this investigation.

Conclusions

Based on the results of this study, the following conclusions can be made:

1) When controlling for age, gender, marital status, occupation, socioeconomic status, and the presence of chronic disease, sense of coherence (SOC) is positively related to perception of health status.

2) Incidence of having experienced death of someone close, having experienced divorce, having experienced being fired from a job, having experienced being laid off from work, having experienced the addition of a new family member, having experienced an outstanding personal achievement and having experienced retirement are unrelated to perception of health status. Having experienced trauma and having experienced disability have significant effects on perception of health status.

3) The impact of divorce, the impact of trauma, the impact of being fired from a job, the impact of being laid off from work, the impact of the addition of a new family member, the impact of experiencing an outstanding personal achievement and the impact of

retirement are unrelated to perception of health status. The impact of having experienced death and the impact of having experienced disability have significant effects on perception of health status.

Similar to previous studies, this study yielded a large effect (Cohen, 1988) for the ability of SOC to predict perception of health status (Eriksson & Lindstrom, 2007). This study contributes to current literature on SOC by testing a population consisting of both healthy individuals and approximately 34% with chronic disease, rather than choosing populations that have been diagnosed with a particular illness or disease. The instrument used to measure perceived health status primarily measured the social health of respondents. Therefore, this study specifically shows that SOC has a large effect on perceived social health. In addition, this study adds the dimension of life changing events to the study model to determine the areas of life in which the social world could benefit from changing policy or by supporting individuals who are enduring certain life experience. The potential for improving the perception of health status for all individuals is tremendous.

Suggestions for Future Study

Based on the results of this investigation, recommendations for future study would be to replicate this study using a population that more closely represents the general population in either the area in which the study is being conducted, or the general population of the U.S. In this investigation, chronic disease appeared to be a major factor, and should be considered a life changing event. Future study could determine the impact of chronic disease on perception of health status when controlling for SOC. The

impact of chronic disease appeared to be an issue in this study, particularly for women as indicated in the incidence study. Studies focusing on men and women, delineating the differences in how they cope with chronic disease, would be helpful for improved education of individuals with chronic disease and their primary care physicians.

REFERENCES

Accent Software International (1998). *Webster's New World Dictionary & Thesaurus.* New York: Macmillan Publishers

Albrecht, G. L., & Devlieger, P. J. (1999). The disability paradox: high quality of life against all odds. *Social Science & Medicine, 48,* 977-988.

Alexandre, R.B., Hamilton, G. & Weatherby, N. (2007). The effect of gender and spirituality differences on SOC among United Methodists, unpublished pilot study.

Allan, J. D., & Hall, B. A. (1988). Challenging the focus on technology: a critique of the medical model in a changing health care system. *Advanced Nursing Science, 10*(3), 22-34.

Allred, K. D., & Smith, T. W. (1989). The hardy personality: cognitive and physiological responses to evaluative threat. *Journal of Personality and Social Psychology, 56*(2), 257-266.

Almenar-Perejo, M., Almenar, L., Martinex-Dolz, L., Campos, J., Galan, J., Girones, P., et al. (2006). Study on health-related quality of life in patients with advanced heart failure before and after transplantation. *Transplantation Proceedings, 38,* 2524-2526.

Antonovsky, A. (1972). Breakdown: a needed fourth step in the conceptual armamentarium of modern medicine. *Social Science and Medicine, 6,* 537-544.

Antonovsky, A. (1979). *Health, Stress and Coping.* San Francisco: Jossey-Bass.

Antonovsky, A. (1987). *Unraveling the Mystery of Health: How People Manage Stress and Stay Well.* San Francisco: Jossey-Bass.

Antonovsky, A. (1993). The structure and properties of the sense of coherence scale. *Social Science and Medicine, 36*(6), 725-733.

Antonovsky, A. (Ed.). (1984). *The Sense of Coherence as a Determinant of Health.* New York: John Wiley & Sons.

Axelsson, L., Andersson, I., Hakansson, A., & Ejlertsson, G. (2005). Work ethics and general work attitudes in adolescents are related to quality of life, sense of coherence and subjective health—a Swedish questionnaire study. *BioMed Central Public Health, 5*, 103-114.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215.

Barney, K. (1994). Limitations of the critique of the medical model. *The Journal of Mind and Behavior, 15*(1-2), 19-33.

Barrett, A. E. (2003). Socioeconomic status and age identity: the role of dimensions of health in the subjective construction of age. *Journal of Gerontology, 58B*(2), S101-S109.

Berry, J. M., & West, R. L. (1993). Cognitive self-efficacy in relation to personal mastery and goal setting across the life span. *International Journal of Behavioral Development, 16*(2), 351-379.

Bonomi, A. E., Patrick, D. L., Bushnell, D. M., & Martin, M. (1999). Validation of the United States' version of the World Health Organization quality of life (WHOQOL) instrument. *Journal of Clinical Epidemiology, 53*(1), 1-12.

Brosnan, M. J. (1998). The impact of computer anxiety and self-efficacy upon performance. *Journal of Computer Assisted Learning, 14*, 223-234.

Caldwell, E. M., Jaxter, J., Mitchell, C. M., Shetterly, S. M., & Hamman, R. F. (1998). The association of non-insulin-dependent diabetes mellitus with perceived quality of life in a biethnic population: the San Luis Valley diabetes study. *American Journal of Public Health, 88*(8), 1225-1229.

Carroll, D. L. (1995). The importance of self-efficacy expectations in elderly patients recovering from coronary artery bypass surgery. *Heart & Lung: The Journal of Acute and Critical Care, 24*(1), 50-59.

Cassidy, C., O'Connor, R. C., Howe, C., & Warden, D. (2004). Perceived discrimination and psychological distress: the role of personal and ethnic self-esteem. *Journal of Counseling Psychology, 51*(3), 329-339.

CDC. (2004). *Vital and Health Statistics*. Retrieved 2 February 2008. from http://www.cdc.gov/nchs/agingact.htm.

CDC. (2007). NCHS Definitions [Electronic Version]. *National Center for Health Statistics*, from http://www.cdc.gov/nchs/datawh/nchsdefs/healthcondition.htm#chronic

Cederblad, M., Dahlin, L., Hagnell, O., & Hansson, K. (1995). Coping with life span crises in a group at risk of mental and behavioral disorders: from the Lundby study. *Acta Psychiatry Scandinavia 91*, 322-330.

Chan, D. W. (2003). Hardiness and its role in the stress-burnout relationship among prospective Chinese teachers in Hong Kong. *Teaching and Teacher Education, 19*, 381-395.

Charon, J.M. (2004). *Symbolic Interactionism: An Introduction, An Interpretation, An Integration.* Upper Saddle River, New Jersey: Pearson Prentice Hall.

Chimich, W. T., & Nekolaichuk, C. L. (2004). Exploring the links between depression, integrity, and hope in the elderly. *Canadian Journal of Psychiatry 49*(7), 428-433.

Christensen, A. J., Weiebe, J. S., Benotsch, E. G., & Lawton, W. J. (1996). Perceived health competence, health locus of control, and patient adherence in renal dialysis. *Cognitive Therapy and Research, 20*(4), 411-421.

Church, A. T., Teresa, J. S., Rosebrook, R., & Szendre, D. (1992). Self-efficacy for careers and occupational consideration in minority high school equivalency students. *Journal of Counseling Psychology, 39*(4), 498-508.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences,* Hillsdale, New Jersey: Lawrence Eribaum Associates.

Cole, C.S. (2007). Nursing home residents' sense of coherence and functional status decline. *Journal of Holistic Nursing, 25(2),* 96-103.

Cottrell, R. R., Girvan, J. T., & McKenzie, J. F. (2006). *Principles and Foundations of Health Promotion and Education, 3rd Ed.* San Francisco: Pearson Benjamin Cummings.

Crowley, B. J., Hayslip, B., & Hobdy, J. (2003). Psychological hardiness and adjustment to life events in adulthood. *Journal of Adult Development, 10*(4), 237-248.

Derryberry, M. (2004). Today's health problems and health education. *American Journal of Public Health, 94*(3), 368-371.

Donnatelle, R. J. (2007). *Health, The Basics* (7th Ed. ed.). San Francisco: Pearson, Benjamin Cummings.

Dunlop, D. D., Manheim, L. M., Sohn, M.-W., Liu, X., & Chang, R. W. (2002). Incidence of functional limitation in older adults: the impact of gender, race, and chronic conditions. *Arch Phys Med Rehabil, 83*, 964-971.

Dunlop, D. D., Manheim, L. M., Song, J., Lyons, J. S., & Chang, R. W. (2005). Incidence of disability among preretirement adults: the impact of depression. *American Journal of Public Health, 95*(11), 2003-2008.

Elasy, T. A., Samuel-Hodge, C. D., DeVellis, R. F., Skelly, A. H., Ammerman, A. S., & Keyserling, T. C. (2000). Development of a health status measure for older African-American women with type 2 diabetes. *Diabetes Care, 23*(3), 325-329.

Empereur, F., Baumann, M., Alla, F., & Briancon, S. (2003). Factors associated with the consumption of psychotropic drugs in a cohort of men and women aged 50 and over. *Journal of Clinical Pharmacy and therapeutics, 28*, 61-68.

Engel, G. L. (1977). The need for a new medical model: a challenge for biomedicine. *Science, 197*(4286), 129-137.

Erickson, E. H. (1963). *Childhood and Society*. Harmondsworth, England: Penguin.

Eriksson, M., & Lindstrom, B. (2005). Validity of Antonovsky's sense of coherence scale--a systematic review. *Journal of Epidemiology and Community Health, 59*, 460-466.

Eriksson, M., & Lindstrom, B. (2006). Antonovsky's sense of coherence scale and the relation with health: a systematic review. *Journal of Epidemiology and Community Health, 60*(5), 376-381.

Eriksson, M. & Lindstrom, B. (2007). Antonovsky's sense of coherence scale and its relation with quality of life: a systematic review. *Journal of Epidemiology and Community Health, 61(11)* 938-944.

Evangelista, L. S., Sarna, L., Brecht, M. L., Padilla, G., & Chen, J. (2003). Health perceptions and risk behaviors of lung cancer survivors. *Heart & Lung: The Journal of Acute and Critical Care, 32*(2), 131-139.

Feldt, T., Kokko, K., Kinnunen, U. & Pulkkinen, L. (2005). The role of family background, school success, and career orientation in the development of sense of coherence. *European Psychologist, 10(4),* 298-308.

Feldt, T., Lintula, H., Suominen, S., Koskenvuo, M., Vahtera, J., & Kivimaki, M. (2007). Structural validity and temporal stability of the 13-item sense of coherence scale: prospective evidence from the population-based HeSSup study. *Quality of Life Research, 16*, 483-493.

Folkman, S., & Lazarus, R. S. (1988). *Manual for the ways of coping questionnaire (research ed.)*. Palo Alto, CA: Consulting Psychologist Press.

Forsyth, A. D., & Carey, M. P. (1998). Measuring self-efficacy in the context of HIV risk reduction: research challenges and recommendations. *Health Psychology, 17*(6), 559-568.

Foster, M. D., & Dion, K. L. (2003). Dispositional hardiness and women's well-being relating to gender discrimination: the role of minimization. *Psychology of Women Quarterly, 27*, 197-2008.

Gall, T. L., Charbonneau, C., Clarke, N. H., Grant, K., Joseph, A., & Shouldice, L. (2005). Understanding the nature and role of spirituality in relation to coping and health: a conceptual framework. *Canadian Psychology, 46*(2), 88-104.

Gana, K. (2001). Is sense of coherence a mediator between adversity and psychological well being in adults? *Stress and Health, 17*, 77-83.

Geyer, S. (1997). Some conceptual considerations on the sense of coherence *Social Science and Medicine, 44*(12), 1771-1779.

Gooding, H. C., Organista, K., Burack, J., & Biesecker, B. B. (2006). Genetic susceptibility testing from a stress and coping perspective. *Social Science and Medicine, 62*, 1880-1890.

Hardy, S.E., Dubin, J.A., Holford, T.R. & Gill, T.M. (2005). Transitions between states of disability and independence among older persons. *American Journal of Epidemiology, 161(6),* 575-584.

Harzke, A. J., Williams, M. L., Nilsson-Schonnesson, L., Ross, M. W., Timpson, S., & Keel, K. B. (2004). Psychosocial factors associated with adherence to antiretroviral medications in a sample of HIV-positive African American drug users. *AIDS Care, 16*(4), 458-470.

Henderson, D. A., & Scutchfield, F. D. (1989). Point-counterpoint: the public health versus medical model of prevention. *American Journal of Preventive Medicine, 5*(2), 113-119.

Herz, M. I. (1979). Short-term hospitalization and the medical model. *Hospital & Community Psychiatry, 30*(2), 117-121.

Hewa, S., & Hetherington, R. W. (1995). Specialists without spirit: limitations of the mechanistic biomedical model. *Theoretical Medicine, 16*(2), 129-139.

Hittner, J. B. (2000). Novel methods for analyzing multifaceted personality scales: sense of coherence and depression as an example. *Journal of Psychology, 134*(199-210).

Jahnsen, R., Villien, L., Stanghelle, J. K., & Holm, I. (2002). Coping potential and disability--sense of coherence in adults with cerebral palsy. *Disability and Rehabilitation, 24*(10), 511-518.

Karlsson, I., Berglin, E., & Larsson, P. A. (2000). Sense of coherence: quality of life before and after coronary artery bypass surgery--a longitudinal study. *Journal of Advanced Nursing, 31*(6), 1383-1392.

Klang, B., Bjorvell, H., & Clyne, N. (1996). Quality of life in predialytic uremic patients. *Quality of Life Research, 5*(1), 109-116.

Klepp, O. M., Asa, A. M., Sorensen, T., Sandanger, I., & Kleiner, R. (2007). Structure analysis of Antonovsky's sense of coherence from an epidemiological mental health survey with a brief nine-item sense of coherence scale. *International Journal of Methods in Psychiatric Research, 16*(1), 11-22.

Kobasa, S. C. (1979). Stressful life events, personality, and health: an inquiry into hardiness. *Journal of Personality and Social Psychology, 37*(1), 1-11.

Langius, A., & Bjorvell, H. (2001). The applicability of the Antonovsky's sense of coherence scale to a group of Pentecostalists. *Scandinavian Journal of Caring Science, 15*, 190-192.

Laubmeier, K. K., Zakowski, S. G., & Bair, J. P. (2004). The role of spirituality in the psychological adjustment to cancer: a test of the transactional model of stress and coping. *International Journal of Behavioral Medicine, 11*(1), 48-55.

Lazarus, R. S. (1993). From psychological stress to the emotions: a history of changing outlooks. *Annual Review of Psychology, 44*, 2-11.

Lee, J. W., Jones, P. S., & Mineayama, Y. (2002). Cultural differences in responses to a Likert scale. *Res Nurs Health, 25*, 295-306.

Leigh, H., Price, L., Ciarcia, J., & Mirassou, M. M. (1982). DSM III and consultation--liaison psychiatry: toward a comprehensive medical model of the patient. *General Hospital Psychiatry, 4*, 283-289.

Lewis, J. (1996). Sense of coherence and the strengths perspective with older persons. *Journal of Gerontological Social Work, 26*, 99-112.

Margalit, M., Raviv, A., & Ankonina, D. B. (1992). Coping and coherence among parents with disabled children. *Journal of Clinical Child Psychology, 21*, 202-209.

Marks, G. R., & Lutgendorf, S. K. (1999). Perceived health competence and personality factors differentially predict health behaviors in older adults. *Journal of Aging and Health, 11*(2), 221-239.

Mathers, C. D., & Loncar, D. (2006). Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Medicine, 3*(11), 2011-2029.

McCollum, M., Hansen, L. B., Ghushchyan, V., & Sullivan, P. W. (2007). Inconsistent health perceptions for US women and men with diabetes. *Journal of Women's Health, 16*, 1421-1428.

Miller, T. A., & McCool, S. F. (2003). Coping with stress in outdoor recreational settings: an application of transactional stress theory. *Leisure Sciences, 25*, 257-275.

Nash, J. K. (2002). Neighborhood effects on sense of school coherence and educational behavior in students at risk of school failure. *Children and Schools, 24*, 73-89.

Nesbitt, B., & Heidrich, S. (2000). Sense of coherence and illness appraisal in older women's quality of life. *Res Nurs Health, 23*, 25-34.

Nilsson, B., Holmgren, L., Stegmayr, B., & Westman, G. (2003). Sense of coherence--stability over time and relation to health, disease and psychosocial changes in a general population: a longitudinal study. *Scandinavian Journal of Public Health, 31*, 297-304.

Nyamathi, A., Sands, H., Pattatucci-Aragon, A., Berg, J., Leake, B., Hahn, J. E., (2004). Perception of health status by homeless US veterans. *Fam Community Health, 27*(1), 65-74.

Patrick, D. L., Danis, M., Southerland, L. I., & Hong, G. (1988). Quality of life following intensive care. *Journal of General Internal Medicine, 3*, 218-223.

Patrick, D. L., Kinne, S., Engelberg, R. A., & Pearlman, R. A. (2000). Functional status and perceived quality of life in adults with and without chronic conditions. *Journal of Clinical Epidemiology, 53*, 779-785.

Peto, J. (2001). Cancer epidemiology in the last century and next decade. *Nature, 411*, 390-395.

Pinquart, M. (2001). Correlates of subjective health in older adults: a meta-analysis. *Psychology and Aging, 16,* 414-426.

Poppius, E., Virkkunen, H., Hakama, M., & Tenkanen, L. (2006). The sense of coherence and incidence of cancer--role of follow-up time and age at baseline. *Journal of Psychosomatic Research, 61*(2), 205-211.

Read, S., Aunola, K., Feldt, T., Leinonen, R., & Ruoppila, I. (2005). The relationship between generalized resistance resources, sense of coherence, and health among Finnish people aged 65-69. *European Psychologist, 10*(3), 244-253.

Reed, J., & Watson, D. (1994). The impact of the medical model on nursing practice and assessment. *International Journal of Nursing Studies, 31*(1), 57-66.

Rodney, V. (2000). Nurse stress associated with aggression in people with dementia: its relationship to hardiness, cognitive appraisal and coping. *Journal of Advanced Nursing, 31*(1), 172-180.

Saevareid, H.I., Thygesen, E., Zygaard, H.A. & Lindstrom, T.C. (2006). Does sense of coherence affect the relationship between self-rated health and health status in sample of community-dwelling frail elderly people? *Aging and Mental Health, 11(6),* 658-667.

Sagy, S., & Antonovsky, A. (1992). The family sense of coherence and the retirement transition. *Journal of Marriage and Family, 54*, 983-994.

Samuel-Hodge, C. D., DeVellis, R. F., Ammerman, A. S., Keyserling, T. C., & Elasy, T. A. (2002). Reliability and validity of a measure of perceived diabetes and dietary competence in African American women with type 2 diabetes. *The Diabetes Educator, 28*(6), 979-988.

Sanna, L. J. (1992). Self-efficacy theory: implications for social facilitation and social loafing. *Journal of Personality and Social Psychology, 62*(5), 774-786.

Schmid-Ott, G., Kunsebeck, H. W., Jecht, E., Shimshoni, R., Lazaroff, I., Schallmayer, S. (2007). Stigmatization experience, coping and sense of coherence in vitiligo patients. *Journal of European Academy of Dermatology and Venereology, 21*, 456-461.

Schneider, G., Driesch, G., Kruse, A., Neben, H.-G., & Heuft, G. (2006). Old and ill and still feeling well? determinants of subjective well-being in those 60 or > year olds: the role of the sense of coherence. *American Journal of Geriatric Psychiatry, 14*(10), 850-859.

Skarsater, I., Langius, A., Agren, H., Haggstrom, L., & Dencker, K. (2005). Sense of coherence and social support in relation to recovery in first-episode patients with major depression: A one-year prospective study. *International Journal of Mental Health Nursing, 14*, 258-264.

Smith Jr., E.V., Wakely, M.B., deKruif, R.E.L & Swartz, C.W. (2003). Optimizing rating scales for self-efficacy (and other) research. *Educational and Psychological Measurement, 63(3),* 369-391.

Smith, P. M., Breslin, F. C., & Beaton, D. E. (2003). Questioning the stability of sense of coherence: The impact of socio-economic status and working conditions in the Canadian population. *Soc Psychiatry Epidemiol, 38*, 475-484.

Soskolne, V. (2001). Single parenthood, occupational drift and psychological distress among immigrant women from the former Soviet Union in Israel. *Women & Health, 33*(3-4), 75-93.

Suominen, K., Gould, R., Ahvenainen, J., Vahtera, J., Uutela, A., & Koskenvuo, M. (2005). Sense of coherence and disability pensions. A nationwide, register based prospective population study of 2196 adult Finns. *Journal of Epidemiology and Public Health, 59*, 455-459.

Surtees, P., Wainwright, N., Luben, R., & Khaw, K. T. (2006). Resilience, misfortune, and mortality: evidence that sense of coherence is a marker of social stress adaptive capacity. *Journal of Psychosomatic Research, 61*, 221-227.

Surtees, P., Wainwright, N., Luben, R., Khaw, K. T., & Day, N. (2003). Sense of coherence and mortality in men and women in the EPIC-Norfolk United Kingdom prospective cohort study. *American Journal of Epidemiology, 158*(12), 1202-1209.

Surtees, P. G., Wainwright, N. W. J., Luben, R., Khaw, K. T., & Day, N. E. (2006). Mastery, sense of coherence, and mortality: evidence of independent associations from the EPIC-Norfolk prospective cohort study. *Health Psychology, 25*(1), 102-110.

Tagay, S., Herpertz, S., Langkafel, M., & Senf, W. (2005). Post-traumatic stress disorder in a psychosomatic outpatient clinic: Gender effects, psychosocial functioning, sense of coherence and service utilization. . *Journal of Psychosomatic Research 58*, 439-446.

Timmereck, T. C. (2002). *An Introduction to Epidemiology* (3rd Edition ed.). Boston: Jones and Bartlett Publishers.

Vancouver, J. B., Thompson, C. M., & Williams, A. A. (2001). The changing signs in the relationships among self-efficacy, personal goals and performance. *Journal of Applied Psychology, 86*(4), 605-620.

Veenstra, M., Moum, T. & Roysamb, E. (2005). Relationships between health domains and sense of coherence: a two-year cross-lagged study in patients with chronic illness. *Quality of Life Research, 14,* 1455-1465.

Volanen, S., Suominen, S., Lahelma, E., Koskenvuo, M. & Silventoinen, K. (2006). Sense of coherence and its determinants: a comparative study of the Finnish-speaking majority and the Swedish-speaking minority in Finland. *Scandinavian Journal of Public Health, 34,* 515-525.

Von Bothmer, M. & Fridlund, B. (2003). Self-rated health among university students in relation to sense of coherence and other personality traits. *Scandinavian Journal of Caring Science, 17*, 347-357.

Wallston, K. A., Rothman, R. L., & Cherrington, A. (2007). Psychometric properties of the perceived diabetes self-management scale (PDSMS). *Journal of Behavioral Medicine, 30*, 395-401.

Wampold, B. E., Ahn, H.-n., & Coleman, H. L. K. (2001). Medical model as metaphor: old habits die hard. *Journal of Counseling Psychology, 48*(3), 268-273.

Weick, A. (1983). Issues in overturning a medical model of social work practice. *Social Work, 28*(6), 467-471.

Westwood, B., & Westwood, G. (1999). Assessment of newspaper reporting of public health and the medical model: a methodological case study. *Health Promotion International, 14*(1), 53-64.

Wheaton, B. (1990). Life transitions, role histories, and mental health. *American Sociological Review, 55(2),* 209-223.

WHO. (1946). What is the WHO definition of health? Retreived October 22, 2007 from http://www.who.int/about/definition/en/print.html.

Whyte, G., Saks, A. M., & Hook, S. (1997). When success breeds failure: the role of self-efficacy in escalating commitment to a losing course of action. *Journal of Organizational Behavior, 18,* 415-432.

APPENDICES

APPENDIX A

APPENDIX A.1

MTSU IRB Form

MTSU IRB Form

Principal Investigator: Renata B. Alexandre Version Date: 9 May 2008
Study Title: The Effect of Sense of Coherence and Life-Changing Events on Perceived Health Status
Institution: Middle Tennessee State University

Middle Tennessee State University Institutional Review Board

Request for Exemption

1. **Principal Investigator Information**
Human Subjects Training Completed (Check all that apply) ☐MTSU training ☒NIH training

First Name: Renata	Middle Initial: B.	Last Name: Alexandre
Degree(s): ☐ Ed.D. ☐ J.D. ☐ M.D. ☐ Ph.D. ☐ R.N. ☒ Other, specify:MA		
Job Title: Graduate Teaching Assistant		Affiliation: ☒ MTSU ☐ Other, specify:
Department/Division: Health and Human Performance		School/College: Education and Behavioral Sciences
Campus Address: PO Box 96 MTSU Murfreesboro, TN		Zip+4: 37132
Campus Phone: 904-8238	Fax:	Email: rba2b@mtsu.edu
Complete if PI does not have campus address:		
Address: 853 Belton Drive		City: Nashville
State: TN	Zip: 37205	Phone: 615-337-5203

2. **Co-Principal Investigator Information**
Human Subjects Training Completed (Check all that apply) ☐MTSU training ☐NIH training

First Name:	Middle Initial:	Last Name:
Degree(s): ☐ Ed.D. ☐ J.D. ☐ M.D. ☐ Ph.D. ☐ R.N. ☐ Other, specify:		
Job Title:		Affiliation: ☐ MTSU ☐ Other, specify:
Department/Division:		School/College:
Campus Address:		Zip+4:
Campus Phone:	Fax:	Email:
Complete if PI does not have campus address:		
Address:		City:
State:	Zip:	Phone:

3. **Faculty Advisor (complete if PI is a student, resident, or fellow)** ☐NA
Human Subjects Training Completed (Check all that apply) ☐MTSU training ☒NIH training

Faculty Advisor's name: Norman Weatherby		Title: Dr.	
Department/Division: Health and Human Performance		School/College: Education and Behavioral Sciences	
Campus Address: PO Box 96 MTSU		Zip+4: 37132	
Campus Phone: 615-898-5241	Fax:	Pager:	Email: weatherb@mtsu.edu

4. **Faculty Advisor (complete if PI is a student, resident, or fellow)** ☐NA
Human Subjects Training Completed (Check all that apply) ☐MTSU training ☒NIH training

Faculty Advisor's name: Gloria Hamilton		Title: Dr.	
Department/Division: Psychology		School/College: Education and Behavioral Sciences	
Campus Address: PO Box 097 MTSU		Zip+4: 37132	
Campus Phone: 615-898-5745	Fax:	Pager:	Email: ghamilto@mtsu.edu

5. **Study Contact Information (complete if primary contact is different from PI)** ☒ **NA**
Human Subjects Training Completed (Check all that apply) ☐ MTSU training ☐ NIH training

First Name:	Middle Initial:	Last Name:

Degree(s): ☐ Ed.D.	☐ J.D.	☐ M.D.	☐ Ph.D.	☐ R.N.	☐ Other, specify:

Job Title:	Affiliation: ☐ MTSU ☐ Other, specify:
Department/Division:	School/College:
Campus Address:	Zip+4:
Campus Phone: / Fax:	Pager: / Email:
Complete if contact does not have campus address:	
Address:	City:
State: / Zip:	Phone:

6. **Study Information:**

A. Give a brief synopsis of the research, including background information and rationale.

Aaron Antonovsky theorized that an individual's sense of coherence would have an effect on how s/he perceived her/his health status. Research using the theory of sense of coherence to examine this topic has primarily been conducted in Europe.

Antonovsky also proposed that those who had experienced life changing events would have either a stronger or weaker sense of coherence, depending on how the individual coped with the event. No study has been done to determine the effect of life changing events on the relationship of sense of coherence to perception of health status. This study will fill this gap in research.

This study could have an impact on health promotion activities if findings conclude that the sense of coherence has an effect on perceived health status that is moderated by life changing events. Sense of coherence is developed as a person matures. Adult populations who have difficulty dealing with the stressors of life may require interventions that provide tools for coping, thereby reducing stress levels and raising perceptions of health status. Such interventions may be especially helpful for those who have had difficulty with life-changing events.

B. Describe the subject population/ type of data/specimens to be studied.
☐ Prisoners (Note: Research involving prisoners is not eligible for exemption).
☐ Children (Note: Research involving children has more restrictive exemption criteria; see instructions).
Other: Adults age 40 and older

C. Describe any inclusion/exclusion criterion used to select participants.
Individuals who cannot read or are otherwise unable to fill out a questionnaire will be excluded.
Those aged 39 and under will be excluded.

D. Describe the source of data/specimens and if these are publicly available. If not publicly available, describe how prior approval will be obtained before accessing this information (attach approval letter if available).

The PI will offer in-service events to various organizations and groups. In-service events will include special training or courses in various health topics for interested groups. Persons who participate in the in-service events will be asked to fill out the questionnaires for this study. Permission will be obtained from organizational leaders prior to doing the in-service events at each institution.

E. Does this study involve the collection of existing records or data often referred to as "on-the-shelf" data [see 45 CFR 46.101 (b)(4)]? Describe how this data is collected, stored and de-identified.

No existing records will be obtained. Only questionnaire information will be obtained. After collecting the data at in-service events, it will be transported to the PI's office or home for data entry. Once entered, questionnaires will be stored in a locked file at the home of the PI. All participants will be assigned an arbitrary identification number, and this number will be used on all data collection forms. No names, addresses or other identifying information will be collected.

F. Describe the recruitment process, including any advertisements, to be used for this study.

a. No advertisements will be used. The PI will be contacting organizations by telephone and then arrange for participation by visiting the organization. Organizations will include the following: mental health organizations, those offering medical or alternative medical treatments, groups for non-traditional college students, churches, and service organizations.

G. Describe any procedures to be used during this study.
The following three questionnaires will be given to individuals to complete in one sitting: The Orientation to Life Questionnaire, the Perceived Quality of Life Questionnaire, and a Demographic Questionnaire. No identifying information will be collected.

H. Is this study affiliated with any other IRB-approved studies?
☒ No ☐ Yes
If "Yes", please list by IRB#:

I. Is this proposal associated with a grant or contract?
☒ No ☐ Yes
If "Yes", attach copy and list the funding source associated with the grant or contract.

J. Does this research involve any approved or unapproved FDA regulated items (including foods, including dietary supplements, that bear a nutrient content claim or a health claim, infant formulas, food and color additives, drugs for human use, medical devices for human use, biological products for human use, and electronic products.)
☒ No ☐ Yes (Note: FDA regulated research has more restrictive exemption criteria; see instructions).

CATEGORIES OF EXEMPTION

Involvement of human subject research in the following categories may be declared exempt from IRB Review by the IRB. Only the Compliance Officer or an IRB member may determine which activities qualify for an exempt review. From the six categories presented below, check **"Yes"** for the categories that you believe describe your proposed research and **"No"** for all others. If none of the categories apply, complete an application for expedited or standard IRB review or contact the IRB staff for instructions.

YOU MUST CHECK "YES" OR "NO" FOR ALL OF THE FOLLOWING:

45 CFR 46.101(b)(1):
☐ Yes ☒ No **EVALUATION/COMPARISON OF INSTRUCTIONAL STRATEGIES/CURRICULA**
Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods. This exemption category cannot be used for FDA regulated research.

If "Yes", describe the educational setting in which the research will be conducted and the type of normal educational practices involved.

45 CFR 46.101(b)(2):
☐ Yes ☒ No **EDUCATIONAL TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS**
Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk

of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. This exemption category cannot be used for FDA regulated research.

Note: When the research involves children as subjects this exemption must be limited to educational tests (cognitive, diagnostic, aptitude, achievement) and observation of public behavior when the investigators do not participate in the activities being observed. Research that uses survey procedures, interview procedures, or observation of public behavior when the investigators participate in the activities being observed cannot be granted an exemption.

45 CFR 46.101(b)(3):

☐ Yes ☒ No **PUBLIC OFFICIALS OR CANDIDATES FOR PUBLIC OFFICE**

Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior that is not exempt under the previous paragraph if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) Federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter. This exemption category cannot be used for FDA regulated research.

Describe how subjects may be identified or are at risk, or state the federal statute that allows the confidentiality of the subject to be maintained throughout the research and thereafter.

45 CFR 46.101(b)(4):

☐ Yes ☒ No **COLLECTION OR STUDY OF EXISTING DATA**

Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. This exemption category cannot be used for FDA regulated research.

Note: To qualify for this exemption, the data, documents, records, or specimens must be in existence before the project begins. Additionally, under this exemption, an investigator (with proper authorization) may inspect identifiable records, but may only record information in a non-identifiable manner. *See* IRB Policy IX.C for additional information and examples regarding this exemption.

45 CFR 46.101(b)(5):

☐ Yes ☒ No **RESEARCH & DEMONSTRATION PROJECTS**

Research and demonstration projects which are conducted by or subject to approval of federal Departmental or Agency heads (such as the Secretary of HHS), and which are designed to study, evaluate, or otherwise examine: (i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; (iv) possible changes in methods or levels of payment for benefits or services under those programs. This exemption category cannot be used for FDA regulated research.

Proof of approval by Department/Agency Head is attached. ☐Yes ☐No

Note: This exemption applies to federally funded projects only and requires authorization or concurrence from the funding agency. Additionally, specific criteria must be satisfied to invoke this exemption. *See* IRB Policy IX.C. Also, this exemption category does not apply if there is a statutory requirement that this project be reviewed by an IRB or if the research involves physical invasion or intrusion upon the privacy of subjects.

45 CFR 46.101(b)(6) and 21 CFR 56.104(d):

☐Yes ☒ No **FOOD QUALITY EVALUATION & CONSUMER ACCEPTANCE STUDIES**

Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome food, without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA or approved by the EPA or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

5. Will Protected Health Information (PHI)[1] be accessed (used within MTSU) in the course of preparing for this research?

☒ No ☐ Yes

If "No", skip to the Conflict of Interest statement on the next page.

STATEMENT OF AFFIRMATION

If Protected Health Information (PHI)[1] is accessed (used) in the course of preparing for this research the following 3 conditions must be met:

1. The use or disclosure of the PHI is sought solely for the purpose of preparing this research protocol.
2. The PHI will not be removed from the covered entity.
3. This PHI is necessary for the purpose of this research study.

The above 3 conditions must be met to allow for the access (use) of PHI as "preparatory to research."

A. Will a de-identified data set be created *(all 18 HIPAA identifiers must be removed, see list attached)*?

☐ No ☐ Yes

B. Will a limited data set be created?

☐ No ☐ Yes *If "Yes", complete the MTSU "Data Use Agreement" below.*

The data use agreement below sets forth the terms and conditions in which the Covered Entity (MTSU) will allow the use and disclosure of a limited data set[2] to the Data Recipient (Principal Investigator). The limited data set must have direct identifiers removed, but may include town, city, and/or 5-digit ZIP codes as well as date elements (e.g., dates of birth, admission, discharge, etc.).

MTSU DATA USE AGREEMENT ☐ **NOT APPLICABLE**

In addition to the Principal Investigator, identify all individuals who will be requesting authorization to access the limited data set:

Name of Institution and/or Individual	Non-MTSU Data Use Agreement Required?*
	☐ Yes ☐ No
	☐ Yes ☐ No
	☐ Yes ☐ No
	☐ Yes ☐ No
	☐ Yes ☐ No
	☐ Yes ☐ No

**A Non-MTSU data use agreement is required to disclose the limited data set to an individual or an institution outside of MTSU. A template will be available at http://www.mtsu.edu/%7Eirb/ once construction is finished.*

As the Principal Investigator of this study I agree:

Not to use or disclose the limited data set for any purpose other than the research project or as required by law.

To use appropriate safeguards to prevent use or disclosure of the limited data set other than as provided for by this Agreement.

To report to the Covered Entity (MTSU) any use or disclosure of the limited data set not provided for by this agreement, of which I become aware, including without limitation, any disclosure of PHI to an unauthorized subcontractor.

To ensure that any agent, including a subcontractor, to whom I provide the limited data set, agrees to the same restrictions and conditions that applies through this agreement to the Data Recipient with respect to such information.

Not to identify the information contained in the limited data set or contact the individual.

6. Potential Conflict of Interest

A. Is there a potential conflict of interest for the Principal Investigator or key research personnel?
Assessment should include anyone listed as Principal Investigator, or other research personnel on page 1 of this application. Please note that the thresholds of ownership described below apply to the aggregate ownership of an individual investigator, his/her spouse, domestic partner and dependent children (e.g., if an investigator, his/her spouse, domestic partner and dependent children own together $10,000 or 5% worth of equities in the sponsor, it should be reported below). Do not consider the combined ownership of all investigators.

☒ No
☐ Yes *If "Yes", the investigator must complete and submit the "Conflict of Interest Supplemental Form" with this application. The form and the protocol must be reviewed by the MTSU IRB.*

NOTE: Although approval may be granted by the IRB, the investigator may not proceed with the research until a final determination letter has been rendered by the IRB.

B. If "Yes", check all that apply:

☐ Compensation whose value could be affected by the study outcome.

☐ A proprietary interest in the tested product included but not limited to, a patent, trademark, copyright or licensing agreement, or the right to receive royalties from product commercialization.

☐ Any equity interest in the sponsor or product whose value cannot be readily determined through preference to public prices (e.g., ownership interest or stock options).

☐ Any equity interest in the sponsor or product that exceeds $10,000 or 5%.

☐ Significant payments or other sorts with a cumulative value of $10,000 made directly by the sponsor to any of the investigators listed on page 1 of this application as an unrestricted research or educational grant, equipment, consultation or honoraria.

Investigator Assurance and Compliance Statement

As the PI of this study I agree:
☒ To accept responsibility for the scientific and ethical conduct of this project;
☒ To ensure all investigators and key study personnel have completed the MTSU human subjects training program;

☒ To submit for approval any additions, corrections or modifications to the protocol or informed consent document to the IRB prior to the implementation of any changes; and
☒ This project will not be started until final approval has been granted from the IRB.

Application Checklist - Incomplete applications may result in delay of research!

Investigator(s): Please **read** and **initial** each item.

Checklist item	
Is all information typed?	rba
Is documentation of IRB training attached for each investigator and faculty supervisor?	rba
Is the investigator email address and other contact information included?	rba
If student research, is the faculty advisor email and other contact information included?	rba
Are surveys, questionnaires, tests, interview forms / scripts attached?	rba
Is the method of PARTICIPANT selection indicated?	rba
If using the Psychology Department PARTICIPANT pool, is information attached?	NA
If a consent form is being used, is a copy of the consent form attached?	rba
For research involving minors, is an assent form attached?	NA
For research at outside institutions (e.g., schools), are permission letters on official letterhead attached? **These will be forwarded as they are collected.**	rba

Renata B. Alexander — Principal Investigator's Signature — 9 May 2008 — Date

Norman L. Weatherby — Faculty Advisor (if PI is non-faculty) — 9 May 2008 — Date

Gloria Hamilton — Faculty Advisor (if PI is non-faculty) — 9 May 2008 — Date

[1] **Protected Health Information (PHI):** Protected health information (PHI) is individually identifiable health information that is or has been collected or maintained by a medical facility, including information that is collected for research purposes only, and can be linked back to the individual participant. Use or disclosure of such information must follow HIPAA guidelines.

Individually identifiable health information is defined as any information collected from an individual (including demographics) that is created or received by a health care provider, health plan, employer, and/or health care clearinghouse that relates to the past, present or future physical or mental health or condition of an individual; or the provision of health care to an individual or the past, present or future payment for the provision of health care to an individual and identifies the individual and/or to which there is reasonable basis to believe that the information can be used to identify the individual **(45 CFR 160.103).**

A covered entity (MTSU) may determine that health information is not individually identifiable **(De-identified)** health information only if all of the following identifiers of the individual or of relatives, employers, or household members of the individual are removed:

1. Names;
2. Any geographic subdivisions smaller than a State, including street address, city, county, precinct, zip code, and their equivalent geocodes, except for the initial three digits of a zip code;
3. All elements of dates (except year) for dates directly related to an individual (e.g., date of birth, admission);
4. Telephone numbers;
5. Fax numbers;
6. Electronic mail addresses;
7. Social security numbers;
8. Medical record numbers;
9. Health plan beneficiary numbers;
10. Account numbers;
11. Certificate/license numbers;
12. Vehicle identifiers and serial numbers, including license plate numbers;
13. Device identifiers and serial numbers;
14. Web Universal Resource Locators (URLs);
15. Internet Protocol (IP) address numbers;
16. Biometric identifiers, including finger and voiceprints;
17. Full-face photographic images and any comparable images; and
18. Any other unique identifying number, characteristic, or code.

[2] **Limited data set:** The limited data set is protected health information that excludes all above data elements with the exception of elements of dates, geographic information (not as specific as street address), and any other unique identifying element not explicitly excluded in the list above.

APPENDIX A.2

MTSU Approval Letter

May 12, 2008

Renata Alexandre, Dr. Norman Weatherby & Dr. Gloria Hamilton
Departments of Health and Human Performance & Psychology
rba2b@mtsu.edu, weatherb@mtsu.edu, ghamilto@mtsu.edu

Re: Protocol Title: "The Effect of Sense of Coherence and Life-Changing Events on..."
Protocol Number: 08-318

Dear Investigator(s),

I found your study to be exempt from Institutional Review Board (IRB) continued review. The exemption is pursuant to 45 CFR 46.101 (b)(2) and is based on the fact that the research is involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior; no identifiers will be used; and, any disclosure of the human subjects' responses could not reasonably place the subjects at risk.

You will need to submit an end-of-project report to the Office of Compliance upon completion of your research. Complete research means that you have finished collecting data and you are ready to submit your thesis and/or publish your findings. Should you not finish your research within the three (3) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires on **May 12, 2011.**

Any change to the protocol must be submitted to the IRB before implementing this change. According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the project. If you need further assistance, please call me at 494-8918.

Once your research is completed, please send us a copy of your final report to the Office of Compliance.

Also, all research materials must be retained in a secure location by the PI or **faculty advisor (if the PI is a student)** for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Tara M. Prairie

Compliance Officer

APPENDIX A.3

MTSU Approval of Changes Letter

June 2, 2008

Renata Alexandre, Dr. Norman Weatherby & Dr. Gloria Hamilton
Departments of Health and Human Performance & Psychology
rba2b@mtsu.edu, weatherb@mtsu.edu, ghamilto@mtsu.edu

Re: Protocol Title: "The Effect of Sense of Coherence and Life-Changing Events on..."
Protocol Number: 08-318

Dear Investigator(s):

I have reviewed your research proposal identified above and your requested changes. I approve of recruiting subjects online. Should there be any changes to the survey or consent document (other than template changes to place them online) please forward the revised documents to me.

Please note that any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918.

You will need to submit an end-of-project report to the Office of Compliance upon completion of your research. Complete research means that you have finished collecting data and you are ready to submit your thesis and/or publish your findings. Should you not finish your research within the three (3) year period, you must submit a Progress Report and request a continuation prior to the expiration date. Please allow time for review and requested revisions. Your study expires **May 11, 2011.**

According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the

project. Any change to the protocol must be submitted to the IRB before implementing this change.

All research materials must be retained by the PI or **faculty advisor (if the PI is a student)** for at least **three (3) years after study completion**. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Tara M. Prairie

Compliance Officer

Middle Tennessee State University

APPENDIX B

APPENDIX B.1

Demographic and Life Changing Events Questionnaire

Demographics

1. Age: _____ years

2. What is your gender? _____

3. What is your marital status? _____

4. What is the highest level of education you have attained? _____

5. What is your race/ethnicity? _____

6. What is your job title? _____

7. How stressful do you find your job?

Not at all stressful *Very stressful*

1 2 3 4 5 6 7

8. List the major responsibilities of your job. _____

_____

_____

9. Where would you fit on the socioeconomic continuum below?

Lower class *Middle class* *Upper class*

1 2 3 4 5 6 7

10. Do you have a chronic disease? *Yes* *No*

If yes, please name the disease. _____

How long have you had this disease? _____

11. Below is a list of common occurrences in individual's lives.

Please indicate whether you experienced any of the common life occurrences below, and the number of months that have passed since the event occurred.

Death of a close family member *Yes* *No*

_____ *months ago*

Severe disability *Yes* *No*

_____ *months ago*

Being fired from a job *Yes* *No*

_____ *months ago*

Addition of a new family member *Yes* *No*

_____ *months ago*

Outstanding personal achievement *Yes* *No*

_____ *months ago*

Severe trauma *Yes* *No*

_____ *months ago*

Divorce *Yes* *No*

_____ *months ago*

Being laid off from a job *Yes* *No*

_____ *months ago*

Retirement ***Yes*** ***No***

_____ ***months ago***

12. Using the continuum below, please rate the impact of each of the experiences you have had. Please place the number of your rating in the blanks below.

Very Negative				***Neutral***				***Very Positive***
1	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***9***

Death of a close family member _____

Severe disability _____

Being fired from a job _____

Addition of a new family member _____

Outstanding personal achievement _____

Severe trauma _____

Divorce _____

Being laid off from a job _____

Retirement _____

13. Please describe each experience you have had to the extent you are comfortable sharing. Use the back of these papers as necessary. _____

_____

_____

_____

_____

APPENDIX B.2

Orientation to Life Questionnaire

Orientation to Life Questionnaire

Here is a series of questions relating to variousl aspects of our lives. Each question has seven possible answers. Please mark the number which expresses your answer, with numbers 1 and 7 being the extreme answers. If the words under 1 ar right for you, circle 1; if the words under 7 are right for you, circle 7. If you feel differently, circle the number which best expresses your feeling. Please give only one answer to each question.

1. Do you have the feeling that you don't really care what goes on around you?

1	2	3	4	5
very seldom or never				very often

2. Has it happened in the past that you were surprised by the behavior of people whom you thought you knew well?

1	2	3	4	5
never happened				always happened

3. Has it happened that people on whom you counted disapppointed you?

1	2	3	4	5
never happened				always happened

4. Until now, your life has had:

1	2	3	4	5
no clear goals or purpose				very clear goals and purpose

5. Do you have the feeling that you're being treated unfairly?

1	2	3	4	5
very often				very seldom or never

6. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

1	2	3	4	5
very often				very seldom or never

7. Doing the things you do every day is:

1	2	3	4	5
a source of deep pleasure and satisfaction				a source of pain and boredom

8. Do you have very mixed-up feelings and ideas?

1	2	3	4	5
very often				very seldom or never

9. Does it happen that you have feelings inside you would rather not feel?

1	2	3	4	5
very often				very seldom or never

10. Many people--even those with a strong character--sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?

1	2	3	4	5
never				very often

11. When something happened, have you generally found that:

1	2	3	4	5
you overestimated or underestimated its importance				you saw things in the right proportion

12. How often do you have the feeling that there's little meaning in the things you do in your daily life?

1	2	3	4	5
very often				very seldom or never

13. How often do you have feelings that you're not sure you can keep under control?

1	2	3	4	5
very often				very seldom or never

APPENDIX B.3

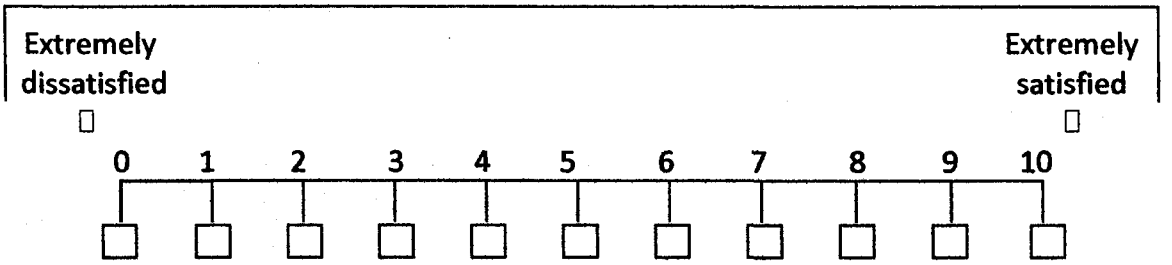
Perceived Quality of Life Questionnaire

Satisfaction with Health and Life

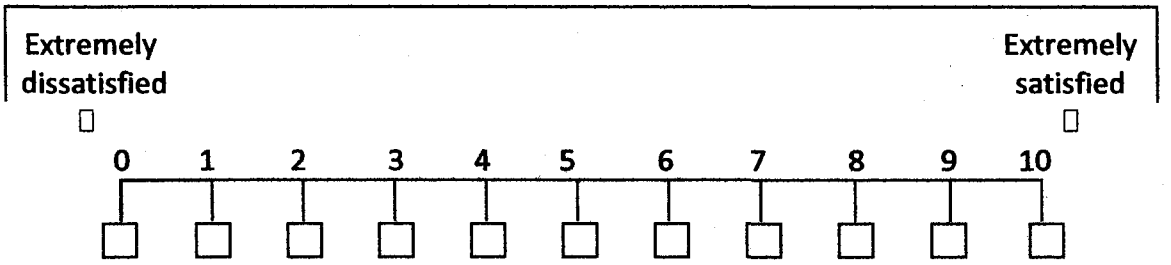
We would like to know how satisfied you are with different aspects of your life. Each item below has a scale where "0" is Extremely Dissatisfied and "10" is Extremely Satisfied. [For each item, mark an ☒ in the box of the number that shows your own level of satisfaction.]

How dissatisfied or satisfied are you with:

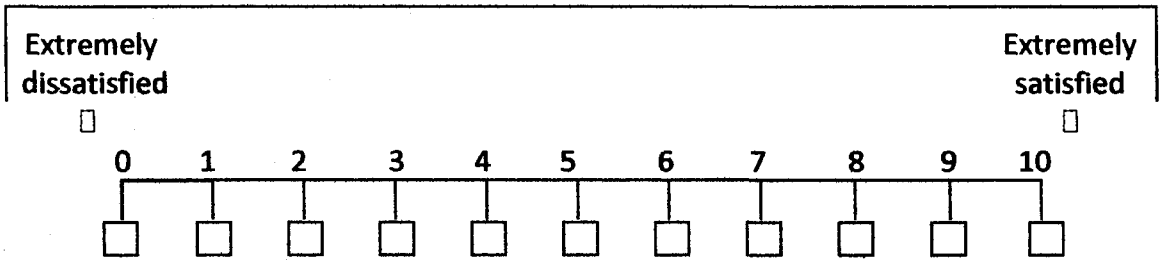
P*1. Your physical health (the health of your body)?



P 2. How well you care for yourself, for example, preparing meals, bathing, or shopping?

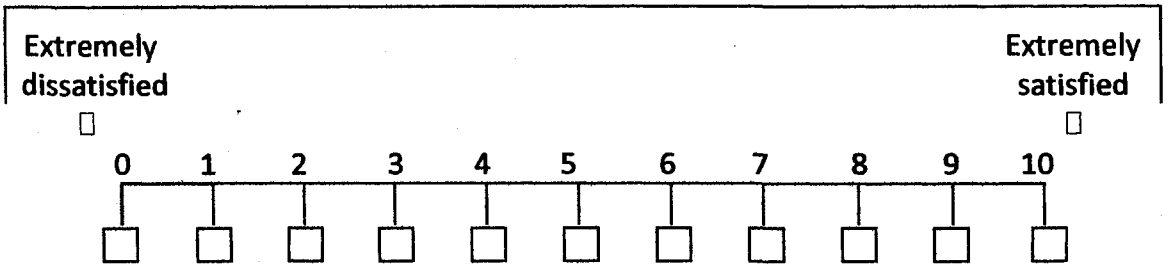


C *3. How well you think and remember?

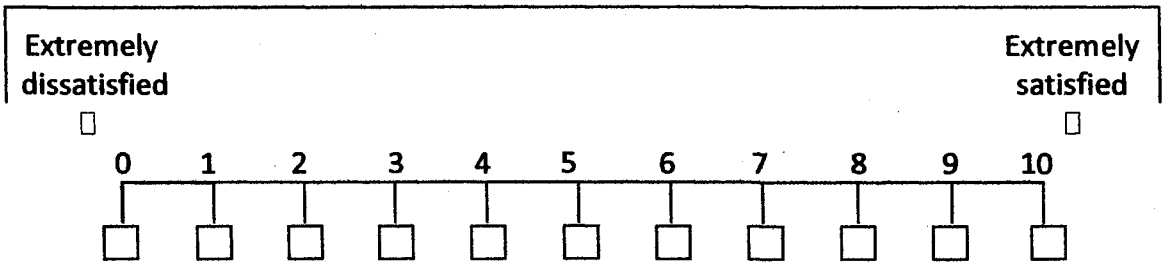


How dissatisfied or satisfied are you with:

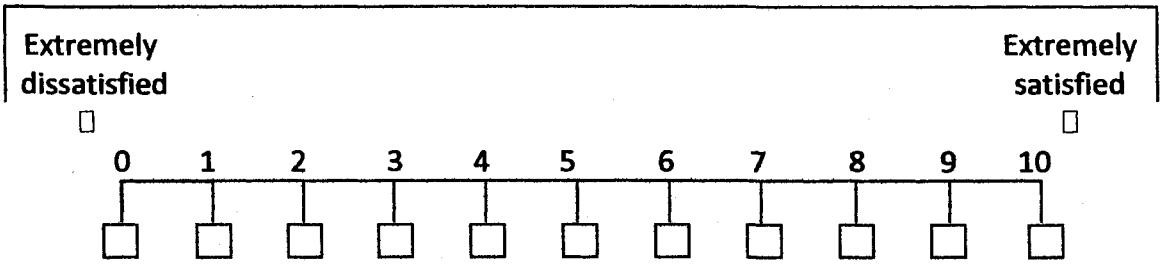
P 4. The amount of walking you do?



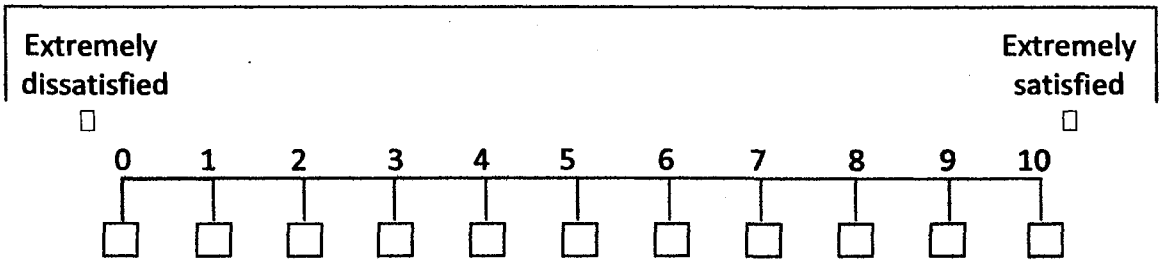
P 5. How often you get outside the house, for example, going into town, using public transportation or driving?



C 6. How well you carry on a conversation, for example, speaking clearly, hearing others, or being understood?

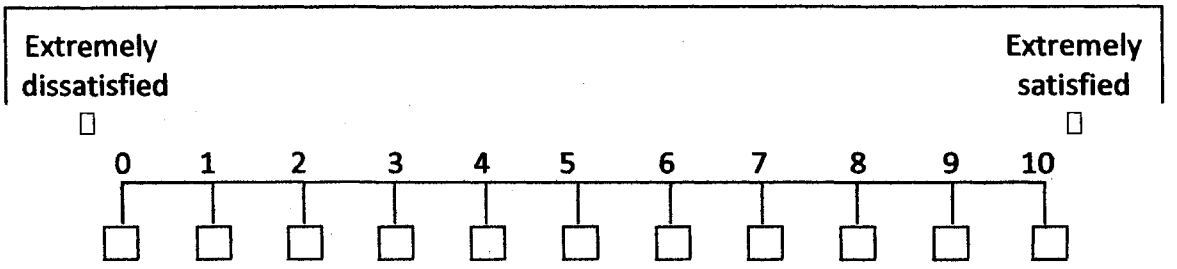


7. The kind and amount of food you eat?

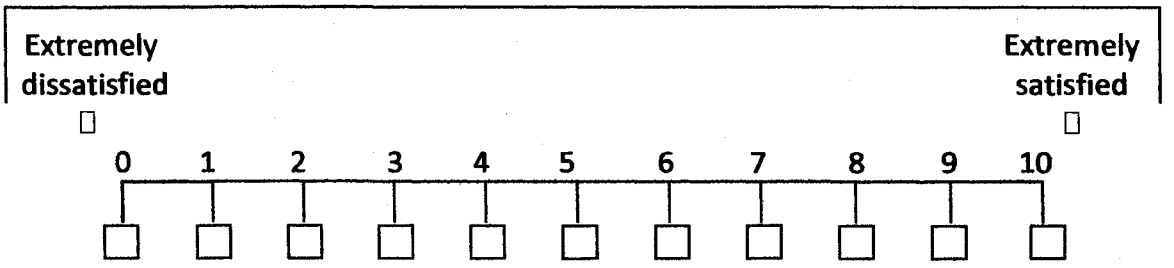


How dissatisfied or satisfied are you with:

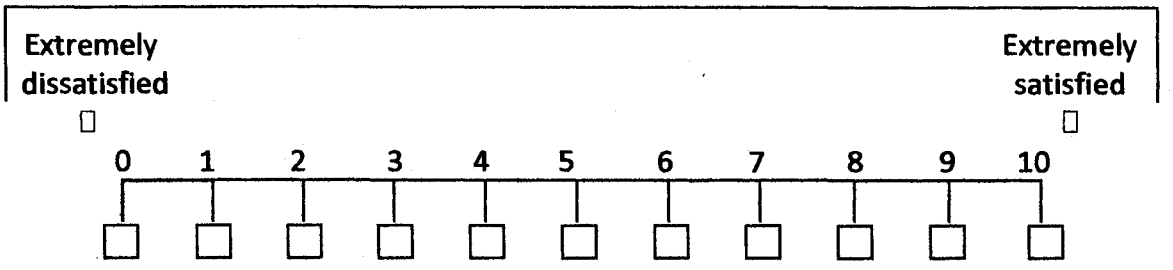
S *8. How often you see or talk to your family and friends?



S *9. The help you get from your family and friends, for example, helping in an emergency, fixing your house, or doing errands?

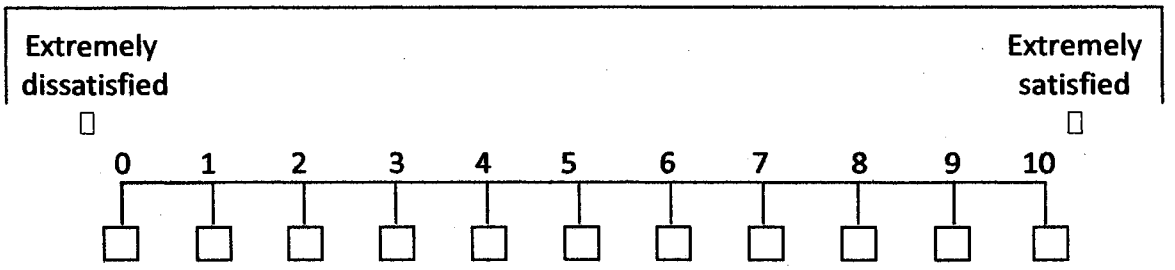


S *10 .The help you give to your family and friends?

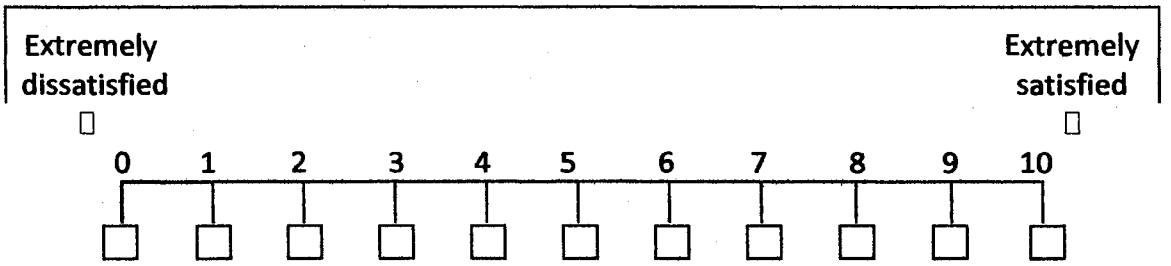


How dissatisfied or satisfied are you with:

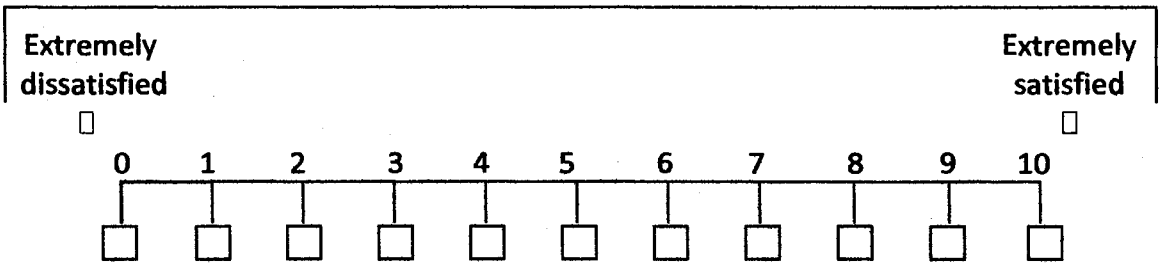
S *11 .Your contribution to your community, for example, a neighborhood, religious, political or other group?



S *12 .Your retirement or current job?

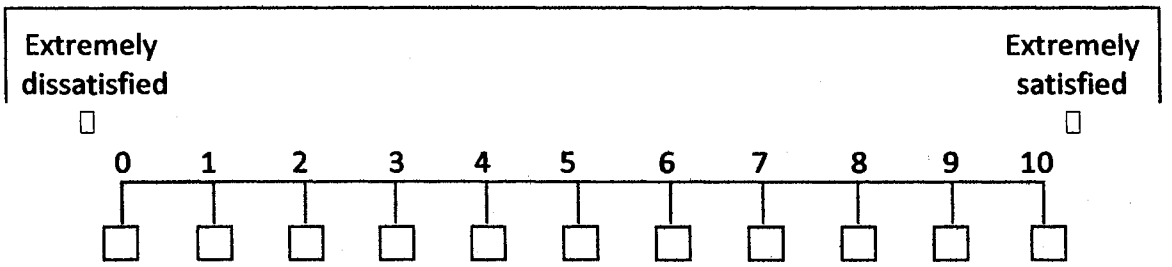


S 13. The kind and amount of recreation or leisure you have?

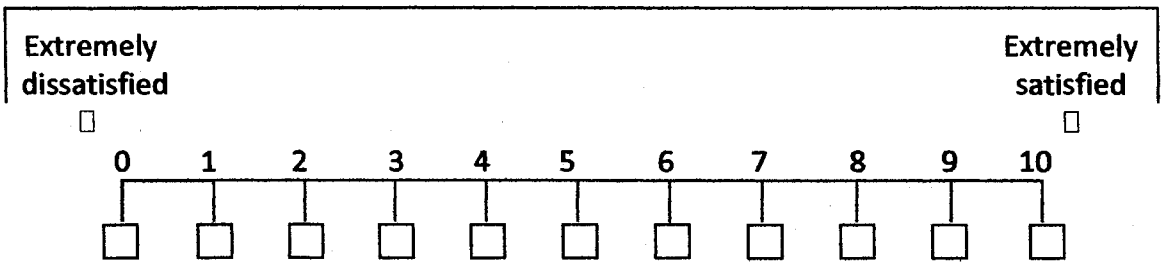


How dissatisfied or satisfied are you with:

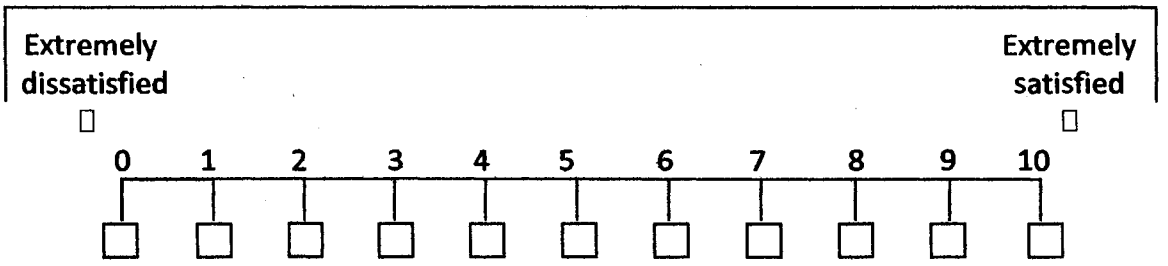
S *14. Your level of sexual activity or lack of sexual activity?



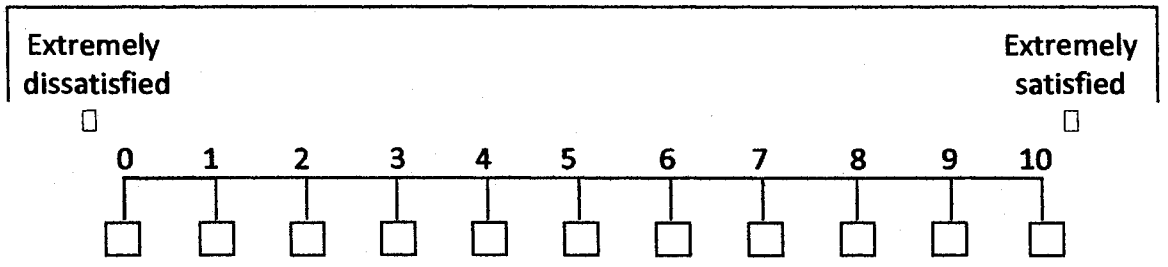
S *15. The way your income meets your needs?



S *16 .How respected you are by others?

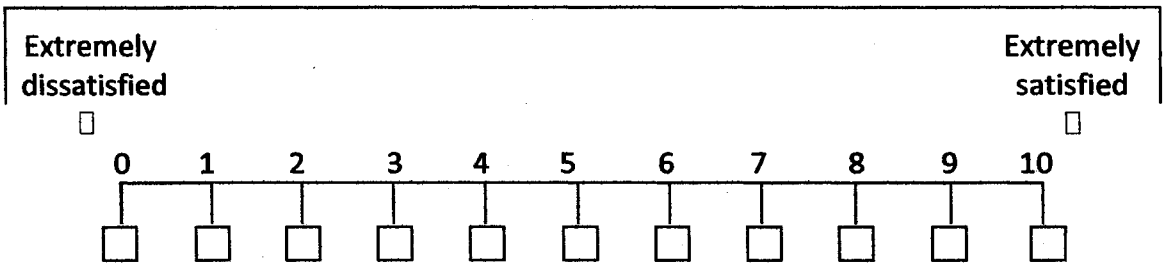


S *17. The meaning and purpose of your life?

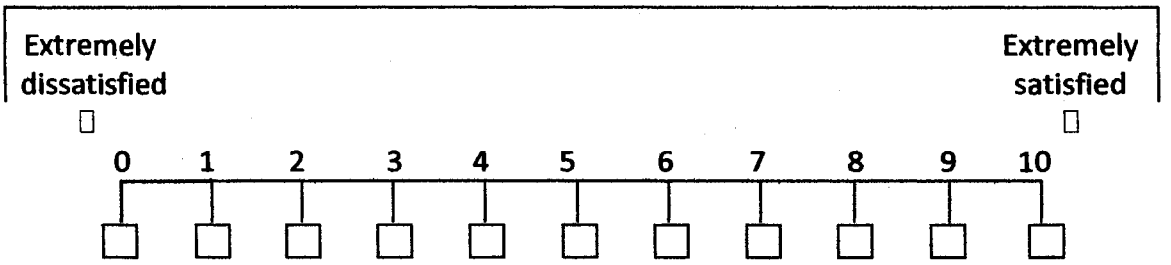


How dissatisfied or satisfied are you with:

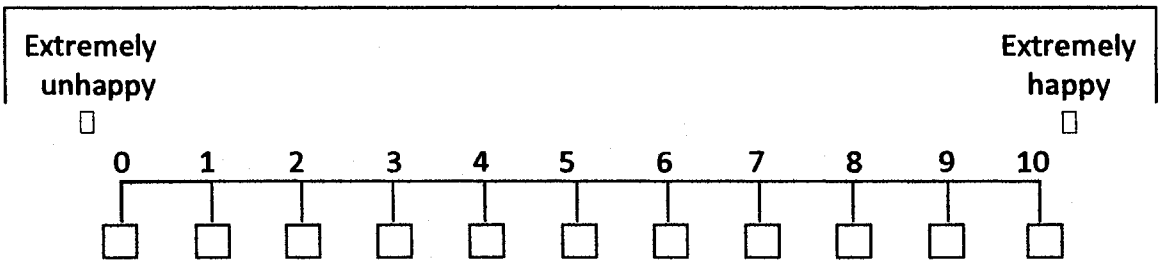
S 18 .The amount of variety in your life?



P 19 .The amount and kind of sleep you get?



S *20. How happy are you?



APPENDIX C

APPENDIX C

Questionnaire Instructions and Consent Form

Questionnaire Instructions and Consent Form

Middle Tennessee State University Institutional Review Board
Informed Consent Document for Research

Principal Investigator: Renata Alexandre
Study Title: The Effect of Sense of Coherence and Life-Changing Events on Perceived Health Status
Institution: Middle Tennessee State University

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Please detach this form from the survey and keep it for your records. If you choose not to keep the consent letter, please hand it in with your survey so it can be recycled.

Your participation in this research study is voluntary. You are also free to withdraw from this study at any time.

For additional information about giving consent or your rights as a participant in this study, please feel free to contact Tara Prairie at the Office of Compliance at (615) 494-8918.

You are being asked to participate in a research study to determine the effect of sense of coherence and life-changing events on the perception of health status. All of these variables are measured through the three questionnaires you are asked to fill out today. This is a one-time survey. You will not be asked to fill out any additional forms after you have completed those given you today.

The potential benefits to science and humankind that may result from this study include the ability of humans to pattern their lives in such a way as to obtain a life of wellness, thereby avoiding as much illness as possible. The potential benefits to you from this study are that if factors contributing to wellness are found, those in authority at your institution will be informed as soon as the researchers discover this knowledge.

There is no compensation for participating in this study. You may withdraw at any time. If you do not complete all the questions in the survey, your data may be withdrawn by the Principal Investigator to maintain the quality of the study. If you choose to withdraw from participation in this study, your data will likely be discarded if it is incomplete.

If you should have any questions about this research study or possibly injury, please feel free to contact Renata Alexandre at (615) 904-8238, or my Faculty Advisors, Dr. Gloria Hamilton at (615) 898-5745 or Dr. Norman Weatherby at (615) 898-5241.

Adapted from Vanderbilt University