

EMOTIONS AND COGNITIONS IN CONSUMER HEALTH BEHAVIORS
A MODEL OF HOPE AND CONTROL APPLIED TO CHRONIC ILLNESSES

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Suzanne Chehayeb Makarem

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Dissertation Chair:
Michael F. Smith, Marketing Department

Dissertation Committee:
James M. Hunt, Marketing Department
Susan Mudambi, Marketing Department
William E. Aaronson, Risk, Insurance, and Healthcare Management Department

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ABSTRACT

Emotions and Cognitions in Consumer Health Behaviors
A Model of Hope and Control Applied to Chronic Illnesses
By Suzanne Chehayeb Makarem
Doctor of Philosophy
Temple University, August 2010
Doctoral Advisor: Dr. Michael F. Smith

This dissertation examines the effects of hope and perceptions of control on compliance and satisfaction with medical regimens recommended to patients living with a chronic illness. The present research advances a model that attempts to predict compliance health behaviors and satisfaction with health treatments by incorporating perceptions of control conceptualized using locus of control and self-efficacy, and hope as identified by appraisal theories of emotions and measured using the Herth Hope Index. The proposed model is empirically tested in the context of a lifestyle changing chronic illness: Diabetes Type II.

The concept of ‘perceptions of control’ constitutes a central component of most social cognition models and its positive effects on health have been well documented in the literature. However, in health care services, customers experience illness, pain, uncertainty, fear and mainly perceived lack of control. What happens when patients experience loss of control? Does this explain the low compliance levels that we witness today? What if patients experience loss of control, but have high levels of hope? Hope has been associated with higher medical regimen adherence and higher levels of

satisfaction. People need hope and manage to have it even in the worst circumstances. In an attempt to answer these questions, the basic premise of the formulation offered here is that the emotion of hope can play an important mediating role between perceptions of control and health behavior and health service evaluation.

The empirical findings of this dissertation are mainly based on cross-sectional panel survey data from 222 Diabetes Type II patients, multiple regression analyses, and structural equation procedures following mediation analysis guidelines. The data analyses results from testing three competing models about the dynamics between hope and control support the role of hope as a mediator between perceptions of control dimensions and compliance and satisfaction with the medical treatment. In particular, the results revealed that hope mediates the effects of self-efficacy and doctors health locus of control on compliance and satisfaction. It appears that individuals have higher levels of hope only to the extent that they believe they are capable of performing the actions required by their Diabetes Type II treatment, and/or that their health outcomes are under the control of powerful doctors. These two dimensions of control lead to higher levels of compliance and satisfaction with the treatment regimen through hope.

The developed model contributes to transformative consumer research by assisting in solving the challenge of patient compliance with recommended health behaviors. The low levels of compliance across various medical conditions and the increasing rate of people suffering from chronic illnesses constitute pressing research concerns in consumer

research. The current research enhances the understanding of compliance behaviors and satisfaction with health services by exploring two of their potential antecedents: hope and perceptions of control; and it represents a step towards enhancing consumer health and well-being.

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I dedicate this dissertation to my family. None of this would have been possible without my family's love, blessings, and sacrifices. I am not capable of expressing my endless gratitude to my parents Riad and Noha, but I can express my adoration for two people who never cease to inspire me to seek higher goals in life. My utmost pride stems from being your daughter. My brother Omar and my sisters Tamara and Dalia have been the source of my strengths and the reason behind my perseverance. I am grateful to Omar for believing in me, to Dalia for continuously cheering for me, and to Tamara for being there for me during the stressful times, the long days, and the lonely nights. Despite being the eldest, I have been the one relying on and learning from all of you. I adore you and I am blessed to have you as my family.

DEDICATION

This dissertation is dedicated to:

My Father

You are the inspiration behind every positive achievement in my life

&

My Mother

When one aspires to be like you, one can never stop advancing

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CHAPTER 1
INTRODUCTION AND OVERVIEW

Introduction

This study examines the effects of hope and perceptions of control on compliance and satisfaction with medical regimens recommended to patients living with a chronic illness. The low level of compliance with medically recommended lifestyle changes, across various chronic conditions, constitutes a pressing concern in the area of transformative consumer research. I propose a model that integrates attribution and appraisal theories of emotions with social cognition theory, to examine the dynamics between hope and perceptions of control. This model contributes to transformative consumer research by enhancing our understanding of the challenges faced by patients in complying with recommended health behaviors.

Scholars in different disciplines have recognized that the constructs of hope (Clayton et al. 2008; Snyder 2002) and perceptions of control (Helgeson 1992; Tangsrud and Smith 2000; Taylor, Lichtman and Wood 1984; Thompson et al. 1993; Van Raaj and Pruyn 1998) individually affect behavior. However, the existing models and theories have failed to examine the simultaneous roles of hope and perceptions of control in predicting consumer behavior and product or service satisfaction. Limited studies on the specific role of hope have suggested its positive effects on consumer behavior, well-being and satisfaction; and cognitive behavior models have established the significant role of

perceptions of control in influencing the likelihood of positive consumer actions. The scarcity of research linking these two constructs and studying their effects on behavior and satisfaction is thus surprising. Given the importance of both hope and perceptions of control in the context of individual health, it is valuable to test a model of hope and control that attempts to predict compliance and satisfaction with health treatments for patients living with a chronic illness.

In 1999, Lazarus has remarked that there is a reluctance to address the concept of hope on the part of researchers in psychology (Lazarus 1999, 654). Today, research on hope is still nascent, particularly in the marketing field. MacInnis and De Mello (2005) have published a conceptual paper where they define the concept of hope using appraisal theory, explain the role of hope in consumer consumption, suggest propositions about its effects on consumer information processing, attitudes, product choice and satisfaction, and advocate that future research examine these propositions. In their paper, MacInnis and De Mello (2005) have anticipated that hope moderates many relationships well-established in marketing such as the relationship between outcome valence from using a product and product satisfaction or between advertising product risks and product choice. Except for one other article that tackles the effects of hope on searching, evaluating and weighing product information in forming product judgments (De Mello, MacInnis, and Stewart 2007), research in marketing has not tapped into the potential richness of the construct of hope. This study explores the role of hope in shaping behaviors and consumer evaluation of services, particularly in the context of health services. There is a great potential for marketing research studies in the health care field (Berry and

Bendapudi 2007). One major research gap in health behavior is “the role of positive emotions in coping, including ideas such as love and hope, that warrant further examination” (Glanz and Schwartz 2008, 229). It is important to further our understanding of consumer health behavior by studying the role of hope in consumer health decisions and health services’ evaluation.

Nevertheless, one cannot ignore existing models that have attempted to explain health behaviors, such as smoking cessation, exercise, the practice of safe sex, adjustment to illnesses, coping efforts, and compliance with medical treatments. The most used theories and models of health behavior are social cognition models such as the Health Belief Model, Theory of Planned Behavior, Locus of Control or Social Learning Theory, and Self-Efficacy models. All these models have emphasized the role of perceptions of control as a central component that shapes behavior and behavioral intentions. Therefore, it is central to study the dynamics between hope and perceptions of control, and the ways by which they can impact patients’ health decisions, outcomes, and evaluation of health services. The main goal of this dissertation is the development and testing of a model of the effects of hope and control perceptions on compliance with medical regimen as a health behavior variable and on satisfaction with the health treatment as an outcome evaluation variable, in the context of chronic illnesses.

Statement of the Problem

Across different treatments, people have low levels of compliance with medical regimen (Schuchler and Kiviniem 2006), which reach only about 50% for compliance with

prescribed medication, and much lower for compliance with other behavioral requirements such as eating or smoking habits (Dellande, Gilly, and Graham 2004). It is crucial to understand the factors that affect health behaviors and particularly compliance with medical recommendations pertaining to prescribed medication, exercise, diet, and other health improvement behaviors. In this study, medical recommendations, health treatments and medical regimen are used interchangeably to represent the above range of recommendations provided to patients by health care providers. Social cognition models have often been used in trying to predict health behaviors. Yet, these models have emphasized the rationality of human behavior and although they provide a strong theoretical basis with a “good selection” of variables to consider, they have fallen short on predicting behavior in many situations where other variables come into play, such as emotions or interpersonal relationships (Conner and Norman 1996). Since perceptions of control is a central component of most social cognition models (Conner and Norman 1996), and because health behaviors such as adherence to a prescribed health regimen, and satisfaction with health treatments are potential outcomes of hope (Farran, Herth, and Popovich 1995), there is a need to study the dynamic between these two constructs and their joint effects on health behaviors. In this dissertation, I develop a model that incorporates perceptions of control and the emotion of hope for the purpose of reaching a better understanding of compliance and satisfaction with health treatments. This model relies on past research findings about the respective effects of hope and perceptions of control on compliance and satisfaction, and uses appraisal and attribution theories of emotions to link the two constructs together.

The role of hope has been mainly explored in psychology, health psychology, and nursing research, where several variables have been investigated in relation to hope but many of these variables have been addressed in only one or two studies and very few of these studies were replicated. These variables include interpersonal factors such as personality, gender, self-esteem, religiosity, mental and physical health, loss/grief, depression, coping, and psychological well-being; intrapersonal factors such as family interaction, social adjustment, ethnic origin, social support; and illness-related factors such as pain, fatigue, quality of life, and energy level (Farran, Herth, and Popovich 1995). Research on the effects of hope in the marketing field, has been limited to two studies that examined the effect of hope on information processing (MacInnis and De Mello 2005), information search and evaluation, and consumer attitudes and satisfaction (De Mello, MacInnis, and Stewart 2007). A thorough review of the literature failed to identify any studies that explicitly investigate hope in relation to perceptions of control. The present research attempts to fill this gap by introducing a model of the effects of hope and control on compliance and satisfaction with medical regimen, and by applying this model in the context of chronic illnesses, which constitute the most frequent causes of death in the U.S. and globally (Glanz, Rimer, and Viswanath 2008).

Purpose of the Study

The main purpose of this dissertation is to develop a model of health behavior that incorporates the emotion of hope and the perceptions of control as predictors of compliance and satisfaction with health regimen. This model is empirically tested in the context of a lifestyle changing chronic illness because the life adaptation required from

patients who are diagnosed with a chronic illness has a major impact on the patients' emotional state. Also, a chronic illness offers opportunities for patients to exert control over the disease by expanding their role in participating in the treatment. In the case of Diabetes Type II, the chronic illness selected for this research, patients can exert control over the disease via daily regimen of insulin, blood glucose monitoring, diet, and exercise (Band and Weisz 1990).

In the exploratory preliminary phase, in-depth interviews with ten informants were used to provide a picture of what patients go through when living with a chronic illness in terms of feelings, thoughts, and experiences. Data for the preliminary phase was obtained from patients living with a chronic condition, recruited mostly from the student and employee population at a large state university in the North East. The second phase focused on empirically testing competing models about the relationship between hope and perceptions of control and their effects on compliance and satisfaction with the treatment, using cross-sectional data and limiting the sample to one chronic illness Diabetes Type II. Empirical survey data was obtained from a sample of 222 Diabetes Type II patients recruited from an online Diabetes panel managed by a marketing research company Marketing Tools Inc. (Zoomerang).

Research Objectives

- ❑ Improving our understanding of why some individuals comply with medical regimens while other do not by empirically testing competing models examining the dynamics between hope and perceptions of control in their joint effect on

compliance and satisfaction with health treatments, in an application to Diabetes Type II patients

- How does hope affect health behaviors such as compliance? How does it affect satisfaction with health treatments?
- How do perceptions of control affect health behaviors and satisfaction with health regimen?
- What is the nature of the relationship between hope and control?
- Does hope mediate the effects of control perceptions on health behavior or satisfaction with health treatments?
- Developing a model of health behavior and satisfaction with health services that incorporates the emotion of hope and the perceptions of control
 - Does the model successfully predict compliance? Satisfaction?
 - Does the model perform better in predicting one of the outcome variables vs. the other?
 - Do the relationships in the model hold up after controlling for relevant control variables?
- Advancing recommendations for health care practitioners regarding ways to enhance levels of consumer compliance and satisfaction with medical regimens.

Significance of the Study

This study is important for three main reasons:

First, it investigates the role of hope, a positive emotion that has been neglected in marketing. The role of emotions in consumer behavior has received some attention in the marketing literature, where the following relationships were explored: the effect of negative emotions such as stress on adherence to positive recommendations (Khan and Frances Luce 2003), the effects of anxiety and fear of death on the nature of consumption (Pavia and Mason 2004), the effect of anxiety caused by mortality salience on self-regulation or self-indulgence behaviors (Ferraro, Shiv, and Bettman 2005), the effects of different negative emotions (anxiety and sadness) on coping (Ragunathan, Pham, and Corfman 2006), the effects of positive vs. negative emotions on processing of information (Argawal, Menon, and Aaker 2007), the effect of emotions on the evaluation of service outcomes or more specifically on satisfaction with these outcomes (Dube´, Be´langer, and Trudeau 1996), and the effect of hope on search, processing and evaluation of information and on consumer attitudes and satisfaction (De Mello, MacInnis, and Stewart 2007; MacInnis and De Mello 2005). Although some of these studies were conducted in the health care context, where researchers examined the effects of emotions on adherence to medical recommendations (Khan and Frances Luce 2003) and on processing of health messages (Argawal, Menon, and Aaker 2007), they have not tackled the effects of positive emotions on health behaviors or evaluation of health services. Studying the effect of positive emotions in general, could contribute to the marketing literature; however, there is a call for the study of individual emotions – as

opposed to positive vs. negative emotion valence – to examine their beyond-valence-effects (Dube', Be' langer, and Trudeau 1996; Lerner and Kelner 2001; Ragnathan, Pham, and Corfman 2006). This dissertation is an attempt to respond to this call by studying the effects of the positive emotion of hope. Hope is vital for humans and “it is remarkable that it has not been a center of theoretical attention and research in social sciences” (Lazarus 1999, 676); hence exploring this positive emotion can be very valuable.

Second, it combines a cognitive variable (perception of control) and an emotional variable (hope) in an attempt to predict health behavior and evaluation of health services. In social cognition models of health behavior, the concept of ‘Perceptions of control’ has been given much attention after its introduction by Ajzen (1988) in his Theory of Planned Behavior. It constitutes a central component of most social cognition models (Conner and Norman 1996) and its positive effects on health have been well documented in numerous research studies (Thompson et al. 1993). One main benefit of control perceptions is better compliance with the treatment. However, in health care services, customers experience illness, pain, uncertainty, fear and mainly perceived lack of control (Berry and Bendapudi 2007). What happens when patients experience loss of control? Does this explain the low compliance levels that we witness today? What if patients experience loss of control, but have high levels of hope? Hope has been associated with higher medical regimen adherence (Snyder 2002) and higher levels of satisfaction (MacInnis and De Mello 2005). People need hope and manage to have it even in the worst circumstances. For example, if we know that our illness cannot be cured, we can hope for pain free days (Lazarus 1999).

This study helps answer the above questions by investigating the joint effect of hope and perceptions of control, especially in the situation of a chronic illness where patients might experience loss of control but manage to have high levels of hope.

Finally, this study explores the proposed model in the context of chronic illnesses which constitute a pressing issue in today's world. The technological and medical advancements in the 20th century have decreased mortality rates but have led to the prevalence of chronic diseases such as heart disease, AIDS, diabetes, and cancer (Jacoby 2003). Most of these chronic conditions require a lifelong process of compliance with health regimens. This research can contribute to the understanding of compliance behaviors by exploring two of its potential antecedents: hope and perceptions of control.

In his presidential address at the North American Conference for the Association of Consumer Research (ACR), David Mick (2006) emphasized that ACR goals encompass "enhancing consumer welfare". According to Mick (2006), there are many pressing issues and problems in life that were not tackled enough in consumer research, two of which are diseases and medical decision making. This dissertation contributes to transformative research in consumer behavior because it tackles a fundamental problem (compliance with medical regimen for people with chronic illnesses) and it has immediate practical implications for health providers. In fact, the results of this study could have implications about the role of health providers in maintaining and fostering hope. There are many sources of hope based on health providers' actions such as: appearing to know all they need to know about the disease, saying that the pain will be

controlled, being occasionally humorous, offering answers to the patient's questions, and telling the patient that his or her will to live can affect outcome (Clayton et al. 2008).

Organization of the Study

The next section presents a research background for the constructs of hope and perceptions of control, reviews research findings pertaining to their significance for human health, and provides conceptualizations for these constructs that will be used in the study. In the third section, I put forward a theoretical framework for the proposed competing models and hypotheses pertaining to the relationships between hope, control and the outcome variables (compliance and satisfaction) and I provide an overview of model variables and their measurements. In the fourth section, I describe the research design and data collection methods, the statistical methodology, as well as the variables and measurement instrument used. The fifth section provides data analysis details starting with a description of the sample, the results of testing psychometric properties of the measurements used, and a description of the variables; then, it progresses to present statistical results for hypotheses and models testing. The sixth and final section discusses the major findings of the study, summarizes the study limitations, and advances important implications for research and practice.

CHAPTER 2

LITERATURE REVIEW

This background chapter lays the grounds for my theoretical framework by providing a review of the research pertaining to the constructs of hope and perceptions of control. The first section of the literature review presents the emotion of hope. It summarizes existing definitions and critical dimensions of hope, the emotion of hope from an appraisal theory perspective, the effects of hope on consumer behavior and well-being, and the conceptualization of hope used for this study. In the second section, I provide a background for perceptions of control, its importance as a component of different health behavior models, the role it plays in human health, as well as the conceptualization of perceptions of control selected for this study.

The Construct of Hope

Definitions and Critical Dimensions of Hope

“There is no universal definition of hope”, a construct that has been conceptualized as a trait, as a state, as an attribute, as an experience and even as a life force... despite their diversity, most definitions of hope have agreed that it has affective, cognitive and behavioral components (Jevne and Nekolaichuk 2003). Unlike fear, which is an automatic emotion, hope is an emotion based on cognitive thinking with positive affective states (Jarymowicz and Bar-Tal 2003). Since there are several existing academic definitions of hope, it is important to systematically examine these definitions in order to select the conceptualization that is most appropriate for the purpose of this dissertation.

When it was first defined, hope was a unidimensional concept that represented “an expectation of goal achievement” (Farran, Herth, and Popovich 1995, 45). This conceptualization of hope is adopted from Stotland (1969) and it served as the foundation for many hope scales: The Hope Scale, The Hope Index, The Stoner Hope Scale, and The Snyder Hope Scale. I will go over the background for one of these unidimensional scales, The Snyder Hope Scale (SNHC) also referred to as The Trait Hope Scale or The Dispositional Hope Scale, because it is based on Hope Theory which is widely recognized in social sciences. The three components of hope theory are:

- ❑ *Goals*: Goals are the cognitive targets of hope. Hope theory posits that high-hope people usually have more clearly defined goals.
- ❑ *Pathways Thinking*: Pathways represent the means, possibilities or routes to reach goals. Hope theory posits that high-hope people are confident in their ability to produce pathways to their goals.
- ❑ *Agency Thinking*: Agency is the motivational component of hope or the “the perceived capacity to use one’s pathways to reach desired goals” (Snyder 2002, 251). High-hope people are expected to engage in more agentic self-talk (Snyder 2002; Snyder et al. 2003).

Based on hope theory, hope is defined as the “perceived capacity to find routes to desired goals (pathways) and perceived motivation to use these routes (agency thoughts)” (Vernberg, Snyder, and Schug 2005, 602). The Trait Hope Scale was developed based on this conception of hope and is one of the most commonly used hope scales. Despite its clinical usefulness, there are two main limitations associated with the Trait Hope Scale:

Unidimensionality and goal and control orientation. Unidimensionality is a limitation that also applies to the other unidimensional hope scales mentioned earlier.

▣ *Unidimensionality*: The Trait Hope Scale is unidimensional and does not capture the complexity of the hope construct. In a synthesis to enhance the understanding of the concept of hope, Miller (2007) has reviewed research on the multidimensional nature of hope and has summarized the critical dimensions of hope, as identified by several researchers:

- Miller and Powers' (1988) dimensions of hope: Interpersonal relations, sense of possible, avoiding absolutizing (all or none attitude), anticipation, goal establishment and accomplishment, psychological well-being, freedom, optimism, reality, and physical and mental activation
- Haase et al.'s (1992) dimensions of hope: Focus on the future, energy, future redefinition, and feeling of uncertainty and uneasiness
- Morse and Doberneck's (1995) dimensions of hope: "Uncertainty while scanning for signs reinforcing hope, bracing for negative outcomes coupled with a determination to endure, envisioning alternatives, as well as setting goals" (Miller 2007, 13)
- Farran et al.'s (1995) components of hope: Experiential process where individuals accept human trials as part of life but believe that imaginative possibilities can occur, spiritual transcendent process where hope and faith are inseparable, rational thought process where hope is grounded in reality, and relational process where hope affects and is affected by the interconnectedness between self and others (Miller 2007)

- ❑ *Goal and Control Orientation:* The Trait Hope Scale is goal and control oriented (Farran, Herth, and Popovich 1995). It emphasizes hope as a successful agency, but we can hope even if we are helpless to affect the outcome, therefore control and self-efficacy, which are embedded in agency, can facilitate hope but they are not essential to it (Lazarus 1999). This specific limitation makes Snyder's conceptualization of hope inappropriate for my study because it overlaps with perceptions of control.

The Miller Hope Scale and the Nowotny Hope Scale were initial measurement attempts based on a multidimensional concept of hope. Miller (1988) was the first to view hope as “a complex multidimensional construct that is more than goal attainment and encompasses a state of being” (Farran, Herth, and Popovich 1995). Miller (2000) has defined hope as a “state of being characterized by an anticipation of a continuous good state, an improved state or a release from a perceived entrapment” (Miller 2007, 17). The Miller Hope Scale measures hope on 40, five-point scale items based on three dimensions of hope: satisfaction with self, others and life, avoidance of hope threats, and anticipation of the future; the length of this scale limits its clinical usefulness (Farran, Herth, and Popovich 1995). The Nowotny Hope Scale (NHS) also has a multidimensional view of hope as “a six dimensional dynamic attribute of the individual that is activated when the individual is confronted with a stressful stimulus” (Farran, Herth, and Popovich 1995, 61). The six dimensions of NHS are: confidence in outcomes, ability to relate to others, belief that the future is possible, spiritual beliefs, active involvement, and inner readiness. The NHS has 29 items and its main limitation is the inclusion of religious items such as

prayer and scripture, which are not applicable to a number of populations (Farran, Herth, and Popovich 1995). The conceptualization of hope in these multidimensional scales bounds the construct's complexity to three main dimensions: Time-oriented future focus of hope, goal achievement expectation of hope, and interpersonal elements (Herth 1992). But hope has other dimensions that enable this construct to transcend suffering and to be available regardless of goal achievement, one such dimension is the "presence of a more global, non-time-oriented sense of hope" (Farran, Herth, and Popovich 1995, 46).

The Herth Hope Scale (HHS) and Herth Hope Index (HHI) are measures that attempt to incorporate these additional dimensions (Farran, Herth, and Popovich 1995). The Herth Hope Scale is based on Dufault and Martocchio's (1985) definition of hope as a "multidimensional dynamic life force characterized by a confident yet uncertain expectation of achieving a future good, which to the hoping person, is realistically possible and personally significant" (Herth 1992, 1253). Based on this definition, Herth (1992) developed a framework of hope with the following dimensions:

- ❑ A *cognitive-temporal* dimension (or "Inner Sense of Temporality and Future") that focuses on the realistic probability of achieving a positive desired outcome.
- ❑ An *affective-behavioral* dimension (or "Inner Positive Readiness and Expectancy") that deals with confidence in affecting desired outcomes.
- ❑ An *affiliative-contextual* dimension (or "Interconnectedness with Self and Others") that embodies the interconnectedness between self and others or self and spirit (Herth 1992).

A first look at Herth's (1992) hope framework might lead one to think that it does not include any dimensions beyond the original three dimensions of hope (Time-oriented future, goal achievement and expectation, and interpersonal elements). But according to Herth (1992), the Herth Hope Scale (HHS), which is based on this framework, incorporates the following dimensions: "a more global sense of hope", "hope despite diminished or absent interpersonal relations", "hope as a sense of 'being' available and engaging in relationships" rather than "'doing' for oneself and others", and "potential hope for controlling behavioral and emotional responses" not events and experiences (Herth 1992, 1252). The Herth Hope Scale is widely used in studies of hope in acute, chronic and terminally ill patients (Ferran, Hert, and Popovich 1995). This study uses the Herth Hope Index (HHI), an abbreviated version of the HHS (12 items instead of 30), to measure hope. The choice of this hope framework will be explained in a subsequent section.

The Emotion of Hope: An Appraisal Theory Perspective

Appraisal theories of emotions have provided a different look at emotions such as hope by identifying appraisal dimensions for discrete emotions. The appraisal dimensions of hope as identified by several appraisal theories are similar to dimensions recognized earlier but can help further our understanding of the cognitive side of hope. According to appraisal theory, whether an emotion is elicited or not and what specific discrete emotion is elicited is a product of the evaluation and interpretation of an event (Roseman, Spindel, and Jose 1990). Appraisal is one theme of Lazarus' (1999) cognitive-motivational-relational approach to emotions and it is the "evaluations of the significance of what is

happening for our well-being and the well-being of those about whom we care” (Lazarus 1999, 658).

Appraisal theories have examined the dimensions used by individuals when evaluating and interpreting events. One prominent appraisal theory is Roseman’s (1984) revised and expanded theory of emotions, which has defined five appraisal dimensions:

1. *Situational State*: The assessment of whether an event is consistent or inconsistent with a person’s motives (motive-consistent or motive-inconsistent). Situational state determines whether the emotion elicited is positive or negative, where motive-consistent events lead to positive emotions while motive-inconsistent events lead to negative emotions. This dimension does not distinguish between specific emotions.
2. *Probability*: The assessment of whether an outcome is certain or uncertain, where uncertainty can lead to emotions such as fear and hope while certainty is associated with emotions such as joy or sadness.
3. *Motivation State*: The assessment of whether a motive is aversive (avoid punishment) or appetitive (obtain reward).
4. *Power*: The perception of oneself as weak or strong in a specific situation. This dimension also reflects the legitimacy of an outcome or whether a negative or positive outcome is deserved by an individual, when legitimacy is a source of power.
5. *Agency*: The assessment of whether the outcome is caused by impersonal circumstances, some other person, or the self. When an outcome is perceived as

caused by circumstances beyond anyone's control, emotions such as sadness can be elicited; when an individual perceives other people as the causes of an outcome, he or she might feel emotions such as anger; and when the perceived cause of an outcome is the self, individuals can experience emotions such as guilt (Roseman, Spindel, and Jose 1990).

Another classification of appraisal dimensions has been provided by Lazarus' (1991) cognitive-motivational-relational theory of emotions. Lazarus (1991) has identified six different appraisal dimensions classified into two categories: primary and secondary appraisal. Primary appraisal "concerns the stakes one has in the outcomes of an encounter" (Lazarus 1991, 827) and encompasses the following dimensions:

1. *Goal Relevance*: The assessment of the importance and strength of a goal.
2. *Goal Congruence or Incongruence*: The assessment of whether an encounter is appraised as harmful or beneficial. This dimension determines whether the elicited emotion is positive or negative. Negative emotions are experienced when perceived harm has occurred while positive emotions are associated with the perceived occurrence of benefit. It is similar to Roseman's (1984) Situational State dimension.
3. *Goal Content or "Type of Ego-Involvement"*: The assessment of the kind of goal at stake or for example whether the goal is related to the preservation of one's "ego-identity" or with living up to an "ego ideal".

The secondary appraisal category “concerns the options and prospects of coping” (Lazarus 1991, 827) and includes the following dimensions:

4. *Blame or Credit*: This dimension has two main attribution assessments. Attribution is the appraisal or evaluation of the causes of an event rather than the appraisal of the event itself. Attributions of accountability and control are necessary for appraisals of Blame or Credit. This dimension is concerned with whom or what an individual holds accountable or responsible for an outcome (attribution of accountability) and the extent to which the accountable agent is in full control of its beneficial or damaging actions. This dimension reflects the “interdependence between two distinct kinds of cognitive activity, attribution, and appraisal” (Lazarus 1991, 827). This dimension is similar to Roseman’s (1984) Agency dimension.
5. *Coping Potential*: The assessment of whether one can influence the “person-environment relationship” and of the ways this influence can be exercised.
6. *Future Expectations*: The assessment of the way in which the situation or outcome will change in the future or whether the change will lead to a positive or negative situation (Lazarus 1991). Future Expectations reflects probability of an outcome (similar to Roseman’s (1984) Probability) but is broader in that it also includes an appraisal of how a situation will change.

In both these theories, the researchers have claimed that all appraisal dimensions are necessary to distinguish among distinct emotions elicited by an event or an outcome.

Lazarus (1991) has posited that the aim of a cognitive-motivational-relational theory of

emotion is to show how the pattern of appraisal differs for each emotion. Of particular interest to this research is the emotion of hope and the dimensions relevant to it. In the following section, I review appraisal dimensions of hope as identified by Roseman (1984) and MacInnis and De Mello (2005); I also infer two other sets of appraisal dimensions for hope using Lazarus' (1999) and Herth's (1992) definitions of hope.

Roseman (1984) has suggested that hope is a result of events appraised as:

- ❑ Motive-consistent (Situational State Dimension)
- ❑ With uncertain outcomes (Probability Dimension)
- ❑ That are attributed to impersonal circumstances (Agency Dimension)
- ❑ These events or outcomes could have motives that are either appetitive or aversive, and where the individual could perceive himself or herself as weak or strong, i.e. the Motivation State and Power dimensions are irrelevant to the emotion of hope (Roseman, Spindel, and Jose 1990)

Lazarus (1999) has posited that “Hope arises in part from the strong desire to be in a different situation than at present, and from the impression that this is possible either as a result of our own effort or external forces we do not control” and that “hope is a response to goal-outcomes ... is better represented as an attitude towards the future... [and] is never a matter of absolute confidence” (Lazarus 1999, 663). From these propositions, we can argue that hope is a result of events appraised as:

- ❑ Motive-consistent (Situational State or Goal Congruence Dimension)

- ❑ With uncertain outcomes (Probability Dimension which is not identified by Lazarus' (1991) appraisal model but which is embedded in Future Expectations)
- ❑ Where the goal is important and highly desirable (Goal Relevance Dimension not identified by Roseman (1984))
- ❑ And where the individual has positive future expectations (Future Expectations Dimension not identified by Roseman (1984))
- ❑ For Lazarus (1999), dimensions of power and agency (Roseman 1984) and dimensions of blame or credit, and coping potential (Lazarus 1991) are irrelevant to the emotion of hope

McInnis and De Mello (2005) have used Johnson and Stewart's (2004) appraisal dimensions (Goal Congruency, Certainty (appraisal of possibility), Personal Agency, Normative or Moral Compatibility and Importance) and have agreed with Lazarus (1999) by arguing that three appraisal dimensions are relevant to hope:

- ❑ Goal Congruency where hope is a result of appraising the outcome as goal congruent
- ❑ Certainty where hope is a result of appraising an outcome as uncertain but possible. Although this dimension is similar to Roseman's (1984) Probability dimension, McInnis and De Mello (2005) emphasize that hope is associated with possibility rather than probability, which leads to hope being present even when we have very low probability of a positive outcome. This is similar to Lazarus' (1991) dimension of Future Expectancy

- ❑ Importance, which is equivalent to Goal Relevance, where hope is experienced when the outcome is important to the individual (McInnis and De Mello 2005)

A look at Dufault and Martocchio's (1985) definition of hope used as a basis for the Herth Hope Scale – “multidimensional dynamic life force characterized by a **confident yet uncertain** expectation of achieving a **future good**, which to the hoping person, is **realistically possible** and **personally significant**” (Herth 1992, 1253) – reveals hope appraisal dimensions similar to those of Lazarus (1999) and MacInnis and De Mello (2005): Goal Congruence, Goal Relevance, and Future Expectations with Uncertainty but Possibility.

Table 2.1 represents appraisal dimensions identified by different theories to help compare and contrast the dimensions of hope as viewed by each of these theories. The Herth Hope Framework (1992) defines hope in a way that reflects dimensions agreed upon by three different appraisal theories: Situation State and Probability. Hope is experienced when an outcome is goal congruent and uncertain but possible. The outcome should also be important or goal relevant (Lazarus 1991; MacInnis and De Mello 2005). However, there is a clear disagreement about one main dimension: Agency or Blame or Credit. Contrary to other researchers (Herth 1992; Lazarus 1999; MacInnis and De Mello 2005; Snyder 2002), Roseman (1984) has hypothesized that hope is a result of a situation or an event appraised as caused by impersonal circumstances beyond anyone's control; Otherwise, when individuals attribute the causes of an event or outcome to others, they feel “liking” instead of hope; and when they attribute the causes to themselves, they feel “pride”

instead of hope. For Lazarus (1999), hope can occur regardless of whether the outcome is a result of our own effort, the effort of others, or external forces beyond control and he has not considered blame or credit appraisal (attribution of accountability and control) to be a dimension of hope. Similarly, MacInnis and De Mello (2005) have not considered personal agency to be a dimension relevant to hope. Since I am interested in the relationship between hope and perceptions of control, the appraisal dimension of (Personal) Agency (or Blame or Credit) will be examined by testing whether the attribution of accountability and control to oneself vs. others vs. circumstances beyond ones control affects the level of hope.

Before discussing the outcomes of hope in the next section, it is important to emphasize one very important attribute of hope, namely that the level of hope can be raised (Snyder 2002). Clayton et al. (2008) have agreed that hope can be influenced and have made suggestions to help health providers maintain hope in patients. Farran, Herth, and Popovich (1995) have posited that hope can be influenced only when it is defined as a state because hope as a state reflects present feelings about or during a situation; while hope as a trait is less subject to change because it represents an enduring attitude about life. The conceptualization of hope used for the Herth Hope Index highlights the dynamic nature of hope: “Hope has the ability to be fluid in its expectations, and in the event that the desired object or outcome does not occur, hope can still be present” (Farran, Herth, and Popovich 1995, 6). Hope can also be induced by marketing tactics for products and services related to or outside of the health domain (Macinnis and De Mello 2005).

Table 2.1. Appraisal Theories of Emotions: The Dimensions Relevant to Hope

Appraisal Dimensions of Hope			Appraisal Theories of Emotions – Dimensions		
<i>Roseman 1984</i>	<i>Lazarus 1999</i>	<i>MacInnis and De Mello 2005</i>	<i>Roseman 1984</i>	<i>Lazarus 1991</i>	<i>Johnson and Stewart 2004</i>
✓	✓	✓	Situational State*	Goal Congruence or Incongruence*	Goal Congruency*
✓	✓	✓	Probability*	Future Expectancy*	Certainty*
			Motivation State		
			Power		
✓			Agency	Blame or Credit (Attribution of Accountability and Control)	Personal Agency
				Coping Potential	
	✓	✓		Goal Relevance*	Importance*
				Goal Content	
					Normative or Moral Compatibility

* Dimension embedded in Herth's (1992) Hope Framework

Effects of Hope on Consumer Behavior and Well-Being

The role of emotions in consumer behavior has grabbed the attention of marketing researchers in the past decade. Marketing research studies that investigate the role of emotions in shaping consumer behavior have explored the following relationships: the effect of negative emotions such as stress on adherence to positive recommendations (Khan and Frances Luce 2003), the effects of anxiety and fear of death on the nature of consumption (Pavia and Mason 2004), the effect of anxiety caused by mortality salience on self-regulation or self-indulgence behaviors (Ferraro, Shiv, and Bettman 2005), the effects of different negative emotions (anxiety and sadness) on coping (Ragunathan, Pham, and Corfman 2006), the effect of positive vs. negative emotions on information processing (Argawal, Menon, and Aaker 2007), the effect of emotions on the evaluation of service outcomes or more specifically on satisfaction with these outcomes (Dube´, Be´langer, and Trudeau 1996), and the effect of hope on search, processing and evaluation of information and on consumer attitudes and satisfaction (De Mello, MacInnis and Stewart 2007; MacInnis and De Mello 2005). Most of these studies agree on the theoretical basis put forward by the *Affect-as-Information Approach*, which posits that people use their affective state as a signal about their current situation or their judgment (Argawal, Menon, and Aaker 2007; Ragunathan, Pham, and Corfman 2006); there also seems to be an agreement that the valence of discrete emotions (positive or negative) provides information on the basis of which information is processed and decisions are made. For instance, a positive emotion encourages processing and acceptance of emotionally aversive but useful information by helping people cope with the effect of threatening information. In the context of health information, a positive

mood helps people deal with health risks and leads to a greater focus on self-efficacy and self-improvement goals. In contrast, a negative mood leads people to avoid threatening information which may cause a further decline in their mood state; instead they focus on how to improve their mood (Argawal, Menon, and Aaker 2007).

Studying emotions is very important in health care contexts such as hospitalization experiences. The hospitalization experience is a highly emotional one and therefore the role of emotions is critical in that they can influence motivation, behavior and outcomes such as compliance, satisfaction, and adjustment. The importance of an emotion as a predictor of outcome stems from the fact that it can be identified by health care providers from patient cues and then used to improve the health care experience. The usual studied emotions in health care include anxiety and depression which are related to negative health outcomes (Dube', Be'langer, and Trudeau 1996). Yet, illness is a source of psychological stress accompanied by a coping process. Illness can lead to both negative emotions (related to psychological stress) as well as positive emotions resulting from coping processes (Heszen-Niejodek, Gottschalk, and Januszek 1999). Research on the effects of positive affect on health outcomes such as coping is rare (Folkman and Moskowitz 2000) and there is a need to study "the role of positive emotions in coping, including ideas such as love and hope, that warrant further examination" (Glanz and Schwartz 2008, 229). Hope is "a positively valenced emotion" (MacInnis and De Mello 2005) and higher hope is related to better outcomes in athletics, physical health, psychological adjustment and psychotherapy (Miller 2007).

Irrespective of the conceptualization used for the construct of hope, several studies have supported its positive role in the context of health. Two recent reviews of such studies are: Snyder's (2002) listing of hope outcomes supported in prior research and Clayton et al.'s (2008) review of 27 articles published between 1985 and 2006 about sustaining hope during end-of-life discussions with patients and their families. The positive outcomes associated with hope can be summarized as follows: In the context of health psychology of prevention, hope increases the use of information to form pathways to goal achievement and raises intentions of preventive health activities. After the development of an illness, higher hope is positively related to better adjustment and coping with severe health problems, it leads to lower distress and less doctor visits, and is associated with higher medical regimen adherence in taking medication and staying in drug treatment programs. In the profound and chronic pain context, high hope helps endure the pain better and motivates patients to produce more strategies to endure the pain, and to initiate those strategies and continue using them (Snyder 2002). Even during end-of-life (EoL) discussions with terminally-ill patients and their families, hope is very important to the well-being and quality of life for patients, it encourages patients to become more involved with their own treatment and supports the interaction between the patient and the physician or health provider (Clayton et al. 2008).

Outside the domain of health, hope has been associated with higher satisfaction and lower dissatisfaction with products and services. It can play a moderating role between product or service outcomes and consumer satisfaction. In fact, people with high hope: engage in motivated reasoning that leads to less *Expectancy Disconfirmation* when the outcome is

negative, have increased levels of yearning which leads to perceptions of low costs when compared to benefits and consequently to higher satisfaction according to *Equity Theory*, have increased intensity of positive emotions which according to the *Emotion Perspective* increases satisfaction because memory for positive emotions is accessed during product evaluation, and attribute positive outcomes to the product and negative outcomes to their unrealistic expectations because hope is associated with high uncertainty; this leads to higher satisfaction according to *Attribution Theory*. Another positive effect of hope on consumer behavior is that it can increase resistance to time-inconsistent choices by enhancing will-power through its yearning (goal relevance) component and it can make people more resistant to time-inconsistent choices that have immediate gratification because these choices become more regrettable as the perceived possibility of positive outcome occurrence increases and individuals become less willing to forgo the long-term good they yearn for (MacInnis and De Mello 2005).

What about the negative effects of ‘false hope’? According to Snyder (2002), some recent scholars have argued that hope can lead to maladaptive coping and risky behaviors, especially if it is based on expectations and goals which are unrealistic, unsuitable, or that rest on illusions. Snyder (2002) has refuted this argument by positing that false hope does not exist and that hope levels reflect reality and therefore can decrease when the threat of a situation increases (Snyder 2002). Lazarus (1999) has agreed that hope depends on the judgment of circumstances and that it is not equivalent to wishful thinking. Also, Clayton et al. (2008) found that patients and their families prefer honest and accurate information that is offered with empathy and understanding and that it is important to have a balance

between hope and reality. Yet, if we take an existential definition of hope, where hope “implies that even against the facts saying that there are long odds against you, you believe that you will ultimately win the race... hope has “value added”, all other things considered” (Hobfoll, Briggs-Phillips, and Stines 2003, 85), one can argue that false hope does exist and that hope does not have to be rooted in reality.

Even if false hope does exist, I have to agree with Lazarus (1999) that “false hope is not a rebuttal of the adaptational value of hope.” Hope is necessary for the acceptance of life’s setbacks (Lazarus 1999) and when goals are not reached, hope can still have a positive effect in helping individuals cope with failure (Snyder 2002), therefore, hope should not lead to maladaptive coping even when false hope exists. MacInnis and De Mello (2005) warn against a non-coping-related negative outcome of hope which is higher susceptibility to risk and fraud. They posit that hope alters consumer perceptions of risks and rewards and that when hope is strong, consumers are willing to undertake more risks, for instance “consumers who hope to overcome illness are willing to take untested medication and controversial expensive methods of alternative healing” (MacInnis and De Mello 2005, 10).

Conceptualization of Hope for this Study

This study adopts Dufault and Martocchio’s (1985) definition of hope as a “multidimensional dynamic life force characterized by a confident yet uncertain expectation of achieving a future good, which to the hoping person, is realistically possible and personally significant” (Herth 1992, 1253) and Herth’s (1992) framework of

hope with its three dimensions: cognitive-temporal, affective-behavioral, and affiliative-contextual (Herth 1992). The reasons behind this include:

- ❑ *Specific and global dimensions of hope:* This conceptualization incorporates global and specific dimensions of hope (Farran, Herth, and Popovich 1995). In addition to goal achievement, future orientation, and interconnectedness, this conceptualization includes “a more global sense of hope”, “hope despite diminished or absent interpersonal relations”, “hope as a sense of ‘being’ available and engaging in relationships” rather than “‘doing’ for oneself and others”, and “potential hope for controlling behavioral and emotional responses” not events and experiences (Herth 1992, 1252). Most importantly, hope is not defined as a trait or general disposition; it can change and/or be influenced. The central four attributes (experiential process, spiritual transcendent process, rational process and relational process) of hope are embedded in the Herth Hope Scale (HHS) and Herth Hope Index (HHI).
- ❑ *Availability of a valid and clinically useful measurement tool:* This conceptualization of hope can be easily measured using the Herth Hope Scale (HHS) or the Herth Hope Index (HHI). The HHS and HHI have been widely used for acute, chronic and terminally ill populations and their construct validity has been well established. I used the HHI for this study because it is highly useful in a clinical setting. The HHI, an abbreviated version of the HHS, captures the multidimensionality of hope and has the advantages of conciseness and lack of complexity (Farran, Herth, and Popovich 1995).

□ *Minimal overlap with perceptions of control:* If we look at some other frameworks, theories, or scales of hope, we can find a significant overlap between hope and perceptions of control. For instance, if we take Snyder's hope theory and his Trait Hope Scale and compare it to Bandura's self-efficacy theory – one conceptualization of control – we find a “shocking similarity” in their emphasis on goal achievement and agency-thinking (Snyder et al. 2003). This similarity is clear in some items of the agency subscale in the Trait Hope Scale, such as “I energetically pursue my goals” and “I meet the goals I set for myself”. A goal-directed probabilistic view of hope makes it similar to self-efficacy or optimism (Hobfoll, Briggs-Phillips, and Stines 2003). In Herth's framework, hope can still be present when the desired outcome does not occur; it is not limited to “expectancy of goal achievement” (Farran, Herth, and Popovich 1995) and it includes a transcendent attribute. Also, the items of the HHI do not overlap with measurement items for the following conceptualization of perceptions of control:

- Perceptions of ease or difficulty in performing a behavior (perceived behavioral control)
- Confidence in performing a behavior (self-efficacy)
- Expectancies about whether a behavior or outcome is under control of self (internal locus of control) or others (external locus of control)

“Most widely accepted definitions of hope in the literature include a goal aspect” (Hobfoll, Briggs-Phillips, and Stines 2003, p. 94), this goal orientation reflects only individual-centered hope and not existential hope which “implies that even against the

facts saying that there are long odds against you, you believe that you will ultimately win the race... hope has “value added”, all other things considered” (Hobfoll, Briggs-Phillips, and Stines 2003, 85). There is a high correlation between locus of control and hope but this correlation is much lower for existential hope than for individual-centered hope (Hobfoll, Briggs-Phillips, and Stines 2003). The use of existential hope as a conceptualization of hope is beyond the scope of this dissertation because there are no validated measures for it. Herth’s hope framework includes a goal aspect in its cognitive-temporal dimension so I expect to have a significant correlation between hope and locus of control. However, a significant correlation does not jeopardize the study given that these constructs do not overlap: even individuals with low sense of control can have high hope (Hobfoll, Briggs-Phillips, and Stines 2003). This means that the constructs do not measure the same thing and that the intercorrelation between them should not be so high (>.85) that multicollinearity occurs. In Structural Equation Modeling, used for data analysis, significant correlation does not pose a threat of violating estimation assumptions unless multicollinearity occurs (Kline 2005).

- ❑ *Similarity to definition of hope used in marketing:* As previously argued, the definition of hope in Herth’s framework has an uncertainty appraisal dimension “confident yet uncertain expectation”, a goal congruency dimension “achieving good”, and an importance dimension “personally significant”, which are similar to the appraisal dimensions of hope identified by MacInnis and De Mello (2005), who define hope as “a positively valenced emotion evoked in response to an uncertain but possible goal-congruent outcome” (MacInnis and De Mello 2005, 2). Hope is terminated when a person is certain that a goal will not occur.

Importance is a very relevant dimension because it determines along with the degree of goal congruity, the “yearning” for a goal-congruent outcome (the degree to which the outcome is positive or goal congruent weighted by the outcome’s importance)” (MacInnis and De Mello 2005).

Perceptions of Control

Background and Importance of Control Perceptions for Human Health

A common and useful way to organize the concept of control is in terms of agents (individuals who exert control), means (pathways through which control is exerted) and ends (outcomes over which control is exerted). The agent can be the self or others (physician, family...) and the means can be internal in the form of actions or attributes, or external, i.e. under the control of powerful others (society, system, physicians...), or even beyond human control (God, luck...). Control cannot be exerted by agents unless there are two main connections:

- ❑ *Agent-means connection*: Helplessness theory posits that the lack of this connection can lead to hopelessness and negative coping styles. It can also lead to low self-efficacy perceptions.
- ❑ *Means-end connection*: The absence of this connection known as the locus of control can lead to universal helplessness (Skinner 1996).

The concept of control has been conceptualized in many ways and there are many classifications for the types of control. Skinner (1996) has identified three main aspects of control: objective control which reflects the actual control conditions in the context or in

the individual, subjective control which is also referred to as “perceived control” or the individual’s belief about control in a situation. The third aspect of control is experiences of control or the “cumulation of action-outcome episodes that accrue from an individual’s actions in a set of objective control conditions that the individual interprets according to his or her subjective control beliefs”. Skinner has explained the benefits of experiences of control by saying that “experiences of control as captured in ratings of effectiveness or feelings of efficacy, should have uniformly positive psychological effects” (Skinner 1996, 560). In the rest of the paper, I will only focus on subjective control and experiences of control since they are more important than objective control (Skinner 1996). Subjective control or perceptions of control are limited by reality and therefore represent valid appraisals of control that are usually close to objective control conditions (Thompson, Armstrong, and Thomas 1998). In the rest of the paper, when ‘control’ or ‘perceived control’ is used, it refers to subjective control; experiences of control are embedded in the ‘self-efficacy’ construct.

In health research, control has been frequently classified according to the scope or domain of control. For instance, Sirois, Davis, and Morgan (2006) have classified control in the context of a chronic illness health condition (Tinnitus), into three categories: General health control, symptom control, and retrospective control. Thompson, Nanni, and Levine (1994) have also used control dimensions of central vs. consequence related control in the context of another chronic illness (HIV). Central control is escaping or avoiding the stressful event itself while consequence-related control is controlling the consequences of the stressor. Usually, there are more avenues to control the

consequences of stressor than there are ones to control the stressor itself and therefore, consequence related control over symptoms is more associated with adjustment than central related control over the disease (Thompson, Nanni, and Levine 1994). Similarly, Thompson et al. (1993) have discussed control over the central event (disease) vs. control over the consequences (such as control over symptoms) of the event in the context of breast cancer, where cancer is the central event. The conceptualization of control in my dissertation is centered on ‘managing the illness’, which does not distinguish between control over the central event and control over its consequences. This research limitation will be stated in chapter 6.

The positive role of control has been documented in numerous research studies about the effects of control on health. Past research results have revealed that higher perceived control is associated with lower depression symptoms in cancer patients, even after controlling for physical functioning, marital satisfaction and negative affectivity (Thompson et al. 1993). Perceived control also plays an important role in adjustment to chronic illness even when there is an overestimation of control and even after control is disconfirmed. Many studies have shown that people with more perceived control have better adjustment (Taylor, Lichtman, and Wood 1984). Other benefits of perceptions of control include increased coping efforts, increased positive self image and decreased distress (Helgeson 1992). Finally, perceptions of control can lead to a better evaluation of service quality, increased satisfaction, and higher loyalty levels (Van Raaj and Pruyn 1998). Tangsrud and Smith (2000) have summarized the benefits of control perceptions as follows: more positive adaptational outcomes to the disease and treatment reflected

through better daily functioning, better interpersonal relationships and a lower focus on the limitations imposed by the disease, better physical well-being through better compliance with the treatment, and avoidance of negative psychological effects that can result from loss of control. For this study, I am focusing on two important variables, which are the dependent variables in my model: compliance and satisfaction with the treatment regimen.

Representation of Control in Different Health Behavior Models

Many factors, intrinsic and extrinsic to an individual, affect that individual's health behavior. Intrinsic cognitive factors such as knowledge, risk perceptions, behavior efficacy and control over the performance of a behavior have been the focus of one family of the most widely used models of health behaviors, labeled Social Cognition Models (SCMs). Social cognition models have been widely used to design interventions and to understand the reasons behind individual behaviors. There are two types of social cognition models: The Attribution models that attempt to explain how people view the cause of health-related events such as disease and how they respond to illnesses, and the Predictive models which are focused on predicting future health behaviors (Conner and Norman 1996).

This study involves predictive social cognition models, because it is trying to describe how the level of patient compliance with medical regimen varies with the levels of hope and perceptions of control, that is, whether and to what extent the constructs of hope and control predict health behaviors related to compliance. Five of the most commonly used

predictive social cognition models are: Health Belief Model (HBM), Health Locus of Control (HLC), Theory of Planned Behavior (TPB), Self-Efficacy Models, and Protection Motivation Theory (PMT) (Conner and Norman 1996). Next, I will provide a brief summary of these different models and their constituents for the purposes of: 1. Demonstrating the importance of control as a central component of these models, 2. Illustrating different conceptualizations of the control construct, and 3. Selecting an appropriate conceptualization of perceptions of control.

Health Belief Model (HBM)

The Health Belief Model is based on the idea that expectancy beliefs guide behaviors, i.e. people are more likely to engage in a behavior when they think that it is likely to reduce a risk that would have severe consequences (Champion and Skinner 2008). The HBM was originally developed by Rosenstock et al. in 1974 in an attempt to explain preventive health behavior and it focused on three main antecedents of behavior (taking recommended health action):

- ❑ *Subjective State of Readiness (Threat)*: Threat is the combination of perceived susceptibility to the disease and the perceived severity of contracting that disease
- ❑ *Evaluation of Advocated Behavior (Benefits and Barriers)*: Benefits represent the amount of reduction in threat while barriers are the costs involved with the proposed action
- ❑ *Cues to Action*: These are triggers of action whose occurrence can lead to/trigger the desired action (Becker and Maiman 1975)

The HBM was initially developed to study preventive behaviors but was then extended to study sick-role behaviors, mainly adherence to medical regimens. In fact, Becker and Maiman (1975) have modified the original HBM and have come up with a version to be used for medical regimen compliance. Brownlee-Duffeck et al. (1987) have used this modified version to study the role of health beliefs in explaining diabetic regimen adherence. After controlling for age and knowledge of 143 insulin-dependent diabetic patients, they have found that health beliefs significantly explain the variation in diabetic regimen adherence (Brownlee-Duffeck et al. 1987). Despite this modification, the HBM has been less frequently used for sick role behaviors than preventive behaviors (Sheeran and Abraham 1996). Another major modification made to the HBM is the recent addition of “Perceived Self-Efficacy” to its components (Champion and Skinner 2008). Figure 2.1 presents the health belief model’s components and linkages.

The HBM has received a fair amount of validity and reliability testing. The results using this model have shown that perceived barriers is the most powerful predictor of behavior in the model and that perceived benefits is a strong and significant predictor for sick-role behavior while perceived susceptibility is more significant for preventive behaviors (Montano and Kasprzyk 2008). The importance of the “perceived barriers” component is of particular interest to this study because, as I will point out in a later section, it bears a similarity to the “perceived behavioral control” component in the Theory of Planned Behavior (TPB).

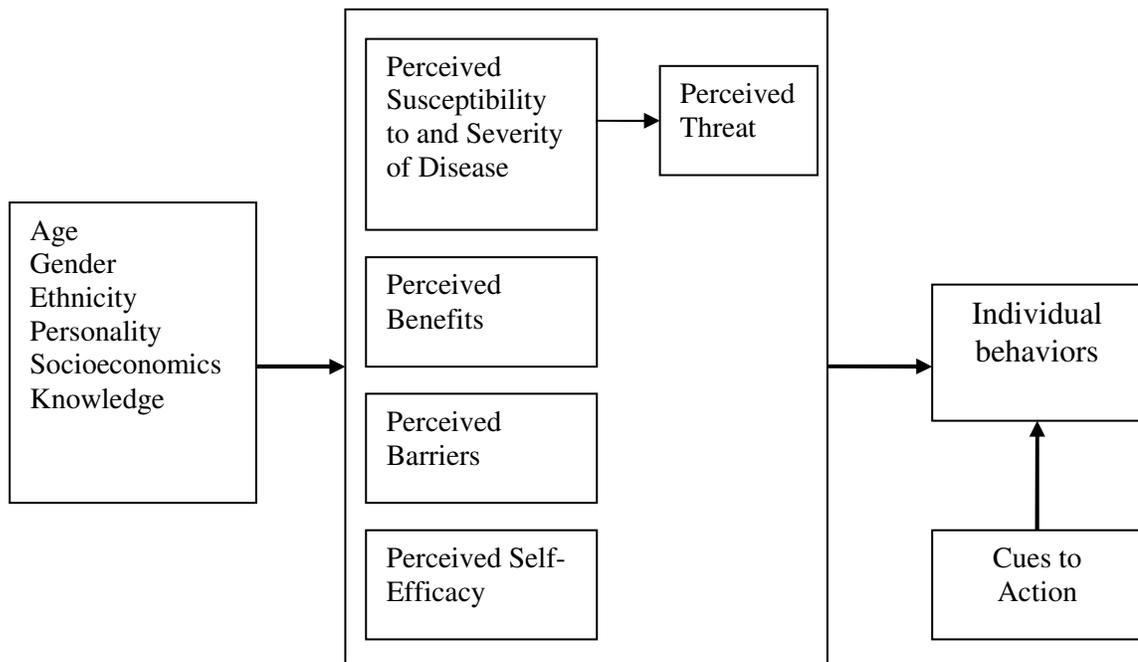


Figure 2.1. Health Belief Model Components and Linkages

Source: Glanz, Rimer and Viswanath (2008), 49

Health Locus of Control (HLC)

The Health Locus of Control (HLC) construct originated in Rotter’s (1954) Social Learning Theory and has been since widely applied in health psychology. Social Learning theory posits that behavior depends on individual’s expectancy that a behavior will lead to an outcome (action-outcome expectancy) and the extent to which this outcome is valued. The locus of control construct is a generalized expectancy that distinguishes between internal and external locus of control, where internals believe that events are a consequence of their own actions while externals believe that events are determined by factors beyond their control.

In studies of health behavior, the HLC construct was found to be “a relatively weak predictor of health behavior” (Conner and Norman 1996, 10). In an attempt to improve the predictive power of HLC, Wallston (1992) has developed a Modified Social Learning Theory, which combines health value, health locus of control and self-efficacy beliefs and has found that HLC was a more distal predictor of behavior compared to health value and self-efficacy. Another expansion to the HLC construct is the development of HLC measures that are more specific to a certain disease or to certain behaviors. These situation or domain specific measures have been more predictive of behavior (Montano and Kasprzyk 2008).

One of the specific HLC measures of interest to this dissertation is the multidimensional health locus of control (MHLC) scale, developed by Wallston et al. (1978). This scale measures expectancy beliefs for health behaviors and distinguishes among beliefs of the extent to which individual health is under the individual’s control, the control of powerful others, or chance. The three dimensions of MHLC can be defined as follows: Internal HLC is “the extent to which individuals believe their health is the result of their own actions”, powerful others HLC is the “extent to which individuals feel their health is under the control of powerful others” and chance HLC is “the extent to which individuals believe that their health is owing to chance or fate” (Norman and Bennett 1996, 64). The MHLC scale has three forms A, B and C. Form C was developed for the purpose of application to specific medical conditions. It has 18 items designed in a way that allows the researcher to easily modify them to fit a specific illness or condition. My conceptualization of perceptions of control for this research study is similar to the

modified social learning theory and will include the HLC construct, as measured by the MHLC – From C tool. Details about the choice of this conceptualization will be covered further in this chapter.

Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) developed by Ajzen (1988) is an extension of Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA). It attempts to explain how influences on the individual determine his or her behavior. The TPB is one of the most influential and most used theories in the study of human action (Ajzen 2002; Montano and Kasprzyk 2008). It posits that human behavior is guided by:

- ❑ *Attitude towards behavior*: Beliefs about the likely consequences or other attributes of behavior (behavioral beliefs)
- ❑ *Social Norms*: Beliefs about normative expectations of other people (normative beliefs)
- ❑ *Perceived Behavioral Control*: Beliefs about the presence of factors that may further or hinder performance of behavior (control beliefs) (Ajzen 2002)

Perceived behavioral control can also be defined as the “individual’s perception of the extent to which performance of a behavior is easy or difficult” (Conner and Norman 1996, 12). Determinants of perceived behavioral control include: Beliefs concerning whether one has access to the necessary resources and opportunities to perform a behavior and the perception of factors likely to inhibit or aid the performance of the behavior. Therefore, if an individual perceives that he or she has access to necessary

resources and perceives that there are facilitators and minor or no inhibitors to the performance of that action, he or she has high perceived behavioral control (Conner and Norman 1996).

One problem with TPB is that it was developed outside the health area and therefore it does not incorporate the health threats component present in other models such as HBM (Conner and Norman 1996). One development introduced to the theory is the addition of self-efficacy as a component along with perceived behavioral control, under what is labeled as the “Personal Agency” component. Perceived behavioral control and self-efficacy might be similar in many ways but they are distinct constructs: Perceived control is “one’s perceived amount of control over behavioral performance, determined by one’s perceptions of the degree to which various environmental factors make it easy versus difficult to carry out the behavior”, while self-efficacy is “one’s degree of confidence in the ability to perform the behavior in the face of various obstacles and challenges” (Montano and Kasprzyk 2008, 79). It is assumed here that perceptions of self-efficacy might reflect the individual’s perceptions of ease or difficulty of performing a behavior. When an individual believes in his or her capability to perform a behavior, this might indicate to that individual, that the behavior is relatively easier for him or her to carry out. In fact, past research testing the TPB operationalized perceived behavioral control in a way similar to self-efficacy (Wallston 1992).

Self-Efficacy Models

As we have seen in the summary of other social cognition health behavior models, self-efficacy has been introduced as an important component to improve the predictive power of these models. In fact, “there is a strong case for including self-efficacy in all models of health behavior” (Norman and Connor 1996, 201). This was clearly exhibited in the addition of self-efficacy as a component to the HBM, the HLC (Modified Social Learning Theory) and the TPB; it is also a component of the Protection Motivation Theory which is covered next. The concept of self-efficacy is “inseparable from the name Albert Bandura” and it “has its origins in Social Learning Theory”. Bandura’s Theory of Self-Efficacy was developed in 1977 and perceived self-efficacy was then defined as “the beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (Walker 2001, 77).

Self-efficacy models posit that human motivation to act depends on three expectancies:

- ❑ *Situation-outcome expectancies* or beliefs about outcomes that will occur without personal interference (expectancy that one is at risk)
- ❑ *Action-outcome expectancies* or expectancy that behavioral change would reduce the threat
- ❑ *Perceived self-efficacy* or expectancy that one is capable of adopting a behavior, it is defined as the “belief in their capability to perform a specific action required to attain a desired outcome” (Shwarzer and Fuchs 1996, 164).

Self-efficacy has been found to be an important predictor of health behaviors (Shwarzer and Fuchs 1996). The importance of this construct as a predictor of behavior, its

representation of ‘experiences of control’ defined previously in this chapter, and its inclusion in all health behavior models compelled me to include it in my conceptualization of control.

Protection Motivation Theory (PMT)

In relation to marketing, health behavior theories have been mostly used in the communication field to study the effectiveness of different messages in changing health behavior or behavioral intentions. The Protection Motivation Theory (PMT) was originally developed to study the effectiveness of fear appeals in health prevention messages. It is used in studies about the role of media in influencing health-related behavior and it is responsible for incorporating self-efficacy into health communication (Block and Keller 1995).

PMT was put forward by Rodgers (1975) to understand the effect of fear appeals in health communication on individual behavior. This theory proposes that threat and coping appraisals determine an individual’s adaptive or maladaptive coping behaviors. Threat appraisals depend on one’s beliefs of susceptibility to the illness and severity of the health threat (similarly to the HBM). Coping appraisals depend on assessing behavioral alternatives and expectancies that a specific behavior will decrease the threat (similar to the perceived benefits component of HBM) and on the beliefs in one’s capability of performing these behaviors (Self-Efficacy). Protection Motivation Theory combines the Health Belief Model and Bandura’s Self-Efficacy Theory (Conner and Norman 1996).

As evident in the previous summary of five main social cognition models, there are common components that all the models have focused on:

- ❑ *'Threat'* is one component represented in the majority of health behavior models as a compound product of perceived susceptibility to and perceived severity of a specific condition (perceived threat in HBM, situation-outcome expectancy in self-efficacy models, and threat appraisals in PMT)
- ❑ The *'consequences of performing a behavior'* is another component central to most of the models under different names: Benefits and costs in HBM, behavioral beliefs in TPB, action-outcome expectancies in self-efficacy theory, and response efficacy in PMT
- ❑ *'Perceptions of control'* is a variable that has been given much attention after the introduction of 'Perceived Behavioral Control' by Ajzen in his 1988 Theory of Planned Behavior. In spite of its different labels and conceptualizations, 'perceptions of control' is a central component of all social cognition models (Norman and Conner 1996)

“Control is one of the most important constructs in psychology and most especially health psychology” (Wallston 2005a, 301). According to Weinstein (1993), “most renowned theories of health behavior have in some way incorporated the construct of control”. In Ajzen’s Theory of Planned Behavior (TBP 1988), control is incorporated in the construct of perceived behavioral control which can be defined as the “individual’s perception of the ease or difficulty of performing a behavior”; it is behavior specific and varies with context and behavior. Perceived behavioral control is very similar to the

perceived barriers component of the Health Belief Model (Conner and Sparks 1996). The perceived barriers construct represents the obstacles to the performance of behavior or the objects whose presence or absence makes performing a behavior harder or easier. In Bandura's Self-Efficacy theory, control is incorporated in the construct of self-efficacy which can be defined as the "confidence in performing a behavior". This is similar to but different from perceived behavioral control because even when the behavior is perceived to be generally difficult, an individual might still be confident in his or her ability to perform it; this individual might then perceive the behavior as relatively easier for him or her compared to other people. Self-efficacy is a crucial representation of control that has significant predictive power in models of health behavior. In fact, self-efficacy has been either an original component of or an added component to all the models of health behavior reviewed in this study (Shwarzer and Fuchs 1996). Finally, locus of control is another representation of control, which focuses on generalized expectancies of control that are stable across situations and not related to a specific behavior (Norman and Bennett 1996). Among these different conceptualizations, locus of control and self-efficacy are the most relevant to this dissertation, for reasons explained earlier.

One major limitation of existing models of health behavior is their lack of attention to emotions. "New findings call for a separate and more central role for affect... emotions [can] affect decisions related to health [through] focusing people's attention on threat, helping people choose among several courses of action, facilitating decisions about dissimilar outcomes such as money and health, and prompting people to spring into action. Emotions can be negative (fear), but they can also be positive (hopefulness)"

(Brewer and Rimer 2008, 161). The Protection Motivation Theory (PMT) incorporates the emotion of fear but recent studies in coping theory have suggested “that positive psychological states should also be taken into account” and added to a cognitive theory of stress and coping (Brewer and Rimer 2008). My contribution to existing models of health behavior is the introduction of a positive emotion that has not been given the attention it deserves: Hope. “Hope has not consistently been identified as an important variable” (Farran, Herth, and Popovich 1995, 17), especially pertaining to individual health and diagnosis with illness. This study is an attempt to predict health behavior using a model that combines the positive emotion of hope with the cognitive component of perceived control.

Conceptualization of Control Perceptions for this Study

Conceptualizing control in a way that incorporates all its different aspects and that is meaningful and useful to health behavior, is a challenging task. In a review of Walker’s (2001) book “Control and the Psychology of Health: Theory, Measurement and Application”, Wallston (2005a) has noted that Walker was able to come up with a model that unifies the theory of control by covering all different conceptualizations of control, such as perceived or personal control, locus of control, self-efficacy, and learned helplessness. This model represents control on two dimensions: Probability of a valued outcome given one’s own response and probability of the outcome given an external response (by someone else). Little empirical work has been done to test Walker’s (2001) model except for her own work in the context of pain and the elderly (Wallston 2005a).

Testing Walker's (2001) theory of control is beyond the scope of my dissertation, but I adopted a conceptualization of control that reflects some components of the theory.

Walker (2001) has posited that "control measures necessary to reflect perceived control should include self-efficacy (agency control), locus of control (outcome control), health value (outcome strength), desire for control and perceived support from others for behavior change" (Walker 2001, 194). The conceptualization of control used for this study is limited to two representations of control: Locus of Control (LOC) and Self-Efficacy. I opted for these two representations of control for the following reasons:

- ❑ Self-efficacy is a component of all predictive health behavior models and "there is a strong case for including self-efficacy in all models of health behavior" (Norman and Connor 1996, 201).
- ❑ Internal locus of control (ILOC) represents a measure of perceived control over outcomes while self-efficacy is measure of perceived control over actions (Walker 2001). A combination of internal locus of control and self-efficacy would therefore be a good representation of personal control. Also, self-efficacy is a representation of the agent-means connection while locus of control represents the means-end connection, mentioned earlier.
- ❑ Walker (2001) agreed with Wallston (1989) who has argued that self-efficacy predicts behavior only in those who are high on internal LOC because if they are high on external locus of control, even if they believe they have the ability to perform an action, they might believe that others can do it better. In her model, internal LOC is an antecedent to self-efficacy (Walker 2001). At the same time,

studies that have investigated the effects of internal LOC on adherence behaviors have found mixed results. Some were positive, others insignificant. This lack of results or mixed results might be due to the inconsideration of factors such as self-efficacy (Ajzen 2002). Because LOC has been found to typically explain a small amount of variance in health behavior and because self-efficacy has been established as a much stronger predictor of health behavior (Wallston 1992), the Locus of Control theory has been modified by Wallston (1992) to include self-efficacy beliefs in his Modified Social Learning Theory. Combining the two constructs (ILOC and Self-Efficacy) is consistent with these propositions and suitable for a conceptualization of control perceptions, in a model that attempts to predict health behavior.

- ❑ Locus of control also emphasizes the beliefs about the influence of external sources on outcome in addition to personal ability and motivation to reach an outcome or take an action. Control in this case is the “expectation of producing the intended outcome” (Walker 2001, 48). External locus of control incorporates the “perceived support from others for behavior change”, a component of Walker’s (2001) unifying theory of control.

Instead of general locus of control, I used Health Locus of Control (HLC) or the “person’s beliefs regarding where control over his/her health lies” (Wallston, Stein, and Smith, 543) combined with Self-Efficacy “the confidence in one’s ability to perform goal-directed behaviors” (Wallston, Rothman, and Cherrington 2007, 395). To measure perceptions of control, I used scales that are specific to the health condition in question.

Ajzen and Fishbein (1974) have noted that it is important to measure attitudes and behaviors at the same level of specificity to get better correlations and better predictive power for a model (Norman and Conner 1996). Also, Wallston (1992) has noted that generalized locus of control is more stable and more reflective of a personality trait when compared to health locus of control which represents beliefs that can be modified through health experiences. Rotter (1975) has agreed that expectancies specific to a situation perform better than generalized expectancies in predicting behavior in that specific psychological situation (Wallston, Stein, and Smith 1994). I used the Multidimensional Health Locus of Control (MHLC), Form C, a scale developed by Wallston, Stein, and Smith (1994) to measure locus of control for a specific health condition; and the Perceived Diabetes Self-Management Scale (PDSMS), a valid measure of diabetes self-efficacy that can easily be altered for other chronic conditions. The PDSMS was created by Wallston, Rothman, and Cherrington (2007). The MHLC – Form C has an established validity that is stronger than those of forms A and B (Wallston, Stein, and Smith 1994). It has three 6-item subscales: IHLC (internal HLC), CHLC (chance HLC), and PHLC (powerful others HLC), which can be divided into two 3-item subscales for control by Doctors and control by Other People. Validity tests for the MHLC scale (in all its forms) have shown no correlation or only weak correlation among its subscales, thus providing support to the statistical independence of these subscales (Wallston 2005b). The PDSMS scale represents one unidimensional measure of self-efficacy. Therefore, to model perceptions of control for this study, I used four components: IHLC, CHLC, PHLC and Self-Efficacy.

CHAPTER 3

THEORETICAL FRAMEWORK

This chapter provides a theoretical framework for the competing models and hypotheses I propose and includes an overview of model variables and their measurements. This chapter examines the relationships between hope, perceptions of control, and outcome variables. Particularly, it looks at the effects of hope and perceptions of control on compliance and satisfaction with medical regimen; three competing models are proposed to delineate the potential dynamics between hope and control based on past research findings and on appraisal and attribution theories of emotions.

Models and Hypotheses

Hope and Perceptions of Control as Antecedents of Compliance with Medical Regimen

Compliance can be simply defined as “the extent to which a person’s behavior [...] coincides with medical or health advice” (Haynes 1979, 1) or “the extent to which patients follow the instructions of their physicians or other providers” (Hulka 1979, 63). Adherence is another term used interchangeably with compliance. Research on adherence with medical regimen has peaked in the 1970s and 1980s. However until this day, many researchers have been trying to identify antecedents of compliance and to uncover strategies that could increase compliance with medical regimen for various health conditions. Research has found that across different treatments, people have low levels of compliance (Schuchler and Kiviniemi 2006). Non-compliance can result in many adverse

effects including lower quality of care, poorer doctor-patient relationships, subjecting the patient to unnecessary procedures and dissatisfaction with the delivery of care (Becker and Maiman 1975). In many situations, non-compliance with prescribed medication, diet or exercise regimens can lead to serious complications, some of which are fatal. Some researchers have even posited that the effects of non-compliance go beyond individual health to influencing health economies by decreasing the cost efficiency of treatments (Cleemput and Kesteloot 2002). It is important to understand the factors that lead to compliance or those that are relevant to compliance intentions (Dellande, Gilly, and Graham 2004; Schuchler and Kivinicm 2006). To that end, compliance was selected as the health behavior outcome because it is crucial for individual health and because non-compliance can lead to severe negative consequences. Also, compliance is important for the achievement of health goals and the success of the health service provided.

The “experience of hope usually involves a change in the intensity of one’s mental state, which is often evident in behavior, subjective effort, and physiology” (Lazarus 1999, 663). Research about the effect of hope on the specific behavior of compliance with medical regimen has been scarce: The association between hope and compliance has been supported in a study of the effects of feelings of hope and discomfort on motivation and capacity to follow recommendations, in psychiatric patients. Motivation to follow through the treatment recommendations has been found to be significantly related to high levels of hope. The study has concluded that patients who follow treatment have higher hope than those who do not (Perley, Winget, and Placci 1971). Few later studies have looked at the effect of hope on compliance. Hope has been shown to motivate patient

participation in treatment (Heszen-Niejodek, Gottschalk, and Januszek 1999). Delvecchio et al. (1990) have found that keeping patients hopeful can help them become more involved in their own treatment (Clayton et al. 2008). Moon et al. (2001) have established that hope significantly predicts adherence in taking inhaler medication for children with juvenile asthma and Seaton and Snyder (2001) have found that hope is a significant predictor of staying in drug treatment programs (Snyder 2002). MacInnis and De Mello (2005) have posited that strong hope has a positive effect on self-regulatory outcomes and can lead to better cessation of maladaptive consumption practices, thus to better compliance with medical regimen (MacInnis and De Mello 2005). This leads to the first hypothesis:

H1: Hope has a positive effect on compliance with the medical regimen

Perceptions of control and efficacy are important in the setting of a chronic illness. In fact, perceptions of control have been linked to the extent to which people learn about or take responsibility for their medical condition, while perceived efficacy has been linked to the level of effort a person expends to respond to challenging circumstances (Band and Weisz 1990). A review of the literature on the effects of health locus of control and self-efficacy on compliance is summarized in this section: Past research has shown that people who have high internal locus of control are more likely to take responsibility for their health and engage in health promoting behaviors (Norman and Bennet 1996). Similarly, self-efficacy has been found to be a significant predictor of a range of health behaviors such as sexual risk behaviors, physical exercise, and weight control (Schwarzer

and Fuchs 1996); some of these studies have established a significant effect of self-efficacy on adherence with medical regimen in contexts such as breast-self examination and diabetes (O’Hea 2003). Researchers have also found a significant interaction effect between internal health locus of control (IHLC) and self-efficacy, and a positive effect of the interaction component on adherence with medical regimen, especially in the context of Type I diabetes patients (O’Hea 2003). The interaction between self-efficacy and internality has been proposed to affect health behavior such that an individual who does not believe that his or her health is under his or her control (IHLC) is not likely to perform positive health behaviors even when he or she believes in his or her capability of performing those behaviors (Wallston 1992), i.e. internality acts as a moderator of the effect of self-efficacy on compliance. The above information about the effects of self-efficacy, IHLC, and their interaction constitutes the basis for hypotheses 2, 3, and 4.

H2: Self-efficacy has a positive effect on compliance with medical regimen

H3: Internal health locus of control (IHLC) has a positive effect on compliance with medical regimen

H4: There is a significant interaction effect of internal health locus of control (IHLC) and self-efficacy on compliance with the treatment, such that self-efficacy predicts compliance only for individuals with high IHLC levels. In other words, the effect of self-efficacy on compliance increases as IHLC increases

The obvious hypotheses in locus of control theory have been that internal health locus of control (IHLC) has a positive effect on the likelihood of good health behaviors while

chance health locus of control (CHLC) has a negative effect on that likelihood (Wallston 2005b). The effects of powerful others health locus of control (PHLC) have been less clear. Although internal locus of control is viewed as more positive than external or chance locus of control, some researchers have posited that high PHLC can also lead to performance of health behaviors when recommended by powerful others such as physicians; compliance with medical regimen is one such behavior. The role of powerful others HLC can be especially important during acute or chronic illnesses. As for chance HLC, it can be adaptive only when objective control conditions are discouraging, i.e. when there is little room for realistic control (Norman and Bennet 1996), which is not the case for people with chronic illnesses and who are not at a critical or end-of-life stage. Steptoe and Wardle (2001) have studied the effects of IHLC, PHLC, and CHLC on performing ten health behaviors, including not smoking, doing exercise, not drinking alcohol, eating breakfast, putting the seatbelt on, and having a diet that is low in salt, low in fat, and high in fiber. The tested behaviors are in the context of keeping a healthy lifestyle rather than complying with a disease treatment. They found that IHLC and CHLC are respectively positively and negatively associated with performing most of these health behaviors; while PHLC can have a positive or a negative effect depending on the behavior in question. It seems that PHLC has a more variable / unstable association with health behavior. One explanation could be that when people believe that their health is under the control of powerful others, they believe that their medical problems can be solved by these powerful others (health professionals), which might lead them to carry out negative health behavior (Steptoe and Wardle 2001). Walker (2001) has posited that internal and external controls complement each other, but that personal control (internal)

which leads to higher perceptions of self-efficacy is preferable because it is associated with lower uncertainty and is more stable (Walker 2001). The confusion around the role of powerful others health locus of control makes it difficult to hypothesize the valence of its effect on compliance. To test this effect and attempt to explain the discrepancies found by past researchers, I propose two competing hypotheses H5a and H5b. Based on the present discussion, the expected effect of CHLC on adherence is described by hypothesis 6.

H5a: Powerful others health locus of control (PHLC) has a positive effect on compliance with medical regimen

H5b: Powerful others health locus of control (PHLC) has a negative effect on compliance with medical regimen

H6: Chance health locus of control (CHLC) has a negative effect on compliance with medical regimen

Hope and Perceptions of Control as Antecedents of Satisfaction with Medical Regimen

Lazarus (1999) has asserted that “hope is created when the fate is uncertain, the person is in an unhappy state and a favorable outcome cannot be completely foreclosed” (Lazarus 1999, 654); and that hope is necessary for the acceptance of a “harsh fate”. Threatening life events might lead to a mixture of hope and despair; this might lead one to think that hope is associated with low levels of satisfaction. Yet, hope is the result of an appraisal of one’s life events and circumstances, where there is a need to view what is occurring in a favorable way (Lazarus 1999). In fact, hope has been used as an index of well-being

(Gibson 1999). Even though unlike optimism, hope is associated with anxiety and uncertainty, its adaptational value is significant (Lazarus 1999). Sullivan (2003) has found that lower levels of hope are associated with poorer quality of life (Miller 2007). The effects of hope on satisfaction with health services has not been empirically tested, but past research on the positive effects of hope (discussed in prior sections) allows us to expect a positive effect of hope on satisfaction with health services. In the marketing context, MacInnis and De Mello (2005) have hypothesized that the main positive effect of hope is that regardless of outcome, high hope leads to more satisfaction or less dissatisfaction than when there is low or no hope. As mentioned previously, they have argued that the moderating role of hope between outcome valence and satisfaction can be explained through expectancy disconfirmation, equity theory, emotion perspective, and attribution theory (MacInnis and De Mello 2005). This leads to the following hypothesis:

H7: Hope has a positive effect on satisfaction with medical regimen

Perceived control in health care services has emotional and physical benefits for the patient; it also has financial benefits to society and managerial benefits of satisfaction and loyalty to the service provider. The positive effects of control have been studied in several domains including aging, stress and health maintenance behaviors. Control perceptions have been expected to lead to better perceptions of service quality, increased satisfaction and loyalty (Tangsrud and Smith 2000). Despite the wide range of variables investigated by health and social psychologists in relation to perceptions of control, I did not encounter any studies that empirically examine the effects of control perceptions on

satisfaction. This might be due to the lack of concern, on the part of health and social psychologists, with satisfaction as an outcome variable and to their focus on understanding and predicting health behaviors and health-related outcomes.

In the services marketing domain, research relating control to satisfaction has also been limited. More research has focused on participation in the service (co-production) as an antecedent of control. Some studies have shown that patients, who are allowed to make choices in the diagnosis and treatment processes (co-production) use less medication, are more active and recover faster (Tangsrud and Smith 2000). Van Raaj and Pruyn (1998) have hypothesized that increased control over the service can lead to an increased perceived responsibility for the service and an increased satisfaction with the outcomes. This effect is mediated by attribution theory and considers participation in the service provision as an antecedent of control. When the customer is a party in the production of the service, there is less attribution to the provider and more attribution to the self. Attributions determine perceptions of service quality and also the behavioral responses towards the outcome (Van Raaj and Pruyn 1998).

If perceptions of personal control over the service have the same effects on service satisfaction as co-production, it can be expected that internal health locus of control and self-efficacy have a positive effect on satisfaction with the treatment while powerful others and chance loci of control have a negative effect on satisfaction. Despite co-production and perceptions of control – conceptualized by self-efficacy and locus of control – being distinct constructs, existing studies have indicated that the

aforementioned expected effects of perceptions of control dimensions on satisfaction are valid. In fact, Jen-Her, Tennyson, and Hsia (2010) have found that self-efficacy is an antecedent of student learning satisfaction with a blended e-learning system environment, Uguak et al. (2007) have shown that students with high internal locus of control have significantly higher levels of academic achievement satisfaction when compared to external students, and Andrasani and Nestel (1976) have established a positive effect of internal locus of control on job satisfaction. Although none of these studies was conducted in the healthcare domain, I expect that perceptions of self-efficacy and internal health locus of control have a positive effect on satisfaction with the medical treatment, while perceptions of control by powerful others or impersonal circumstances (chance) have a negative effect on satisfaction. It is logical to also expect that there is an interaction effect between self-efficacy and internal health locus of control (IHLC) on satisfaction. If an individual is high on IHLC but has low perceived self-efficacy, that individual would perceive that he or she is responsible for their own health but is not able to take the actions required to improve it; this might lead to feelings of frustration and helplessness and consequently to dissatisfaction. I expect that individuals with high IHLC will have higher satisfaction only when they also have high self-efficacy beliefs. Hence, I propose the following hypotheses about the effects of perceptions of control dimensions on treatment satisfaction:

H8: Self-efficacy has a positive effect on satisfaction with medical regimen

H9: Internal health locus of control (IHLC) has a positive effect on satisfaction with with medical regimen

H10: There is a significant interaction effect of internal health locus of control (IHLC) and self-efficacy on satisfaction with the treatment, such that IHLC has a positive effect on satisfaction only for individuals with high self-efficacy. In other words, the effect of IHLC on satisfaction increases as self-efficacy increases

H11: Powerful others health locus of control (PHLC) has a negative effect on satisfaction with medical regimen

H12: Chance health locus of control (CHLC) has a negative effect on satisfaction with medical regimen

The Dynamics between Hope and Control

As mentioned earlier, there are no studies that have explicitly investigated hope in relation to perceptions of control. In this section, I will suggest three competing hypotheses which are exploratory in nature because of the lack of past research supporting a clear relationship between hope and control. Based on these hypotheses, three models will be proposed for the simultaneous effects of perceptions of control and hope on compliance and satisfaction with the medical treatment. Existing research on hope and control separately has made suggestions about the dynamics between these two constructs. One stream of literature has hypothesized that the relationship between hope and control is that of mere correlation. Those who feel they have control over their environment have been assumed to have resources to exercise that control and therefore to have higher levels of hope. There is a high correlation between locus of control and hope (Hobfoll, Briggs-Phillips, and Stines 2003). Lazarus (1999) has posited that self-efficacy and control facilitate hope but they are not essential to it; he has refused that “the

belief that our actions could help make the desired outcome come about” is a component of hope (Lazarus 1999).

A contrasting view is posited by Farran, Herth, and Popovich (1995), who have argued that hope “requires a sense of control over one’s destiny” and that a loss of control could lead to hopelessness. The relationship between lack of control and hopelessness has been slightly more present in the literature: Henry (2004) has argued that lack of control can lead to helplessness (belief that there is nothing one can do to change the likelihood of expected outcomes), which leads to hopelessness (the expectation that a highly desired outcome will not occur or expectancy that a highly negative outcome will occur). He has also affirmed that lack of control is not only an antecedent of hopelessness but a prerequisite for it; hopelessness has two requirements: Negative outcome expectancies and helplessness expectancies (Henry 2004). In her unifying theory of control, illustrated in Figure 3.1, Walker (2001) has agreed with Henry (2004) and has hypothesized that the likely occurrence of hopelessness is associated with the simultaneous occurrence of perceptions of negative outcome expectancies given own control and perceptions of negative outcome expectancies given social support (control by others). She has also stated that in some cases chance locus of control can be adaptive, particularly when associated to fate rather than luck or chance. She has actually suggested that the contingency space represented in Figure 3.1 could be extended to represent the chance locus of control as a third dimension (Walker 2001).

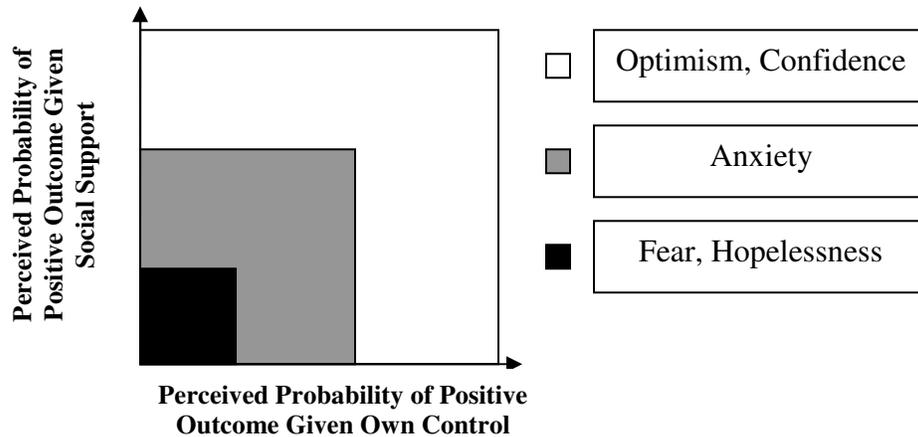


Figure 3.1. Contingency Space Illustrating Emotional Responses to Perceived Control

Source: Walker (2001), 177

From these research suggestions, it can be expected that individuals who are low on all locus of control dimensions: Internal health locus of control (IHLC), powerful others health locus of control (PHLC), and chance health locus of control (CHLC) have lower levels of hope than those who are high on any one or more of these dimensions.

Therefore, IHLC, PHLC, and CHLC have significant positive effects on the level of hope. As for self-efficacy, it was found to be a strong predictor of hope in at least one previous study (Duggleby, Cooper, and Penz 2009), which leads to the expectation that self-efficacy has a positive effect on hope. Walker (2001) has also suggested that internal health locus of control is an antecedent for self-efficacy and that there is a significant interaction effect between IHLC and self-efficacy on hope, such that the effect of self-efficacy on hope is significant only for individuals who are high on IHLC. Hypotheses

13a to e represent the basis for the first proposed model stemming from the perceptions of control literature: Model 1.

H13a: Internal health locus of control (IHLC) has a positive effect on hope

H13b: Self-efficacy has a positive effect on hope

H13c: There is a significant interaction effect between internal health locus of control (IHLC) and self-efficacy on hope, such that the effect of self-efficacy on hope increases as IHLC increases

H13d: Powerful others locus of control (PHLC) has a positive effect on hope

H13e: Chance health locus of control (CHLC) has a positive effect on hope

Because this is only a limited view of the dynamics between hope and perceptions of control, two cognitive theories of emotions were used to provide a framework on the basis of which we can better explain the nature of the relationship between hope and locus of control: Weiner's (1985) Attribution Theory of Motivation and Emotion and Appraisal Theories of Emotions (Lazarus 1991; Johnson and Stewart 2004; Roseman 1984).

In his attribution theory of motivation and emotion, Weiner (1985) has argued that dimensions of causality and the causal structure attributed to an event determine individual emotions, which in turn guide motivated behavior. There are three properties or causal dimensions for attributions related to events and/or outcomes: Locus, stability

and controllability. These dimensions determine the individual's emotional experience following an event or an outcome:

- ❑ *Locus* is the perception that the cause of an event or outcome is internal vs. external
- ❑ *Stability* is the perception that the cause of an event or outcome is stable vs. unstable
- ❑ *Controllability* is the perception that the cause of an event or outcome is controllable (something can be done about it) vs. uncontrollable (nothing can be done about it)

Rotter (1954) has confounded locus and controllability dimensions in his Locus of Control construct. He has considered events or outcomes to be perceived as either under personal control (internal locus of control) or under the control of external factors (others or chance) (external locus of control). Locus of control represents the locus dimension rather than the controllability dimension of causal attributions, where events and outcomes are perceived as controllable (Weiner 1985). Weiner's (1985) attribution framework has proposed laws linking attributional thinking to individual emotions. He has posited that the primary appraisal of an event or outcome as positive or negative elicits outcome-dependent attribution-independent emotions and that the secondary appraisal of an event or outcome with causal ascriptions determines individual attribution-dependent emotions. In this attribution framework, each causal dimension is related to a set of emotions: Self-related emotions such as pride and self-esteem are related to the locus dimension; the controllability dimension is associated with social emotions such as anger, shame or guilt; and the stability dimension is related to

expectancies for future success which elicits emotions of hopefulness or hopelessness (Weiner 1985). Going back to appraisal dimensions of emotions in Table 2.1, Weiner's (1985) causal dimensions seem similar to some appraisal dimensions defined by Roseman (1984). In fact, according to Roseman, Spindel, and Jose (1990), the locus and controllability causal dimensions are similar to the appraisal dimensions of agency and power respectively. The causal dimension of stability can also be compared to the probability appraisal dimension.

Attribution and appraisal theorists have provided two views about the relationship between hope and locus of control: Lazarus (1991), MacInnis and De Mello (2005), and Weiner (1985) have all agreed that the emotion of hope is elicited mainly by the dimension of stability (probability or certainty) and that the dimension of agency (personal agency or locus) is irrelevant to emotions of hopefulness and helplessness. Roseman (1984) on the other hand, has argued that the agency dimension is relevant to the emotion of hope, which would be elicited when an event or outcome is appraised as caused by impersonal circumstances. Roseman's (1984) revised and extended theory of emotions has received significant support. A test of the theory has shown that hypotheses related to the agency dimension were well supported for events and outcomes attributed to the self (elicited emotions: pride, shame, guilt, and regret), events and outcomes attributed to others (elicited emotions: unfriendliness, liking, and anger) but not for events and outcomes attributed to impersonal circumstances. When causes of events are attributed to impersonal circumstances, the dimension of agency is not well supported as an appraisal dimension for emotions of joy, relief, distress, sadness, fear and hope

(Roseman, Spindel, and Jose 1990). Roseman, Spindel, and Jose (1990) have suggested that these emotions can be experienced not only when the event is appraised as caused by impersonal circumstances, but also when the cause of an event is not specified or when “a causal agent is identified but the agency information is disregarded and the person’s focus is on the event itself” (Roseman, Spindel, and Jose 1990, 912). They have concluded that such emotions (joy, relief, hope, surprise, distress, disgust, sadness, fear, and frustration) are event-directed emotions where the cause of the event is disregarded, unspecified, or identified as circumstances beyond anyone’s control. These are similar to Weiner’s (1985) outcome-dependent attribution-independent emotions (happiness, sadness and frustration).

From previous research on attribution and appraisal dimensions of hope, the following can be inferred about the relationship between hope and locus of control:

- Hope is either elicited when chance locus of control is high, i.e. in terms of agency, the cause is attributed to impersonal circumstances (Roseman 1984); or when there is no attribution or disregarded attribution to an agent (Roseman, Spindel, and Jose 1990). Hypothesis 14 represents the basis for the second proposed model stemming from Roseman’s appraisal theory of emotions: Model 2.

H14: Only chance locus of control (CHLC) has a positive effect on hope

- There is no relationship between hope and locus of control because the agency appraisal dimension, also referred to as blame or credit, or personal agency is not an antecedent to hope (Lazarus 1991; MacInnis and De Mello 2005). Also, the locus and controllability causal dimensions are not related to emotions of hopefulness and hopelessness (Weiner 1985). Hypothesis 15 represents this view from attribution and other appraisal theories and is the basis for the third proposed model: Model 3.

H15: Internal health locus of control (IHLC), powerful others health locus of control (PHLC), chance health locus of control (CHLC), and self-efficacy have no significant effects on hope

This section illustrates the lack of past research examining the relationships between hope, control and compliance or satisfaction. By investigating these relationships and testing three competing models, my dissertation will contribute to the existing body of knowledge about how the dynamics between hope and control influence compliance and satisfaction with health treatments. Figure 3.2 provides an overview of the theoretical framework and hypotheses.

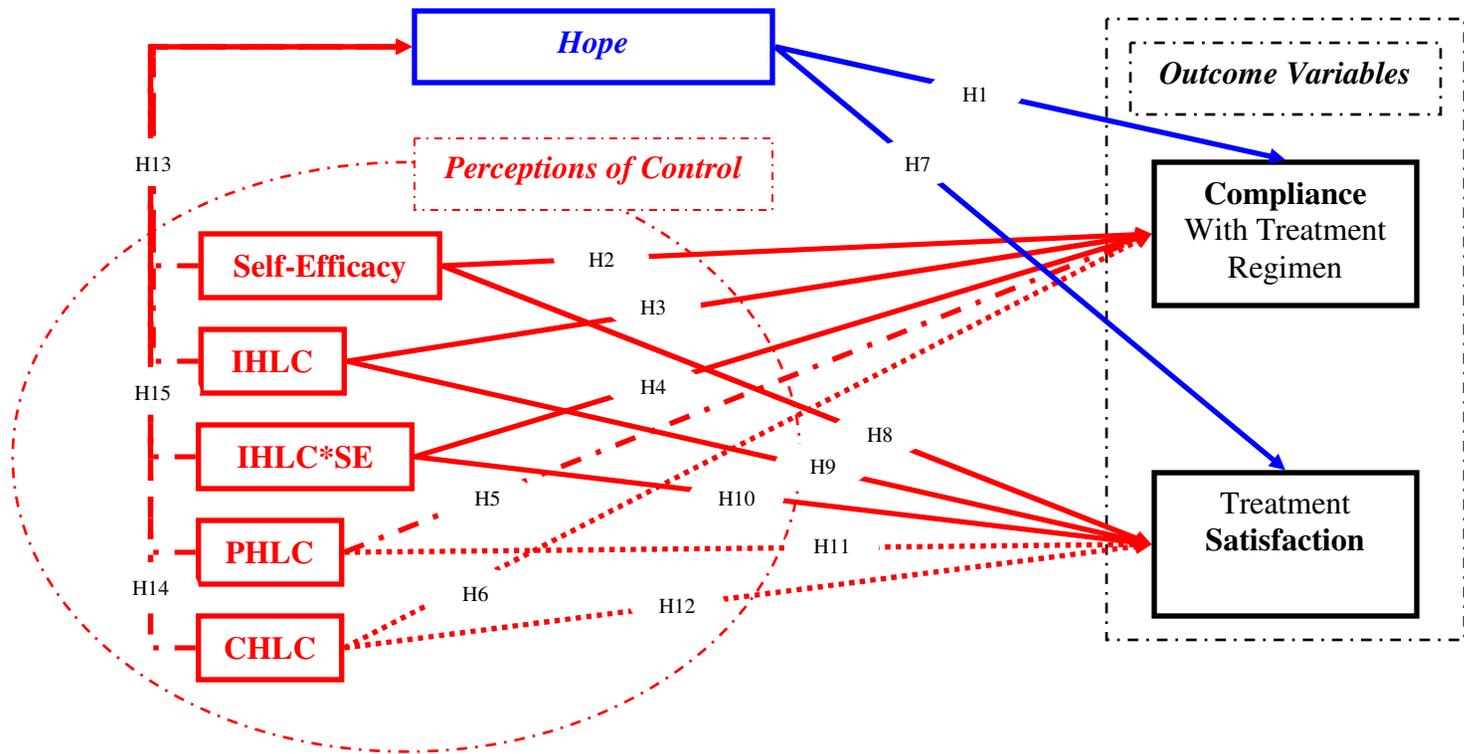


Figure 3.2. Theoretical Framework and Hypotheses

Legend:

- * CHLC: Chance Health Locus of Control; PHLC: Powerful Others Health Locus of Control; IHLC: Internal Health Locus of Control; SE: Self-efficacy
- * Variables in rectangular shapes represent observed variables (Measured using scales)
- * Solid arrows represent hypothesized positive effects; Dotted arrows represent hypothesized negative effects; and Mixed arrows represent an uncertain effect

Overview of Model Variables and Measurements

Tables 3.1 and 3.2 provide an overview of the model variables and their measurements.

Table 3.1. Overview of Dependent Variables

Dependent Variables	
<i>Variables</i>	<i>Measurement Tools</i>
Compliance	General Adherence Scale – Specific Measure – Diabetes, Hypertension, and Heart Disease: 0 to 15-items scale, where the number of items depends on the number of medical recommendations (Hays 1994)
Satisfaction	Treatment Satisfaction Questionnaires (TSQ's): 10-items scale modified to each chronic condition (Woodcock and Bradley 2006)

Table 3.2. Overview of Independent Variables

Independent Variables	
<i>Variables</i>	<i>Measurement Tools</i>
Hope	The Herth Hope Index: 12-items scale (Herth 1989)
Perceptions of Control	
Health Locus of Control	The Multidimensional Health Locus of Control Scale (MHLC) – Form C: 18-items scale modified for each chronic condition (Wallston, Stein, and Smith 1994)
Self-Efficacy	The Perceived Diabetes Self-Management Scale (PDSMS): 8-items scale modified for each chronic condition (Wallston, Rothman, and Cherrington 2007)

CHAPTER 4
METHODOLOGY

Research Design and Data Collection Methods

This chapter explains the methodology used in the preliminary exploratory phase and in the empirical phase of the research. In the preliminary phase, in-depth interviews explored perceptions, emotions, and behaviors of chronic illness patients. In the empirical phase, panel survey data allowed for testing the proposed models in order to develop a refined model linking perceptions of control, hope, and adherence to or satisfaction with medical treatments.

*Preliminary Phase: Exploring Perceptions, Emotions and Behaviors of Chronic
Illness Patients through In-Depth Interviews*

Prior to initiating this empirical phase for model testing, I conducted in-depth interviews with ten informants, diagnosed with a chronic illness, as part of a preliminary exploratory phase aimed at identifying what patients go through when living with a chronic illness in terms of feelings, thoughts, and experiences. In my dissertation, I attempt to develop a model that introduces the dynamics between the emotion of hope and perceptions of control, which have not been researched in past studies exploring compliance and satisfaction with medical treatments. A qualitative methodology that allows for complexity-capturing is therefore appropriate as a preliminary phase of the research (McCracken 1988).

For convenience, participants for this preliminary phase were recruited mostly from the student and employee population at a large state university in the North East. This is a valid approach, as university students and employees living with chronic conditions are able to provide insights about their life experiences, in ways that are relevant to the objectives of the research. The ten informants included 8 females and 2 males between the ages of 28 and 50. Each was diagnosed with one or more chronic conditions including but not limited to: Diabetes Type I, Diabetes Type II, Asthma, Hypertension, HIV, and Lupus. The recorded interviews were transcribed and coded into themes following guidelines of the phenomenological approach (Pavia and Mason 2004; Thompson 2005) although not strictly because only one coder performed the analysis rather than multiple coders. The data collection instrument (in-depth interview script) used for this phase and a summary of the qualitative data analysis are provided in **Appendix A**. The qualitative data analysis of the in-depth interviews generated better insights into the perceptions, emotions, and behaviors of individuals living with a chronic illness. The principle emergent themes from the ethnographic accounts are as follows:

- ❑ *Negative Initial Reactions*: Shock, disappointment, anger, uncertainty, confusion, and frustration were the emotions mostly uttered by informants when asked about their reaction to being diagnosed. Uncertainty about their future, as the main cause for their frustration and fear, was emphasized by most respondents. Appraisal and attribution theorists agree that the emotion of hope is elicited when an event is appraised as uncertain.

- ❑ *Positive Emotional Change over Time:* When asked about how their reactions to the diagnosis changed over time, respondents expressed feelings of relief, hope, and acceptance of their health condition as part of their lives. In many instances, the informants articulated their belief that this positive change was due to increased knowledge about their chronic condition, and their realization that it could be managed. This might hint to the importance of knowledge and control as antecedents to positive emotions such hope.
- ❑ *Perceptions of Control over Health: Emotional and Behavioral Consequences:* Many informants indicated that at many points in time, they experienced loss of control over their health status. In their opinion, this occurred when they witnessed health setbacks despite doing what they thought they were supposed to do. This led them to feel frustrated, afraid, and helpless. To cope with this loss of control, individuals described many strategies including going to their physician, seeking support from their family and friends, trying to have a positive attitude about their health condition, and trying to plan ahead for unforeseen health setbacks.
- ❑ *Perceptions of Disease Progression and Hope for the Future:* When asked about their perceptions of the disease progression in the future, many informants expressed their hopes for getting better or even being cured. These hopes stemmed either from their current health state and their dedication to improve, or from their trust in medical advancements capable of procuring a cure in the future.
- ❑ *Risk of Non-Compliance Perceptions: From Likely Low Risks to Unlikely High Risk.* All the informants were knowledgeable about potential setbacks in their

health whether moderate such as fatigue and increase in medication dosage, or severe such as blindness and even death. However, many of them indicated that the more serious setbacks are not likely to occur to them.

In addition to confirming my expectations about the importance of hope and perceptions of control for patients living with chronic conditions, this preliminary phase allowed me to better pinpoint key information that should be considered, especially in terms of control variables, such as knowledge and risk perceptions, to include in testing alternative models.

Empirical Phase: Testing the Models Using Panel Survey Data

The dynamics between hope, perceptions of control, and compliance and satisfaction with recommended medical regimen have not been empirically tested in past research. Thus, the intent of this dissertation is to empirically test the proposed alternative models using cross-sectional panel survey data. Using well-established scales that have been tested for validity and reliability, empirical data collection allowed for testing the proposed hypotheses and to establish links between model constructs, in an attempt to develop a model for treatment adherence and treatment satisfaction which incorporates hope and perceptions of control.

Rather than initially trying to fit the models across diseases as divergent as diabetes and HIV, data was gathered within one health domain: Diabetes Type II, to avoid confounding effects. The specific choice of Diabetes Type II was based on the premise that Diabetes Type II is a lifestyle changing chronic condition, which allows patients to

exert control over the disease via daily regimen of insulin, blood glucose monitoring, diet, and exercise (Band and Weisz 1990). Also, in 2007, it has been estimated that 23.6 million Americans (7.6% of the population) have Diabetes (American Diabetes Association). Access to survey respondents was provided through Zoomerang, part of Market Tools Inc., a market research company specializing in web-based surveys. Zoomerang compiles and rigorously manages several panels since 1999; some of these panels are specialized for people with specific medical ailments. The research agency was provided with a fee for every completed survey. The panels are validated national panels with members from all states, they are well-managed and the company uses data validity technology that allows for elimination of duplicate or fraudulent respondents. Also, to insure adequate response rates, Zoomerang employs an incentive system based on Zoom points, which panel members earn for completing surveys.

After pre-testing the survey, it was programmed online and a request to complete it was sent to panel members through Zoomerang. Data was collected from 222 panel participants recruited from the Diabetes panel (Types I and II), during the week of February 15, 2010. Screening questions were used to filter out participants who did not meet the required criteria for inclusion in the sample: Participation was restricted to adults between the ages of 18 and 65, who have been diagnosed Diabetes Type II, and who have medical coverage of some kind. Children under 18 years of age were not considered because they pose data collection challenges and they are very unlikely to have Diabetes Type II; while older adults aged 65 and above were not considered because they are more likely to have health complications that are due to old age rather than non-

compliance. The sample was limited to those who have some medical coverage to control for the effects of negative emotions and stress due to absence of coverage, as these might mask or be confused with negative emotions, loss of hope or stress that are due to the chronic illness itself. There were no restrictions imposed on the subjects' gender, ethnic, and economic backgrounds. A diverse sample in terms of demographic characteristics increases the external validity of the study. The next two sections outline the statistical methodology and the measurement instrument used.

Statistical Methodology

The statistical methodology intended to test three alternative models representing three competing theories about the relationship between perceptions of control and hope:

- *Model 1 - Perceptions of Control Literature Theory:* Using past literature about perceptions of control (Walker 2001; Henry 2004), the first model posits that all the dimensions of locus of control and self-efficacy have an effect on compliance and satisfaction with medical treatment, and that this relationship is mediated – at least partially – by hope. In other words, hope acts as a mediator or partial mediator of the relationship between perceptions of control and compliance or satisfaction with medical treatments.
- *Model 2 – Roseman's Appraisal Theory of Emotions:* Roseman (1984) suggests that hope is elicited when an event or outcome is appraised as caused by impersonal circumstances. This is the basis for the second model where hope acts as a mediator or partial mediator only between chance health locus of control

CHLC (the belief that one's health is "owing to chance or fate") and compliance or satisfaction with medical treatment.

- ❑ *Model 3 – Attribution and Other Appraisal Theories:* Weiner's (1985) attribution theory posits that the dimensions of locus and controllability are irrelevant to the emotion of hope. Many appraisal theorists (Lazarus 1999; Johnson and Stewart 2004) agree that the dimension of agency is irrelevant to hope. This third model proposes that there is no relationship between perceptions of control and hope. Perceptions of control and hope independently have direct effects on compliance and satisfaction with the medical treatment, without the presence of mediation.

Not only do I have competing models to test, but I have used the perceptions of control literature to propose hypotheses, which in some instances are competing hypotheses about the relationship between various pairs of constructs. Nevertheless, this approach of multiple alternative models and competing hypotheses can increase "scientific effectiveness" and decrease "emotional attachment to one hypothesis" (Platt 1992).

The following statistical analyses were conducted, with results reported in chapter 5:

- ❑ *Exploratory and Confirmatory Factor Analyses (EFA and CFA):* In addition to internal consistency (Cronbach's alpha) measures, EFA and CFA were used to check the psychometric properties of the measurement scales used (Hausman 2004).
- ❑ *Multiple Regression Analyses:*
 - Linear Multiple Regression was used, first, to test individual hypotheses about the effects of perceptions of control in its different dimensions

(internal health locus of control IHLC, powerful others health locus of control for doctors and other people PHLC, chance health locus of control CHLC, and self-efficacy) on compliance with treatment regimen, treatment satisfaction, and hope.

- Hierarchical Multiple Regression was then used to test the same models, with hope as an independent variable added at the second step of the regression analysis. This approach was used to test hypotheses about the effect of hope on compliance and on treatment satisfaction, after controlling for the effects of perceptions of control.
- Multiple Linear Regression analyses were conducted to test hypotheses about the significance of interaction effects. Specifically, it was expected that internal health locus of control (IHLC) and self-efficacy interact to predict health behavior and treatment satisfaction.
- Following Baron and Kenny's (1986) causal steps for mediation analysis, Multiple Linear Regression analyses were used to test the role of hope as a mediator between perceptions of control dimensions and the dependent variables: compliance and satisfaction.
- When a significant interaction effect between IHLC and self-efficacy was found, Muller, Judd, and Yzerbyt (2005) strategies were followed to test for mediated moderation. These steps are based on Baron and Kenny's (1986) causal steps for mediation but extended to enable checking for the presence of mediated moderation.

- *Structural Equation Modeling*: The primary method of analysis was Path Analysis using AMOS 18.0, to test and compare the fit of alternative models.
 - Although Baron and Kenny's (1986) causal regression steps have been widely used to test for mediation, structural equation modeling (SEM) is a superior alternative, even when using single item measures. Not only because SEM may be used in any scenario, but also SEM has the advantage of reduced standard errors because it estimates all the coefficients simultaneously rather than in a piecemeal approach of fitting three separate models as in the regression analysis (Iacobucci 2008). SEM allows one variable to be independent and dependent at the same time; the results from SEM are more powerful than the regression results because the later ignores intercorrelations among variables. Finally, SEM gives fit indices and allows for model comparison (Kline 2005). Fit statistics such as the Normed Fit Index (NFI), the Comparative Fit Index (CFI), and the Root Mean Square Error of Approximation (RMSEA) can support the convergent validity of the entire model and the individual constructs (Hausman 2004).
 - When testing alternative models in SEM, a Model Development Approach was used. This approach is both confirmatory and exploratory: the researcher tests a specific model and then modifies that model based on changes suggested by SEM modification indexes and the significance of different estimates. This approach's main limitation

is that it allows for the development of models in a post-hoc manner, and therefore the resulting models might not be stable and might lack the ability to fit new data. However, this has been the most common approach used in the literature (Kline 2005).

Measurement Instrument

A web-based survey sent to an online panel was deemed as the most appropriate measurement instrument, because of the nature of the study, the amount of information required, and the number of Diabetes Type II cases needed. The web-based survey consisted of 73 questions asking participants to report the following information:

- ❑ *Demographics and Psychographics:* Age, gender, marital status, education, ethnicity, income, having children, and religious affiliation
- ❑ *Medically Related Questions:* Chronic conditions other than Diabetes Type II, year of diagnosis with Diabetes Type II, type of medical coverage, main medical care provider, main medical provider location type, belonging to a Diabetes Type II support group
- ❑ *Other Relevant Control Variables:* Perceptions of knowledge about Diabetes Type II, co-production of medical treatment, life satisfaction, risk perceptions (perceived severity of and vulnerability to potential complications), perceptions about the number of treatment options available, and likelihood to participate in clinical trials

- *Model Variables:* Hope, perceptions of control, compliance, and satisfaction with current medical treatment

Well-established scales that have been tested for validity and reliability were used for all model variables and most control variables. The survey was pre-tested using a sample of 53 respondents from the same Diabetes panel. The time elapsed between launching the web-based survey and achieving the pre-test target of 50 completed surveys was 2 days (12/14/2009 to 12/16/2009). A descriptive analysis of the results and scale reliability tests indicated that there was no need to make any changes to the survey, except for one question about potential future complications that might occur to the respondents if they do not follow Diabetes Type II treatment recommendations. Originally, the question asked respondents to list three complications, but that led to respondent confusion with follow-up questions about the severity of and vulnerability to each complication. The question was then modified to ask about one unique complication at a time, up to three complications in total. The following sections provide details about measurement scales used in the development of the survey. The final measurement instrument (survey) is provided in **Appendix B**.

Dependent Variables

Compliance with the Medical Regimen

Measuring compliance is not easy. Direct methods like blood tests are not only hard to obtain but also irrelevant because they measure outcomes rather than the process of compliance. Therefore, indirect measures, mainly self-report compliance data have been the most frequently used in research. According to the U.S. Department of Veterans

Affairs, the three most commonly used compliance and adherence scales include: The Morisky Scale (4 dichotomous yes/no items) which has been used extensively for different medical conditions, the AACTG (Adult AIDS Clinical Trials Group) scale which is specific to adherence with antiretroviral therapy, and the General Adherence Scale (GAS) designed as a part of the Medical Outcomes Study (Hays 1994) to assess patients' tendency to adhere with a prescribed medical treatment. Although each scale has advantages in some settings, the General Adherence Scale (GAS) was selected for this study because it has been used for many chronic conditions such as Diabetes, Hypertension and Heart Disease. The General Adherence Scale (GAS) has two measures:

- ❑ *GAS – Generic Measure*: The first scale is a generic measure of adherence that has 5-items measured on a 6-point scale
- ❑ *GAS – Specific Measure*: The second scale works for Diabetes, Hypertension and Heart Disease and includes 15-items. Each item is a common recommendation received by patients with Diabetes, Hypertension, and/or Heart Disease. The scale asks participants to select the items that match medical recommendations they have received to manage their chronic illness, and then for each of these items, it asks participants to rate the frequency of performing the behavior on a 6-point scale similar to that of the GAS – Generic Measure

These two measures have received significant validity, internal and general reliability after being tested using Cronbach's alpha coefficients and repeated subject measurements overtime. One problem with these two measures is that past research has found a very weak correlation between them, which means that the specific measure has elements different from those of the generic measure (Hays 1994). Since the generic measure of

the GAS scale is more subject to bias (Hays 1994), I used the GAS-Specific Measure to measure compliance with the medical regimen but kept only 13 items after removing 2 items that are irrelevant to Diabetes: “Used relaxation techniques” and “took part in a cardiac rehabilitation program”.

Satisfaction with the Medical Regimen

To measure satisfaction with the medical regimen, I used the Human Immunodeficiency Virus Treatment Satisfaction Questionnaire – status version (HIVTSQs) developed by Woodcock and Bradley (2006), and modified it to apply to Diabetes Type II. The HIVTSQs is based on the Diabetes Treatment Satisfaction Questionnaire (DTSQs), which has been widely used and validated. Treatment Satisfaction Questionnaires (TSQs) were developed for several diseases including renal disease, genital herpes, diabetic retinopathy, and hyperthyroidism. The series of TSQs have shown high validity and reliability. The HIVTSQs measures total treatment satisfaction and has two subscales: the general satisfaction/ clinical subscale (5 items) and the lifestyle/ ease satisfaction subscale (5 items). The 10-items are measured on 7-point Likert-type scales indicating the level of satisfaction with, convenience of, flexibility of... for different items. The scale and both subscales have been shown to have excellent internal reliability and validity. Following Woodcock and Bradley’s (2006) recommendation, the wording of item 7 “understanding the disease” was changed to focus on “understanding the treatment”. The lifestyle / ease satisfaction subscale is of high importance for patients with chronic diseases, who have to change their lifestyle for a long period of time to be able to manage the disease.

I selected this scale because it is a valid and reliable scale that has been widely used in the measurement of treatment satisfaction and because the existence of different versions for various diseases shows that these TSQs scales are flexible and can be modified for each chronic condition. An additional advantage of this scale is that it incorporates two behavioral intentions measures (likelihood to recommend the treatment, and decision to continue the treatment in the future). I used the HIV Treatment Satisfaction Questionnaire, modified to apply to Diabetes Type II, instead of using the Diabetes Treatment Satisfaction Questionnaire (DTSQs) because it was more recently developed and because the DTSQs was not accessible through library resources.

Independent and Control Variables

Hope

To measure hope, I used the Herth Hope Index (HHI) developed by Herth (1989). The HHI has 12 items measured on a 4-point Likert scale. It is based on the Herth Hope Scale (HHS) which has 30 items and which has been widely used in studies of hope in acute, chronic, and terminally ill patients. The HHI was specifically designed for clinical use because of its more appropriate length (Farran, Herth, and Popovich 1995). The HHI captures the multidimensionality of hope and reflects each unique dimension clearly in clinical populations. The HHI scale has three 4-items factors: Inner sense of temporality and future, inner positive readiness and expectancy, and interconnectedness with self and others (Herth 1992). When testing this instrument, Herth (1992) has found no significant

differences in hope levels for gender, education level, race, age, or phase of illness (acute, chronic, terminal). However, marital status (married individuals have higher levels of hope), diagnosis (people with more dangerous illnesses have lower levels of hope), length of illness (negatively affects hope), income status (positively affects hope), and fatigue (negatively affects hope) have been found to affect hope significantly.

Although hope as measured by the Herth Hope Index, has been found to represent an individual's state or emotion, some have argued that it represents a personality trait (Morrin 2010, personal correspondence). Therefore, I also measured hope by adapting Nenkov, MacInnis, and Morrin's (2008) scale in the context of Diabetes Type II patients. The scale measures hope on 3, 7-point Likert scale items representing importance of health improvement, desire for health improvement, and pleasure resulting from health improvement. Nenkov, MacInnis, and Morrin (2008) have developed this scale to measure hope defined as the "yearning for a good outcome that seems possible even if it might not be likely." This allowed for testing the reliability of the developed models using a different measure of hope.

Perceptions of Control

Locus of control and self-efficacy are the two key constructs that have dominated the literature as measures of perceived control. They were both used to conceptualize perceptions of control for this study.

Locus of Control. Health locus of control was measured using the Multidimensional Health Locus of Control Scale – Form C (MHLC – Form C). The

MHLC scales have been used in hundreds of studies and the reliability results were moderate with a Cronbach Alpha between 0.6 and 0.7. These scales have established validity and reliability. Form C of the MHLC scales was designed to flexibly assess patients' locus of control beliefs regarding an existing medical condition – it taps into the beliefs about control over one's illness. Form C has three subscales: Internal Health Locus of Control (IHLC), Powerful Others Health Locus of Control (PHLC), and Chance Health Locus of Control (CHLC). Each subscale is measured using six items for a total of 18 items. The PHLC subscales can be divided further into two 3-items subscales for: Doctors and Other People. This feature is unique to Form C. It is important to note that the MHLC scale measures perceptions of control over health outcomes, and is less stable and less reflective of personality than is the more generalized locus of control orientation, which reflects a personality trait. Therefore the MHLC scale represents perceptions of control that can be altered by individual health experiences (Wallston 2005b).

Self-Efficacy. To measure self-efficacy, I used the Perceived Diabetes Self-Management Scale (PDSMS) developed and tested by Wallston, Rothman, and Cherrington (2007). The PDSMS is based on the Perceived Medical Condition Self-Management Scale (PMCSMS), modified for Diabetes. PDSMS is a valid measure of Diabetes self-efficacy and can easily be altered for other chronic conditions. It is designed to have a uniform measure for self-efficacy that is disease specific. It is a unidimensional scale with eight items measured on a 5-point Likert scale (Wallston, Rothman, and Cherrington 2007). Self-efficacy represents perceptions of control over one's actions or health behaviors rather than control over health outcomes.

Control Variables

Co-Production. Co-production was measured using a 4-items scale adopted from Auh et al. (2007) who have measured co-production in the context of the physician-patient relationship. This scale is unidimensional and each item is measured on a 7-point Likert scale, where respondents are asked to indicate their level of agreement with the following 4 statements: “I try to work cooperatively with my care provider”, “I do things to make my care provider’s job easier”, “I prepare my questions before going to an appointment with my care provider”, and “I openly discuss my needs with my care provider to help him/her deliver the best possible treatment”.

Knowledge. To measure perceptions of knowledge about Diabetes Type II, its progression and its treatment, I developed a 3-items 5-point Likert scale. The scale asked respondents to indicate their levels of agreement with statements about their perceived knowledge, compared to other Diabetics, of Diabetes Type II, the treatment regimen they should follow, and the future progression of their Diabetes Type II.

Life Satisfaction. General life satisfaction was measured using an 8-items scale. The scale asked respondents to indicate their level of satisfaction – on a 5-point Likert-type scale (Very Dissatisfied to Very Satisfied) – with the following different aspects or domains of their lives: “ability to perform day-to-day activities”, “physical appearance”, “relationship with your family”, “relationship with your friends”,

“relationship with your partner”, “job”, “financial situation”, and “current health state”. A “not applicable” option was provided for each aspect.

Risk Perceptions. To measure risk perceptions, I followed the conceptualization used by the Health Belief Model (Glanz, Rimer, and Viswanath 2008), where risk perceptions are defined as the perceived severity of and susceptibility to the disease. However, I modified this measure to better fit the context of this study by asking respondents to indicate a complication that could occur to them if they do not closely follow treatment recommendations and guidelines. Respondents were then asked to indicate the severity of this complication on a 7-point itemized rating scale (Not at all Severe to Extremely Severe), and their vulnerability to the complication using a similar scale (Not at all Vulnerable to Extremely Vulnerable). The product term of these two items was used as a single item measure of risk perceptions.

CHAPTER 5

DATA ANALYSIS AND RESULTS¹

Description of Sample

Subjects are 222 adults diagnosed with Diabetes Type II, recruited from a national online Diabetes panel maintained by Zoomerang, a market research agency. Table 5.1 summarizes the breakdown of respondents according to main demographic characteristics:

Table 5.1. Demographic Profile of Sample Respondents

	Gender		Age Groups					Ethnicity		
	<i>Female</i>	<i>Male</i>	<i>18-25</i>	<i>26-35</i>	<i>36-45</i>	<i>46-55</i>	<i>56-65</i>	<i>Caucasian</i>	<i>African American</i>	<i>Other</i>
Percentage	45%	55%	0%	1.8%	8.1%	20.7%	69.4%	88.7%	7.7%	3.6%

As one can see from Table 5.1, 90.1% of the respondents are between the ages of 45 and 65, most of them (69.4% of the sample) in the older age bracket of 56 to 65. Only 9.9% of the respondents are between 26 and 45 years old. Although the age structure of the sample does not mirror that of the United States population, it is not alarming that the sample consists mostly of adults between the ages of 46 and 65 because the likelihood of being diagnosed with Diabetes Type II increases with age. In fact, of all individuals aged 20 years or older, 10.7% have Diabetes, while among people above 60, the rate of

¹ Additional data analyses and results that were not reported in this chapter can be found in **Appendix C**

patients living with Diabetes more than doubles to 23.1% (American Diabetes Association, 2007 Estimates). The sample is far from being representative of the United States population in terms of ethnicity distribution. 88.7% of all respondents are Caucasian and 7.7% are African American. The Hispanic population is not represented, which is a major drawback, considering that 10.4% of Hispanics aged 20 or older have Diabetes (American Diabetes Association, 2007 Estimates). Only 3 respondents (1.4% of the sample) have an education level of less than high school, 53.6% have only a high school degree or some college, while the rest, 45% of the sample, have at least an associate college degree. Of those 45%, more than half have at least a 4-year college degree. The distribution of income in the sample is such that all the income levels are represented. While about 25% of respondents have an income below \$30,000, 53% have an income level between \$30,000 and \$70,000, and 22% have an income level above \$70,000. Figures 5.1 and 5.2 portray the distribution of sample respondents in terms of education and income respectively.

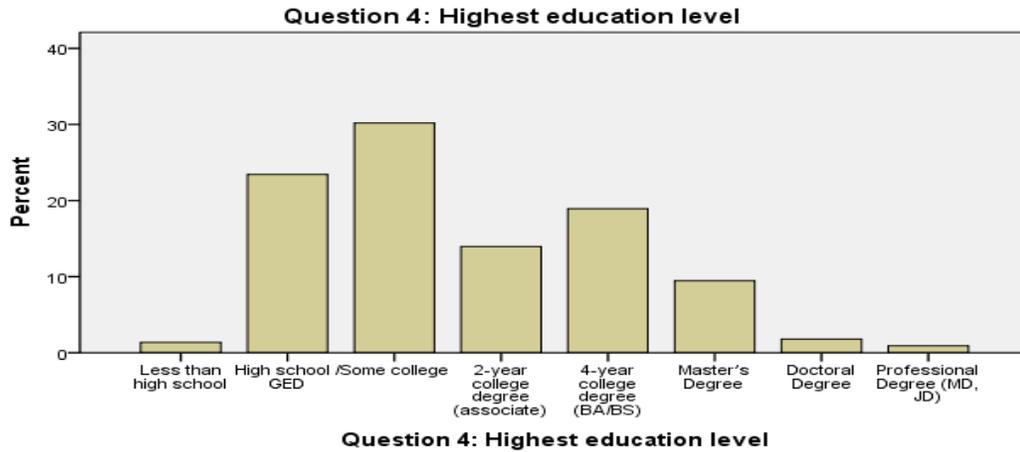


Figure 5.1. Education Level for Sample Respondents

About 78% of the sample respondents have children, and among those about 17% have children less than 18 years of age. As for religions, 93.2% of respondents reported that they have a religious affiliation to one of the following religions: Christian, Jewish, Muslim, and Buddhist; the majority of respondents (79.7% of the sample) are Christian (Protestant, Catholic, or Evangelical). Only 15 respondents (6.8%) reported that they are Atheist or Agnostic.

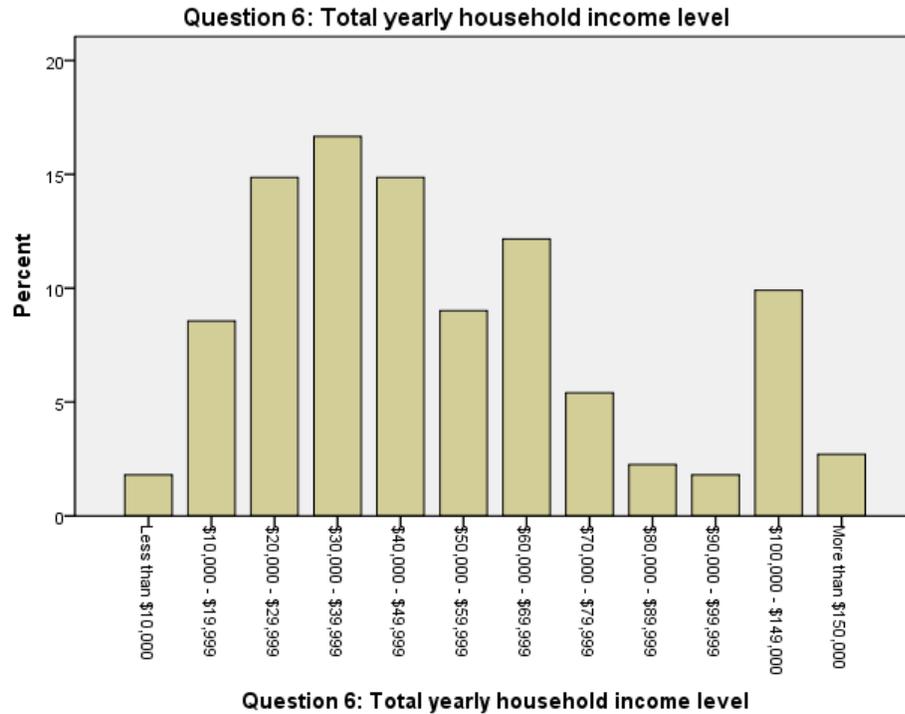


Figure 5.2. Income Level for Sample Respondents

In terms of medical or health related characteristics, the duration of Diabetes Type II – time elapsed between the year of diagnosis and the data collection time – ranges between one and 46 year(s). The average duration of the illness for all sample respondents is 11.23 years with about 59.5% of the sample at 10 years or less, and 40.5% of the sample at 11 years or more. The majority of respondents (80.6%) have a primary physician as their main care provider, while 15.8% of sample respondents go to a specialist for Diabetes Type II care. The remaining 3.6% depend on nurse practitioners to provide them with their care needs. The most frequented Diabetes care location is physicians’ private practices (76.6%), followed by primary care centers (14%). The remaining 9.5% of

respondents use community clinics or hospitals as their main Diabetes care location. It was interesting to observe that more than half of the sample respondents (58.6%) were at some point diagnosed with at least one chronic condition other than Diabetes Type II. This, however, is not surprising given that 69.4% of subjects are in the 56 to 65 age group. Among those diagnosed with other chronic ailments, 58.5% have only one other chronic ailment, 24.4% have 2 other chronic ailments, and the rest have between 3 and 7 other ailments. Only 10 respondents (4.5% of the sample) reported belonging to a health-related support group.

Psychometric Properties of Measurement Scales²

All model variables were measured using well-established scales. This constitutes support for their *content validity*. This section provides Reliability/*Internal Consistency* measures (using Cronbach's alpha) and *construct validity* tests (using Exploratory and Confirmatory Factor Analyses) for the scales used in this study, including the main dependent and independent variables: Hope (Herth Hope Index), locus of control (Multidimensional Health Locus of Control – Form C), self-efficacy (Perceived Diabetes Self-Management Scale), compliance (General Adherence Scale), and satisfaction (Treatment Satisfaction Questionnaire). Reliability coefficient alpha scores for some control variables including co-production, knowledge, and life satisfaction are also presented. For the Specific Measure of the General Adherence Scale (GAS), only internal consistency was measured. The nature of the General Adherence Scale – Specific Measure does not allow for conducting valid exploratory and confirmatory factor

² Note that all measurement scales are conventional reflective measures

analyses because the scale items selected are different for each respondent; they depend on specific recommendations made by each individual's care provider.

Internal Consistency of Measurement Scales

The internal consistency reliability measure of a scale is established through the alpha coefficient (Cronbach's alpha) score, which should be at least .6 and preferably .7 or higher. Table 5.2 provides internal consistency measures found in this study and compares them to previous measures in the literature. Cronbach's alpha scores for all scales exceed the minimum required standard. This indicates good internal consistency levels for all scales.

Table 5.2. Internal Consistency of Measurement Scales³

	# of Items	Cronbach's Alpha	Previous Research	Source
Hope (HHI)	12	0.898	0.75-0.95 0.96 for Chronic Illness	Herth 1991 Herth 1992
Temporality and Future	4	0.726		
Readiness and Expectancy	4	0.793		
Interconnectedness	4	0.693		
Locus of Control (MHLC From C)	18		0.60-0.75	Wallston 2005
Internal Health Locus of Control	6	0.871		
Chance Health Locus of Control	6	0.623		
Powerful Others Health Locus of Control	6	0.877		
Self-Efficacy (PDSMS)	8	0.891	0.83	Wallston, Rothman, and Cherrington 2007
Adherence (GAS)				Hays 1994
Generic Measure	5	0.819	0.81	
Specific Measure	13	0.802	> Minimum Standards	
Satisfaction (TSQ)	10	0.946	0.89-0.91	Woodcock and Bradley 2006
Hope 2	3	0.865		Nenkov, McInnis, and Morrin 2008
Coproduction Knowledge	4	0.873	0.76	Auh et al. 2007
Life Satisfaction	3	0.902		
	8	0.868		

³ HHI = Herth Hope Index; MHLC = Multidimensional Health Locus of Control Scale; PDSMS = Perceived Diabetes Self-Management Scale; GAS = General Adherence Scale; TSQ = Treatment Satisfaction Questionnaire

Construct Validity of Measurement Scales

Exploratory Factor Analysis (EFA) can check for construct validity by testing whether items of a multidimensional scale fall into the different factors in a way consistent with the scale's design. For hope, locus of control, self-efficacy, and treatment satisfaction, Exploratory Factor Analyses were performed using Principal Component Analysis as the extraction method and Varimax⁴ rotation. Factor loadings of 0.7 or higher were considered adequate. For each scale, Confirmatory Factor Analysis (CFA) was then used as an additional test of construct validity, where items with a loading (standardized regression weight) below 0.5 were considered for deletion (Hair et al. 2009). Model fit was assessed using the following indices: Goodness of Fit Index (GFI of .90 or above is indicative of good fit), Comparative Fit Index (CFI of .90 or above provides evidence of scale unidimensionality), and Root Mean Square Error of Approximation (RMSEA below .05 indicates good overall fit for the measurement model, RMSEA between .05 and .08 represents adequate fit, and RMSEA above .08 shows mediocre fit). The Chi-square statistic was reported; however its p-value was not considered when assessing model fit because it is sensitive to sample size (Kline 2005).

Hope: Herth Hope Index (HHI)

Exploratory factor analysis performed on the 12 items constituting the Herth Hope Index indicated that, except for the two reverse scale items (3 and 6), all items load onto one

⁴ Varimax rotation considers the factors to be independent, while Promax rotation allows for some correlation between factors

factor. This might be due to the sensitive nature of these items “I feel all alone” and “I feel scared about my future”; it also might be due to the fact that these scales are reversed. It is important to note that, even with a Promax rotation which allows for components to be highly correlated, the three proposed dimensions of the HHI (inner sense of temporality and future, inner positive readiness and expectancy, and interconnectedness with self and others) were not identified as separate factors. This might indicate that the Herth Hope Index is a unidimensional measure of hope rather than a multidimensional measure. Herth (1991) posits that these three dimensions are highly related, and the scoring process she proposes for this scale is consistent with and appropriate for unidimensional scales. The coefficient alpha for the HHI is 0.898, which is higher than that of its three dimensions or subscales. The results of Confirmatory Factor Analysis in Table 5.3 show that, except for the two reverse scale items (3 and 6), the standardized regression estimates (factor loadings) for all the items were above 0.5.

These results are consistent with the exploratory factor analysis findings and they indicate the need for deleting the two reverse scale items: “I feel all alone” and “I feel scared about my future”. The new CFA model with only 10 indicators for the hope factor had good fit indices (Chi-square = 79.58; GFI = .935; CFI = .963; RMSEA = .076) with all the factor loadings being above 0.5. The Herth Hope Index has higher construct validity without the two reverse scale items. Hope level was then computed by adding respondents’ scores on all 10 items. The new hope scale had values ranging between 10 and 40 instead of 12 and 48.

Table 5.3. Herth Hope Index – CFA Results

Herth Hope Index HHI: 12 Items	Standardized Regression Weights on Hope Factor
1.I have a positive outlook toward life	.781
2.I have short and/or long range goals	.617
3.I feel all alone (Reverse)	.435
4.I can see possibilities in the midst of difficulties	.687
5.I have a faith that gives me comfort	.564
6.I feel scared about my future (Reverse)	.369
7.I can recall happy joyful times	.533
8.I have deep inner strength	.741
9.I am able to give and receive caring love	.746
10.I have a sense of direction	.772
11.I believe that each day has potential	.880
12.I feel my life has value and worth	.840

Locus of Control: Multidimensional Health Locus of Control (MHLC – Form C)

An Exploratory Factor Analysis was performed on all 18 items of the Multidimensional Health Locus of Control scale (MHLC – Form C), with Principal Components extraction and Varimax rotation. The results showed a clear extraction into 4 components: Internal Health Locus of Control (IHLC), Chance Health Locus of Control (CHLC), Powerful Others Health Locus of Control - Others (PHLCO), and Powerful Other Health Locus of Control - Doctors (PHLCD). Table 5.4 shows that all the items had loadings of approximately 0.7 or higher on their respective factors.

Table 5.4. Multidimensional Health Locus of Control (Form C) – EFA Results

Multidimensional Health Locus of Control MHLC – Form C: 18 Items	Components ⁵			
	<i>IHLC</i>	<i>CHLC</i>	<i>PHLCO</i>	<i>PHLCD</i>
IHLC If my Diabetes worsens, it is my own behavior which determines how soon I will feel better again.	.761	-.116	.042	.108
IHLC I am directly responsible for my Diabetes getting better or worse.	.752	-.141	.038	.313
IHLC Whatever goes wrong with my Diabetes is my own fault.	.825	.103	-.091	-.100
IHLC The main thing which affects my Diabetes is what I myself do.	.701	-.246	.002	.276
IHLC I deserve the credit when my Diabetes improves and the blame when it gets worse.	.776	-.057	-.133	.080
IHLC If my Diabetes takes a turn for the worse, it is because I have not been taking proper care of myself.	.809	-.167	.049	-.001
CHLC Luck plays a big part in determining how my Diabetes improves.	-.076	.826	.205	-.079
CHLC Whatever improvement occurs with my Diabetes is largely a matter of good fortune.	-.122	.804	.225	-.079
CHLC As to my Diabetes, what will be will be.	.035	.647	.239	-.247
CHLC Most things that affect my Diabetes happen to me by chance.	-.092	.732	.106	.050
CHLC If my Diabetes worsens, it's a matter of fate.	-.260	.784	.252	-.031
CHLC If I am lucky, my Diabetes will get better.	-.101	.767	.031	.110
PHLC The type of help I receive from other people determines how soon my Diabetes improves.	.030	.224	.790	.104
PHLC In order for my Diabetes to improve, it is up to other people to see that the right things happen.	-.096	.310	.781	-.084
PHLC Other people play a big role in whether my Diabetes improves, stays the same, or gets worse.	-.001	.192	.798	.069
PHLC If I see my doctor regularly, I am less likely to have problems with my Diabetes.	.154	.036	.005	.791
PHLC Whenever my Diabetes worsens, I should consult a medically trained professional.	-.012	.004	.074	.811
PHLC Following doctor's orders to the letter is the best way to keep my Diabetes from getting any worse.	.388	-.194	.009	.654

⁵ IHLC = Internal Health Locus of Control; CHLC = Chance Health Locus of Control; PHLCO = Powerful Others Health Locus of Control – Others; PHLCD = Powerful Others Health Locus of Control – Doctors

A Confirmatory Factor Analysis was performed on the 4-factor MHLC - Form C model with Powerful Others Health Locus of Control (PHLC) divided into its two subscales: Doctors and Others. Although the model fit measures were less than adequate (GFI = .833 < 0.9; CFI = .842 < 0.9; RMSEA = .098 > 0.08), all the items had significant regression weights and all the factor loadings were above 0.5, as shown in Table 5.5. Given these results, MHLC – Form C was used as is to represent locus of control. The items for each subscale were added to form four locus of control dimensions, where IHLC and CHLC values ranged from 6 to 36 (6 items each), and PHLC Others and PHLC Doctors had values between 3 and 18 (3 items each).

Self-Efficacy: Perceived Diabetes Self-Management Scale (PDSMS)

An Exploratory Factor Analysis performed on the 8 items of the Perceived Diabetes Self-Management Scale (PDSMS) resulted in a clear loading of items into two factors, with all factor loadings above 0.7. The first factor consisted of 4 non-reverse scale items and the other factor consisted of the remaining 4 reverse-scale items (1, 2, 6, and 7). This result might be due to the nature of reverse-scale items. PDSMS was developed as a unidimensional measurement scale; therefore a Confirmatory Factor Analysis was conducted to test the fit of a one factor model with all 8 indicators. The model fit was mediocre (GFI = .719; CFI = .795; RMSEA = .235) and the standardized regression weights or factor loadings for two of the four reverse-scale items (1 and 2) were below 0.5 as shown in Table 5.6.

Table 5.5. Multidimensional Health Locus of Control (Form C) – CFA Results

Multidimensional Health Locus of Control MHLC – Form C: 18 Items	Factors	Standardized Regression Weights
IHLC If my Diabetes worsens, it is my own behavior which determines how soon I will feel better again.	Internal Health Locus of Control (IHLC)	.719
IHLC I am directly responsible for my Diabetes getting better or worse.		.794
IHLC Whatever goes wrong with my Diabetes is my own fault.		.692
IHLC The main thing which affects my Diabetes is what I myself do.		.745
IHLC I deserve the credit when my Diabetes improves and the blame when it gets worse.		.724
IHLC If my Diabetes takes a turn for the worse, it is because I have not been taking proper care of myself.		.755
PHLC If I see my doctor regularly, I am less likely to have problems with my Diabetes.	Powerful Others Health Locus of Control – Doctors (PHLC Doctors)	.561
PHLC Whenever my Diabetes worsens, I should consult a medically trained professional.		.531
PHLC Following doctor's orders to the letter is the best way to keep my Diabetes from getting any worse.		.848
PHLC The type of help I receive from other people determines how soon my Diabetes improves.	Powerful Others Health Locus of Control – Others (PHLCOthers)	.695
PHLC In order for my Diabetes to improve, it is up to other people to see that the right things happen.		.814
PHLC Other people play a big role in whether my Diabetes improves, stays the same, or gets worse.		.682
CHLC Luck plays a big part in determining how my Diabetes improves.	Chance Health Locus of Control (CHLC)	.618
CHLC Whatever improvement occurs with my Diabetes is largely a matter of good fortune.		.658
CHLC As to my Diabetes, what will be will be.		.833
CHLC Most things that affect my Diabetes happen to me by chance.		.830
CHLC If my Diabetes worsens, it's a matter of fate.		.831
CHLC If I am lucky, my Diabetes will get better.		.680

Table 5.6. Perceived Diabetes Self-Management Scale (PDSMS) – CFA Results

Perceived Diabetes Self-Management Scale PDSMS: 8 Items	Standardized Regression Weights on Self-Efficacy Factor
1.It is difficult for me to find effective solutions for problems (Reverse)	.473
2.I find efforts to change things I don't like about my Diabetes are ineffective (Reverse)	.379
3.I handle myself well with respect to my Diabetes	.842
4.I am able to manage things related to my Diabetes as well as most	.859
5.I succeed in the projects I undertake to manage my Diabetes	.902
6.Typically my plans for managing my Diabetes don't work out well (Reverse)	.685
7.No matter how hard I try managing my Diabetes doesn't turn out the way I want (Reverse)	.569
8.I'm generally able to accomplish my goals with respect to managing my Diabetes	.866

These results led to the deletion of the first two reverse-scale items of the PDSMS: “It is difficult for me to find effective solutions for problems that occur with managing my diabetes” and “I find efforts to change things I don't like about my Diabetes are ineffective”, with respective standardized regression weights of .473 and .379. The elimination of these two items resulted in a one factor model with 6 indicators. Despite having weak fit indices (GFI = .819; CFI = .862; and RMSEA = 0.265), the new model had significant standardized regression weights above 0.5 for all indicators. A measure of self-efficacy was computed by adding respondents' scores on the remaining 6 items of

the PDSMS scale; the values for this self-efficacy measure ranged between 6 and 30, compared to values between 8 and 40 for the original scale.

Adherence: General Adherence Scale (GAS - Generic and Specific Measures)

Although the Generic Measure of the General Adherence Scale (GAS) was not used in the Structural Equation Models because it has shown more biased results than the Specific Measure of GAS in past research (Hays 1994), it was deemed important to report psychometric properties for this scale because EFA and CFA could not be conducted for the Specific Measure of the General Adherence Scale. An exploratory factor analysis for the 5 items of the GAS- Generic Measure showed that all the items load onto one factor with loadings above 0.7, except for one of the reverse-scale items: “I was unable to do what was necessary to follow my doctor’s treatment plan”, which had a factor loading of 0.53. A confirmatory factor analysis reinforced these findings when the standardized regression weight for the same reverse item 3 was found to be .381, which is less than 0.5. The CFA results are depicted in Table 5.7.

Despite adequate fit indices for the one factor model with all five indicators (GFI = .954, CFI = .952, and RMSEA = .142), I decided to delete the 3rd item of the GAS – Generic Measure. The new model for a generic measure of compliance with 4 items had perfect fit indices (GFI = .999; CFI = 1.000; RMSEA = .000). Following the scoring instructions proposed by Hays (1994), a generic measure of compliance was computed by averaging the scores on the 4 items and then transforming them linearly to 0-100 scale $[(X-1)*20]$; because each item is scored on a scale of 1 to 6].

Table 5.7. General Adherence Scale (GAS – Generic Measure) – CFA Results

General Adherence Scale GAS – Generic Measure: 5 Items	Standardized Regression Weights on GAS Factor
1.I had a hard time doing what the doctor suggested I do (Reverse)	.654
2.I followed my doctor’s suggestions exactly	.716
3.I was unable to do what was necessary to follow my doctor’s treatment (Reverse)	.381
4.I found it easy to do the things my doctor suggested I do	.841
5.Generally speaking how often during the past 4 weeks were you able to do what the doctor told you to do?	.891

The compliance measure I used in the data analysis is based on the General Adherence Scale – Specific Measure. It was computed according to Hays’ (1994) scoring instructions by averaging the adherence frequency scores for the items selected and then transforming the scores linearly to 0-100 scale using the formula $[(X-1)*20]$. To obtain the specific measure of the General Adherence Scale, respondents were given 13 specific treatment recommendations that are usually prescribed by physicians for Diabetes patients. Respondents were asked to indicate which of these 13 items were recommended by their physician and then to indicate their level of adherence for each. When computing the measure of compliance, each item selected was matched to its respective adherence frequency. The number of recommended items varied between 2 and 13, with an average

of 8.34 and a standard deviation of 2.44. In later sections, this number will be referred to as the “Number of Adherence Items”, and will be used as a control variable.

Treatment Satisfaction: Treatment Satisfaction Questionnaire (TSQ)

Exploratory Factor Analysis for the HIV Treatment Satisfaction Questionnaire (HIVTSQ) scale modified and applied to Diabetes, resulted in one factor with all the 10 items. The factor loadings for all the items exceeded 0.7, which suggests strong construct validity. This was also supported by a Confirmatory Factor Analysis, where the standardized regression weights were significant and above 0.7 for all items, as shown in Table 5.8. Therefore, as a measure of Treatment Satisfaction, the TSQ scale developed by Woodcock and Bradley (2006) for HIV was used as is after adapting in to Diabetes Type II by replacing “HIV” with “Diabetes Type II” in the scale items. Treatment Satisfaction was computed by adding the scores on all items, which resulted in a measurement range between 0 and 60, given that each item was measured on a 7-point scale from 0 to 6.

Table 5.8. Treatment Satisfaction (TSQ) – CFA Results

Treatment Satisfaction Questionnaire TSQ: 10 Items	Standardized Regression Weights on TSQ Factor
1. How satisfied are you with your current treatment?	.811
2. How well controlled do you feel your Diabetes Type II has been over the past 4 weeks?	.780
3. How satisfied are you with any side effects of your present treatment?	.795
4. How satisfied are you with the demands made by your current treatment?	.850
5. How convenient have you been finding your treatment to be over the past 4 weeks?	.848
6. How flexible have you been finding your treatment to be over the past 4 weeks?	.708
7. How satisfied are you with your understanding of Diabetes?	.726
8. How satisfied are you with the extent to which the treatment fits in with your lifestyle?	.891
9. Would you recommend your current treatment to someone else with Diabetes?	.715
10. How satisfied would you be to continue with your present form of treatment?	.879

Final Measurement Scales

Final scales were developed by deleting items from multidimensional scales whenever indicated by confirmatory factor analysis results and the computing a score for each measure following prescribed guidelines from past studies. Before providing a summary of the properties of these final scales in Table 5.9, this section describes the computation of variables which, despite not being part of the models' dependent and independent variables, were relevant to the models as control variables or in the case of Hope2, as variables used for cross-checking of the results.

Computation of Other Relevant Variables

Hope 2. To compute the level of hope using the measure developed by Nenkov, McInnis, and Morrin (2008), I used the average of the three items measuring importance of, desire of, and pleasure from improvement in the respondents' Diabetes related health condition. The resulting hope measurement was referred to as "Hope 2" and has values ranging between 1 and 7.

Knowledge. Given the high internal consistency (coefficient alpha = 0.902) of the three items used to measure respondents' knowledge perceptions, a measure of knowledge was computed by averaging the scores on the three items, resulting in one item with values ranging between 1 and 5.

Co-Production. Similarly to Auh et al. (2007), a measure of co-production was computed by averaging the scores on all 4 items, resulting in one value between 1 and 7.

Life Satisfaction. A general measure of Life Satisfaction was computed by averaging satisfaction scores on all the items that were relevant to the respondent. There was a total of 8 items, but some items such as “relationship with partner” or “job” might not be applicable to everyone. The resulting single item measure of Life Satisfaction had values ranging between 1 and 5.

Risk Perceptions: A single item measure of risk perceptions was computed by multiplying two 7-point itemized rating scales between 1 and 7: Severity of the first potential complication mentioned by the respondent and Susceptibility or the respondent’s perceived vulnerability to that complication.

Properties of Final Measurement Scales

For the purpose of data analysis by means of regression and structural equation models, all the variables were treated as single item measures. The previous section provided support for the reliability and construct validity of the measures. Therefore, creating index scores to represent each construct (i.e. sum or mean across items) – based on prescribed computation guidelines – is appropriate. Table 5.9 summarizes the main properties of the final measures used including: the number of items (after deletion of items with inadequate factor loadings), coefficient alpha scores, the range of possible

scores, and notes from previous research. Changes from the original measurement scales are underlined.

Description of Variables

This section provides a description of the dependent and independent variables used in the models. These variables include measures of hope, locus of control, self-efficacy, and measures of compliance and satisfaction with the medical treatment. In addition, I provide a description of other important variables that might provide further insights about health behaviors of interest to this research. These variables include co-production, knowledge about Diabetes Type II, life satisfaction, risk perceptions, and reported willingness to participate in various types of clinical trials. At the end of this section, a summary table of descriptive statistics and bivariate correlations for the dependent and independent variables is presented.

Table 5.9. Final Measurement Scales and their Properties

	# of Items	Cronbach's Alpha	Range	Previous Research Cronbach's Alpha
Hope (HHI)	<u>10</u>	<u>0.912</u>	10-40	0.75-0.95 0.96: Chronic Illness
Locus of Control (MHLC From C)	18			0.60-0.75
Internal HLC	6	0.871	6-36	
Chance HLC	6	0.623	6-36	
Powerful Others HLC Doctors	<u>3</u>	<u>0.696</u>	3-18	
Powerful Others HLC Others	<u>3</u>	<u>0.774</u>	3-18	
Self-Efficacy (PDSMS)	<u>6</u>	<u>0.902</u>	6-30	0.83
Adherence (GAS)				
Generic Measure	<u>4</u>	<u>0.849</u>	0-100	0.81
Specific Measure	13	0.802	0-100	> Minimum Standards
Satisfaction (TSQ)	10	0.946	0-60	0.89-0.91
Hope 2	3	0.865	1-7	
Coproduction	4	0.873	1-7	0.76
Knowledge	3	0.902	1-5	
Life Satisfaction	8	0.868	1-5	
Risk Perceptions	1	N/A	1-49	
Severity	1	N/A	1-7	
Vulnerability	1	N/A	1-7	

Means, standard deviations, medians, and observed ranges of dependent and independent variables are presented in Table 5.10. It is important to note that before the deletion of the two reverse items from the Herth Hope Index, the average hope level observed in this study was 37.74 with a standard deviation of 6.134. Herth (1992) reported mean levels of hope between 34 and 38 with a standard deviation of 8.84, for chronically ill patients. The current observed mean level falls in this range but the measure has a smaller standard deviation which might be due to limiting the sample to one chronic illness: Diabetes Type II. For additional validation, another measure of hope was observed: Hope 2 (Nenkov, McInnis, and Morrin 2008). Hope 2 mean was 5.80 with a standard deviation of 0.99 and a median of 6.00. The observed values were between 3 and 7. It is not surprising that people rate improvements in their health as highly important and desirable, and as a source of pleasure if achieved. For the Multidimensional Health Locus of Control (Form C) scale, Wallston (2005) found that Diabetes patients have higher IHLC and lower CHLC when compared to Cancer, Rheumatoid Arthritis, and chronic pain patients. PHLC for Diabetes patients is higher than that of individuals diagnosed with other diseases. This explains the MHLC subscale means observed in this study: higher for IHLC (mean = 29.59) and PHLC (mean = 22.93) and lower for CHLC (mean = 15.53), with possible values between 6 and 36 for all three subscales.

Table 5.10. General Descriptives for Model Variables

	Mean	Standard Deviation	Median	Observed Range
Hope (HHI)	31.99	5.31	32.00	12-40
Locus of Control (MHLC From C)				
Internal HLC	29.59	5.18	30.00	12-36
Chance HLC	15.53	6.65	14.50	6-36
Powerful Others HLC Doctors	14.92	2.64	15.00	3-18
Powerful Others HLC Others	8.00	3.47	8.00	3-18
Self-Efficacy (PDSMS)	22.09	5.18	22.00	6-30
Adherence (GAS)				
Generic Measure	63.04	21.58	65.00	5-100
Specific Measure	73.68	18.35	78.26	20-100
Satisfaction (TSQ)	44.94	12.55	48.00	4-60

In addition to demographic control variables (Gender, Age, Income, and Education), the following seven variables were controlled for at various stages of the data analysis:

Duration of the illness, number of other chronic ailments, number of adherence items, co-production, knowledge, life satisfaction, and risk perceptions. Table 5.11 provides descriptives for these variables.

Table 5.11. General Descriptives for Control Variables

	Mean	Standard Deviation	Median	Observed Range
Duration of Illness	11.23	8.953	8.00	1-46
Number of Adherence Items	8.34	2.44	8.00	2-13
Number of Other Chronic Ailments	1.05	1.00	1.25	0-7
Coproduction	5.79	1.20	6.00	1-7
Knowledge	3.63	0.86	3.67	1-5
Life Satisfaction	3.80	0.82	3.88	1-5
Risk Perceptions	28.17	12.58	28.00	1-49
Severity	6.07	1.29	6.54	1-7
Vulnerability	4.58	1.70	5.00	1-7

The measures of severity and vulnerability were related to the first complication reported by participants as a possible setback that could occur to them in the future if they do not follow medical guidelines closely. Based on 201 answers, complications were coded into 10 categories. Table 5.12 provides frequencies and percentages for each type of complication, in addition to severity and vulnerability means for each category. The most mentioned complications were feet problems, sores, or numbness, abnormal blood sugar levels, medication change such as move from pills to insulin shots, and blindness. An Analysis of Variance (ANOVA) test comparing severity means for all categories indicated that the perceived severity level of fatigue, weight gain, or poor health is significantly lower than that of all other categories, which were not significantly different. The highest mean severity was reported for blindness but it was not higher than means for other categories in statistical significance, except for fatigue, weight gain, or poor health. On average, sample respondents perceived that they are most vulnerable to

heart, kidney, or liver problems and failure, feet problems, and fatigue, while they are least vulnerable to coma or death and poor circulation.

Table 5.13 presents descriptive statistics and bivariate correlations for the variables included in the models. Of particular interest to us are bivariate correlations between the independent variables in the model: Multidimensional Health Locus of Control (MHLC) subscales (Internal Health Locus of Control - IHLC, Chance Health Locus of Control - CHLC, Powerful Other Health Locus of Control for Others - PHLC Others, and Powerful Others Health Locus of Control for Doctors - PHLC Doctors) and Self-Efficacy. Different research studied using the MHLC Form C scale found different patterns of correlations among the four subscales, depending on the disease in question. In some instances, correlations among pairs of subscales exceeded 0.40. One common finding is that PHLC Doctors is uncorrelated with PHLC Others, which is why they are treated as two separate dimensions. Wallston, Stein, and Smith (1994) found a significant negative correlation between IHLC and CHLC, a significant positive correlation between IHLC and PHLC Doctors, and a significant positive correlation between CHLC and PHLC Others, which have the highest common variance. The findings from our data show a very similar pattern, with the highest positive correlation of 0.49 between CHLC and PHLC Others. All other bivariate correlations among MHLC subscales are mild (~0.20) or moderate (~0.30). Correlations between MHLC subscales and Self-efficacy are below 0.20 except for PHLC Doctors with a positive correlation coefficient (with self-efficacy) of 0.42. None of the correlation coefficients is substantial (> 0.60) and there are no signs of multicollinearity.

Table 5.12. Potential Future Complications related to Diabetes Type II

Complication	Frequency	Valid Percentage	Severity	Vulnerability
Feet Problems - Sores or Numbness	37	18.4	5.92	5.00
Blood Sugar / Insulin	28	13.9	5.75	4.18
Blindness	25	12.4	6.76	4.08
Heart/Kidney/Liver Problem	21	10.4	6.24	4.85
Heart/Kidney/Liver Failure	20	10.0	6.55	5.43
Limb Amputation	17	8.5	6.29	4.47
Eye Problems	16	8.0	6.13	4.94
Coma/Death	15	7.5	6.07	3.07
Fatigue/Weight Change/Poor Health	14	7.0	4.36	5.00
Poor Circulation	8	4.0	6.34	3.25
Total	201	100%	6.07	4.58

Table 5.13. Descriptive Statistics and Bivariate Correlations for Model Variables

Variable		# Items	Coef. α	\bar{x}	Std. Dev.	X1	X2	X3	X4	X5	X6	X7	X8
IHLC	X1	6	0.871	29.59	5.18								
PHLC Doctors	X2	3	0.696	14.92	2.64	.32**							
PHLC Others	X3	3	0.774	8.00	3.47	-.07	.05						
CHLC	X4	6	0.623	15.53	6.65	-.25**	-.13	.49**					
Self-Efficacy	X5	6	0.902	22.09	5.18	.16*	.42**	-.16*	-.17*				
IHLC*Self- Efficacy	X6	N/A	N/A	658.08	212.97	.66**	.47**	-.17*	-.26**	.84**			
Hope	X7	10	0.912	31.99	5.31	.17*	.43**	-.06	-.12	.61**	.54**		
Compliance: GAS Specific Measure	X8	15*15	N/A	73.68	18.35	.20**	.33**	-.10	.03	.45**	.44**	.45**	
Treatment Satisfaction	X9	10	0.946	44.94	12.55	.23**	.45**	-.06	-.00	.66**	.61**	.52**	.40**

Statistical Results: Hypotheses Testing

In this section, the statistical results of the hypotheses will be discussed. A summary of the results can be found in Table 5.14.

Hope and Perceptions of Control as Antecedents to Compliance with Medical Regimen

This section details statistical results for the following hypotheses about the effects of perceptions of control dimensions and hope on compliance with the medical regimen:

H1: Hope has a positive effect on compliance with medical regimen

H2: Self-efficacy has a positive effect on compliance with medical regimen

H3: Internal Health Locus of Control (IHLC) has a positive effect on compliance with medical regimen

H4: There is a significant interaction effect of Internal Health Locus of Control (IHLC) and Self-Efficacy on compliance with the treatment, such that self-efficacy predicts compliance only for individuals with high IHLC levels. In other words, the effect of self-efficacy on compliance increases as IHLC increases

H5a: Powerful Others Health Locus of Control (PHLC) has a positive effect on compliance with medical regimen

H5b: Powerful Others Health Locus of Control (PHLC) has a negative effect on compliance with medical regimen

H6: Chance Health Locus of Control (CHLC) has a negative effect on compliance with medical regimen

Hypotheses 2, 3, 5 and 6 propose directional relationships between Perceptions of Control subscales and Compliance with the medical treatment. They state that IHLC and self-efficacy have positive effects on compliance, while CHLC has a negative effect. Two competing hypotheses were proposed for the effect PHLC on compliance, which was found to have both positive and negative effects on health behavior in past research, depending on the behavior investigated; the measure of PHLC used in this study was divided into PHLC Others and PHLC Doctors. To test these hypotheses, a multiple linear regression was used, where compliance with the medical treatment is the dependent variable and dimensions of perceptions of control are the independent variables. **Note that for all regression results reported in this dissertation, the independent variables were mean centered prior to performing regression analyses.** Centering variables at their means helps interpret the results and is useful for models that incorporate an interaction term since it decreases multicollinearity (Muller, Judd, and Yzerbyt 2005).

Table 5.14. Summary of Hypotheses

Hypotheses	Support
H1: Hope has a positive effect on compliance with medical regimen	Yes**
H2: Self-efficacy has a positive effect on compliance with medical regimen	Yes**
H3: IHLC has a positive effect on compliance with medical regimen	Yes*
H4: There is a significant interaction effect of ILHC and Self-Efficacy on compliance with the treatment, such that self-efficacy predicts compliance only for individuals with high IHLC levels. In other words, the effect of self-efficacy on compliance increases as IHLC increases	No
H5a: PHLC has a positive effect on compliance with medical regimen	Yes for Doctors*
H5b: PHLC has a negative effect on compliance with medical regimen	Yes for Others*
H6: CHLC has a negative effect on compliance with medical regimen	No: Positive**!
H7: Hope has a positive effect on satisfaction with medical regimen	Yes*
H8: Self-efficacy has a positive effect on satisfaction with medical regimen	Yes**
H9: IHLC has a positive effect on satisfaction with medical regimen	Yes*
H10: There is a significant interaction effect of ILHC and Self-Efficacy on satisfaction with the treatment, such that IHLC has a positive effect on satisfaction only for individuals with high self-efficacy. In other words, the effect of IHLC on satisfaction increases as self-efficacy increases	Yes but Negative Interaction*
H11: PHLC has a negative effect on satisfaction with medical regimen	No: Positive for PHLC Doctors**!
H12: CHLC has a negative effect on satisfaction with medical regimen	No: Positive**!
H13a: IHLC has a positive effect on hope	No
H13b: Self-efficacy has a positive effect on hope	Yes**
H 13c: There is significant interaction effect of IHLC and self-efficacy on hope, such that the effect of self-efficacy on hope increases as IHLC increases	No
H13d: PHLC has a positive effect on hope	Yes for Doctors**
H13e: CHLC has a positive effect on hope	No
H14: Only CHLC has a positive effect on hope	No
H15: IHLC, PHLC, CHLC, and Self-Efficacy have no significant effects on Hope	No

*p < 0.05; **p < 0.01

The results in Table 5.15 indicate a significant positive effect of self-efficacy on compliance at the 0.01 level and a positive effect of IHLC on compliance at the 0.05 level (H2 and H3 are supported). The effect of PHLC Doctors on compliance is significantly positive at the 0.05 level, while that of PHLC Others is significantly negative at the 0.05 level. Both H5a and H5b are supported, where the effect of PHLC is positive for doctors and negative for others. Contradictory findings about the effect of PHLC on health behavior in previous research might be due to the need to divide PHLC into its two subscales: Others and Doctors, rather than considering it as one unidimensional scale. One surprising finding is the significant positive effect of CHLC on compliance with the medical treatment at the 0.01 level. This result is not consistent with any previous empirical studies about the effects of Locus of Control dimensions on health behaviors. It seems that for the sample of patients in this study, Walker's (2001) proposition about the adaptive effects of chance health locus of control is at play.

Table 5.15. Multiple Linear Regression Results: Effects of Perceptions of Control on Compliance

Independent Variables	Unstandardized B	SE	Standardized Beta	t	p-value
Self-Efficacy	1.300	.232	.367	5.599	.000
IHLC	.466	.223	.131	2.089	.038
PHLC Doctors	1.189	.471	.171	2.526	.012
PHLC Others	-.791	.359	-.149	-2.201	.029
CHLC	.619	.190	.224	3.253	.001

Dependent Variable: Compliance (GAS – Specific Measure)
 $R^2 = .270$; Adj. $R^2 = .253$; $F = 15.967^{**}$

Hypothesis 1 states that hope has a positive effect on compliance with the medical treatment. By testing this hypothesis, I wanted to also check if hope, not only has a significant positive effect on compliance, but also that this effect is significantly incremental in a model that has perceptions of control subscales as antecedents to compliance. To this end, a hierarchical linear regression analysis was performed with compliance as the dependent variable and perceptions of control dimensions and hope as the independent variables. This procedure is consistent with previous practices in published marketing articles (Brown et al. 2002). Hope was entered at the second step of the hierarchical regression model. The results in Table 5.16 indicate that hypothesis 1 is supported because the effect of hope on compliance is positive and significant at the 0.01 level. Furthermore, the F test⁶ of R² difference between the two models (before and after the addition of hope) was significant at the 0.01 level. The increment in squared multiple correlation caused by the addition of hope to the model is significant. Note that the effect of PHLC Doctors on compliance with the medical treatment is no longer significant when hope is added to the regression model. This might be considered as an indication of mediation, which will be discussed in the Mediation Analysis section of this chapter.

⁶ $F = [(R_2^2 - R_1^2) / (k_2 - k_1)] / [(1 - R_2^2) / (N - k_2 - 1)]$ with degrees of freedom $(k_2 - k_1; N - k_2 - 1)$; where R_2^2 is the squared multiple correlation of the model with additional predictors (model 2) and R_1^2 is that of the model with less predictors (model 1); k_2 is the number of predictors in model 2 and k_1 is the number of predictors in model 1; N is the sample size (Jaccard and Turrisi 2003)

Table 5.16. Hierarchical Multiple Linear Regression Results: Incremental Effect of Hope on Compliance

Independent Variables	Unstandardized B	SE	Standardized Beta	t	p-value
Self-Efficacy	.830	.265	.367	5.599	.000
IHLC	.447	.218	.131	2.089	.041
PHLC Doctors	.828	.471	.171	2.526	.081
PHLC Others	-.813	.351	-.149	-2.201	.021
CHLC	.623	.186	.224	3.253	.001
Hope	.879	.255	.254	3.441	.001

Dependent Variable: Compliance (GAS – Specific Measure)

Hope Entered in Step 2

$R^2 = .308$; Adj. $R^2 = .289$; $F = 15.947^{**}$

Hypothesis 4 states that there is a significant interaction effect of IHLC and Self-Efficacy on compliance with the treatment. To test this hypothesis, I computed the product term between IHLC and self-efficacy (mean centered measures) to represent the interaction term, and performed the same regression analysis portrayed in Table 5.15, with the addition of the product term (Jaccard and Turrisi 2003). The regression coefficient for the interaction term was not significant and the R^2 for the model with the interaction term was the same as that of the model without the interaction term (.270). This indicates that there is no increment in the squared multiple correlation caused by the addition of the interaction term. H4 is not supported. It seems that internal health locus of control does not moderate the effect of self-efficacy on compliance with the treatment; individuals with higher self-efficacy are more likely to comply with treatment recommendations because they believe in their capability to do so, regardless of their expectancy about whether their health is under their own control or not.

Hope and Perceptions of Control as Antecedents of Satisfaction with Medical Regimen

This section details statistical results for the following hypotheses about the effects of perceptions of control dimensions and hope on treatment satisfaction:

H7: Hope has a positive effect on satisfaction with medical regimen

H8: Self-efficacy has a positive effect on satisfaction with medical regimen

H9: Internal Health Locus of Control (IHLC) has a positive effect on satisfaction with medical regimen

H10: There is a significant interaction effect of Internal Health Locus of Control (IHLC) and Self-Efficacy on satisfaction with the treatment, such that IHLC has a positive effect on satisfaction only for individuals with high self-efficacy. In other words, the effect of IHLC on satisfaction increases as self-efficacy increases

H11: Powerful Others Health Locus of Control (PHLC) has a negative effect on satisfaction with medical regimen

H12: Chance Health Locus of Control (CHLC) has a negative effect on satisfaction with medical regimen

The analyses for this section mirror the ones used in the preceding section. To test the hypothesized effects of different perceptions of control dimensions on treatment satisfaction (Hypotheses 8, 9, 11, and 12), a multiple linear regression was performed with treatment satisfaction as the dependent variable and Self-Efficacy, IHLC, PHLC

Doctors, PHLC Others, and CHLC as the independent variables. The results in Table 5.17 indicate that self-efficacy and IHLC have significant positive effect on satisfaction with medical treatment at 0.01 and 0.05 significance levels, respectively. Contrary to the expectations in hypotheses 11 and 12, the effects of PHLC Doctors and CHLC on treatment satisfaction were significant but positive rather than negative; a possible explanation for these unexpected results is provided in the discussion chapter 6. The effect of PHLC Others on treatment satisfaction was not significant. It is not surprising that the role of other people different from physicians is less important in its effect on satisfaction with the treatment, relative to the physician who provides the treatment, the individual who follows it, and luck or fate which plays a role in whether the treatment works for one individual better than another.

When testing the effect of hope on treatment satisfaction (H7), the hierarchical multiple linear regression analysis results in Table 5.18 show that the effect of hope on treatment satisfaction is positive and significant at the 0.05 significance level. An F-test $F(1,215) = 4.38$ (p -value = .038) of the increment in squared multiple correlation (from $R^2 = .499$ to $R^2 = .509$) caused by the addition of hope to the model is significant at the 0.05 significance level. Hypothesis 7 is supported.

Table 5.17. Multiple Linear Regression Results: Effects of Perceptions of Control on Satisfaction with the Medical Regimen

Independent Variables	Unstandardized B	SE	Standardized Beta	t	p-value
Self-Efficacy	1.426	.132	.589	10.841	.000
IHLC	.280	.126	.116	2.217	.028
PHLC Doctors	.867	.267	.183	3.249	.001
PHLC Others	-.155	.204	-.043	-.764	.446
CHLC	.324	.108	.172	3.011	.003

Dependent Variable: Treatment Satisfaction (TSQ)
 $R^2 = .499$; Adj. $R^2 = .488$; $F = 43.054^{**}$

Table 5.18. Hierarchical Multiple Linear Regression Results: Incremental Effect of Hope on Treatment Satisfaction

Independent Variables	Unstandardized B	SE	Standardized Beta	t	p-value
Self-Efficacy	1.261	.152	.520	8.271	.000
IHLC	.273	.125	.113	2.180	.030
PHLC Doctors	.740	.272	.156	2.723	.007
PHLC Others	-.163	.202	-.045	-.808	.420
CHLC	.326	.107	.173	3.050	.003
Hope	.310	.147	.131	2.107	.036

Dependent Variable: Treatment Satisfaction (TSQ)
 Hope Entered in Step 2
 $R^2 = .509$; Adj. $R^2 = .496$; $F = 37.189^{**}$

Hypothesis 10 states that there is a significant interaction effect of IHLC and Self-Efficacy on treatment satisfaction. To test this hypothesis, I performed a multiple linear regression after including the product term between IHLC and self-efficacy in the model, as an independent variable along with perceptions of control dimensions (Table 5.19). The regression coefficient for the interaction term was significant at the 0.05 level. Also, the increment in the squared multiple correlation caused by adding the interaction term was significantly different than zero, according to the F-test for difference between R_2^2 and R_1^2 . H10 is supported in terms of significance of the interaction effect but that effect is not in the direction predicted. I expected to see the effect of IHLC on satisfaction increase as self-efficacy increased; however, the negative sign of the interaction's regression coefficient indicates that as self-efficacy increases, the slope of treatment satisfaction (DV) on IHLC (IV) decreases. For every unit increase in self-efficacy, the effect of IHLC on treatment satisfaction decreases by .055 units. In other words, the effect of IHLC on treatment satisfaction when self-efficacy is set to zero (Unstandardized $b = .319$) is higher than its general effect (Unstandardized $b = .273$) averaging across all levels of self-efficacy (Jaccard and Turrisi 2003). Although different from the expectations of the original hypothesis, this effect has a reasonable alternative explanation: when self-efficacy is high, individuals believe that they are capable of doing what the treatment requires them to do (fulfilling treatment requirements might be perceived as relatively easier). This increases the individuals' levels of satisfaction with the treatment; and this level of satisfaction is not as affected as much by their expectancy that their actions will lead to positive health outcomes. On the other hand, if individuals believe that they are less capable of doing what the treatment requires them to do, they

might perceive the treatment regimen as more difficult to perform, and consequently their expectancy that these difficult to perform actions will lead to positive health outcomes becomes more important. Note that self-efficacy is assumed to reflect an individual's perception of the ease or difficulty of performing an action because it is directly related to the individual's capability of performing that action.

Table 5.19. Multiple Linear Regression Results: Interaction Effect of IHLC and Self-Efficacy on Treatment Satisfaction

Independent Variables	Unstandardized B	SE	Standardized Beta	t	p-value
Self-Efficacy	1.523	.138	.629	11.010	.000
IHLC	.319	.127	.131	2.516	.013
PHLC Doctors	.733	.272	.154	2.694	.008
PHLC Others	-.175	.202	-.048	-.863	.389
CHLC	.347	.107	.184	3.232	.001
IHLC * Self-Efficacy	-.055	.026	-.109	-2.111	.036

Dependent Variable: Treatment Satisfaction (TSQ)
 $R^2 = .509$; Adj. $R^2 = .496$; $F = 37.189^{**}$

The Dynamics between Hope and Perceptions of Control

This section provides a first look at the relationship between Perceptions of Control and Hope. This relationship is the central component of the dissertation, and will be the focus of data analyses in subsequent sections. The current section details the results for the following hypotheses:

H13a: Internal Health Locus of Control (IHLC) has a positive effect on hope

H13b: Self-efficacy has a positive effect on hope

H 13c: There is significant interaction effect of Internal Health Locus of Control (IHLC) and self-efficacy on hope, such that the effect of self-efficacy on hope increases as IHLC increases

H13d: Powerful Others Health Locus of Control (PHLC) has a positive effect on hope

H13e: Chance Health Locus of Control (CHLC) has a positive effect on hope

H14: Only Chance Health Locus of Control (CHLC) has a positive effect on hope

H15: Internal Health Locus of Control (IHLC), Powerful Others Health Locus of Control (PHLC), Chance Health Locus of Control (CHLC), and Self-Efficacy have no significant effects on Hope

Note that hypotheses 14 and 15 constitute two alternatives for hypothesis 13 in all its components, i.e. support or rejection for these hypotheses will be inferred from the results of testing hypothesis 13. Also, the basic relationships proposed by hypothesis 13 constitute the basis for the proposed mediating role of “Hope”, which will be tested in the following section and then in the context of comprehensive models in the final section of this chapter.

To test hypotheses 13a, 13b, 13d, and 13e, a multiple linear regression analysis was performed with hope as the dependent variable and the components of perceptions of control (self-efficacy, IHLC, PHLC Doctors, PHLC Others, and CHLC) as the independent variables. Table 5.20 depicts the results of this analysis. Only hypotheses H13b and H13d were supported: Self-efficacy and PHLC Doctors have a significant positive effect on hope. In other words, individuals have higher hope when they have either: (1) a higher belief that they are capable of doing what Diabetes Type II requires in order to obtain positive health results and/or (2) a higher expectancy that their health is under the control of their doctor. For individuals with Diabetes Type II, high self-efficacy could reflect the ease of following treatment recommendations, which might in turn lead to a higher hope of being able to follow the treatment recommendations successfully. High PHLC Doctors could enhance the trust in the treatment and increase the level of hope that this treatment will actually lead to positive health outcomes. IHLC, PHLC Others, and CHLC have no significant effect on hope levels (H13a, 13d, and 13e are not supported). These hypotheses were exploratory in nature and aimed at testing which of the perceptions of control dimensions are antecedents of hope; the insignificant effect of some of these dimensions is thus not alarming.

To test hypothesis 13c that there is a significant interaction effect of IHLC and self-efficacy on hope, the same regression analysis was repeated with the product term added as an independent variable. The results showed that the regression coefficient for the interaction term was not significant and that the R^2 for the model with interaction term (.418) was not statistically different from the original $R^2 = .411$. After performing the F-

test, $F(1,215) = 2.586$ was not significant ($p\text{-value} = 0.109$). Therefore, the increment in the squared multiple correlation caused by the addition of the interaction term is not significantly different from zero and H13 c was not supported.

Table 5.20. Multiple Linear Regression Results: Effects of Perceptions of Control on Hope

Independent Variables	Unstandardized B	SE	Standardized Beta	t	p-value
Self-Efficacy	.535	.060	.522	8.857	.000
IHLC	.022	.058	.021	.376	.708
PHLC Doctors	.412	.122	.205	3.362	.001
PHLC Others	.025	.093	.016	.267	.789
CHLC	-.005	.049	-.007	-.105	.916

Dependent Variable: Hope (Herth Hope Scale with 10 Items)
 $R^2 = .411$; $\text{Adj. } R^2 = .397$; $F = 30.129^{**}$

Although, not all the parts of Hypothesis 13 were supported, the results from the previous tests allow us to conclude that Hypothesis 14 is rejected because there is no significant effect of CHLC on hope. Similarly, Hypothesis 15 is rejected because self-efficacy and PHLC Doctors are two dimensions of perceptions of control that have significant effects on hope.

This dissertation proposes to test the mediating role of hope between perceptions of control and compliance and satisfaction with the medical regimen. The results discussed in this section suggest that hope might be acting as a partial or full mediator between self-

efficacy and PHLC Doctors, and both dependent variables: Compliance and Satisfaction with the treatment recommendations. This is indicated by the significant direct effects of self-efficacy and PHLC Doctors on Hope, and the significant effect of the later on both compliance and satisfaction. Because these results do not constitute proper evidence of mediation, appropriate mediation analysis procedures were performed and the results are presented in the next section.

Statistical Results: Mediation Analyses

“Mediation represents the consideration of how a third variable affects the relationship between two other variables” (Mackinnon, Fairchild, and Fritz 2007, 595), whereby the independent variable affects the dependent variable “not directly but rather through an intervening process, captured by the mediator variable. Researchers testing for mediation relationships usually make causal statements about these interrelationships” (Iacobucci 2008, 1). This section presents a statistical investigation of Hope as a mediator of the effects of Perceptions of Control on the outcome variables of Compliance and Satisfaction with the treatment regimen. This is a statistical investigation of mediation, where all the relevant variables are measured rather than an experimental investigation, where the variables would be manipulated. Baron and Kenny’s (1986) mediation procedure is the most popular way of testing mediation (Iacobucci 2008). Baron and Kenny’s (1986) causal steps require fitting three regression models:

$$Y = \beta_1 + c X + \varepsilon_1 \quad [5.1]$$

$$Me = \beta_2 + a X + \varepsilon_2 \quad [5.2]$$

$$Y = \beta_3 + c' X + b Me + \varepsilon_3 \quad [5.3]$$

Where, Y is the dependent variable, X is the independent variable, and Me is the mediating variable. This classical mediation process is graphically represented in Figure 5.3.

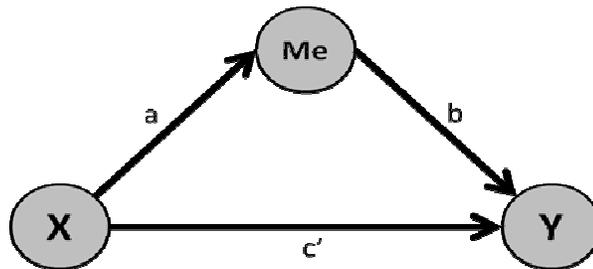


Figure 5.3. Classical Mediation Process

Source: Kenny (2009)

For Mediation to be established, **c**, **a**, and **b** must be non-zero and **c'** should be significantly smaller than **c**. The necessity of requiring **c** to be different from zero can be relaxed (Kenny 2009). Establishing that **c'** is significantly smaller than **c**, and consequently that the indirect effect of X on Y through Me is statistically significant can be done using the Sobel test, which is a z-test (Iacobucci 2008); the Sobel statistic is computed as follows:

$$Sobel = \frac{a * b}{\sqrt{b^2 * Sa^2 + a^2 * Sb^2}}$$

Sa and Sb are the standard errors for coefficients a and b respectively

The regression models in equations 5.1, 5.2, and 5.3, can be extended to test mediation in the presence of multiple independent variables. To test whether hope mediates the relationship between perceptions of control dimensions and compliance and satisfaction with the medical regimen, the regression models in equations 5.4, 5.5, and 5.6 were fitted to the data once with compliance as the dependent variable and another time with treatment satisfaction as the dependent variable. For all regression models, the independent variables were centered prior to conducting the analysis.

$$Y = \beta_1 + c_1X_1 + c_2X_2 + c_3X_3 + c_4X_4 + c_5X_5 + \varepsilon_1 \quad [5.4]$$

$$Me = \beta_2 + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + \varepsilon_2 \quad [5.5]$$

$$Y = \beta_3 + c'_1X_1 + c'_2X_2 + c'_3X_3 + c'_4X_4 + c'_5X_5 + bMe + \varepsilon_3 \quad [5.6]$$

Where Y is the dependent variable (Compliance or Satisfaction with the medical treatment), Me is the mediator (Hope), and X₁, X₂, X₃, X₄, and X₅ are the independent variables representing Perceptions of Control dimensions: Self-Efficacy, IHLC, PHLC Doctors, PHLC Others, and CHLC. For Mediation to be established for any of the independent variables X_i (controlling for the other independent variables), its coefficients **a_i** and **c_i**, as well as the mediator's coefficient **b** in equation 5.6 should be nonzero. Also, for that variable, the Sobel test should indicate that there is a significant indirect effect of X on Y through Me.

Table 5.21. Multiple Linear Regression Results: Hope as a Mediator between Perceptions of Control and Compliance

<i>Predictors</i>	Equation 5.4 Y = Compliance		Equation 5.5 Me = Hope		Equation 5.6 Y = Compliance	
	Unstd. b	t	Unstd. b	t	Unstd b	t
X₁: Self-Efficacy	c₁ = 1.300 (.367)	5.599**	a₁ = .535 (.522)	8.857**	c' ₁ = .830 (.235)	3.138**
X₂:IHLC	c ₂ = .466 (.131)	2.089*	a ₂ = .022 (.021)	.376	c' ₂ = .447 (.126)	2.053*
X₃:PHLC Doctors	c₃= 1.189 (.171)	2.526*	a₃ = .412 (.205)	3.362**	c' ₃ = .828 (.119)	1.756
X₄:PHLC Others	c ₄ = -.791 (-.149)	-2.201*	a ₄ = .025 (.016)	.267	c' ₄ = -.813 (-.153)	-2.318*
X₅:CHLC	c ₅ = .619 (.224)	3.253**	a ₅ = -.005 (-.007)	-.105	c' ₅ = .623 (.226)	3.358**
Me: Hope					b = .879 (.254)	3.441**

* p < 0.05; ** p < 0.01; The coefficients between brackets are the standardized beta coefficients

For adherence with treatment recommendations (compliance), the results in Table 5.21 show that coefficient **a** (the effect of X on Me) is significant for **X₁** (Self-Efficacy) and **X₃** (PHLC Doctors). For these two control dimensions, coefficients **c₁** and **c₃** (the respective effects of **X₁** and **X₃** on **Y**) are also significant. Finally, coefficient **b** for the effect of Hope on Compliance is significant. For Self-Efficacy and PHLC Doctors, Baron and Kenny's (1986) conditions for establishing mediation are met. Sobel tests indicated that the indirect effects are significant for both Self-Efficacy (Sobel z = 3.215**; Sa₁ = .060; Sb = .255) and PHLC Doctors (Sobel z = 2.412*; Sa₃ = .122). It is important to note that for PHLC Doctors, coefficient **c'₃** is not only significantly smaller than **c₃**, but also statistically insignificant. This is an indication of full mediation. Individuals'

expectancies that their health is under the control of doctors (powerful others) lead them to comply more with the recommended treatment, by increasing their hope levels. For self-efficacy, its effect on compliance is only partially mediated by hope. Although the effects of IHLC, PHLC Others, and CHLC on adherence are significant, these effects are not mediated by hope.

For treatment satisfaction, the same steps were repeated with treatment satisfaction as the dependent variable in regression equations 5.4 and 5.6. The findings in Table 5.22 provide evidence of mediation for Self-Efficacy and PHLC Doctors because c_1 and c_3 (the effects of self-efficacy and PHLC doctors on treatment satisfaction) are significant at the 0.01 significance level; coefficient b representing the effect of hope on treatment satisfaction is significant at the 0.05 significance level. In equation 5.6, c'_1 and c'_3 are both significant and therefore, hope's role as a mediator between self-efficacy and PHLC doctors and treatment satisfaction is partial at best. The last step in testing the mediating effect of hope is to calculate the Sobel test statistic for the significance of the indirect effects. Sobel tests indicate that both indirect effects for Self-Efficacy (Sobel $z = 2.052^*$; $Sa_1 = .060$; $Sb = .147$) and PHLC Doctors (Sobel $z = 1.789^*$; $Sa_3 = .122$) are significant at the 0.05 level. The effects of self-efficacy and PHLC doctors on treatment satisfaction are mediated by hope. When individuals believe that they are capable of performing the actions necessary for their Diabetes treatment or/and when they believe that their health is under the control of physicians who prescribe this treatment, they are more satisfied with the treatment. This increased satisfaction is due in part directly to their belief that the treatment requirements can be performed and to the expectation that physicians, who

prescribed the treatment, have high control over health status. As for the other part, higher treatment satisfaction is due to an increased level of hope, which is significantly affected by self-efficacy and PHLC doctors.

Before concluding the mediation analyses section, it was essential to go back to Hypothesis 10, where test results indicated the presence of a significant interaction effect between IHLC and Self-Efficacy on Treatment Satisfaction. The next question was: Is this interaction effect mediated by hope? To answer this question, I followed Muller, Judd, and Yzerbyt (2005) analytic strategies developed to assess this type of mediated moderation. Muller, Judd, and Yzerbyt (2005) strategies follow Baron and Kenny's (1989) classic approach for mediation and require fitting the following regression models:

$$Y = \beta_1 + \beta_2 X + \beta_3 Mo + \beta_4 X*Mo + \varepsilon_1 \quad [5.7]$$

$$Me = \beta_5 + \beta_6 X + \beta_7 Mo + \beta_8 X*Mo + \varepsilon_2 \quad [5.8]$$

$$Y = \beta_9 + \beta_{10} X + \beta_{11} Mo + \beta_{12} X*Mo + \beta_{13} Me + \beta_{14} Me*Mo + \varepsilon_3 \quad [5.9]$$

Where Y is the dependent variable Treatment Satisfaction, X is the independent variable IHLC, Mo is the moderator Self-Efficacy, and Me is the mediator Hope. The interpretation of slope parameters in equations 5.7, 5.8, and 5.9 is presented in Table 5.23. Hypothesis 10 analysis results showed that the effect of IHLC on treatment satisfaction is moderated by self-efficacy such that this effect decreases when self-efficacy increases.

Table 5.22. Multiple Linear Regression Results: Hope as a Mediator between Perceptions of Control and Treatment Satisfaction

<i>Predictors</i>	Equation 5.4 Y = Satisfaction		Equation 5.5 Me = Hope		Equation 5.6 Y = Satisfaction	
	Unstd. b	T	Unstd. b	t	Unstd b	t
X₁:Self-Efficacy	c₁ = 1.426 (.589)	10.841**	a₁ = .535 (.522)	8.857**	c'₁ = 1.261 (.520)	8.271**
X₂:IHLC	c₂ = .280 (.116)	2.217*	a₂ = .022 (.021)	.376	c'₂ = .273 (.113)	2.180*
X₃:PHLC Doctors	c₃ = .867 (.183)	3.249**	a₃ = .412 (.205)	3.362**	c'₃ = .740 (.156)	2.723**
X₄: PHLC Others	c₄ = -.155 (-.043)	-.764	a₄ = .025 (.016)	.267	c'₄ = -.163 (-.045)	-.808
X₅:CHLC	c₅ = .324 (.172)	3.011**	a₅ = -.005 (-.007)	-.105	c'₅ = .326 (.173)	3.050**
Me:Hope					b = .310 (.131)	2.107*

* p < 0.05; ** p < 0.01; The coefficients between brackets are the standardized beta coefficients

Table 5.23. Interpretation of Slope Parameters in Equations 5.7, 5.8, and 5.9

Slope Parameters	Interpretation of Slope Parameters
β_2	Overall treatment effect on Y at the average level of Mo
β_3	Moderator effect on Y on average across the two treatment levels
β_4	Change in overall treatment effect on Y as Mo increases
β_6	Treatment effect on Me at the average level of Mo
β_7	Moderator effect on Me on average across the two treatment levels
β_8	Change in treatment effect on Me as Mo increases
β_{10}	Residual direct treatment effect on Y at the average level of Mo
β_{11}	Moderator effect on Y on average within the two treatment levels and at the average level of Me
β_{12}	Change in residual direct treatment effect on Y as Mo increases
β_{13}	Mediator effect on Y on average within the two treatment levels and at the average level of Mo
β_{14}	Change in mediator effect on Y as Mo increases

Source: Muller, Judd, and Yzerbyt (2005), 855

To test whether the significant interaction effect (IHLC*Self-Efficacy) on treatment satisfaction is mediated by hope, I extended the three regression models in equations 5.7, 5.8, and 5.9 to include the other dimensions of perceptions of control as non-moderated independent variables in the models. Prior to the regression analyses, all the independent variables were centered at their means and two interaction terms were computed: IHLC*Self-Efficacy and Hope*Self-Efficacy. As mentioned earlier, centering variables at their means helps interpret the results and is useful for models that incorporate an interaction term since it decreases multicollinearity. There are two ways to establish mediated moderation and both of them require β_4 or effect of the interaction on treatment satisfaction to be significant: 1. β_8 and β_{13} are nonzero: the effect of the interaction term

of the mediator hope and the effect of hope on the dependent variable treatment satisfaction are both significant; 2. β_6 and β_{14} are nonzero: the effect of X on Y and the effect of the interaction between the mediator and the moderator on Y are both significant (Muller, Judd, and Yzerbyt 2005). The results in Table 5.24 show that there is no evidence of mediated moderation. In fact, the effect of the interaction term IHLC*Self-Efficacy on hope in equation 5.8 is not significant, neither are the effects of hope and Me*Mo on satisfaction in equation 5.9.

Table 5.24. Multiple Linear Regression Results: Mediated Moderation of the Effect of IHLC on Treatment Satisfaction

<i>Predictors</i>	Equation 5.7 Y = Satisfaction		Equation 5.8 Me = Hope		Equation 5.9 Y = Satisfaction	
	Unstd. b	t	Unstd. b	t	Unstd. b	t
X1:IHLC	.319	2.516**	.036	.611	.321	2.558*
Mo: SE	1.523	11.010**	.570	8.936**	1.335	8.279**
XMo: IHLC*SE	-.055	-2.111*	-.020	-1.647	-.044	-1.689
Me: Hope					.212	1.403
MeMo: Hope*SE					-.034	-1.777
X2:PHLC Doctors	.733	2.694**	.364	2.899**	.663	2.409*
X3:PHLC Others	-.175	-.863	.018	.195	-.185	-.924
X4:CHLC	.347	3.232**	.003	.061	.336	3.157**

* p < 0.05; ** p < 0.01; Mo is the moderator Self-Efficacy; Me is the mediator Hope

My next step was to use SEM Path Analysis to test and compare model fit for the proposed competing models, using the Model Development Approach, a process by which the better fitting model is modified (for example by trimming) to reach a final model. Two models were tested: *Model 1 – Perceptions of Control Literature* (Hope as a Mediator between Perceptions of Control and Outcome Variables: Compliance and Satisfaction) and *Model 3 – Attribution and Other Appraisal Theories* (No Relationship between Perceptions of Control and Hope).

Model 2 – Roseman’s Appraisal Theory of Emotions (Relationship between Chance Health Locus of Control ‘CHLC’ and Hope) was not tested using SEM. Up to this point, the data analysis results were consistent in showing that there is no significant effect of CHLC on hope. Roseman’s (1984) proposition that hope is elicited when an outcome is appraised as caused by impersonal circumstances was not supported. Although neither Model 1 nor Model 3 were completely supported by previous results, the findings about the role of hope as a mediator between some but not all perceptions of control dimensions and compliance or satisfaction with the medical treatment suggest that there is a need to compare the fit of both models using a chi-square difference test. Subsequently, the better model was used to develop a “Model of Hope and Control” that attempts to explain Compliance and Satisfaction with medical treatment for patients living with a chronic illness. This procedure is consistent with previous practices in published marketing research papers (Brown et al. 2002).

Statistical Results: Assessment of Models

As previously mentioned, the primary method of analysis for this dissertation is Structural Equations Modeling (SEM) using Amos 18.0. Structural equation modeling is a superior alternative to test mediation because it estimates all the coefficients simultaneously rather than in a piecemeal approach of fitting three separate models as we saw in the regression analyses (Iacobucci 2008); SEM also allows for model comparison and overall model fit evaluation.

I used raw data as an input for the structural equations analysis, which is equivalent to using the covariance matrix (unstandardized variables). Each construct in the path analysis is treated as a single item measure. It is conventional to create latent variables with single indicators and to fix the path coefficients and error variances by using estimated reliability measures for each construct. This is called the “correction for attenuation” method, which aims at correcting the assumption that single indicators are 100% reliable (Kline 2005). However, this method is controversial and can be problematic because of the lack of true measures of reliability (Kline 2005; Kenny 2009). Therefore, I decided to perform Path Analyses, where all the constructs are treated as observed single-item indicators. All the models are recursive.

When testing mediation using path analysis, it is still important to perform post-hoc tests such as the Sobel test to check for the significance of indirect effects (Iacobucci 2008). An alternative method embedded in AMOS is the Monte Carlo Parametric Bootstrap estimation technique in SEM, where one can use the bias-corrected estimates and p-

values to test for the significance and size of direct and indirect effects. Effect sizes smaller than 0.1 are considered small, those around 0.3 are considered medium, and effect sizes around 0.5 are considered large. For any given independent variable, when the indirect effect is significant and the direct effect is not, there is evidence of full mediation; partial mediation is supported if the direct effect remains significant in the presence of a significant indirect effect through the mediator (Kline 2005). The results reported in this section are based on bias-corrected estimates and significance levels using Monte Carlo Parametric Bootstrap in SEM. The following model fit indices were used to compare models and assess model fit:

- ❑ *Chi-square and its p-value:* The Chi-square statistic is used to test the null hypothesis of perfect model fit. Smaller Chi-square values with p-values larger than 0.01 indicate better fit. A significant Chi-square (p-value > 0.01) was not required for accepting models because the Chi-square statistic depends on the size of the sample and it does not constitute a very good fit measure. Instead, I relied on the other statistics to evaluate model fit. When comparing the fit of two models, the Chi-square difference test was used, and the significance of Chi-square difference which indicates that one model fits better than another, was computed using the Chi-square calculator⁷. Given two models with the same fit, the model with higher degrees of freedom was accepted (Kline 2005, 133).
- ❑ *Comparative Fit Index CFI:* The comparative fit index is a good fit measure. CFI of .95 or above provides strong evidence of good model fit, and a CFI above .90 is deemed adequate.

⁷ <http://www.stat.tamu.edu/~west/applets/chisqdemo.html>

- ❑ *Normed Fit Index NFI*: The Normed Fit Index is a fit measure that compares the proposed model to the independence model, which assumes unrelated variables. An NFI of .90 or higher indicates good model fit.
- ❑ *Root Mean Square Error of Approximation RMSEA*: The Root Mean Square Error of Approximation is a measure of the model's overall fit. RMSEA values smaller than .05 indicate perfect fit, those between .05 and .08 represent adequate overall model fit, and models with RMSEA above .1 are deemed mediocre.
- ❑ *Akaike Information Criterion AIC*: The Akaike Information Criterion is a predictive fit index, which assesses “model fit in hypothetical replication samples of the same size and randomly drawn from the same population” (Kline 2005, 142). One characteristic of AIC is that it allows for comparison between hierarchical and non-hierarchical models, where the model with a smaller AIC value is deemed better.

Comparison of Model 1 and Model 3

To examine the mediating role of hope between perceptions of control and adherence and satisfaction with the medical treatment, I estimated two models. The first model, Model 1, shown in Figure 5.4, positions hope as a mediator between perceptions of control dimensions (Self-Efficacy, IHLC, PHLC Doctors, PHLC Others, and CHLC) and compliance and satisfaction with the medical treatment. The second model, Model 3, depicted graphically in Figure 5.5, represents the hypothesis of no relationship between hope and perceptions of control dimensions. Because Model 3 is nested within Model 1, we can perform a χ^2 difference test to determine whether hope mediates the effects of

perceptions of control dimensions on compliance and satisfaction with the medical treatment. Table 5.25 presents the results of the structural equations analyses for Model 1 and Model 3. These results indicate that while Model 1 fits adequately, Model 3 has mediocre fit indices. Furthermore, a Chi-square difference test provides evidence that Model 1 is a better fit for the data ($\Delta\chi^2$, 5 d.f. = 116.696, $p < .01$). The weak fit of Model 3 is caused by the assumption that hope and perceptions of control dimensions are not correlated; however, even if I wanted to consider Model 3 without hope to obtain a better fit, the results have previously shown that the addition of hope as an independent variable to the model causes a significant increment in the squared multiple correlations for both compliance and satisfaction⁸.

⁸ Improvement in R^2 cannot be directly tested in AMOS; I relied on the findings from hierarchical regression analyses, which constitute the formal test for significance of the increment in squared multiple correlation

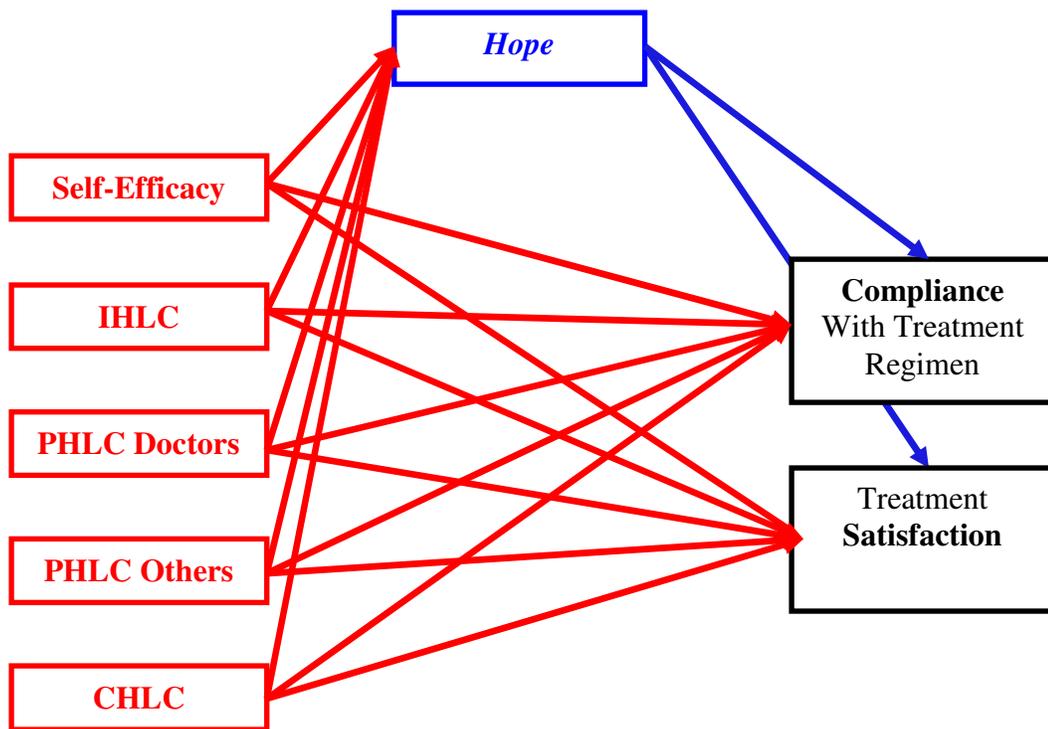


Figure 5.4. Model 1: Hope Mediator between Perceptions of Control and Outcome Variables

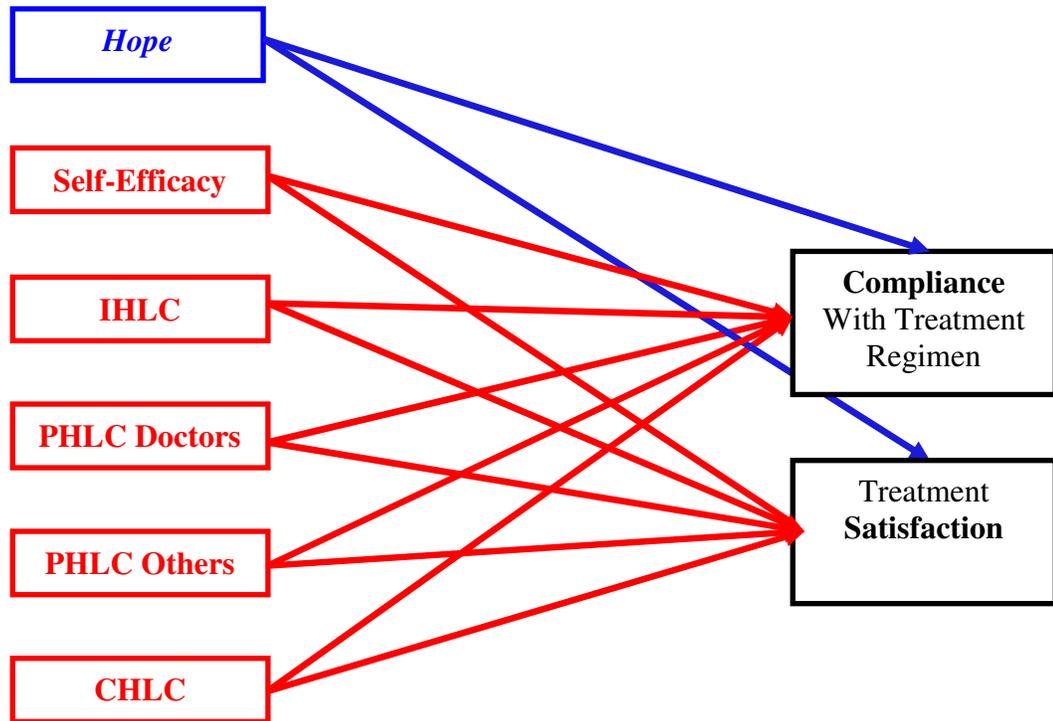


Figure 5.5. Model 3: No Relationship between Hope and Perceptions of Control Dimensions

Table 5.25. Path Analyses Results for Model 1 and Model 3

<i>Paths</i>	Model 1: Hope Mediator		Model 3: No Relationship between Perceptions of Control and Hope	
	<i>Standardized Path Coefficient</i>	<i>C.R.</i>	<i>Standardized Path Coefficient</i>	<i>C.R.</i>
Self-Efficacy → Compliance	.234	3.215**	.247	3.768**
IHLC → Compliance	.125	2.098 ⁹	.132	2.099*
PHLC Doctors → Compliance	.118	1.783	.124	1.829
PHLC Others → Compliance	-.154	-2.352*	-.161	-2.353*
CHLC → Compliance	.224	3.436**	.236	3.436**
Self-Efficacy → Satisfaction	.519	8.473**	.547	9.930**
IHLC → Satisfaction	.112	2.229*	.118	2.229*
PHLC Doctors → Satisfaction	.154	2.765**	.162	2.836**
PHLC Others → Satisfaction	-.054	-.820	-.047	-.820
CHLC → Satisfaction	.171	3.120**	.181	3.120**
Hope → Compliance	.252	3.489**	.268	4.546**
Hope → Satisfaction	.130	2.136*	.138	2.783*
Self-Efficacy → Hope	.525	9.087**		
IHLC → Hope	.021	.383		
PHLC Doctors → Hope	.204	3.406**		
PHLC Others → Hope	.016	.271		
CHLC → Hope	-.007	-.107		
Model Fit Statistics				
χ^2	11.704 (p-value = .039)		128.640 (p-value = .000)	
d.f.	5		10	
CFI	.986		.754	
NFI	.977		.748	
RMSEA	.078		.232	
AIC	89.705		196.640	
Variance Explained (R²)				
Compliance	.311		.234	
Treatment Satisfaction	.513		.459	
Hope	.404			

*p-value < 0.05; ** p-value < 0.01; N = 222

Model Modification: Trimmed Model 1

⁹ The non-bias corrected estimate of IHLC → Compliance is significant at the 0.05 level but the bias-corrected significance level is 0.053 > 0.05

As a second step, following the Model Development Approach of Structural Equations Modeling, Model 1 (the better fitting model) was trimmed to include only significant paths from perceptions of control dimensions to hope, compliance, and satisfaction. A trimmed model should have the same fit as Model 1 but with a larger number of degrees of freedom. When two models are equivalent, the model with more degrees of freedom should be accepted (Kline 2005). To that end, I repeated the path analysis after removing the paths from IHLC, PHLC Others, and CHLC to Hope, because they were insignificant. I also removed the path from PHLC Others to Treatment Satisfaction. Although not significant, the path from PHLC Doctors to Compliance was not removed to allow for the analysis of direct and indirect effects in the final model before making conclusions about the presence of full mediation. Figure 5.6 represents the trimmed Model 1. A Chi-square difference test to check for difference of fit between Trimmed Model 1 and Model 1 found no significant difference between the models ($\Delta\chi^2$, 4 d.f. = 0.895, $p = .925$). Figure 5.7 attempts to graphically depict the analysis results, where the colors and thicknesses of arrows were used to represent the signs and sizes of different effects. Table 5.26 summarizes the analysis results for Trimmed Model 1. As recommended by Kline (2005), both standardized and unstandardized coefficients were reported, along with standard errors, and bias-corrected significance (p-value) for estimates.

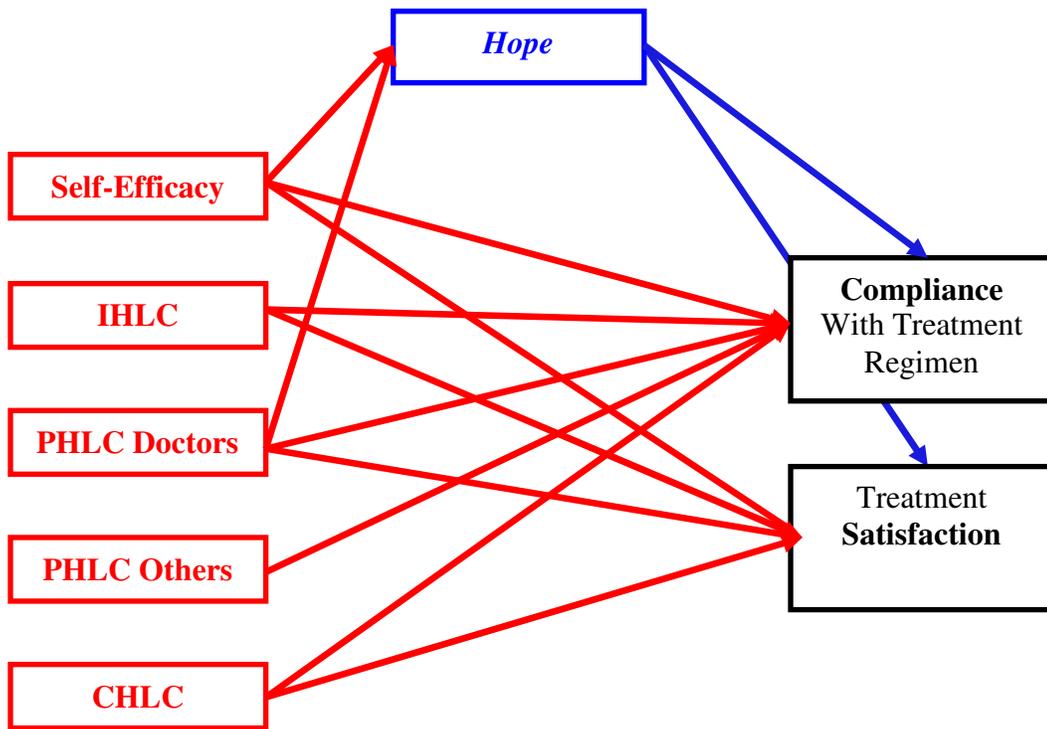


Figure 5.6. Model 1 Trimmed

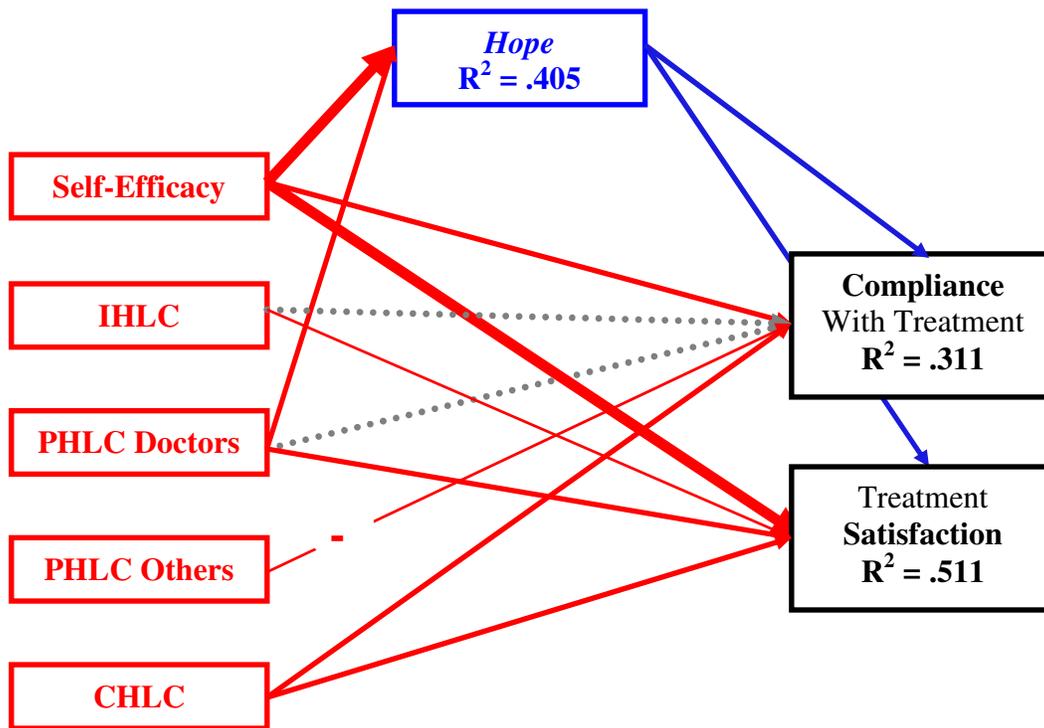


Figure 5.7. Model 1 Trimmed - Results¹⁰

¹⁰ Thicker arrows represent large effects (around .5); Thinner arrows represent weak effects ($p < .05$); Dotted arrows represent insignificant effects; A negative sign on the arrow indicates a negative effect

Table 5.26. Path Analysis Results for Trimmed Model 1

<i>Paths</i>	Unstd. Path Coefficient	Std. Path Coefficient	Standard Error	Bias-Corrected p-value
<i>Direct Effects</i>				
Self-Efficacy → Compliance	.830	.234	.073	.001
IHLC → Compliance	.447	.125	.059	.064
PHLC Doctors → Compliance	.828	.118	.067	.071
PHLC Others → Compliance	-.813	-.153	.064	.022
CHLC → Compliance	.623	.224	.065	.001
Self-Efficacy → Satisfaction	1.278	.526	.057	.001
IHLC → Satisfaction	.271	.111	.052	.032
PHLC Doctors → Satisfaction	.704	.146	.054	.008
CHLC → Satisfaction	.285	.150	.048	.001
Self-Efficacy → Hope	.533	.522	.051	.001
PHLC Doctors → Hope	.430	.213	.057	.001
Hope → Compliance	.879	.253	.072	.002
Hope → Satisfaction	.308	.129	.061	.029
<i>Indirect Effects</i>				
Self-Efficacy → Compliance	.468	.132	.041	.002
PHLC Doctors → Compliance	.378	.054	.033	.001
Self-Efficacy → Satisfaction	.164	.067	.022	.029
PHLC Doctors → Satisfaction	.132	.027	.015	.018
<i>Model Fit Statistics</i>				
χ^2	12.599 (p-value = .182)			
d.f.	9			
CFI	.993			
NFI	.975			
RMSEA	.043			
AIC	82.599			
<i>Variance Explained (R²)</i>				
Compliance	.311			
Treatment Satisfaction	.511			
Hope	.405			

The results in Table 5.26 show that the indirect effects of self-efficacy and PHLC Doctors on both compliance and satisfaction through hope are all significant and positive. Thus, the effects of self-efficacy and PHLC Doctors on compliance and treatment satisfaction are mediated by hope. This mediation is partial in all instances except for the effect of PHLC Doctors on compliance, which is fully mediated by hope; the insignificance of the direct effect of PHLC Doctors on compliance constitutes evidence of this full mediation. Except for IHLC, all dimensions of perceptions of control have a significant direct effect on compliance. It was expected to see a negative direct effect for PHLC Others, but the surprising finding is that CHLC has a positive direct effect on compliance rather than a negative effect. Except for the effect of PHLC Others on treatment satisfaction, which was removed from the trimmed model, all dimensions of perceptions of control have a positive effect on treatment satisfaction including CHLC, which was expected to have a negative effect. Hope has a positive significant effect on both compliance (at 0.01 significance level) and satisfaction (at 0.05 significance level). The next section will test the effects of control variables on this final Trimmed Model 1.

Examining the Role of Control Variables

To retest Trimmed Model 1 with relevant control variables, the first step was to check the effects of different control variables on the dependent variables compliance and satisfaction with the medical regimen. Since it would not be efficient to model all the potential control variables in the path analysis with a sample size of 222, the purpose of this step was to eliminate all variables that have no significant effect on either dependent

variable, and consequently to identify the control variables that should be explicitly modeled into Trimmed Model 1. I examined the following potential control variables:

- ❑ *Demographics*: Gender, age, income, and education
- ❑ *Chronic Illness Related and Other Variables*: Number of other chronic conditions, duration of illness, number of adherence items recommended, risk perceptions, co-production, knowledge, and life satisfaction

All the variables are measured on ordinal or numeric scales except for Gender. Gender was controlled for by constraining estimates to be equal for males and females in order to estimate the best fitting model for both groups. As I have just mentioned, I first tested the effects of the control variables on the independent variables only, outside the context of Trimmed Model 1. Table 5.27 summarizes the direction and significance of the effects of control variables on compliance and satisfaction with the treatment regimen, after controlling for gender.

The significant control variables were then explicitly modeled in Trimmed Model 1, except for gender, which was controlled for by setting equal estimates for males and females. When tested within the context of the Trimmed Model 1 with perceptions of control and hope, only the following control variables had significant effects on the dependent variables: Age, knowledge, and co-production had significant positive effects on compliance; co-production and life satisfaction had significant positive effects on treatment satisfaction.

Table 5.27. Control Variables: Effects on Compliance and Satisfaction with Medical Regimen

Control Variables	Compliance	Satisfaction
Age	Significant Positive**	No effect
Income	Significant Negative*	No effect
Education	No effect	No effect
Number of other chronic conditions	No effect	Significant Positive*
Duration of Diabetes Type II	No effect	No effect
Number of adherence items	Significant Positive*	No effect
Risk perceptions	No effect	No effect
Knowledge	Significant Positive**	Significant Positive**
Co-production	Significant Positive**	Significant Positive**
Life satisfaction	Significant Positive**	Significant Positive**

*p < 0.05; ** p < 0.01

The next step was to modify the Trimmed Model 1 with control variables by trimming the insignificant paths and adding the modification indices recommended by AMOS for the control variables. This resulted in, what I will refer to from this point forward as the Final Model. Information about the estimates for control variables are provided in Table 5.28. Table 5.29 provides the path analysis results for the Final Model after controlling for **gender**, and explicitly modeling **age, knowledge, co-production, and life satisfaction** as covariates (control variables) (Fletcher, Selgrade, and Germano 2006).

Table 5.28. Path Analysis Results: Estimates for Control Variables

<i>Paths</i>	Unstd. Path Coefficient	Std. Path Coefficient	Standard Error	Bias-Corrected p-value
<i>Direct Effects</i>				
Age → Compliance	4.599	.187	.056	.004
Knowledge → Compliance	3.328	.161	.070	.033
Co-Production → Compliance	2.741	.182	.064	.011
Co-Production → Satisfaction	1.631	.160	.055	.005
Life Satisfaction → Satisfaction	3.276	.223	.059	.002

Table 5.29. Path Analysis Results for Final Model

<i>Paths</i>	Unstd. Path Coefficient	Std. Path Coefficient	Standard Error	Bias-Corrected p-value
<i>Direct Effects</i>				
Self-Efficacy → Compliance	.424	.119	.078	.124
IHLC → Compliance	.403	.117	.063	.054
PHLC Doctors → Compliance	.299	.045	.072	.507
PHLC Others → Compliance	-.570	-.112	.066	.073
CHLC → Compliance	.568	.212	.062	.002
Self-Efficacy → Satisfaction	1.084	.448	.059	.002
IHLC → Satisfaction	.205	.088	.053	.115
PHLC Doctors → Satisfaction	.562	.123	.057	.033
CHLC → Satisfaction	.216	.119	.050	.025
Self-Efficacy → Hope	.553	.539	.051	.002
PHLC Doctors → Hope	.284	.147	.059	.020
Hope → Compliance	.758	.218	.066	.003
Hope → Satisfaction	.026	.011	.069	.883
<i>Indirect Effects</i>				
Self-Efficacy → Compliance	.419	.117	.040	.002
PHLC Doctors → Compliance	.215	.032	.017	.012
Self-Efficacy → Satisfaction	.014	.006	.036	.883
PHLC Doctors → Satisfaction	.007	.002	.011	.840
<i>Model Fit Statistics</i>				
χ^2	170.124 (p-value = .001)			
d.f.	119			
CFI	.936			
NFI	.818			
RMSEA	.044			
AIC	292.124			
<i>Variance Explained (R²)</i>				
Compliance	.341			
Treatment Satisfaction	.510			
Hope	.353			

After controlling for gender, age, co-production, knowledge, and life satisfaction, hope becomes a full mediator of the effects of both PHLC doctors and self-efficacy on compliance. That is, PHLC doctors and self-efficacy have significant positive indirect effects on compliance through hope and their direct effects on compliance are insignificant. The only dimension of perceptions of control that has a direct positive effect on compliance is CHLC. For compliance as the dependent variable, these findings are consistent with the findings from Trimmed Model 1, with the only difference that the effect of PHLC others is no longer significant and that the effect of self-efficacy on compliance is now fully mediated by hope rather than partially. In contrast, for treatment satisfaction as the dependent variable, the model is quite different. The effect of hope on treatment satisfaction is no longer significant; consequently, the role of hope as a mediator as well as the indirect effects of PHLC doctors and self-efficacy on treatment satisfaction disappear. In terms of the direct effects on treatment satisfaction, self-efficacy, PHLC doctors and CHLC still have significant positive direct effects, but the effect of IHLC on treatment satisfaction is no longer significant. Figure 5.8 graphically depicts these results.

The results in this final section of chapter 5 indicate that the important role of hope as a mediator – between perceptions of control dimensions and compliance with treatment recommendations – holds up strongly even after controlling for patient demographics and other relevant illness related variables. Contrary to my expectations, the effect of hope on treatment satisfaction is not significant in the Final Model. However, the larger Akaike Information Criterion for the Final Model (AIC = 292.124) indicates that it has a much

worse fit than Trimmed Model 1 (AIC = 82.599). This should be taken into consideration when interpreting the results of the Final Model, which are less reliable than the results of Trimmed Model 1. In fact, the introduction of control variables to Trimmed Model 1 did not influence the proportion of variance explained for treatment satisfaction (Final Model $R^2 = .510$; Trimmed Model 1 $R^2 = .511$) and led to a decrease in the variance explained for hope (Final Model $R^2 = .353$; Trimmed Model 1 $R^2 = .405$). This later effect might be due to the addition of life satisfaction, a construct which is highly correlated with both treatment satisfaction and hope. The addition of life satisfaction to the model as a covariate affecting treatment satisfaction might have masked the effect of hope on treatment satisfaction.

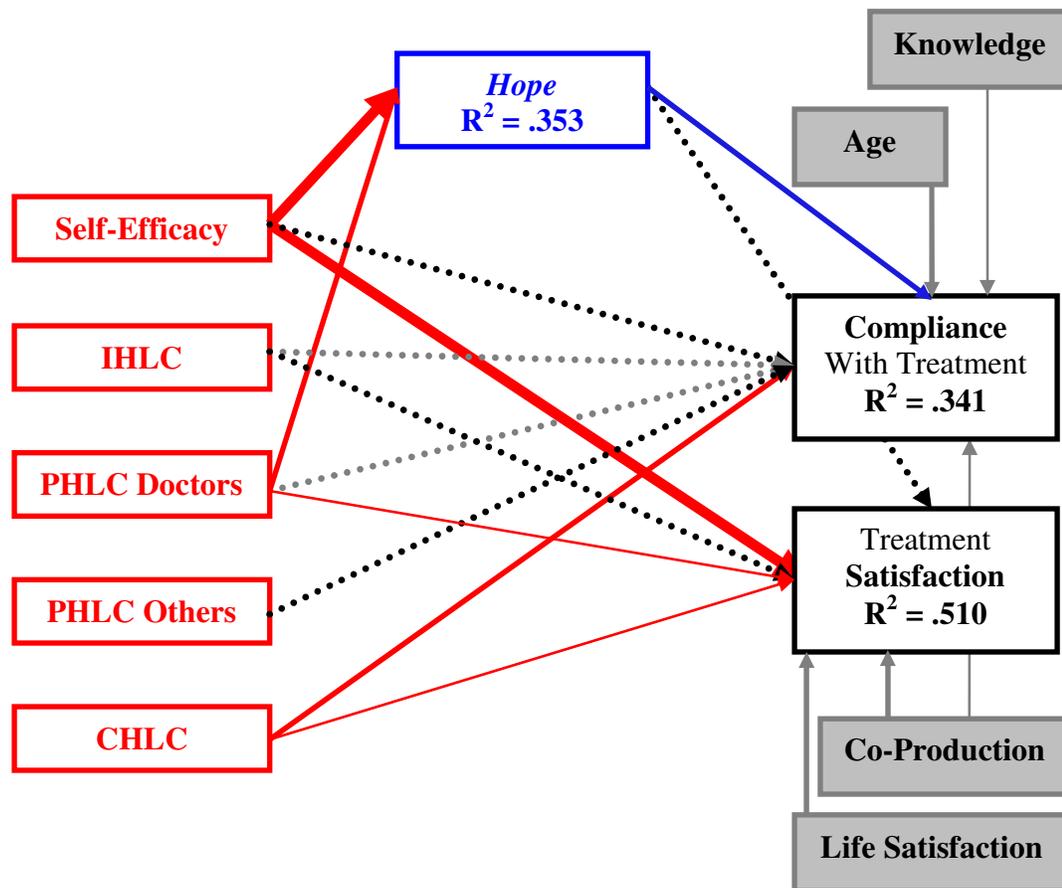


Figure 5.8. Final Model - Results¹¹

¹¹ Thicker arrows represent large effects (around .5); Thinner arrows represent weak effects ($p < .05$); Dotted arrows represent insignificant effects; Control variables are represented in gray boxes; Gender was also controlled for

CHAPTER 6

DISCUSSION

Major Findings

The purpose of this dissertation was to develop a model of health behavior and health service evaluation that incorporates perceptions of control and the emotion of hope. Social cognition models, commonly used in health behavior research, have emphasized the role of perceptions of control as a central component in shaping health behavior. In particular, the constructs of Locus of Control (Rotter 1954) and Self-Efficacy (Bandura 1977) have dominated the health behavior research literature. However, one major limitation of existing health behavior models is their lack of attention to emotions (Brewer and Rimer 2008). The basic premise of the formulation offered here is that the emotion of hope can play an important mediating role between perceptions of control and health behavior and health service evaluation. More specifically, this research focuses on the dynamics between perceptions of control and hope and their simultaneous effects on two health-related outcome variables: compliance with the medical regimen and treatment satisfaction.

Based on the literature, I proposed three competing models about the relationship between hope and perceptions of control and how these two constructs simultaneously affect compliance and satisfaction with the medical regimen. This study empirically tested the models in the context of a lifestyle changing chronic illness: Diabetes Type II. The study findings contribute to transformative consumer research by tackling the

fundamental problem of compliance with the medical treatments in general, and for individuals with Diabetes Type II, more specifically. Moreover, this study provides immediate practical implications to health care providers; thus allowing for a better understanding of potential antecedents for both compliance and satisfaction with medical treatments, and consequently engaging in the enhancement of consumer satisfaction and welfare. Table 6.1 provides a summary of these findings detailed in chapter 5.

Chapter 6 provides a summary of the major findings of the research, describes the limitations of the study, and advances implications for future research and for practice. This section starts with an outline of the research steps leading into the discussion of the study results.

Table 6.1. Summary of Data Analysis and Results

	Compliance with Diabetes Regimen	Diabetes Treatment Satisfaction
<i>Hierarchical Regression Results</i>		
Self-Efficacy	Positive**	Positive***
IHLC	Positive*	Positive*
PHLC Doctors	None	Positive**
PHLC Others	Negative*	None
CHLC	Positive**	Positive**
Variance Explained R²	.270	.499
Hope	Positive**	Positive*
Variance Explained after adding Hope	.308**	.509*
<i>Path Analysis: Trimmed Model 1</i>		
<i>Direct Effects</i>		
Self-Efficacy	Positive**	Positive***
IHLC	None	Positive*
PHLC Doctors	None	Positive**
PHLC Others	Negative*	None
CHLC	Positive**	Positive**
Hope	Positive**	Positive*
<i>Indirect Effects through Hope</i>		
Self-Efficacy	Positive**	Positive*
IHLC	None	None
PHLC Doctors	Positive**	Positive*
PHLC Others	None	None
CHLC	None	None
Variance Explained R²	.311	.511
<i>Path Analysis: Final Model</i>		
Relevant Control Variables	Gender, Age, Knowledge, Co-Production, Life Satisfaction	
<i>Direct Effects</i>		
Self-Efficacy	None	Positive***
IHLC	None	None
PHLC Doctors	None	Positive*
PHLC Others	None	None
CHLC	Positive**	Positive*
Hope	Positive**	None

Table 6.1. (continued)

	Compliance with Diabetes Regimen	Diabetes Treatment Satisfaction
<i>Indirect Effects through Hope</i>		
Self-Efficacy	Positive**	None
IHLC	None	None
PHLC Doctors	Positive*	None
PHLC Others	None	None
CHLC	None	None
Variance Explained R²	.341	.510

*Result is significant at $p < .05$; **Result is significant at $p < 0.01$; ***Large Effect Size $\approx .5$

First, I employed hierarchical regression models which indicated that including hope, in addition to perceptions of control as a predictor of compliance and satisfaction with treatment regimen, significantly improves the explanation and predictive power for both outcome variables. Hope was conceptualized as a “confident yet uncertain expectation of achieving a future good” (Herth 1992, 1253). The combination of perceptions of control and hope accounted for around 31% and 51% of the variance in compliance with the treatment regimen and treatment satisfaction respectively. These findings are consistent with previous research about the role of hope in consumer well-being; higher levels of hope have been associated with higher medical regimen adherence (Snyder 2002) and higher satisfaction with the service (MacInnis and De Mello 2005). These results also validate the main foundation of this dissertation, which is the importance of investigating the role of positive emotions such as hope when trying to predict consumer behavior and service evaluation.

Second, three competing models representing alternative descriptions of the relationship between perceptions of control and hope, were tested. The results revealed that Roseman's (1984) proposition that hope is elicited when an event or outcome is appraised as caused by impersonal circumstances was rejected. Chance Health Locus of Control or individuals' expectancy that "their health is owing to chance or fate" (Norman and Bennett 1996, 64), was not found to be a significant predictor of the emotion of hope. Furthermore, the results did not support the alternative model based on Weiner's (1985) attribution theory and the appraisal theories proposed by Lazarus (1999) and Johnson and Stewart (2004), among others, and which suggests that the dimensions of locus and controllability or the dimension of agency, which are represented by perceptions of control, are irrelevant to hope. In fact, the fit of this model was significantly worse than that of a model casting hope as a mediator between perceptions of control and compliance and treatment satisfaction. This indicates that it does not suffice to include hope as a predictor of compliance and satisfaction along with perceptions of control dimensions. Based on the findings here, hope should be modeled as a mediator in the formulation of compliance and satisfaction with the treatment regimen. Such a finding has significant implications for consumer research especially when it comes to high involvement services such as medical services. I discuss these implications in more details further in the chapter.

Third, path analyses results suggested the development of a model of hope and control depicting the relationship between these two constructs and their effects on compliance and satisfaction, where hope acts as a mediator for the effects of certain dimensions of

perceptions of control. This same model was tested after controlling for gender, age, knowledge, co-production, and life satisfaction. The following sections present the major findings of the developed model.

Antecedents of Compliance with the Treatment Regimen

For our sample of Diabetes Type II patients, the developed model suggests that:

Internal Health Locus of Control (IHLC) – the belief that one’s health is owing to one’s actions – has no significant effect on patient compliance with the treatment. Although, the result is inconsistent with this study’s predictions, previous researchers have found that IHLC was a “relatively weak predictor of health behavior” (Corner and Norman 1996, 10); some studies have reported a positive effect of IHLC on compliance, while others have found that this effect is insignificant. Ajzen (2002) suggested that the lack of results might be due to the exclusion of other factors such as self-efficacy, which was the reason behind Wallston’s (1992) attempt to improve the predictive power of Health Locus of Control by combining it with self-efficacy beliefs. In this study, the inclusion of self-efficacy as a dimension of perceptions of control did not improve the predictive power of IHLC. In fact, the results indicated that there was no significant interaction effect between IHLC and self-efficacy on compliance with the treatment as suggested by Wallston (1989) and Walker (2001).

Self-efficacy or the “belief in one’s capabilities to organize and execute the course of action required” by the prescribed treatment regimen (Walker 2001) was found to have

a positive effect on compliance; this effect is mediated by hope even after controlling for gender, age, co-production, knowledge, and life satisfaction. This is a major finding of the study, given the importance of self-efficacy as a robust predictor of health behavior (Wallston 1992) and given that there is a “strong case of including self-efficacy in all models of health behavior” (Norman and Connor 1996, 201). This finding is an indicator of two things: First, it provides evidence about the importance of self-efficacy, a measure of control over one’s actions, as a predictor of hope. Second, it advances a proposition about the process by which self-efficacy beliefs lead to higher compliance with treatment recommendations, which is through increasing the individuals’ hope levels.

Powerful Other Health Locus of Control for Doctors (PHLC Doctors), the belief that one’s health is under the control of doctors, has no significant direct effect on compliance with the treatment. However, one major finding of this study is that the effect of PHLC Doctors on compliance is fully mediated by hope; the indirect effect of PHLC Doctors on compliance with the treatment through hope is significant and positive. This result is very interesting; it suggests that an individual’s belief that his or her health is under the control of physicians, increases the individual’s level of compliance with the treatment prescribed by these physicians by eliciting a higher level of hope that the treatments will lead to positive health outcomes. Also, this finding can provide one explanation to the unstable association between PHLC and compliance found by Steptoe and Wardle (2001) who have not accounted for the effects of positive emotions such as hope. To explain their finding that PHLC Doctors can in some cases

have a negative effect on compliance, Steptoe and Wardle (2001) have posited that people's belief that powerful health professionals have control over their health can lead to lower levels of compliance when these beliefs were associated with health professionals' capabilities to solve health problems occurring due to lack of compliance. The results of this study offer another explanation by suggesting that higher PHLC Doctors leads to higher compliance through hope, i.e. the effect of PHLC Doctors on compliance is positive only when it leads to higher levels of hope.

As predicted, Powerful Others Health Locus of Control for other people (PHLC Others) – the belief that one's health is owing to powerful others different from doctors – has a negative direct effect on compliance with the treatment; but this effect becomes insignificant when gender, age, co-production, knowledge, and life satisfaction are controlled for. This finding is consistent with previous research (Wallston 2005 b) and is not surprising, given that the belief that one's health is owing to other people who are not health professionals, can increase the uncertainty surrounding health outcomes and consequently decrease the likelihood of positive health behaviors such as compliance with the treatment regimen.

One unexpected finding was the significant positive effect of Chance Health Locus of Control (CHLC) – the belief that one's health is owing to fate or chance – on compliance with the treatment. This result is also inconsistent with previous research findings (Wallston 2005 b; Steptoe and Wardle 2001). However, although there are no studies that have found a similar empirical result, Norman and Bennet (1996) posited

that CHLC can have a positive effect on coping only when objective control conditions are discouraging or when there is little room for realistic control over the outcomes.

Also, Walker (2001) argued that CHLC can be adaptive when associated with fate and not luck or chance. I believe that the later provides a more suitable explanation for this result since Diabetes Type II does provide enough room for realistic control over health outcomes (Band and Weisz 1990). The Diabetes Type II patients in this study might have viewed CHLC as representing fate more than luck or chance. In fact, around 93% of sample participants reported having a religious affiliation, which might suggest that they emphasize the importance of fate.

Antecedents of Treatment Satisfaction

For our sample of Diabetes Type II patients, the model developed here suggests that self-efficacy, IHLC, PHLC Doctors, and CHLC all have significant positive direct effects on treatment satisfaction.

An important finding of this dissertation was that among other perceptions of control dimensions, self-efficacy is the single most robust predictor of treatment satisfaction. The effect of self-efficacy on treatment satisfaction is significant and large even when compared to effects of control variables such as life satisfaction and co-production.

Previous researchers have emphasized the importance of co-production for customer satisfaction in the services literature and they have posited that the positive effect of co-production can increase perceptions of control over the service production and delivery (Van Raaj and Pruyn 1998). The findings from this study transcend these relationships to

suggest that self-efficacy or perceptions of control over the actions required by the treatment regimen, is a robust predictor of satisfaction with the health service (particularly the Diabetes Type II treatment), even after controlling for co-production. Also, the effect of self-efficacy on treatment satisfaction is partially mediated by hope but that mediation is attenuated when gender, age, co-production, and life satisfaction are controlled for. Here it is important to remind the reader that self-efficacy is assumed to reflect the perceived ease or difficulty of performing a behavior, where when individuals believe they are more capable of performing a behavior, they might perceive that behavior as easy. It is thus not surprising that if individuals perceive the treatment regimen as easier to perform (higher self-efficacy), they are more satisfied with it and they are more hopeful that they will reach positive health outcomes because they are more likely to actually perform the actions recommended by their physicians.

It was expected that an increase in perceptions of internal control (IHLC) over the service outcomes, in this case the outcomes of the Diabetes Type II treatment, would have a positive effect on treatment satisfaction. This effect was found to be moderated by self-efficacy, which being the strongest predictor of treatment satisfaction, can mask the effect of IHLC when it is high. That is, at higher levels of self-efficacy, there is a decrease in the effect of IHLC. In fact, the effect of IHLC disappears when age, gender, co-production, and life satisfaction are controlled for; it seems that IHLC is not only a “weak predictor of health behavior” (Corner and Norman 1996, 10) but also a weak predictor of satisfaction. As mentioned before, the negative interaction effect between self-efficacy and IHLC might be due to the occurrence of the following: when people

perceive an action as more difficult to perform (low self-efficacy), it becomes more important for them that performing this action will lead to positive outcomes.

Otherwise, the effort spent in performing a difficult action will be in vain; hence, the higher importance of IHLC under low self-efficacy.

The positive effects of PHLC Doctors and CHLC were unexpected. These effects remained significant even after controlling for gender, age, co-production, and life satisfaction. One explanation for the positive effect of PHLC Doctors is that when patients believe that their physicians have control over their health outcomes, the prescribed treatment regimen might be perceived as more reliable and trustworthy which consequently might increase satisfaction with the treatment. Also, under the no control condition, the effect of PHLC Doctors is partially mediated by hope. This indicates that the increased level of hope due to increased PHLC Doctors holds up with treatment satisfaction as the outcome variable and that a higher level of powerful doctors locus of control increases treatment satisfaction, partially by increasing the patient's level of hope that the treatment will lead to positive health outcomes.

The positive effect on treatment satisfaction of believing that one's health outcomes are owing to fate, chance, or luck (CHLC), is much harder to explain. In fact, the scarcity of existing research in the services literature, about the effects of perceptions of control on satisfaction, prevented me from offering alternative reasons for this observation. I expected that higher levels of CHLC will undermine the consistency dimension of service quality and consequently lead to negative attitudes towards the service which in

this case would be a lower satisfaction with the medical treatment, but this proposition was not supported by the results.

The Mediating Role of Hope

The primary findings of this research underscore the role of hope in guiding patient behavior and judgment of satisfaction. Hope has a positive direct effect on both compliance and satisfaction with the medical treatment and that it mediates the effects of perceptions of control on these outcome variables. In particular, the results revealed that hope mediates the effects of self-efficacy and PHLC Doctors on compliance and satisfaction. This mediation is full for compliance after we control for gender, age, co-production, knowledge, and life satisfaction; and only partial for treatment satisfaction under the no control condition. The positive effect of hope on compliance and satisfaction with the prescribed treatment is consistent with previous research findings and propositions (Moon et al. 2001; Snyder 2001; and MacInnis and De Mello 2005). Furthermore, higher levels of hope are associated with only two dimensions of perceived control: self-efficacy, which has a significant and relatively large effect on hope, and PHLC Doctors. This finding only offers partial support for Walker's (2001) notion that high levels of perceived control emanating from self, others, or chance lead to lower levels of hopelessness. It appears that individuals have higher levels of hope only to the extent that they believe they are capable of performing the actions required by their Diabetes Type II treatment, and/or that their health outcomes are under the control of powerful doctors. These two dimensions of control lead to higher levels of compliance and satisfaction with the treatment regimen through hope. Given that self-

efficacy was found to be among the most robust predictors of both compliance health behaviors and treatment satisfaction, the role of hope as a mediator of the effects of self-efficacy on health behavior and health service evaluation becomes even more fundamental.

The insignificant effect of hope on satisfaction after controlling for gender, age, co-production, and life satisfaction might be due to the high correlation between life satisfaction with both hope and treatment satisfaction. In other words, the addition of life satisfaction as a predictor of treatment satisfaction might have masked the effect of hope. An individual's high level of satisfaction with different aspects of his or her life could have transferred to other aspects such as satisfaction with the medical treatment, in a manner similar to a halo effect. This would mean that the significant effect of hope on satisfaction found before controlling for life satisfaction remains compelling.

Although the results of this study are more suggestive than conclusive, they put forward a new understanding of the process by which perceptions of control affect compliance health behaviors and health service evaluation in the context of a service (medical treatment) provided to patients living with a lifestyle changing chronic illness (Diabetes Type II). This process introduces an important player in a new model of health behavior and health service evaluation: the positive emotion of hope which acts as a mediator between perceptions of control and compliance and satisfaction with the treatment regimen.

Limitations

There are several potential limitations for this dissertation, the most important of which is the use of the Model Development Approach in SEM. Although the most commonly found in the literature, this approach confirms models in a post-hoc manner and therefore may result in models that are not stable and thus might not fit new data.

Cross-validation of the proposed model using an independent validation sample would be required before drawing definitive conclusions about the reliability of the findings in the context studied (Kline 2005). This and other potential limitations of the study need to be taken into account when assessing the results and the possibilities for generalization.

The first limitation pertains to the sample and data collection method used, particularly the use of cross-sectional data and the choice of one chronic illness: Diabetes Type II. As mentioned earlier, the empirical data was collected using a cross-sectional research design. This limits the contribution of the research findings in that it does not allow for observing the dynamics between hope and control and their effects on compliance and satisfaction with the treatment over time, throughout the progression of the chronic illness. Heszen-Niejodek, Gottschalk, and Januszek (1999) have found that emotions of anxiety and hope for patients living with three different kinds of illnesses – primary hypertension, myocardial infarction, and cancer of the lungs and pharynx – change over time. Also, this study tests the model in the context of only one chronic illness Diabetes Type II. Although this illness was chosen for sound reasons explained in chapter 4, it seems reasonable to expect that hope and perceptions of control might have greater or

lesser influence on compliance and treatment satisfaction depending on the chronic illness studied.

The second limitation is concerned with measurements used, specifically the potential boundaries of the conceptualizations for hope and perceptions of control. The conceptualization of control in my dissertation is centered on ‘managing the illness’, which does not distinguish between control over the central event and control over its consequences. In health research, control has most frequently been classified according to the scope or domain of control. Some classifications categories include: General health control vs. symptom control vs. retrospective control (Sirois, Davis, and Morgan 2006) and control over the central event vs. control over the consequences of an event (Thompson, Nanni, and Levine 1994; Thompson et al. 1993). The “compensatory model of control” states that individuals faced with one uncontrollable situation compensate for that lack of control by increasing self-efficacy in other areas and this allows them to maintain high general perceptions of control (Thompson et al. 1993). Control measured using health locus of control and self-efficacy is limited in scope and does not allow for the observation of control shifts from one domain to the other, when perceptions of loss of control occur. Another limitation related to my conceptualization of perceptions of control is that it does not incorporate health value, desire for control, or perceived support from others for behavior change, which are all necessary to reflect perceptions of control (Walker 2001). The Herth Hope Index (HHI) used to measure hope is also limited in that it is a general measure reflecting the individual’s level of hope overall and not specific to the chronic illness in question. Ajzen and Fishbein (1974) have noted that it is important

to measure attitudes and behaviors at the same level of specificity to get better correlations and better predictive power for a model (Norman and Conner 1996).

Although hope is an emotion and not an attitude, future research on hope should develop valid and reliable measurement scales that measure hope in relation to a specific event, outcome, or medical condition.

The last limitation is associated with the use of constructs as single item composite observed measures in the data analysis. Rather than modeling the composites – computed from the scales used in this study (HHI, MHLC, PDSMS, GAS, and TSQ) – as latent variables with error terms using the correction for attenuation method, these constructs were modeled in path analyses as observed measures. This is a potential problem for exogenous variables (Perceptions of Control Dimensions) because observed exogenous variables are assumed to be measured without error in SEM. This assumption might lead to biased estimates for the coefficients of exogenous variables (Kline 2005). This limitation does not disqualify the structural equation modeling results in this study because the observed variables approach has been shown to generate more conservative estimates and it “remains a commonly used, valid, and viable approach” appropriate for single item or composite measures (Stephenson and Holbert 2003, 334).

The contributions provided by this dissertation should be carefully evaluated in view of these limitations; at the same time, the limitations should be viewed as avenues for future research.

Conclusion and Implications for Research and Practice

In summary, this dissertation yielded a new model of health behavior and health service evaluation which incorporates the emotion of hope in addition to perceptions of control. The empirical investigation of the model in the context of Diabetes Type II produced a fresh approach to the understanding of the process by which perceptions of control affect compliance and satisfaction with medical treatments. This dissertation tried to address one major research gap in the health behavior literature, which is the role of positive emotions such as hope (Glanz and Schwatz 2008). It also responds to MacInnis and De Mello's (2005) call for future research examining propositions about the role of hope in consumer consumption, attitudes, product choice, and satisfaction. Except for one study by De Mello, MacInnis, and Stewart (2007), the effect of hope on satisfaction with a product or service has not been empirically investigated in the marketing literature.

Furthermore, to my knowledge, this is the first study that empirically investigates the relationship between hope and perceptions of control, and more specifically their mutual effects on compliance and satisfaction with the medical treatment. One research area identified as a major gap in the literature is the introduction of positive emotions such as hope as antecedents to health behavior, along with perceptions of control which have been central to existing models of health behavior (Glanz and Schwartz 2008). Studying the role of the specific positive emotion of hope is very valuable given its vital importance to human beings (Lazarus 1999). By tackling the vital emotion of hope and perceptions of control as antecedents to compliance and satisfaction with medical

treatments, specifically in the context of chronic illnesses – the number one cause of death in the United States and globally – this dissertation takes a step towards the enhancement of consumer welfare and contributes to transformative consumer research.

Future Directions for Research

Future research should address the limitations of this dissertation first, by extending the study to chronic illnesses other than Diabetes Types II to establish the model's generalizability across medical conditions; and second, by testing the proposed model using longitudinal data to observe how the levels of hope and control and the relationship between them changes over time, and to check whether the model reliably portrays the simultaneous effects of hope and perceptions of control on compliance and satisfaction over the progression of the chronic illness.

In my view, further research should include a closer investigation of the potential influences of key constructs such as health beliefs and risk perceptions, which are represented in the majority of health behavior models. Future studies should incorporate these constructs explicitly in the proposed model rather than considering them control variables. The role of hopefulness in patients' evaluation of risks and payoffs of medical treatments is one aspect of consumer behavior and marketing that the existing literature has failed to explore (Berry and Bendapudi 2007). One option could be to model perceived risk as a moderator of the effects of both hope and perceptions of control on compliance behaviors as suggested by inferences from the research of Helgeson (1992), Bolton, Cohen and Bloom (2006), and MacInnis and

DeMello (2005). Another important key construct which is central to services marketing is co-production. In this study, co-production was only considered as a control variable affecting compliance and satisfaction with the treatment. Future research should empirically investigate the relationship between co-production and perceptions of control dimensions, or co-production and hope. In the context of individuals living with chronic illnesses, co-production of the medical service might be a significant antecedent of both self-efficacy and hope. Co-production can be manifested, for example, through patients participating in the choice of a treatment regimen that they deem most suitable given their lifestyles, searching for information about the chronic illness, their current treatment, or new treatments, and sharing of that information with their physicians...

Although there is a great potential for marketing research studies in the health care field (Berry and Bendapudi 2007), future research should extend the findings of this dissertation to other fields, mainly professional services fields such as consulting. Any organization providing professional services can benefit from a model that incorporates perceptions of control – over the outcomes of the service (locus of control) and over the actions required by the customer to successfully consume the service (self-efficacy) – and hope that the service will lead to desired outcomes. These two constructs: perceptions of control and hope can play an important role in increasing the organization's understanding of consumers' performance of the actions required by the service (such as the implementation of a consultant's recommendations) and of consumers' satisfaction with the service, which is a central goal for any organization.

Implications for Practice

The two main research findings about the importance of self-efficacy as a predictor of both compliance and satisfaction, and about the role of hope as a mediator of the effects of self-efficacy and powerful others locus of control doctors (PHLC Doctors) on these outcome variables, have practical relevance to practitioners in the health care industry, especially physicians. First, they reveal that it is important for physicians to work with patients, especially chronic illness patients who have to continuously comply with medical recommendations for extended periods of time, to come up with treatment regimens that are perceived by patients as possible and relatively easy to follow. Patients' beliefs that they are capable of performing the actions required by their treatment, high self-efficacy, lead to higher levels of compliance and satisfaction with the treatment regimen recommended. Also, physicians can increase levels of compliance and satisfaction with the treatment by exhibiting signs of being in control of the medical situation or having control over the patient's health outcomes. Health providers' actions such as: appearing to know all they need to know about the disease, saying that the pain will be controlled, being occasionally humorous, and offering answers to the patient's questions can induce higher levels of hope (Clayton et al. 2008), which consequently lead to more compliance and satisfaction.

The implications of this research go beyond health care services and physicians. They suggest that providers of products and services, especially services that are relatively complicated such as health care, should not merely focus on the attributes of their products or services. Rather, they should realize that consumer satisfaction with a

product or service depends on their level of hope that the desired outcome can be achieved, and their belief that they are capable of performing the actions required in consuming the product or service. This could be as simple as the belief that they are capable of using the product or service correctly and effectively. Self-efficacy beliefs not only increase satisfaction with the product or service, but also the likelihood of complying with the product or service requirements. In today's marketing era, there is an increased focus on the role of the consumer as a co-producer of products and services; particularly professional service firms from hair salons to consulting firms are characterized with increased consumer participation in the production and delivery of their services. To enable successful co-production of services, which could be thought of as compliance with the service requirements, firms must ensure that they have the right strategy to increase consumers' self-efficacy beliefs. This strategy could for example focus on consumer training and the provision of necessary information, in a way that increases consumer confidence in their capability of performing the requirements of the service. This study suggests that a focus on increasing consumers' beliefs in these capabilities can lead to higher levels of hope that the outcome desired will be reached and consequently to higher levels of customer satisfaction.

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APPENDIX A
PRELIMINARY PHASE

**Exploring Perceptions, Emotions and Behaviors of Chronic Illness Patients
through In-Depth Interviews
*In-Depth Interview Script***

Preliminary Questions

Today's Date:

Place:

Time:

Interviewer's Name:

Subject's Assigned (Fake) Name:

Gender:

Highest Education Level:

Age:

Income Level:

Marital Status:

Type of Insurance Coverage:

Number and ages of Children:

Health Related Questions

What chronic illness were you diagnosed for? Can you briefly describe your condition?

When were you diagnosed?

What were your initial reactions to the diagnosis? How did they change overtime? What are the bases for these changes (Support, Information...)?

Were you referred to a specialist? Are you still with the same specialist?

Are there other medical personnel who help you care for your health? Who are they?

Where do you go for your care?

How would you describe your relationship with your doctors? Other health personnel?

The hospital itself?

Co-production and Compliance Measures

Co-production:

Did you ask your doctor to:

- Explain your problem and tell you about the information you need to know?
- Explain clearly what you are supposed to do and how you can help yourself?
- Clarify things you do not understand?
- Tell you about all the problems you should anticipate?

Did you tell your doctor:

- What you expect him or her to do?
- About information you found online or heard from friends that relate to your case?
- Your preferences for treatment?

Have you disagreed with your doctor? How many times did you have these disagreements? How were they resolved?

Were you at any point confused about what your doctor said about your diagnosis, treatment, or risks? Please explain

How knowledgeable do you consider yourself to be about your condition?
What information you learned was most useful to you?

Compliance:

What behaviors were prescribed as part of your treatment?

To what extent do you believe you perform these behaviors?

Taking your medication on time

Following nutrition, exercise or other guidelines recommended by your doctor

If you don't follow guidelines closely, what are the reasons that prohibit you from doing so?

What guidelines are the hardest for you to follow? What can make it easier?

Relative to other people you know who suffer from the same condition, how well do you follow your doctor's instructions?

Risk Perceptions Questions

What complications do you think can occur if you were not to follow doctor's guidelines and orders?

In your opinion, how likely are these problems to happen to you? When do you think these problems would happen?

Lifestyle Change and Quality of Life Questions

How did your chronic illness diagnosis affect your life overall?

What were the major changes that occurred at home (with your family members)? at work? in your social life? and with your financial situation?

Hope

While living with a chronic condition, there are ups and downs. Can you tell me about the good days and the bad days? How do you keep going?

Control

Do you feel that you have control over your health? Based on your past experience, how much does your behavior affect your treatment outcomes?

If your condition worsens or gets better, what or who do you believe would be the main contributor to this setback or improvement? Please Explain

Can you describe how difficult or easy it has been for you to manage your chronic illness?

Satisfaction

Are you satisfied with: Your specialist? Other care providers? Your Hospital or Clinic? Would you recommend them to someone with a similar condition?

How do you feel about your treatment? Are you satisfied with it? What would you like to change in regards to your treatment? Would you recommend it to someone with a similar condition?

How do you feel about your current health state? Is it better or worse than you expected it to be at this point?

If you were to go to a new doctor, how would you briefly describe your health condition, your response to treatment, and your relationship with your previous doctor?

If you were to describe yourself as a person, is your image of yourself different now than before the diagnosis? How?

At this point, the subject was asked to complete a brief survey which addresses Hope, Control and Satisfaction issues.
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Summary of Qualitative Data Analysis

In-depth interviews were conducted with ten informants who were at some point diagnosed with a chronic condition. Informants were between the ages of 28 and 50, eight females and two males, diagnosed with various chronic conditions including Diabetes Type I, Diabetes Type II, Hypertension Asthma, HIV, and Lupus. The interview lengths ranged between 30 minutes and a little less than two hours. Participants were generally open about their experiences; they were thoughtful about their answers and the interactions between the interviewer and the informants were comfortable, unrestrained, and not hurried. The recorded interviews were transcribed and coded into themes.

A Story Overview: Hope, Control, and Compliance

Julie, 30, Indian Female, Single, PhD, Insulin Resistance for 4 years

Julie sees that her condition has become part of her life. She focuses on having a positive attitude and embracing the diagnosis, which has made her stronger and maybe a better person, according to her testimony. It took her sometime to figure out what works, but then her reported compliance level is relatively good except for some slips in food eating habits. Not everything is under her control in terms of health but she turns to support from medical professional and her family and friends to deal with the loss of control, which frustrates her but then she has to accept it. She is satisfied with her physicians, but not with her treatment, which she believes to be non-holistic. She is fairly satisfied with her health condition. Her hope level is high (43/48).

***Sara, 50, African American Female, Widow with Partner and 4 kids, Some College,
Diabetes Type II for 18 years***

Sara didn't expect to be diagnosed that early with Diabetes Type II. She thought she had more time and she expresses remorse for not taking it seriously. Diabetes education is what helped her most. She even became an advocate for diabetes prevention among her family and friends. She believes that her behaviors are almost the only thing that affects her health and she tries to find the reasons behind any negative outcomes. She hopes that in the future she will be better off than her mother. She is satisfied with her doctors, treatment, and health status. She believes that she is knowledgeable about Diabetes Type II and her compliance level is good. Her hope level is high (43/48).

Dana, 28, Caucasian Female, Single, Graduate Student, Diabetes Type I for 17 years

Dana learned to accept herself. She had hopes about medical advances being able to cure Diabetes Type I but now she avoids reading about new studies so that she does not have false hope. She however mentions her hope for a cure when asked about the future. She does not believe in giving up because she has responsibilities that she has to always meet. However, she does not feel in control over her health. She is not satisfied with her health status because she thought she would be cured by now. She is very satisfied with her physicians because they are proactive. She has to comply with medication but sometimes chooses not to comply with diet and exercise and pays for it later. Her hope level is moderate (38/48).

Allen, 29, Caucasian Male, Married with one kid, PhD Student, Multiple Conditions including Asthma for 14 years, GERD and Hypersonmia for 1 year

Allen was relieved to find that his fatigue and continuous illness had a medical reason. He is very satisfied with his physicians and does not in any way believe that he is more knowledgeable than them. He looks up treatment information online for drug facts and he has trouble complying with many recommendations mainly because of laziness or absent mindedness. He believes that he is in control of his health but feels helpless occasionally. He is not satisfied with his treatment because it is not convenient and he believes that his health is much worse than he had expected it to be at this age. He has a moderate level of hope (38/48).

Harry, 41, Caucasian Male, Married, Hemiplegia for 7 years

Harry had decided to fight to get back to normal since the day he was diagnosed. He refused to give up when he was told that he will never walk up steps again and that he will be in the wheelchair all his life. He took the most aggressive approach possible to treatment and has achieved almost miraculous results by being able to walk again. He is very well informed about his condition and believes that his current doctor has little more to give so he is ready to move to someone new. The only reason he mentioned for occasionally not complying with treatment recommendations is life interventions and unexpected workloads. He believes that his compliance levels are certainly higher than anyone else and he believes that his actions are the primary thing affecting his health. He is very satisfied with his treatments and health status. His hope level is high (44/48).

Rachel, 29, Caucasian Female, Single, PhD student, Superior Mesenteric Artery for 4 years

Rachel was confused about her diagnosis because it is a very rare condition. She is still confused about the possible future progression of her disease. The uncertainties surrounding her condition are what frustrate her most. She feels helpless when she is sick but she hopes that the next day will be better; she feels hopeful during the good days. She does not always comply with things such as not drinking because she is uncertain about the intensity of its effects on her condition. She gets frustrated for not being able to do what other people can do. She experiences loss of control when she is sick. She is however, satisfied with her current condition because it is better than it had been during previous year. Her level of hope was not measured.

Kathy, 43, Caucasian Female, Married with 4 kids, Graduate Degree, Multiple conditions including Lupus for 9 years, Chronic Sinusitis for 6 years, Hypothyroid for 2 years, and Hypertension for 1 year

Kathy has to take 11 pills daily and that is the hardest part of her treatment regimen: keeping up with pills, prescription refills and doctor appointments. She always complies with the treatment and never feels like a victim. She believes that she is in control of her own health and that her risks of developing something more are minimal and might be only due to age. She is very satisfied with her physician and treatment, and her current health status is fairly satisfactory as it is better than the previous year. Her hope level is very high (47/48).

Nora, 29, Caucasian Female, Single, Graduate Student, Severe Asthma for 24 years

Nora has no memory of life without Asthma: Normal breathing for her is equivalent to emergency room breathing for a normal person. She has lived with asthma for so long that there is nothing new to learn or to ask her physicians about. She follows most of her treatment recommendations because she could not survive otherwise but she is not aggressive in using steroids as early as she should because she does not like their side effects and would rather take the risk. She does not feel that she has control over her health status and her hope level is relatively low (34/48).

Mark, 35, Caucasian Male, Married, PhD, Hypertension for 4 years

Mark was not surprised with his hypertension diagnosis because of his family history. He posits that it is genetic and there is not much that can be done about it. His frustration stems mostly from the physicians and the health insurance system, where he cannot get to a specialist because of all the mazes he has to go through; he finally opted not to see one. He believes that the system is very wrong and he would even self-prescribe medication if he could get access to it abroad. He does not believe that he has control over his health because his actions will not cure him. He hopes that by the time when complications due to hypertension would arise, medical sciences would have improved and his condition would have been cured. He is moderately satisfied with his primary physician because he never expected more from him and he is not satisfied with his health status or with his prescribed treatment regimen. He is the only patient interviewed who wants to move to a higher dose of medication. He does not always comply but that is due to choice depending on events in his daily life. His hope level is relatively low (35/48).

Molly, 37, African American Female, Single, Graduate Degree, HIV positive for 20 years

Molly was really upset when she was diagnosed with HIV and she did not get back on her feet until she realized that she is not going to “drop dead”. She is fairly knowledgeable about her condition but when new questions come up, she asks her physician. She is satisfied with her physician and with her treatment, which works for her. According to Molly, the most difficult thing to deal with is the emotional and psychological consequences. She complies with the treatment in terms of taking the pill, staying connected with support groups, and she tries to exercise regularly. Taking her medication daily and on time is the hardest thing to follow for her. She believes that she has minor risks of moving to different treatments in the future and she believes that she is in control of her health. She is satisfied with her health status, and she has a very high level of hope (46/48).

Principal Emergent Themes

The ethnographic accounts revealed the following perceptions, beliefs, and emotional states as related to living with a chronic condition:

1. Initial Reactions: Shock, Disappointment, Anger, Uncertainty, Confusion, and Frustration... but sometimes Hope and Relief

Informants expressed initial shock, disappointment and anger for having a chronic illness, for being different, for having to live with it for a long time, and for not being able to be like others. Most of the informants were mainly frustrated with the uncertainty

surrounding the diagnosis and/or the possible progression of the disease. Rachel expressed her initial feelings of **uncertainty and confusion** about the diagnosis and about her future:

I still think about how, like if this is going to evolve, if I'm going to feel worse in the future or if I'm going to stay like that. I do feel like I'm uncertain about a lot of things... I don't know clearly what to anticipate... I would like to know about my future, what to expect... I need to know if I should worry or not (Rachel, 29, Caucasian Female, SMA)

Regret was only mentioned by one informant, Sara, who believes that she is in control of her own health and who has high levels of compliance:

I thought I had a few more years to play around and I wish I took it more seriously. I thought I won't get it until my early 60's but to get it in my 40's meant that certain things had to be changed (Sara, 50, African American Female, Diabetes Type II)

Nevertheless, not all of the initial emotional reactions to the diagnosis were negative.

Although to a very limited extent, two informants expressed feelings of hope and relief as part of their initial reactions to being diagnosed with a chronic illness. In one instance, Harry, who suffered from Hemiplegia or cerebral hemorrhage which led to semi paralysis of his left side for seven years, expressed **hope** at the time of diagnosis:

Well it was obviously disappointing, but, I hoped I could overcome it which I have to some extent but, I was told I would never be out of a wheelchair; that was a difficult thing to hear. But fortunately I am no longer in a wheelchair so... (Harry, 41, Caucasian Male, Hemiplegia)

Feelings of relief in being diagnosed was expressed by two informants: Allen and Julie.

Allen, who was diagnosed for multiple conditions including Asthma, GERD or Acid Reflux, Hiatal Hernia, and Idiopathic Hypersomnia, expressed comfort in knowing:

*I felt good that there was an explanation for why I wasn't comfortable
(Rachel, 29, Caucasian Female, SMA)*

Julie, who was diagnosed with Insulin Resistance four years prior to the interview date, had the same initial reaction:

To be honest, because of having issues in the past, it was somewhat, you know, you had a name for it... not that it changes anything but it was more like it had a label and I understand it better... now I know the mystery is solved (Julie, 30, Indian Female, Insulin Resistance)

These expressions of relief further emphasize the negative emotional effects of uncertainty. Being diagnosed provided relief for some informants because it removed the uncertainty associated with not knowing what is wrong with their health or what is happening to them physically.

2. Positive Emotional Change over Time: Relief, Acceptance, Hope, Ability to Manage the Chronic Condition and its Acceptance as Part of Life

Informants' reaction to their respective chronic conditions had changed to more positive ones over time. This change occurred for all the informants and it was, for many of them, the result of knowing that their **condition can be managed** and more specifically, their **ability to manage** their chronic illness, to do something about it, or at least deal with it. The belief that they are able to control their health state led to positive emotional states. This is how the informants expressed their experiences of this change or transition:

I'm really happy that it's under much better control with medication and the steps my doctor suggested taking. So, it's under good control, I'm happy with that (Allen, 29, Caucasian Male, Multiple Conditions)

It was frustrating in the initial phases because I felt impaired or things were like that this was a big handicap to deal with. But then after a certain point, with some support from family and friends, it kind of was okay fine, I can deal with it and now it's like all that it is, is a way of life[...] Positive attitude and acceptance has come in a lot. Again, there was a transition in the initial phase when I used to fight then realized ok I need to solve it and I wanted a solution. Now it's more of an acceptance. The solution is behavioral changes and the way I live life... changes came in as a mandate, now I enjoy it (Julie, 30, Indian Female, Insulin Resistance)

I wasn't sure what's wrong with me, I wasn't sure about anything, and I was frustrated because I didn't think there's hope and that I am just going to keep feeling bad and bad... but then when I actually started feeling better, and that I can do something about it, that actually changed, I feel that it is manageable... Now I feel better, I feel healthy (Rachel, 29, Caucasian Female, SMA)

I realized that after a while, I wasn't going to drop dead and that I had to go back to school. After some time of not being sick, I realized that I might be ok with it. After I realized that I am not physically deteriorating. (Molly, 37, African American Female, HIV)

Some informants were more positive than others and had more acceptance of the chronic illness as part of their life. The main reasons behind the change in reactions mentioned by informants were: Being able to Manage the Illness, Education (knowing more about the diagnosis, the progression, the medication, and about what needs to be done), Support Groups (Listening to other people's stories), Support from Friends and Family, Support from Medical Personnel, Positive Attitude, and Acceptance of Self.

3. Comparison of Self to Others: A Source of Positive and Negative Emotions

There were some instances where informants expressed negative feelings and attitudes such as frustration or inability to cope because of “Not Being Normal like Everybody Else”:

I don't think I can live with this, like dealing with feeling sick or not being able to eat like normal people (Rachel, 29, Caucasian Female, SMA)

The idea of being normal or similar to everyone else came up again for Rachel when she was asked to describe a good day for her:

I think it's a good day when I'm actually like everybody else, and I don't have to do anything. I don't have to take medication for digestive or anti-nausea. I think that's my good day... A typical good day is when I eat like everybody else is eating, even like drink like everybody is drinking... and not feel worse than anybody else (Rachel, 29, Caucasian Female, SMA)

At the same time, comparing self to others who are worse off helped some informants accept their condition and feel better about it. When asked about whether he ever feels sorry for himself, Allen (29, Caucasian Male, Multiple Conditions including Asthma) expressed this by saying:

Yeah, I guess we all feel sorry for ourselves. But I generally am able to frame it and sort of look at the bigger picture, look at other people and what they are going through and realize that all the things I have are minor... A month ago I felt like Oh God I just want to die and the emergency room, but I managed to overhear nurses talking about the guy in the area next to me that had had a brain tumor... he wasn't some old man whose time had come. This was someone my age and I've got a flu; I've got to take pills every day, but that's really nothing compared to the troubles other people dealt with... I don't know I compare myself to others and realize that I 'm still in very fortunate position (Allen, 29, Caucasian Male, Multiple Conditions including Asthma)

Similarly, Julie (30, Indian Female, Insulin Resistance) expressed:

There are times when I get angry about it, I get irritated... why is this happening or it is just annoying to live like this... but I think this is better than that... especially when you see others who have bigger conditions than this then you feel, okay, this is something you can manage (Julie, 30, Indian Female, Insulin Resistance)

Also, Kathy (43, Caucasian Female, Multiple Conditions including Lupus) said:

I never feel sorry for myself; there are so many people worse off (Kathy, 43, Caucasian Female, Multiple Conditions including Lupus)

4. Perceptions of Control over Health: Emotional and Behavioral Consequences

Perceptions of control over their health were different for each informant: Some believed that they were completely in control while other perceived that they had little personal control over their health. However, one common theme among informants was **that loss of personal control made them feel frustrated, helpless, afraid, and a sense of injustice.**

Most of the time, they expressed loss of control over the outcome or over when they feel physically better or worse:

I don't have any control over how my body is going to be, it is very frustrating because I feel it doesn't matter what I do I get really frustrated about doing all this when I feel like this; But I get more rational and feel that maybe it would be a lot worse if I don't do what I have to. The medication affects my health in that it allows it not to get worse than this but there is no control over the setbacks (Nora, 29, Caucasian Female, Severe Asthma)

I don't feel that I have significant control... hypertension is genetic and I don't have either of the two risk factors smoking and being overweight. I blame genetics... Part of it is also about finding a good doctor but you cannot have a good relationship with the doctor these days... I feel that in

many cases it's all on me. At the end of the day, I am really the only one who is responsible for me (Mark, 35 Caucasian Male, Hypertension)

The emotional reactions of Fear, Frustration, Helplessness, and Sense of Injustice, were expressed as consequences of loss of control in the following instances:

I do not feel mostly in control of my diabetes. Why my blood sugar was high the other day... I don't know. I feel really frustrated but I have to accept it... Things that I do affect my health a lot because if I don't do them I will feel much worse but then I get really scared that this is happening and I feel that it is not fair because I am doing everything (Dana, 28, Caucasian Female, Diabetes Type I)

On occasion, I'll feel helpless. Again, it's when I've done what I'm supposed to do. I've taken all my pills. I've gotten a good night sleep and I still feel bad. You know, the allergy pills only do so much... and so you get to a stage where you can't do anything more; you've done all you can. It's frustrating when you've done all you can and you still don't feel better (Allen, 29, Caucasian Male, Multiple Conditions)

In response to loss of control over their health, informants reported dealing with this loss by **going to their physician, seeking support from their family and friends, trying to have a positive attitude about their health condition, and trying to plan ahead for unforeseen health setbacks:**

Going to their Physician

I asked the doctor and she said: you know what, after this point there is nothing you can do about it so just accept it and it's okay because you can't stay frustrated and beat yourself over it (Julie, 30, Indian Female, Single, PhD, Insulin Resistance for 4 years)

I feel like I'm at the doctor all the time, and that's not something I would say I'm happy about. I'm happy that they are there and that they can help me when I need it but I'm not happy that I have to be there (Allen, 29, Caucasian Male, Multiple Conditions including Asthma)

If it [the sickness and symptoms] goes on for a long time then I feel desperate and feel like I really need doctors to solve it for me, because I can't do anything"... "Sometimes I do feel that this is not in my hands, and I think that's when I feel bad... it's just when I feel bad, like with everything I am doing and I am still feeling sick that's when I feel actually bad, when I have to rely on doctors to give me the solution (Rachel, 29, Caucasian Female, SMA)

Trying to have a Positive Attitude about it

A positive attitude really really helps to keep it going and I think that self pity is one thing that one needs to stay away from, because the minute you start sympathizing with yourself then it's like you go downward (Julie, 30, Indian Female, Insulin Resistance)

Planning Ahead

I have some control over my health... [my actions] are clearly the primary factor determining my health but it's certainly not the only factor... the physiological problem controls how your body understands fatigue and so what happens is that I don't really have control over when I am tired... I don't really have control over that, so I just try to prepare for it, plan around it happening and not put myself in a situation where if I get exhausted quickly I can't handle it (Harry, 41, Caucasian Male, Hemiplegia)

In some instances, patients believed that they have full control over their health, and they want to search for all the reasons behind each outcome. Usually with a negative outcome such as high blood sugar level, they blame themselves and seek explanations in terms of what they did wrong and what might have been the cause of that outcome. One such instance is portrayed by Sara (50, African American Female, Diabetes Type II):

I have complete control over my health... sometimes my blood sugar level is high... and I think now I wish I paid more attention to myself. I always look at it, sometimes I do everything I had to do but the blood sugar levels are up, we couldn't figure out why: I go back and think why? Something else must cause it... my sugar is reactive to stress so I know I have to deal with things in life (Sara, 50, African American Female, Diabetes Type II)

In another instance, Kathy (43, Caucasian Female, Multiple conditions including Lupus) expressed being in control of her health which for her meant that she has to face the consequences of her actions:

I have control. Life is what it is and sometimes you have to do your responsibilities. I know if I make a choice, that I will face the consequences (Kathy, 43, Caucasian Female, Multiple conditions including Lupus)

5. Future Disease Progression and Risk Perceptions

The informants were asked about their perceptions of how their condition will progress in the future, and about their risk perceptions in terms of complications happening to them.

A preliminary analysis of the interviews allowed us to outline the following themes:

Perceptions of Disease Progression and Hope for the future

When they were asked to project how their conditions will progress in the future, many informants had hopes for a better future. Some hoped that they would no longer need medication while others hoped that advancement in science will procure a cure:

If I improve my diet and maintain healthy, my health would definitely improve and I might not even need medicine anymore (Molly, 37, African-American Female, HIV)

I might definitely have strokes and possible heart attack. They are pretty likely to happen – maybe in my sixties but I am kind of hoping that science advances and finds a solution for this. I hope that hypertension would go away, I just realized that it's going to be here for the rest of my life (Mark, 35, Caucasian Male, Hypertension)

My hope is that medical advances continue and one day I will not have to deal with it at all and that I will be cured... in terms of progression, I am sure something might occur, but I don't see it progressing to be worse (Dana, 28, Caucasian Female, Diabetes Type I)

Risk of Non-Compliance Perceptions: From Likely Low Risks to Unlikely High Risk

All the informants seem aware and knowledgeable about the complications that might occur to their health as a consequence of not complying with the treatment. The complications that they mention vary from minor ones such as increased fatigue or moving to stronger and higher doses of medication to major complications such as blindness, heart attacks, and even death. The interesting observation from the ethnographic account is that when serious complications are mentioned, these complications are viewed by the informant, as unlikely to occur, although possible:

I could die, I could go to sleep and not wake up if my lungs shut down. I don't think it will happen because I know when I am getting into a dangerous spot (Nora, 29, Caucasian Female, Severe Asthma)

Well, the hypothyroid could lead to death if I don't take the pill but I just don't even think about it... I never forget to take the pill and it's so well controlled with the medication that it's nothing that enters my thought process... Complications if I don't take the allergy medication would be that I get more allergic reactions, I have a harder time breathing it kicks in the asthma, it makes me more susceptible to bronchitis, sinus infections, and things like that... so then it interferes with the ability to sleep well, eat well...it really cascades. The allergies seem to be sort of gateway to a lot of problems (Allen, 29, Caucasian Male, Multiple conditions including Asthma)

If I have the symptoms for prolonged time, I probably should see a physician, because I probably would require surgery... See, I don't feel they are likely to occur to me. I mean, I just think because, I don't know, it's just because I'm doing well I don't think I'm going to be one of those who would actually need the surgery. Maybe I will. I mean, I guess that's the only part that's really unknown for me in this condition, it's that I don't really know what's going to happen to me. But I feel it's unlikely, but it's definitely a possibility (Rachel, 29, Caucasian Female, SMA)

Even when health setbacks are expected to happen, some informants expressed their hope that these setbacks will not occur to them, whether they are major such as going blind or

minor such as moving to higher medication dosage. In one instance, the informant, Julie, expressed that any of these setbacks would cause her to be miserable:

What I know I have to watch out for is neuropathy, my eyes, and cholesterol because my mom has the last two. What scares me most is that I could go blind. My hope is that when I am my mother's age, I will have some complications but not as much as her. Hopefully I will have no cholesterol or eye problems. I am hoping that I will be able to drive (Sara, 50, African American Female, Diabetes Type II)

Overtime with negligence, I expect to have my medicine regimen changed to a higher dose. This will open the door to new side effects... I don't want to switch to a new medicine so I try to follow guidelines as close as I can. I am hoping not to switch. Physically, I would experience fatigue (Molly, 37, African-American Female, HIV)

If I don't comply, it could ruin lots of things... I have been having acute oesophagitis because of this, my food pipe has been eroded significantly. So if I continue to eat what I want to eat and not follow the medications, that's precursor to cancer. Also, sugar, if I eat sugar, Diabetes is the biggest type of immediate threat... I think life is going to be miserable if I don't follow it (Julie, 30, Indian Female, Insulin Resistant)

In two instances, informants who were very high on reported perceptions of control, hope and compliance (Kathy and Harry) emphasized that health setbacks are meant to occur in the future because of age and the nature of life. This however did not stem from feeling helpless but rather from perceived knowledge of how things progress and of the nature of life itself:

Everything has been under control. Lupus can cause kidney damage but I never had these problems. The other thing that could happen is swollen muscles and then I would have to be on steroids for short periods of time. I don't have to be on steroids all the time like many people and that is good because of the side effects. Maybe with age it will get worse, just a guess that things could get more complicated (Kathy, 43, Caucasian Female, Multiple Conditions including Lupus)

*I have to be careful, I mean only having the use of one arm, I need to be careful not to injure my other arm too badly, so the more function I get out of that arm, the more security it can provide me in case I develop something else along the way, which in all honesty, probably more likely than not, someday, that's how life is, yeah, I mean you're going to deal with something at some point; if not now, 50 years from now, who knows
(Harry, 41, Caucasian Male, Hemiplegia)*

APPENDIX B

MEASUREMENT INSTRUMENT

Survey

I am a PhD student and am conducting a research study about emotions and their effects on consumer health decisions for people who have a chronic illness. Therefore, I am looking for volunteers who have Diabetes Type II or other chronic conditions that impact lifestyle such as: Hepatitis C, Multiple Sclerosis, Rheumatoid Arthritis, or Heart Disease.

The purpose of the study is to identify how having a chronic illness affects the feelings of individuals and how these feelings affect health decisions. Participation in this study will require 45 minutes of your time to complete a survey which asks questions related to your chronic illness. Some questions might lead to your emotional discomfort since they pertain to your health status and specifically to a chronic condition you have been dealing with.

The data you will provide will not have personally identifiable information. Also, this survey data will not be linked to any personal information you had provided to Zoomerang when you joined their panel.

1. What best indicates your gender?
 - Female
 - Male

2. What indicates your age range?
 - 18-25
 - 26-35
 - 36-45
 - 46-55
 - 56-65

3. Marital status:
 - Single, never married
 - Married
 - Separated
 - Divorced
 - Widowed

4. Highest education level:
 - Less than high school
 - High school / GED
 - Some college
 - 2-year college degree (associate)
 - 4-year college degree (BA/BS)
 - Master's Degree

- Doctoral Degree
- Professional Degree (MD, JD)

5. What best indicates your race/ethnicity?

- Caucasian
- African-American
- Hispanic
- Asian-Pacific Islander
- Native American
- Multiracial

6. Total yearly household income level:

- Less than \$10,000
- \$10,000 - \$19,999
- \$20,000 - \$29,999
- \$30,000 - \$39,999
- \$40,000 - \$49,999
- \$50,000 - \$59,999
- \$60,000 - \$69,999
- \$70,000 - \$79,999
- \$80,000 - \$89,999
- \$90,000 - \$99,999
- \$100,000 - \$149,000
- More than \$150,000

7. Which if any represents your religious affiliation? **(This question is not mandatory)**

- Protestant Christian
- Roman Catholic
- Evangelical Christian
- Jewish
- Muslim
- Hindu
- Buddhist
- Agnostic
- Atheist

8. Do you have children?

- Yes
- No [Skip Q9]

9. Do you have children under 18 years of age?

- Yes
- No

10. Were you diagnosed with Diabetes Type II?
- Yes
 - No [Out of Survey]
11. What year were you diagnosed with Diabetes Type II? _____
12. Have you been diagnosed with other chronic illnesses?
- Yes
 - No [Skip Q13]
13. Please check all chronic illnesses that you have been diagnosed for, other than Diabetes Type II:
- Diabetes Type I
 - Heart Disease or Angina
 - Arthritis
 - Asthma
 - HIV/AIDS
 - Osteoporosis
 - Other, Please Specify: _____
14. What type of medical coverage or assistance do you receive?
- Employee / School Sponsored Insurance
 - Individual, Family, or Private Insurance (Not sponsored)
 - Medicaid
 - VA for military personnel
 - I have no assistance for medical expenses [Out of Survey]
 - Other, please specify: _____
15. Please specify your main medical care provider (the one that prescribes the treatment regimen for your Diabetes Type II):
- Nurse Practitioner
 - Primary Physician
 - Specialist Physician
 - Physiotherapist
16. Where do you primarily go for your Diabetes Type II care?
- Physician Private Practice
 - Hospital
 - Primary Care Center
 - Infirmary
 - Community Clinic

17. Do you currently belong to a support group related to your Diabetes Type II?
- Yes
 - No [Skip Q18 and 19]

18. What type of support group(s) do you belong to? (Please check all that apply)
- Internet-based community
 - Local community organized support group
 - Hospital / Physician associated support group
 - Other, please specify: _____

19. Please indicate the extent of your agreement or disagreement with the following statements, on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree):

	SD				SA
I get a good deal of help from support group members	1	2	3	4	5
I get a good deal of comfort from being a member of the support group	1	2	3	4	5
I am satisfied with the support group I belong to	1	2	3	4	5
I am an active member of the support group (attend meetings, read postings online if applicable...)	1	2	3	4	5
Relative to others in the support group, I participate more actively in support group activities (attending meetings, online postings, organizing meet-ups...)	1	2	3	4	5

20. **Think about your last few visits to your main care provider in relation to your Diabetes Type II.** Please rate the extent of your agreement or disagreement with the following statements, on a scale of 1 (Strongly Disagree) to 7 (Strongly Agree): [Co-Production Measure JR - Auh et al.]

	SD						SA
I try to work cooperatively with my care provider	1	2	3	4	5	6	7
I do things that make my care provider's job easier	1	2	3	4	5	6	7
I prepare my questions before going to an appointment with my care provider	1	2	3	4	5	6	7
I openly discuss my needs with my care provider to help him/her deliver the best possible treatment	1	2	3	4	5	6	7

21. Please rate the extent of your agreement or disagreement with the following statements about your knowledge of Diabetes Type II, on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree):

	SD				SA
Compared to other Diabetics, I am more knowledgeable about Diabetes Type II	1	2	3	4	5
Compared to other Diabetics, I am more knowledgeable about the treatment regimen I should follow	1	2	3	4	5
Compared to other Diabetics, I am more knowledgeable about the future progression of my Diabetes Type II	1	2	3	4	5

22. On a scale of 1 (Very Dissatisfied) to 5 (Very Satisfied), please indicate your satisfaction level with the following: [Quality of Life Measure]

	VD				VS	N/A
Your ability to perform day-to-day activities	1	2	3	4	5	
Your physical appearance	1	2	3	4	5	
Your relationship with your family	1	2	3	4	5	
Your relationship with your friends	1	2	3	4	5	
Your relationship with your partner	1	2	3	4	5	
Your job	1	2	3	4	5	
Your financial situation	1	2	3	4	5	
Your current health state	1	2	3	4	5	

23. Listed below are a number of statements. Read each statement and describe how much you agree with that statement **right now**. [Herth Hope Scale]

	Strongly Disagree	Disagree	Agree	Strongly Agree
I have a positive outlook toward life	1	2	3	4
I have short and/or long range goals	1	2	3	4
I feel all alone	1	2	3	4
I can see possibilities in the midst of difficulties	1	2	3	4

I have a faith that gives me comfort	1	2	3	4
I feel scared about my future	1	2	3	4
I can recall happy/joyful times	1	2	3	4
I have deep inner strength	1	2	3	4
I am able to give and receive caring/love	1	2	3	4
I have a sense of direction	1	2	3	4
I believe that each day has potential	1	2	3	4
I feel my life has value and worth	1	2	3	4

24. Please indicate the extent of your agreement or disagreement with the following statements, on a scale from 1(Strongly Disagree) to 7 (Strongly Agree): [Morrin, Nenkov, and McInnis – Hope]

	Strongly Disagree						Strongly Agree
Having improvement in my Diabetes related health condition is essential to my psychological well-being.	1	2	3	4	5	6	7
I have a really strong desire to have my Diabetes related health condition improve, and not have to worry about health complications in the future.	1	2	3	4	5	6	7
It would give me an enormous sense of pleasure to have Diabetes related health improvements.	1	2	3	4	5	6	7

25. The likelihood that my Diabetes related health condition will improve in the future is: [Morrin, Nenkov, and McInnis – Hopefulness]

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

26. Each item below is a statement regarding your beliefs about your medical condition with which you may agree or disagree. Please indicate the extent of your agreement or disagreement with each statement on a scale of 1 (Strongly Disagree) to 6 (Strongly Agree):

	SD	MD	D	A	MA	SA
If my Diabetes worsens, it is my own behavior which determines how soon I will feel better again.	1	2	3	4	5	6

As to my Diabetes, what will be will be.	1	2	3	4	5	6
If I see my doctor regularly, I am less likely to have problems with my Diabetes.	1	2	3	4	5	6
Most things that affect my Diabetes happen to me by chance.	1	2	3	4	5	6
Whenever my Diabetes worsens, I should consult a medically trained professional.	1	2	3	4	5	6
I am directly responsible for my Diabetes getting better or worse.	1	2	3	4	5	6
Other people play a big role in whether my Diabetes improves, stays the same, or gets worse.	1	2	3	4	5	6
Whatever goes wrong with my Diabetes is my own fault.	1	2	3	4	5	6
Luck plays a big part in determining how my Diabetes improves.	1	2	3	4	5	6
In order for my Diabetes to improve, it is up to other people to see that the right things happen.	1	2	3	4	5	6
Whatever improvement occurs with my Diabetes is largely a matter of good fortune.	1	2	3	4	5	6
The main thing which affects my Diabetes is what I myself do.	1	2	3	4	5	6
I deserve the credit when my Diabetes improves and the blame when it gets worse.	1	2	3	4	5	6
Following doctor's orders to the letter is the best way to keep my Diabetes from getting any worse.	1	2	3	4	5	6
If my Diabetes worsens, it's a matter of fate.	1	2	3	4	5	6
If I am lucky, my Diabetes will get better.	1	2	3	4	5	6
If my Diabetes takes a turn for the worse, it is because I have not been taking proper care of myself.	1	2	3	4	5	6
The type of help I receive from other people determines how soon my Diabetes improves.	1	2	3	4	5	6

27. Please indicate the extent of your agreement or disagreement with the following statements on a scale of 1 (Strongly Disagree) to 5 (Strongly Agree):

	SD				SA
1. It is difficult for me to find effective solutions for problems that occur with managing my Diabetes.	1	2	3	4	5
2. I find efforts to change things I don't like about my Diabetes are ineffective.	1	2	3	4	5
3. I handle myself well with respect to my Diabetes.	1	2	3	4	5
4. I am able to manage things related to my Diabetes as well as most other people.	1	2	3	4	5

5. I succeed in the projects I undertake to manage my Diabetes.	1	2	3	4	5
6. Typically, my plans for managing my Diabetes don't work out well.	1	2	3	4	5
7. No matter how hard I try, managing my Diabetes doesn't turn out the way I would like.	1	2	3	4	5
8. I'm generally able to accomplish my goals with respect to managing my Diabetes.	1	2	3	4	5

28. Think about all the recommendations given to you by your health care provider(s). In terms of how often you followed these recommendations in the **past 4 weeks**, please indicate the frequency of the following occurrences, on a scale of 1 (None of the time) to 6 (All of the time):

	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
I had a hard time doing what the doctor suggested I do	1	2	3	4	5	6
I followed my doctor's suggestions exactly	1	2	3	4	5	6
I was unable to do what was necessary to follow my doctor's treatment plan	1	2	3	4	5	6
I found it easy to do the things my doctor suggested I do	1	2	3	4	5	6
Generally speaking, how often during the past 4 weeks, were you able to do what the doctor told you to do?	1	2	3	4	5	6

Next I have a list of things your doctor, nurse, or other health care professional may have recommended that you do as part of your treatment. As you read each one, please indicate if your doctor, nurse, or other health care professional has recommended that you do this now.

29. Follow a low salt diet	Yes	No
30. Follow a low fat or weight loss diet	Yes	No
31. Follow a diabetic diet	Yes	No
32. Take a prescribed medication	Yes	No
33. Check your blood for sugar	Yes	No

34. Exercise regularly	Yes	No
35. Socialize <u>more</u> than usual with others	Yes	No
36. Cut down on the alcohol you drink	Yes	No
37. Stop or cut down on smoking	Yes	No
38. Check your feet for minor bruises, injuries, and ingrown toenails	Yes	No
39. Cut down on stress in your life	Yes	No
40. Carry something with sugar in it as a source of glucose for emergencies	Yes	No
41. Carry medical supplies needed for your self-care	Yes	No

42. How often have you done each of the following in the past 4 weeks.

	None of the time	A little of the time	Some of the time	A good bit of the time	Most of the time	All of the time
Cut down on the stress in your life	1	2	3	4	5	6
Exercised regularly	1	2	3	4	5	6
Tried to socialize more with others	1	2	3	4	5	6
Took prescribed medication	1	2	3	4	5	6
Cut down on the alcohol you drank	1	2	3	4	5	6
Stopped or cut down on smoking	1	2	3	4	5	6
Checked your blood sugar	1	2	3	4	5	6
Checked your feet for minor bruises, injuries, and ingrown toenails	1	2	3	4	5	6
Carried something with sugar in it as a source of glucose for emergencies when outside of your home	1	2	3	4	5	6
Carried medical supplies needs for your self-care when outside your home	1	2	3	4	5	6
Followed a low salt diet	1	2	3	4	5	6
Followed a low fat or weight loss diet	1	2	3	4	5	6
Followed a diabetic diet	1	2	3	4	5	6

In your opinion and based on your knowledge from multiple sources including your health care provider(s), please list **the complications** that can occur if you do not follow the medical guidelines closely.

43. What is the first complication that comes to your mind?

Complication 1 (Please list only one): _____

44. On a scale of 1 (Not at all Severe) to 7 (Extremely Severe), how severe do you think the consequences of this complication would be?

Not at All Severe						Extremely Severe
1	2	3	4	5	6	7

45. On a scale of 1 (Not at all Vulnerable) to 7 (Extremely Vulnerable), how vulnerable do you think you are to this complication?

Not at all Vulnerable						Extremely Vulnerable
1	2	3	4	5	6	7

46. Please indicate the likelihood that this complication will happen to you:
 __0% __10% __20% __30% __40% __50% __60% __70% __80% __90% __100%

47. Other than the first complication you listed, are there other complications that could occur to you if you do not follow the medical guidelines closely?

- Yes
- No [Skip Q48 to Q56]

48. Complication 2 (Please list only one): _____

49. On a scale of 1 (Not at all Severe) to 7 (Extremely Severe), how severe do you think the consequences of this complication would be?

Not at All Severe						Extremely Severe
1	2	3	4	5	6	7

50. On a scale of 1 (Not at all Vulnerable) to 7 (Extremely Vulnerable), how vulnerable do you think you are to this complication?

Not at all Vulnerable						Extremely Vulnerable
1	2	3	4	5	6	7

51. Please indicate the likelihood that this complication will happen to you:
 __0% __10% __20% __30% __40% __50% __60% __70% __80% __90% __100%

52. Other than the first two complications you listed, are there other complications that could occur to you if you do not follow the medical guidelines closely?

- Yes
- No [Skip Q53 to Q56]

53. **Complication 3 (Please list only one):** _____

54. On a scale of 1 (Not at all Severe) to 7 (Extremely Severe), how severe do you think the consequences of this complication would be?

Not at All Severe						Extremely Severe
1	2	3	4	5	6	7

55. On a scale of 1 (Not at all Vulnerable) to 7 (Extremely Vulnerable), how vulnerable do you think you are to this complication?

Not at all Vulnerable						Extremely Vulnerable
1	2	3	4	5	6	7

56. Please indicate the likelihood that this complication will happen to you:

 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

57. Other than your current treatment (prescribed by your main health care provider), what other treatments are available for your condition?

- There are no other treatments available
- The number of treatments available is very limited
- There are some alternative treatments for my condition
- There are many alternative treatments for my condition
- Other available treatments are only in the experimental clinical trial stage

The following questions are concerned with your treatment for Diabetes Type II and your experience with the treatment **over the past 4 weeks**.

58. How confident are you that your current treatment is producing the best possible outcomes?

Extremely Unconfident						Extremely Confident
1	2	3	4	5	6	7

59. If you could go back in time to when you were first diagnosed, how likely are you to opt for your current treatment?

Extremely Unlikely						Extremely Likely
1	2	3	4	5	6	7

60. How satisfied are you with your current treatment?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

61. How well controlled do you feel your Diabetes Type II has been over the past 4 weeks?

Very Poorly Controlled						Very Well Controlled
1	2	3	4	5	6	7

62. How satisfied are you with any side effects of your present treatment?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

63. How satisfied are you with the demands made by your current treatment?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

64. How convenient have you been finding your treatment to be over the past 4 weeks?

Very inconvenient						Very Convenient
1	2	3	4	5	6	7

65. How flexible have you been finding your treatment to be over the past 4 weeks?

Very inflexible						Very Flexible
1	2	3	4	5	6	7

66. How satisfied are you with your understanding of your Diabetes Type II Treatment?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

67. How satisfied are you with the extent to which the treatment fits in with your lifestyle?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

68. Would you recommend your current treatment to someone else with Diabetes Type II?

No, I would definitely not recommend						Yes, I would definitely recommend
1	2	3	4	5	6	7

69. How satisfied would you be to continue with your present form of treatment?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

70. How satisfied are you with your main health care provider for your Diabetes Type II care?

Very Dissatisfied						Very Satisfied
1	2	3	4	5	6	7

71. Would you recommend your current main health care provider to someone else with Diabetes Type II?

No, I would definitely not recommend						Yes, I would definitely recommend
1	2	3	4	5	6	7

72. If you found out about a research study from your physician, would you participate if the study required: (Choose all that apply)

- Completing surveys about the usual treatment you get from your physician
- Taking a new drug and multiple blood draws
- Entering a study of a new medicine and a placebo. You do not know which one you will get
- Testing a new vaccine for an infectious disease
- Obtaining genetic information that might reveal information about the disease or its treatment
- No, I would not participate in such a trial

73. Please indicate on scale from 1 (Extremely Unlikely) to 7 (Extremely Likely), the likelihood that you would do the following:

	Extremely Unlikely						Extremely Likely
Participate in a clinical trial for a drug that might allow you to better manage your chronic condition	1	2	3	4	5	6	7
Participate in a clinical trial for a new procedure that might cure your chronic illness	1	2	3	4	5	6	7

APPENDIX C

DATA ANALYSIS AND RESULTS: ADDITIONAL DETAILS

Psychometric Properties of Measurement Scales

Hope Measurement Scale

Table C.1. Herth Hope Index (HHI) 10 Items – CFA Results

Herth Hope Index: 10 Items	Standardized Regression Weights
I have a positive outlook towards life	.771
I have short and long term goals	.619
I can see possibilities in the midst of difficulty	.687
I have faith that gives me comfort	.567
I can recall happy joyful times	.532
I have deep inner strengths	.742
I am able to give and receive caring love	.749
I have a sense of direction	.765
I believe that each day has potential	.889
I feel my life has value and worth	.841

Self-Efficacy Measurement Scale

Table C.2. Perceived Diabetes Self-Management Scale (PDSMS) 6 Items – CFA Results

PDSMS: 6 Items	Standardized Regression Weights
I handle myself well with respect to my Diabetes	.858
I am able to manage things related to my Diabetes as well as most other people	.874
I succeed in the projects I undertake to manage my Diabetes	.907
Typically my plans for managing my Diabetes don't work out well	.657
No matter how hard I try, managing my Diabetes does not turn out the way I want	.536
I am generally able to accomplish my goals with respect to my Diabetes	.855

Compliance Measurement Scale

Table C.3. General Adherence Scale (GAS – Generic Measure) – EFA Results

GAS – Generic Measure: 5 Items	Component
I had a hard time doing what the doctor suggested I do	.781
I followed my doctor’s suggestions exactly	.772
I was unable to do what was necessary to follow my doctor’s treatment plan	.533
I found it easy to do the things my doctor suggested I do	.859
Generally speaking, how often during the past 4 weeks, were you able to do what the doctor told you to do?	.879

Compliance Measurement Scale

Table C.4. General Adherence Scale (GAS – Generic Measure) – CFA Results

GAS – Generic Measure: 4 Items	Standardized Regression Weights
I had a hard time doing what the doctor suggested I do	.638
I followed my doctor’s suggestions exactly	.720
I found it easy to do things my doctor suggested I do	.837
Generally speaking, how often during the past 4 weeks were you able to follow what the doctor suggested	.900

Participation in Clinical Trials

Although studying the effects of control perceptions and hope on likelihood to participate in clinical trials is beyond the scope of this dissertation, I measured clinical trial likelihood and respondent willingness to participate in different types of clinical trials. Only 16.7% of all sample respondents were not willing to participate in any type of clinical trial. The best received types of medical research or clinical trials were surveys, trying a new drug and blood draws, and treatment research studies requiring genetic information. The type of clinical trial with lowest potential participation frequency is testing a new vaccine. On a scale from 1 to 7, the average likelihood of trying a new drug to better manage Diabetes is 5.10 ($\sigma = 1.92$) and that of trying a new procedure to cure Diabetes is 5.59 ($\sigma = 1.75$).

Table C.5. Participation in Clinical Trials by Type of Research

Type of Clinical Trial	Frequency	Percentage
Surveys	161	72.5%
New Drug and Blood Draws	121	54.5%
Genetic Information important for Treatment Research	109	49.1%
New Medicine and a Placebo	71	32.0%
New Vaccine Test	43	19.4%
Never Participate in Clinical Trials	37	16.7%

The results of a linear regression analysis with Likelihood to participate in clinical trials as the dependent variable and Perceptions of Control dimensions and Hope as the independent variables, indicates that the likelihood to participate in clinical trials is

significantly affected positively by hope and PHLC Doctors and negatively by self-efficacy (Adjusted R² = 0.052; F = 3.021; p-value = 0.007). These findings are consistent with our expectations that a higher hope level can lead individuals to take higher risks by increasing their likelihood to participate in clinical trials. Individuals who believe that their health is under the control of their doctors are more likely to participate in clinical trials, probably because doctors are those who run these trials. Also, it is not surprising to find that individuals who believe that they are capable of performing behaviors necessary to improve their health are less likely to participate in clinical trials.

Table C.6. Linear Regression Results: Factors Affecting Likelihood to Participate in Clinical Trials

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.557	1.155		3.080	.002
IHLC	-.015	.026	-.040	-.570	.569
CHLC	-.002	.022	-.007	-.085	.933
PHLC Doctors	.114	.057	.157	2.008	.046
PHLC Others	-.049	.042	-.089	-1.159	.248
Hope10Items	.093	.031	.257	3.011	.003
SelfEfficacy6Items	-.102	.032	-.276	-3.205	.002

Dependent Variable: Question 73: Participate in a clinical trial for a drug that might allow you to better manage your chronic condition

Assessment of Final Model with Hope 2 (Nenkov, MacInnis, and Morrin 2008)

One drawback of using the Herth Hope Index HHI as a measure of hope is that some researchers might argue that it is a personal trait measure rather than a state which could vary depending on changing personal circumstances and health experiences. To deal with this issue, I decided to re-test the Final Model by replacing the HHI as a measure of hope with Hope 2, the measure developed by Nenkov, MacInnis, and Morrin (2008). Hope 2 measures hope on three items representing importance of and desire for an outcome, in addition to the pleasure elicited from the achievement of that outcome. The results displayed next show that replacing HHI by Hope 2 in measuring hope does not affect the results for the Final Model. Despite having less adequate fit indices ($\chi^2 = 192.612$, d.f. = 119, p-value = .000; CFI = .902; NFI = .781; RMSEA = .053), the RMSEA = .053 shows adequate overall model fit. The significance of all regression weights remains the same, except for one path self-efficacy → compliance which remains significant. Hope 2 only partially mediated the effect of self-efficacy on compliance. With Hope 2, the variances explained for compliance (.355) and treatment satisfaction (.516) are a little higher but AMOS does not allow testing the significance of the difference between old and new variances explained. Also, the variance explained by self-efficacy and PHLC doctors is lower for Hope 2 (.278) than that of HHI (.353). Overall, these findings provide further support for the robustness of the Final Model.

APPENDIX D

REQUIRED APPROVALS AND PERMISSIONS

IRB Approval for Preliminary Phase

Protocol **12105**
Number:

PI: **SMITH, MICHAEL**

Approved On: 19-Nov-2008

Review Date: 16-Dec-2008

Committee: B BEHAVIORAL AND SOCIAL SCIENCES

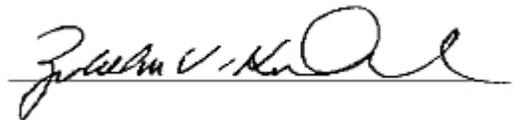
Department: BUSINESS-MARKETING (1509)

Project Title: The Effects of Hope and Control on Patient Health Behavior and Outcomes

In accordance with the policy of the Department of Health and Human Services on protection of human subjects in research, it is hereby certified that protocol number 12105, having received preliminary review and approval by the department of BUSINESS-MARKETING (1509) was subsequently reviewed by the Institutional Review Board in its present form and approved on 19-Nov-2008 with respect to the rights and welfare of the subjects involved; appropriateness and adequacy of the methods used to obtain informed consent; and risks to the individual and potential benefits of the project.

In conforming with the criteria set forth in the DHHS regulations for the protection of human research subjects, and in exercise of the power granted to the Committee, and subject to execution of the consent form(s), if required, and such other requirements as the Committee may have ordered, such orders, if any, being stated hereon or appended hereto.

It is understood that it is the investigator's responsibility to notify the Committee immediately of any untoward results of this study to permit review of the matter. In such case, the investigator should call Richard Throm at 707-8757.



**ZEBULON KENDRICK, Ph.D.
CHAIRMAN, IRB**

IRB Approval for Empirical Phase

Protocol Number: 12793
PI: SMITH, MICHAEL
Approved On: 10-Nov-2009
Review Date: 08-Dec-2009
Committee: B BEHAVIORAL AND SOCIAL SCIENCES
Department: BUSINESS-MARKETING (1509)
Project Title: The Effects of Hope and Control on Patient Health Behavior and Outcomes

In accordance with the policy of the Department of Health and Human Services on protection of human subjects in research, it is hereby certified that protocol number 12793, having received preliminary review and approval by the department of BUSINESS-MARKETING (1509) was subsequently reviewed by the Institutional Review Board in its present form and approved on 10-Nov-2009 with respect to the rights and welfare of the subjects involved; appropriateness and adequacy of the methods used to obtain informed consent; and risks to the individual and potential benefits of the project.

In conforming with the criteria set forth in the DHHS regulations for the protection of human research subjects, and in exercise of the power granted to the Committee, and subject to execution of the consent form(s), if required, and such other requirements as the Committee may have ordered, such orders, if any, being stated hereon or appended hereto.

It is understood that it is the investigator's responsibility to notify the Committee immediately of any untoward results of this study to permit review of the matter. In such case, the investigator should call Richard Throm at 707-8757.

ZEBULON KENDRICK, Ph.D.
CHAIRMAN, IRB

Permission to Use the Herth Hope Index

Date: Mon 19 Jan 16:32:34 EST 2009
From: "Herth, Kaye A" <kaye.herth@mnsu.edu>
Subject: RE: Herth Hope Scale and Index - Permission to Use
To: "suzannem@temple.edu" <suzannem@temple.edu>

Dear Suzanne,

I appreciate your interest in my hope tools. I have attached a copy of the abbreviated Herth Hope Index (HHI) and the longer Herth Hope Scale (HHS), scoring instructions, and several reference lists I have compiled on hope primarily from a nursing perspective.

You have my permission to use either the HHI or HHS in your dissertation research project. If you decide to use either tool I would appreciate your providing a summary of the study findings at completion and any psychometrics related to the tool.

If I can be of any further assistance don't hesitate to contact me. Best wishes in your highly important work!

Dr. Kaye Herth

Kaye A. Herth, Ph.D., R.N., F.A.A.N.
Dean, College of Allied Health and Nursing
124 Myers Field House
Mankato, MN 56001
507-389-6315
Fax: 507-389-6447
kaye.herth@mnsu.edu