

EXAMINING THE EFFECTS OF HEALTH BEHAVIORS
AND EMOTIONS ON MEDICAL CARE SEEKING
AND AVOIDANT BEHAVIORS
IN OLDER ADULTS

by

HOLLIE BETH PELLOSMMA

Presented to the Faculty of the Graduate School of
The University of Texas at Arlington in Partial Fulfillment
of the Requirements
for the Degree of

MASTER OF SCIENCE IN PSYCHOLOGY

THE UNIVERSITY OF TEXAS AT ARLINGTON

December 2013

Copyright © by Hollie Pellosmaa 2013

All Rights Reserved



Acknowledgements

Thanks first go to my initial Faculty Mentor, Dr. Pablo Mora, for all of his direction and belief in this project. Dr. Mora was able to provide me with consistent support and encouragement during my first two years at UTA. His instruction and leadership will be sorely missed but fondly remembered. Secondly, I would like to thank my current Faculty Mentor and Thesis Committee Chairperson, Dr. Angela Liegey Dougall, for all the help and guidance she has provided, not only on this project but during the entirety graduate career here at UTA. I would also like to acknowledge the help of my Committee Members, Dr. Gatchel and Dr. Kenworthy, as well as Dr. Leventhal.

I would also like to thank my fellow graduate students for all of their help and support for this project and throughout my graduate career. Finally, I would like to thank my family and friends for their continued support and patience.

August 28, 2013

Abstract

EXAMINING THE EFFECTS OF HEALTH BEHAVIORS AND EMOTIONS ON MEDICAL
CARE SEEKING AND AVOIDANT BEHAVIORS IN OLDER ADULTS

Hollie Pellosmaa, MHuServ, M.S.

The University of Texas at Arlington, 2013

Supervising Professor: Angela Liegey Dougall

There has been a dearth of information that explains how an individual's emotional reactions to their illness symptoms affects their care seeking behaviors. The overall aims of this study were to elucidate the emotional and behavioral predictors for care seeking in older adults, and describe the reasons that they choose not to seek care. Cross-sectional data from a larger, longitudinal study with older adults were analyzed. Participants ($N = 267$, mean age=72 years) living in a retirement community in a northeastern state were interviewed. Differences were found in health behaviors between care seekers and non-care seekers; care seekers were positively associated with taking prescription medications and reading about their symptoms, whereas non-care seekers were positively associated with avoidant thoughts. Additionally, anxiety and depression were found to predict care seeking when symptoms were at their worst. Unfortunately, negative affect did not moderate the relationship between the perceived effectiveness of health behaviors and care seeking. It did, however, predict participant's failure to seek care for multiple reasons. The current study furthered the research examining the impact health behaviors and emotions have on care seeking. Future directions should focus on the ways in which both positive and negative emotions impact a person's decision to seek medical care as well as emotional differences between care seekers and care avoiders.

Table of Contents

Acknowledgements.....	iii
Abstract	iv
List of Figures	viii
List of Tables	ix
Chapter 1 Introduction	1
1.1 Care Seeking and Avoidance in the Elderly.....	2
1.2 Self-Evaluations of Health Behaviors	5
1.3 State Negative Emotions and Care Seeking	6
1.4 Common-Sense Model of Self-Regulation	7
1.5 Overview of the Current Study.....	9
Chapter 2 Methods.....	11
2.1 Participants	11
2.2 Sampling Procedure	13
2.3 Materials and Measures.....	15
2.3.1 Demographic Information.....	15
2.3.2 Care Seeking	15
2.3.3 Health Behaviors for New Symptoms (First Noticed).....	15
2.3.4 Health Behaviors for Severe Symptoms (Worst Point)	15
2.3.5 Self-Evaluation of Health Behaviors.....	16
2.3.6 Episode-Linked Emotions.....	16
2.3.7 Medical Care Avoidant Behaviors.....	16
2.4 Procedure.....	17
2.5 Power	18
Chapter 3 Results.....	19

3.1 Data Analysis	19
3.2 Data Screening	20
3.3 Hypothesis 1: Assessment of Health Behavior Differences	21
3.3.1 Health Behaviors and Care Seeking when Symptoms were First Noticed	21
3.3.2 Health Behaviors and Care Seeking when Symptoms were at Their Worst	22
3.4 Hypothesis 2: Negative Affect as a Predictor of Care Seeking	25
3.4.1 Negative Affect as a Predictor of Care Seeking when Symptoms were First Noticed	25
3.4.2 Negative Affect as a Predictor of Care Seeking when Symptoms were at Their Worst	25
3.5 Hypothesis 3: Health Behaviors as a Predictor of Care Seeking	29
3.5.1 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Anxiety when Symptoms were First Noticed	29
3.5.2 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Depression when Symptoms were First Noticed	32
3.5.3 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Stress when Symptoms were First Noticed	32
3.5.4 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Anxiety when Symptoms were at Their Worst	41
3.5.5 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Depression when Symptoms were at Their Worst	42
3.5.3 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Stress when Symptoms were at Their Worst	44
3.6 Descriptive Characteristics of Avoidant Behaviors	52
3.7 Hypothesis 4: Negative Affect as a Predictor of Avoidant Behaviors	54

3.7.1 Negative Affect as a Predictor of Avoidant Behaviors when Symptoms were First Noticed.....	54
3.7.2 Negative Affect as a Predictor of Avoidant Behaviors when Symptoms were at Their Worst.....	55
Chapter 4 Discussion	62
Appendix A.....	69
Appendix B.....	74
References	82
Biographical Information	88

List of Figures

Figure 1.1 Behavioral Model of Health Services Usage	3
Figure 1.2 A General Model of Total Patient Delay	4
Figure 1.3 The Common-Sense Model of Self-Regulation	8
Figure 1.4 Visual representation of the hypotheses.....	10
Figure 2.1 Recruitment procedures	14

List of Tables

Table 2.1 Descriptive statistics for care seeking and non-care seeking older adults (N = 267) ...	12
Table 3.1 Associations between care seeking and health behaviors in older adults (N = 267) when symptoms were first noticed	23
Table 3.2 Associations between care seeking and health behaviors in older adults (N = 267) when symptoms were at their worst	24
Table 3.3 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for negative affect with three predictors when symptoms were first noticed	27
Table 3.4 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for negative affect with three predictors when symptoms were at their worst...	28
Table 3.5 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with anxiety as a moderator when symptoms were first noticed.....	35
Table 3.6 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with depression as a moderator when symptoms were first noticed	37
Table 3.7 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with stress as a moderator when symptoms were first noticed.....	39
Table 3.8 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with anxiety as a moderator when symptoms were at their worst.....	46
Table 3.9 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with depression as a moderator when symptoms were at their worst	48
Table 3.10 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with stress as a moderator when symptoms were at their worst.....	50
Table 3.11 Avoidant behaviors frequency table (N = 127)	53
Table 3.12 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for negative affect with three predictors when symptoms were first noticed	58
Table 3.13 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for negative affect with three predictors when symptoms were at their worst...	60

Chapter 1

Introduction

In 2000 there were 756.7 million visits to office-based physicians in the United States and a large proportion of these visits occurred in adults who were 65 years or older. Between 1992 and 2000 there was a 12% increase in office-based physician visits in this population and a 21% increase in emergency department visits (Bernstein et al., 2003). According to the US National Center for Health Statistics (2010), in 2009 94.4% of adults sampled aged 65-74 and 96.3% of adults 75 and older visited a health care professional. With such large increases and such a large proportion of older adults seeking care, it is important to understand the various reasons why they choose to seek care, as well as the reasons that they fail to seek care. Historically, research on healthcare utilization has focused on health behaviors which predict hospital usage (de Boer, Wijker, & de Haes, 1997). This research has focused on *what* care seekers do, instead of *why* they seek medical care. Theoretical approaches such as the common-sense model of self-regulation (Leventhal, Leventhal, & Contrada, 1998) and the behavioral model of health services usage (Andersen, 1968) provide a framework for explaining numerous factors (including emotional reasons) which describe and predict care seeking in older adults.

Whilst using the aforementioned theoretical models as a framework, the current study examined the differences in health behaviors between individuals who sought care and those who did not. Secondly, emotional predictors of care seeking were examined. Thirdly, the study determined if the perceived effectiveness of the health behaviors predicted care seeking, using negative affect as a moderator. Lastly, the study describes the reasons that individuals identified regarding their failure to seek care as well as the emotional predictors for failing to seek care. Overall, the aims of this study were to elucidate the emotional and behavioral predictors for older adults seeking care, and to describe the reasons that they choose not to seek medical care.

1.1 Care Seeking and Avoidance in the Elderly

Since 1990 the United States population of older adults (65 and older) has increased from 31.2 million to 40.4 million in 2010. This accounts for over 13 percent of the total population of the United States and is projected to climb to roughly 20 percent by 2030 (Administration on Aging, 2010). These older Americans are more educated and occupy higher income groups than ever before (Administration on Aging, 2010). Unfortunately, the increased life expectancy for older adults is accompanied by a greater proportion of individuals with chronic and acute health problems. According to the Administration on Aging (2010), both hospital visits and physician consultations have increased for the elderly since 1992. However, researchers have indicated that the elderly are underutilizing healthcare (Fleming et al., 1992; Roos & Shapiro, 1981).

It is a common belief that more often than not the general population is healthy and asymptomatic. As a result of this assumption, it is also believed that when individuals do experience symptoms of disease and illnesses, they take action to counteract them. Zola (1973) noted that there are a disproportionate number of people not receiving treatment for serious physical disorders compared to those receiving treatment. This is contrasted by the fact that a large number of general practitioner visits are for minor disorders. This information seems contradictory, thus, researchers have begun examining the reasons why individuals choose to seek medical care and why they avoid seeking treatment. Older adults in particular, who experience symptoms relating to chronic and current illnesses, have often been overlooked in this research, and, therefore, it is important to explore their perceptions of illnesses and their reasons for seeking or avoiding care (DHHS, 2010).

According to Andersen (1968), the behavioral model of health services use depicts the relevant factors which lead to care seeking. As seen in Figure 1.1, Andersen's model states that seeking care is influenced by a wide range of factors, including personal traits/beliefs, social supports, and self-evaluations of health (Andersen, 1995). In an effort to understand the predictors

of healthcare utilization, researchers have focused on various health behaviors, as well as negative and positive trait affects, which predict care seeking. Demographic predictors of care seeking for acute conditions include age, gender, and marital status, whereas health beliefs include medical knowledge and locus of control (Snih et al., 2006). Subjective beliefs, such as perceived need for care and negative self-reported health are also strong predictors in the elderly (Fernandez-Olano et al., 2006). A meta-analysis of the literature on the chronically ill revealed that disease severity and psychological well-being were the strongest predictors for healthcare utilization (de Boer et al., 1997). According to this study, in a chronically ill sample predisposing characteristics have weaker associations than perceived need.



Figure 1.1 Behavioral Model of Health Services Usage

Although numerous predictors have been identified regarding care seeking, little research has focused on when individuals choose to seek care (Verbrugge & Ascione, 1987). According to Andersen, Cacioppo and Roberts (1995) there are six stages of delay in care seeking. As seen in Figure 1.2, individuals can delay seeking care for symptoms and conditions at various points in time, including when they initially notice they have symptoms, when they decide they are actually sick, once they decide they need medical intervention, when they first take action by making an appointment, and when they receive medical attention before they start a treatment plan. Delays in care seeking are influenced by a variety of biopsychosocial factors, including the severity and

duration of the symptoms, conceptual beliefs regarding the symptoms, and past experiences (Safer, et al., 1979).

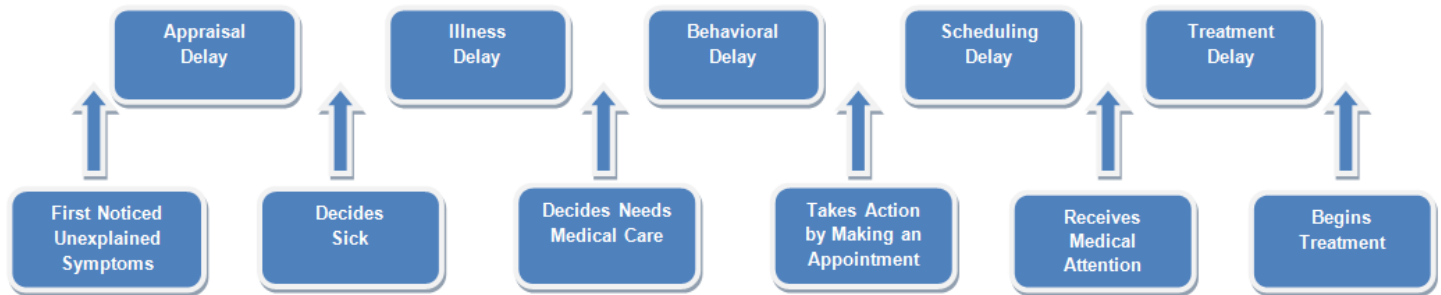


Figure 1.2 A General Model of Total Patient Delay

Most of the delay research has focused on patients who have suffered from symptoms of a heart attack (Finnegan, et al., 2000; Leslie, Urie, Hooper, & Morrison, 2000), stroke (Chang, Tseng, & Tan, 2004; Mandelzweig, Goldbourt, Boyko, & Tanne, 2006), or cancer (Burgess, Hunter, & Ramirez, 2001). However, a study of newly admitted patients at five U.S. hospitals revealed that patients delayed medical care due to their subjective beliefs (they thought their symptoms would go away on their own) as well as physical barriers (the inability to obtain an appointment). This study also revealed that individuals who delayed care had longer hospital stays than individuals who did not delay care (Weissman et al., 1991). Although studies comparing care seekers to care avoiders (individuals who do not seek medical care) have been scarce, this was one of the few studies that made this comparison.

To date, researchers have examined the reasons that individuals have avoided seeking medical care for specific conditions, such as heart attacks. Dracup, Moser, Eisenberg, Meischke, Alonzo, and Braslow (1995) discussed the various demographic reasons that individuals were likely to postpone treatment when suffering from symptoms commonly associated with cardiac arrest; including old age, low socioeconomic status, and gender. Dracup et al. (1995) concluded

that individuals with specific characteristics (e.g. older adults and females) were less likely to perceive their symptoms as being cardiac in origin, which is why they delayed treatment. Adamson, Ben-Shlomo, Chaturvedi and Donovan (2003) conducted a study that examined individual's perceptions of the need and urgency to seek care. This study used vignettes to determine if ethnicity, age, and/or socioeconomic status influence an individual's determination to seek care. Again, this study had a specialized focus, symptoms of a heart attack (vignette 1) and breast cancer (vignette 2). Like Dracup et al. (1995), this study examined demographic characteristics of those individuals who sought care and those who avoided it. The results indicated that women and black respondents were less likely to seek immediate care.

Previous research has examined self-assessed health, cognitive and emotional representations of illnesses, and medical care avoidant behaviors. The common method of assessing these variables has been to use surveys based on vignettes (Adamson et al., 2003) and data collected on specialized symptoms. Unfortunately vignettes did not assess the behaviors that an individual actually made; they assessed the way the participant believed he/she would respond. Specialized surveys, however, often measure actual responses but are not very generalizable. The current study took a different approach by asking participants to recall their actual recent behaviors and emotions in response to general and chronic illness symptoms.

1.2 Self-Evaluations of Health Behaviors

In addition to assessing which behaviors individuals engage in once they experience illness symptoms, it is also important to assess the individual's perceived effectiveness of their coping behaviors. Very few studies have measured self-evaluations of health behaviors, these being limited to individuals with end stage renal disease (Lindqvist & Sjöden, 1998) as well as heart attack (Daly et al., 2000) and transplant survivors (Lindqvist, Carlsson, & Sjöden, 2004). Although some condition specific health behaviors and their effectiveness have been examined, perceived effectiveness has not been used to predict care-seeking. In fact, studies that examine

health behavior effectiveness have only examined individuals who are undergoing regular medical supervision for severe chronic conditions.

All of the aforementioned studies used the Jalowiec Coping Scale (Jalowiec, Murphy, & Powers, 1984) in which participants are able to score their perceived use of coping strategies and their effectiveness. Perceived use was scored on a Likert scale from “never used” to “used often” for items such as “confronting the problem” and “responding emotionally”. Effectiveness was scored on a scale from “not helpful” to “very helpful” (Jalowiec, Murphy, & Powers, 1984). Unfortunately this scale does not specify specific health behaviors, such as taking over the counter medications, nor does it distinguish health behaviors which may have had a negative effect versus those with a neutral effect. The current study addressed this limitation by using a scale that allowed participants to indicate if their health behaviors made them feel better, worse or the same. Additionally, the health behaviors were more specific to illness symptoms than those found in the Jalowiec Coping Scale.

1.3 State Negative Emotions and Care Seeking

Previous research has indicated that depressive symptoms are an important predictor for general well-being and mental health in the elderly. More depressive symptoms were associated with decreased physical health and increased healthcare utilization (Luber et al., 2001). According to a meta-analysis conducted by de Boer and colleagues (1997), depression and psychological distress were strong predictors of hospitalizations and physician visits. Similar findings have been associated with generalized anxiety disorder (GAD). Individuals with GAD were found to have worse health related quality-of-life and increased healthcare utilization (Porensky et al., 2009). A study conducted by de Beurs et al (1999) found that individuals with anxiety disorders and those with symptoms of anxiety had increased healthcare utilization.

As previously stated, prior studies regarding care seeking have mainly focused on demographic factors as well as trait positive and negative affect, but less is known about how state

dependent emotions may influence actual care-seeking behaviors. Trait negative affect (TNA), which focuses on an individual's overall affect, has been repeatedly examined as a predictor for healthcare utilization; however findings have shown mixed results (Costa & McCrae, 1987; Mora et al., 2002). Trait negative affect is typically comprised of scores which reflect both depression and anxiety. State negative emotions, which focus on a specific event, have not been widely examined.

1.4 Common-Sense Model of Self-Regulation

Due to supporting literature which indicates that emotional responses to illness symptoms can influence health care decision-making, it is imperative that a theoretical approach incorporates both a cognitive and emotional component. Unlike Andersen's (1968 and 1995) model's, the common-sense model of self-regulation (CSM) provides a strong theoretical framework to understand how social and psychological factors determine care-seeking and coping behaviors in response to a health threat (Leventhal, Leventhal, & Contrada, 1998). Leventhal's CSM builds on Andersen's initial model by incorporating emotional reactions and responses to health threats. The CSM conceptualizes illness events from the perspective of the patient, not the medical observer. This model divides illness representations into five categories (identity, consequences, timeline, causes, and controllability) and it incorporates cognitive and affective components of each. A patient's affective identity of an illness refers to their perception of their symptoms (i.e. blurred vision and numbed extremities), whereas their cognitive identity refers to an unbiased label of a condition (i.e. type II diabetes). These representations, in turn, lead to health behavior, such as seeking medical care (Leventhal, Diefenback, & Leventhal, 1992).

The common-sense model of self-regulation primarily focuses on how people process threats to their wellbeing, stating that cognitive and emotional representations drive coping behaviors (Hale, Treharne, & Kitas, 2007). The CSM is structured around the belief that individuals play an active role in their own healthcare (i.e. interpreting and responding to

symptoms). As seen in Figure 1.3, this model is cyclical, allowing patients to hierarchically organize three main constructs, 1) their representation of their illness experience, 2) their coping responses, and 3) appraisal, or the monitoring of their efforts (Nerenz & Leventhal, 1983). This model states that individuals re-evaluate their cognitive and emotional responses to symptoms after they have engaged in coping behaviors, and thus repeating the process until they return to their normal state of wellbeing (Watkins, et al., 2000).

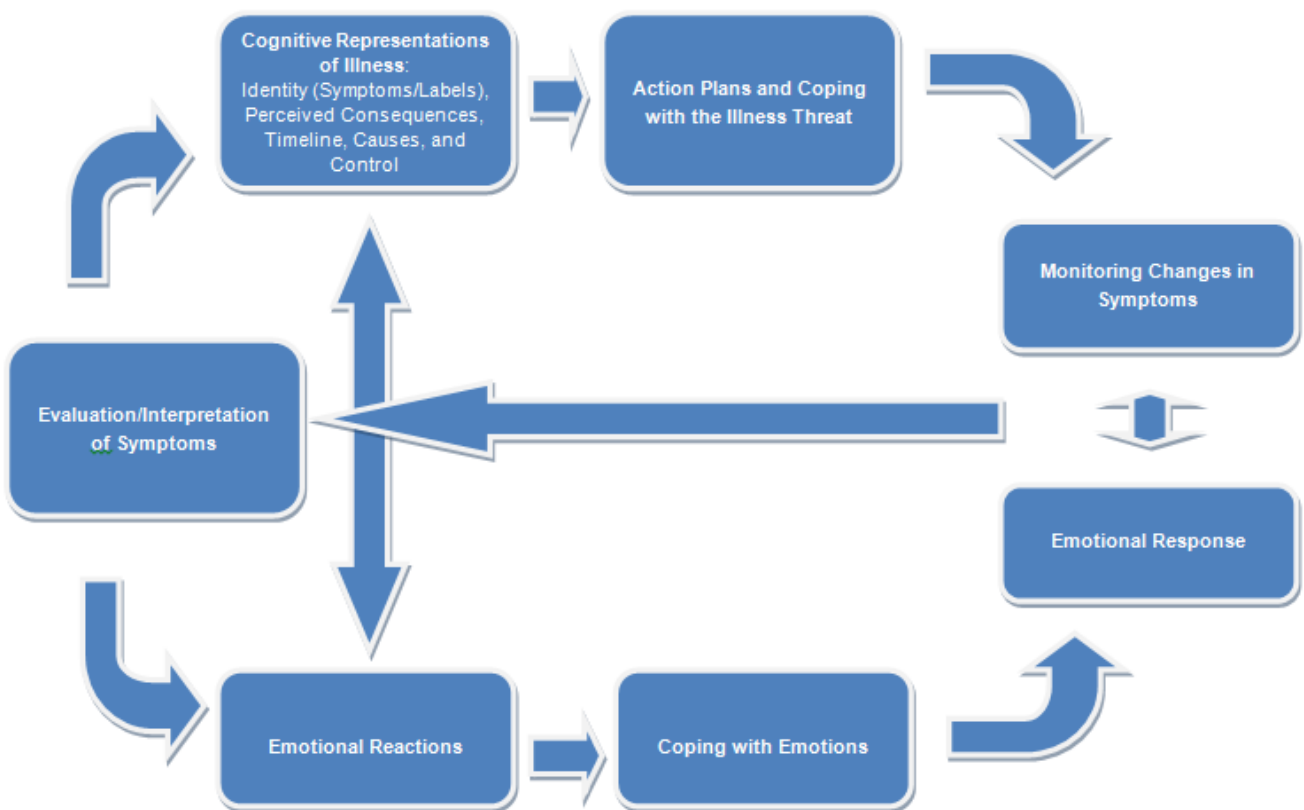


Figure 1.3 The Common-Sense Model of Self-Regulation

Historically, the common-sense model has been used to gain a better understanding of a variety of illnesses, including diabetes (Watkins et al., 2000) and osteoarthritis (Hale, Treharne, & Kitas, 2007). Research using this model has primarily focused on the utilization of emergency

medicine (i.e. hospitals and emergency clinics) as well as trait positive and negative affect. Unlike previous research, this study used the CSM to explore older adults' emotional reactions to general illness symptoms as well as their health care decision-making. Although older adults often experience symptoms related to specific illnesses (e.g. osteoarthritis and cancer), they also experience general symptoms related to chronic and acute conditions more frequently. Hence, it is important to understand individual's emotional and behavioral reactions to illness symptoms, which was the goal of the current study.

1.5 Overview of the Current Study

The current study conducted secondary data analyses on cross-sectional data from a larger, longitudinal study with older adults. Participants ($N = 267$, mean age = 72 years) who were >45 years and living in a retirement community in a northeastern state were interviewed. The purpose of the current study was fourfold. First, the study examined the relationships between health behaviors and seeking care for their illness symptoms among older adults. It was expected that individuals who sought care would be more likely to engage in proactive health behaviors, such as reading about their symptoms, asking for advice, and taking over-the-counter medications, vitamins, and prescription medications (Ybarra & Suman, 2006). Conversely, it was expected that individuals who did not seek care would be more likely to engage in passive behaviors, such as resting, avoiding thinking about their symptoms, and changing their diet and exercise habits. Participants were asked to indicate their emotional responses to their symptoms when they first noticed them as well as when they were at their worst. Second, this study examined the emotional predictors for seeking care. It was hypothesized that older adults who experienced more negative emotions (e.g. depression and anxiety) would be more likely to seek care than older adults who experienced fewer negative emotions (Cameron, Leventhal, & Leventhal, 1993; Mora et al., 2002). Third, the study determined if the perceived effectiveness of the health behaviors predicted care seeking, using negative affect as a moderator. For example, participants were asked if their

health behaviors made their symptoms better, worse, or the same. It was hypothesized that participants who did not seek care and had lower levels of negative affect would believe their health behaviors were more beneficial than those who did not seek care and had high levels of negative affect. It was also hypothesized that participants who did not seek care and had lower levels of negative affect would believe their health behaviors were more beneficial than those who sought care regardless of the level of negative affect. Lastly, this study examined the emotional predictors for failing to seek care due to avoidant behaviors. It was expected that individuals who had higher levels of negative emotions would engage in more medical avoidant behaviors (such as not going to the doctor because they believe their symptoms will go away on their own). Overall, this study attempted to explain the behavioral and emotional components which differentiate care seekers from non-care seekers.

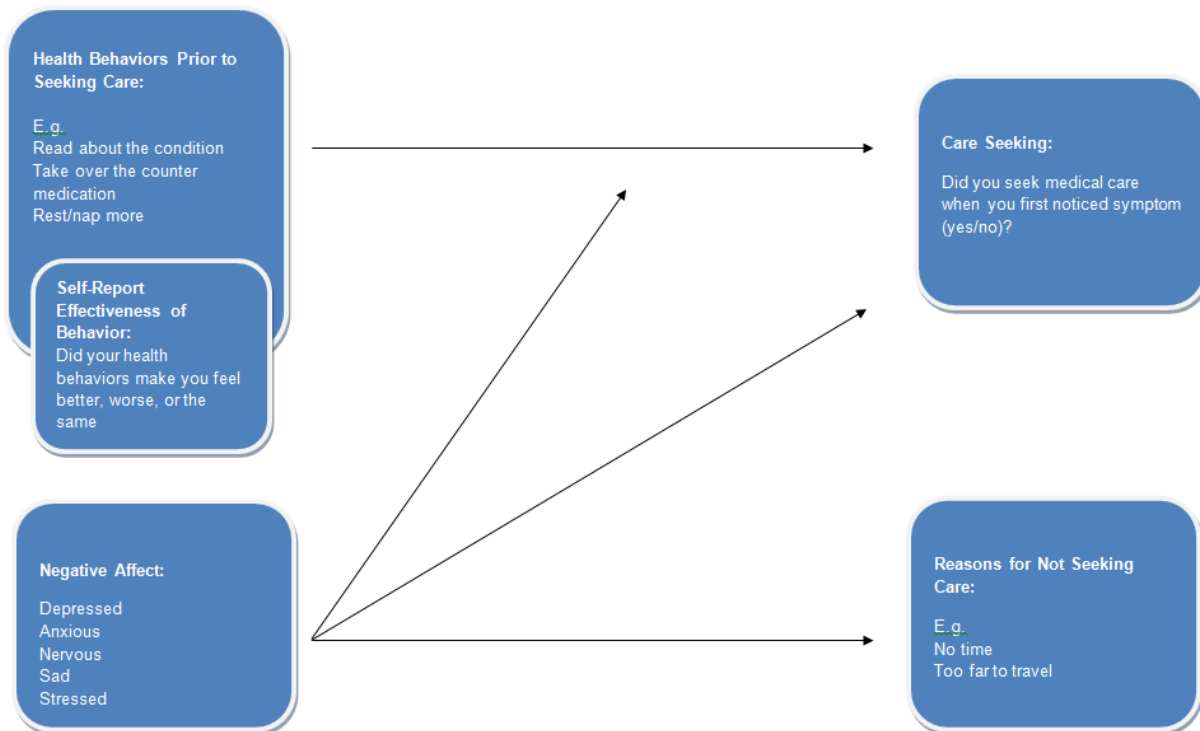


Figure 1.4 Visual representation of the hypotheses

Chapter 2

Methods

2.1 Participants

Data for these analyses were obtained from the Rutgers Aging and Health Study. Data were from the third interview (spring 1992) of this nine year longitudinal study that was conducted with older adults (> 45) residing in a retirement community in a northeastern state ($N = 267$). The mean age of participants was 72 years (with a range from 49 to 93) and 81% of participants were 65 or older (for additional demographic information, see Table 2.1). Ninety-five participants were male and roughly 59% of participants were married. Only 17% of participants believed their general health to be fair or poor, whereas the remaining 83% thought their health was good, very good or excellent. Potential participants were excluded from this study if they did not speak English, they had a severe hearing impairment, they had dementia and/or they had a severe cognitive impairment.

Table 2.1 Descriptive statistics for care seeking and non-care seeking older adults (N = 267)

Variable	Valid N ¹	Care ² (N = 140)	No Care ³ (N=127)	F/ χ^2 value	Significance
Gender, n (% male)	267	52 (37%)	43 (34%)	0.313	0.576
Age, mean (SD)	267	73.69 (7.23)	70.60 (7.85)	1.059	0.304
Duration of Symptoms mean hours (SD)	267	1316.30 (1081.17)	735.24 (858.55)	1.370	0.243
Perceived Health, n (%)	267			0.027	0.868
Poor		2 (1%)	0 (0%)		
Fair		31 (22%)	13 (10%)		
Good		55 (39%)	54 (43%)		
Very Good		41 (29%)	40 (31%)		
Excellent		11 (8%)	20 (16%)		

Note. 1 = valid N represents the number of participants used to complete the analysis; 2 = sought care for illness symptoms; 3 = did not seek care for illness symptoms.

2.2 Sampling Procedure

Participants were recruited from a retirement community that housed 2,955 residents in the fall of 1991. Researchers randomly selected 1,772 names from the community directory (872 males, 900 females) and targeted those individuals via telephone recruitment. Four hundred and fifty nine individuals were eliminated due to the researchers' inability to contact them (e.g. moved, changed phone number, deceased), and 607 individuals consented to participate during the initial phone recruitment. There was a recruitment rate of 46.2% on first contact. A further 244 residents, who were not targeted, unexpectedly approached the researchers to participate. These 244 participants were accepted into the study upon advice of the residential community advisory board. Due to resource restrictions, the researchers decided not to make follow-up calls. A total sample of 851 participants was achieved. Participants were interviewed at their retirement community, either in their apartment or at the recreation center, by a trained researcher.

Of the 851 participants, 790 were still engaged in the project at the third time point (spring, 1992). However, only 267 participants indicated that they had current and/or ongoing conditions that produced symptoms. This subset of the sample completed the questionnaire sections relevant to this paper (refer to Figure 2.1).

This study was approved by the institutional review board at Rutgers University and by the governing body of the senior retirement community. Ethical standards were met (as determined by the IRB) and safety monitoring procedures were put in place. Minimal harm was foreseen in this project, with the only likelihood resulting from some discomfort in subjects talking about their symptoms and/or illnesses. Participants were fully debriefed after each interview session. Participation in this study was voluntary and participants were not compensated.

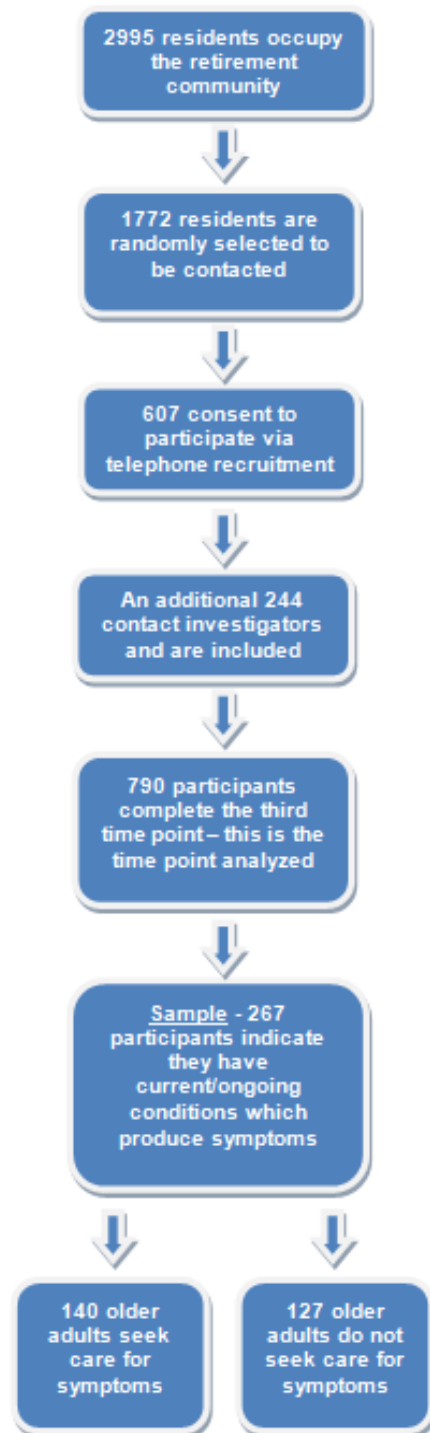


Figure 2.1 Recruitment procedures

2.3 Materials and Measures

2.3.1 Demographic Information

Demographic and socioeconomic outcome data were collected during the face-to-face interview. Relevant demographic information collected included age, length of symptoms, perceived general health, and gender.

2.3.2 Care Seeking

A single item assessed whether or not subjects sought care: “Did you seek medical care when you first noticed symptoms?” (yes/no).

2.3.3 Health Behaviors for New Symptoms (First Noticed)

For subjects who indicated that they experienced illness symptoms, nine items assessed their health behaviors in relation to their new symptoms: “Did you _____ when you first noticed any symptoms?”; 1) take any over-the-counter medication; 2) take any prescription medication; 3) rest or nap more; 4) change your diet; 5) take any additional vitamins; 6) change your exercise habits; 7) read something about your condition; 8) try to avoid thinking about it; and 9) ask a relative or friend for advice. Respondents answered yes or no to these questions. In regards to a change in diet or exercise, responses could be bidirectional. Some individuals may have increased these behaviors, whereas others decreased these behaviors. Unfortunately the direction of the change was not noted. Items were analyzed individually.

2.3.4 Health Behaviors for Severe Symptoms (Worst Point)

For subjects who indicated that they experienced illness symptoms, nine items assessed their health behaviors in relation to their most severe symptoms: “Did you _____ when it was at its worst?”; 1) take any over-the-counter medication; 2) take any prescription medication; 3) rest or nap more; 4) change your diet; 5) take any additional vitamins; 6) change your exercise habits; 7) read something about your condition; 8) try to avoid thinking about it; and 9) ask a relative or friend for advice. Respondents answered yes or no to these questions. In regards to a change in

diet or exercise, responses could be bidirectional. Some individuals may have increased these behaviors, whereas others decreased these behaviors. Unfortunately the direction of the change was not noted. Items were analyzed individually.

2.3.5 Self-Evaluation of Health Behaviors

Participants were also asked to evaluate the effectiveness of their health behaviors. After each behavior, participants were asked to indicate if engaging in the behavior made them feel better, worse, or the same.

2.3.6 Episode-Linked Emotions

The following five items were selected and modified from Usala and Hertzog (1989) and a high reliability for the scales ($\alpha = .90$) was achieved. Items were ranked on a five point Likert scale (1 = not at all to 5 = very). A single item which stated “How _____ were you when you first noticed symptoms?” assessed each of the following episode-linked emotions: 1) depressed, 2) anxious, 3) nervous, 4) stressed, and 5) sad. Items were analyzed in two ways; three (anxiety, depression, and stress) and five (nervousness, anxiety, depression, sadness, and stress) predictor models. The five predictor model used all of the variables individually. In the three predictor model, anxiety was a created variable from the average of anxious and nervous, whereas depression was the average of depressed and sad. This approach was taken to address the theoretical implications of having synonymous questions which convey ideas of anxiety and depression (e.g. “how sad were you” *and* “how depressed were you”).

2.3.7 Medical Care Avoidant Behaviors

For subjects who indicated that they did not seek care for their illness symptoms, fourteen items assessed reasons for avoidance: 1) “You mentioned earlier that you did not seek medical care. Was it because you felt doctors couldn’t do anything about it?”; 2) “Or because you didn’t think it was serious enough?”; 3) “Or because you thought it would go away on its own?”; 4) “Or because you don’t like going to doctors?”; 5) “Or you didn’t seek medical care because you had

this condition before and knew what to do about it?”, 6) “Or because you didn’t have time to go to the doctors?”, 7) “Or because you didn’t have transportation to the doctors?”, 8) “Or because you thought it was too far to travel to the doctors?”, 9) “Or because you had financial concerns?”, 10) “Or because you could not get an appointment?”, 11) Or because you didn’t want to know what was wrong?”, 12) “Or because you were embarrassed?”, 13) “Or because you needed to care for an ailing family member?”, and 14) “Or due to another reason?” Respondents answered yes or no to these questions. Items were analyzed individually.

2.4 Procedure

Prior to collecting data, researchers were trained by the primary investigator. This training enhanced the quality of the measurements taken. Researchers were briefed on the nature of the study and ways to appropriately interact with the participants. They were also encouraged to conduct mock interviews to familiarize themselves with the content and structure of the interview.

Each interview was conducted by a trained graduate student or post-doctoral researcher. Once participants were recruited, the researchers contacted each participant to determine a time and place to conduct the interview. Participants were called the day prior to the interview as a reminder. On the day of the interview, researchers met the participant at their preferred time and place (their apartment or recreation center). The investigator in charge of each interview emphasized to the participants: (a) that participation was entirely voluntary and had no effect on their health care and/or community status; and (b) that all personal, identifying information would be removed from their documents. Before the interview commenced, participants agreed to sign the informed consent form.

The structured interview allowed participants to elaborate on their current and past health status, health beliefs, and factors contributing to these. Each interview lasted roughly 90 minutes and participants were asked to answer the questions and recall information as honestly as they could. While the participants answered the questions posed, the researchers transferred their

responses to the questionnaires. Upon completion of the interview, the researcher transferred the data into SPSS and stored the materials in a secure location. This process was repeated every six months for nine years. Although this was a longitudinal study, the measures taken every six months varied; not all measures were repeated at each time point. The third time point was chosen due to the specific variables that were available and of interest to the researcher.

2.5 Power

The final sample size for this study was restricted by the resources available, however sufficient power was achieved. Power analyses for each of the statistical tests used were completed. The most stringent analysis conducted with G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009) was for a logistic regression, which yielded a minimum of 206 participants which would produce a power of .80 in order to detect an effect size of $OR = 2.1$ (and $\alpha = .05$). The sample obtained exceeded this. The sample selected was not known to differ from the target population, and the maximum number of participants in the study was reached.

Chapter 3

Results

3.1 Data Analysis

Prior to the analyses, variables were examined through various SPSS programs for missing values. Univariate descriptive statistics were examined to identify patterns in missing data, out of range values, and outliers. Independent Chi-Square tests (χ^2) were used for categorical variables found in hypothesis one, which examined the relationship between health behaviors and seeking care. Logistic regressions were used in the second hypotheses; these hypotheses stated that older adults who had higher levels of negative affect would be more likely to seek care than older adults who experienced lower levels of negative affect. Moderated logistic regression was used to test the third hypothesis, which stated that participants who did not seek care and had lower levels of negative affect would believe their health behaviors were more beneficial than those who did not seek care and had higher levels of negative affect. Each of the nine health behaviors were examined individually. Finally, logistic regression analyses will be used to assess the last hypothesis; that individuals who had higher levels of negative affect will engage in medical care avoidant behaviors (such as not going to the doctor because they believe their symptoms will go away on their own). Effect sizes were reported for all significant variables: Cohen's W (Cohen, 1992) will be used for categorical variables.

Prior to running the regression analyses, the assumptions of multicollinearity, linearity, and independence of errors were tested. To test the assumption of multicollinearity, tolerance, variance inflation factors (VIF), and the condition indexes (CI) were analyzed. In all of the regression analyses, tolerance was not less than 0.1 and VIF was not greater than 10. Additionally, the CI did not exceed 30, therefore the assumption of multicollinearity was met (Field, 2009). To test the assumption of the linearity of the logit, the interactions between the predictors and their logs were assessed (Field, 2009). Unless otherwise noted, these interactions were not significant

and therefore the assumption of linearity was met. The Durbin-Watson test was used to test the assumption of independence of errors. This assumption was also met (Durbin-Watson = between 1 and 3). Additionally, it was determined that outliers were not present.

In regards to the third hypothesis, moderated logistic regression was performed on evaluations of the following health behavior: over-the-counter medication use, prescription medication use, resting more, changing diet and exercise habits, avoidant thinking about their symptoms and asking for advice. The use of vitamins and reading about their symptoms were not included in the analysis because too few individuals indicated that they engaged in these health behaviors ((Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). When symptoms were first noticed, prescription medication was also excluded, because all participants who took prescription medications sought care. Additionally, the evaluations of health behaviors were made dichotomous measures, due to too few participants indicating that their health behaviors made them worse. The new measure for evaluations of health behaviors included same (0) and better (1).

When using negative affect as the predictors, it was measured with both three (anxiety, depression, and stress) and five (nervousness, anxiety, depression, sadness, and stress) predictor models. The three predictor approach was taken to address the theoretical implications of having synonymous questions which convey ideas of anxiety and depression (e.g. “how sad were you” *and* “how depressed were you”) and is presented in the text. Additional information was not gained from the five predictor model. These models are presented for reference in Appendix A and Appendix B.

3.2 Data Screening

Prior to the analyses, variables were examined through various SPSS programs for missing values. Univariate descriptive statistics were examined to identify patterns in missing data, out of range values, and outliers. There were minimal data missing, with the exception of the

questions which asked how nervous/depressed/anxious/sad/stressed participants were regarding their condition when they initially experienced symptoms. These questions elicited between 72 and 74 missing values (roughly 27% of cases) whereas the other questions elicited a maximum of two missing values. Upon further investigation it was discovered that this was not the result of biases based on demographic data. Additionally, these missing data could not be attributed to a particular investigator or date when the interview was conducted. Other factors could have influenced the participant's decision not to answer this question (for example, not accurately remembering if they were anxious or not) however these remain unknown. Only two participants did not answer this same question when referring to symptoms at their worst point. It is possible that there was an error in the programming of the software, which resulted in these questions being skipped unknowingly. Unfortunately, it was impossible to determine why these participants were missing data for these questions, although it appeared to be at random. All of the scores given by the participants without missing data were within the appropriate range, and, therefore, all data were used in the subsequent analyses.

3.3 Hypothesis 1: Assessment of Health Behavior Differences

3.3.1 Health Behaviors and Care Seeking when Symptoms were First Noticed

The first hypothesis was that care seeking would be associated with engaging in more health behaviors when symptoms were either first noticed or at their worst. The first hypothesis was partially supported. There was a statistically significant association between taking prescription medication and care seeking when symptoms were first noticed. Non-care seekers were less likely than expected to take prescription medications ($z = -2.4$), whereas care seekers were more likely ($z = 2.3$) when symptoms were first noticed. Unfortunately, there was not a statistically significant association between taking over-the-counter medications or vitamins, asking for advice, resting, changing diet or exercise, reading about their symptoms, or avoiding thinking about the symptoms and care seeking when symptoms were first noticed (see Table 3.1).

3.3.2 Health Behaviors and Care Seeking when Symptoms were at Their Worst

It was also expected that participants would report engaging in more health behaviors when they sought care for symptoms at their worst. As predicted, seeking care for symptoms at their worst was associated with taking over-the-counter medication and taking prescription medications. Non-care seekers were more likely than expected to take over-the-counter medication ($z = 2.9$), whereas care seekers were more likely to take prescription medication ($z = 3.1$). Unfortunately, there was not a statistically significant association between taking vitamins, asking for advice, resting, changing diet or exercise, reading about their symptoms, or avoiding thinking about the symptoms and care seeking when symptoms were at their worst (see Table 3.2 for more details regarding these associations).

Table 3.1 Associations between care seeking and health behaviors in older adults (N = 267) when symptoms were first noticed

Health Behaviors	χ^2 Value	Significance	w	OR
Over-the-counter medication	2.53	0.112	0.10	1.54
Prescription medication	13.04	0.000	0.22	0.21
Vitamins	3.33	0.068	0.11	2.35
Reading about the symptoms	4.84	0.028	0.13	0.26
Asking advice from friends/family	0.32	0.572	0.04	1.27
Resting more	0.01	0.923	0.01	1.03
Changing diet	0.04	0.845	0.01	0.94
Changing exercise habits	1.50	0.221	0.08	0.67
Avoidant thoughts	2.11	0.147	0.09	0.66

Note. **Bold** = significant

Table 3.2 Associations between care seeking and health behaviors in older adults (N = 267) when symptoms were at their worst.

Health Behaviors	χ^2 Value	Significance	w	OR
Over-the-counter medication	25.37	0.000	0.31	3.60
Prescription medication	32.25	0.000	0.35	0.22
Vitamins	2.14	0.144	0.09	2.12
Reading about the symptoms	5.93	0.015	0.15	0.30
Asking advice from friends/family	0.06	0.814	0.01	0.92
Resting more	0.42	0.518	0.04	1.17
Changing diet	0.74	0.390	0.05	1.30
Changing exercise habits	0.21	0.648	0.03	1.13
Avoidant thoughts	5.68	0.017	0.15	1.86

Note. **Bold** = significant

3.4 Hypothesis 2: Negative Affect as a Predictor of Care Seeking

3.4.1 Negative Affect as a Predictor of Care Seeking when Symptoms were First Noticed

Logistic regression was used to assess the second hypothesis, which measured the association between negative affect and care seeking when symptoms were first noticed and at their worst. It was hypothesized that higher levels of negative affect (anxiety, depression and stress) would predict care seeking when symptoms were first noticed.

A logistic regression was performed to determine if anxiety, depression and stress were good predictors of participants seeking medical care when symptoms were first noticed. Four iterations were required to meet a log likelihood of 252.17, $\chi^2 = (3, N=193) = 13.09, p = .004$. The null model, without any predictors, had a 55.4% chance to correctly classify cases to care-seeking or not, whereas the full model, with three predictors, had a 60.6% classification rate. This increased 5.2% from the null model. Table 3.3 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, anxiety predicted whether or not participants sought care; one unit change in anxiety increased the probability of seeking care by 2.21 times. Depression and stress were non-significant (see Table 3.3). Overall, these predictors collectively accounted for about 8.8% of the variance (Nagelkerke $R^2 = .088$).

3.4.2 Negative Affect as a Predictor of Care Seeking when Symptoms were at Their Worst

Logistic regression was also used to measure the association between negative affect and care-seeking when symptoms were at their worst. It was also hypothesized that negative affect would predict care seeking when symptoms were at their worst.

A logistic regression was performed to determine if anxiety, depression and stress were good predictors of participants seeking medical care. Four iterations were required to meet a log likelihood of 347.39, $\chi^2 = (3, N=264) = 18.40, p < .001$. The null model, without any predictors,

had a 52.3% chance to correctly classify cases to care-seeking or not, whereas the full model, with three predictors, had a 59.8% classification rate. This increased 7.5% from the null model. Table 3.4 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, anxiety and depression predicted whether or not participants sought care. One unit change in anxiety increased the probability of seeking care by 1.84 times and one unit change in depression decreased the probability by 0.68. Stress was non-significant (see Table 3.4). Overall, these predictors collectively accounted for about 9% of the variance (Nagelkerke $R^2 = .090$).

Table 3.3 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with three predictors when symptoms were first noticed

Variable	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
							Lower	Upper
Anxiety	0.79	0.27	8.74	1	0.003	2.21	1.31	3.73
Depression	-0.41	0.29	2.03	1	0.155	0.66	0.38	1.17
Stress	-0.26	0.18	2.06	1	0.151	0.77	0.54	1.10
<i>Constant</i>	-0.16	0.37	0.18	1	0.672	0.86		

Note. **Bold** = significant

Table 3.4 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with three predictors when symptoms were at their worst

Variable	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
							Lower	Upper
Anxiety	0.61	0.16	14.62	1	0.000	1.84	1.35	2.52
Depression	-0.38	0.19	4.06	1	0.044	0.68	0.47	0.99
Stress	-0.11	0.14	0.61	1	0.434	0.90	0.69	1.17
Constant	-0.35	0.29	1.41	1	0.236	0.71		

Note. **Bold** = significant

3.5 Hypothesis 3: Health Behaviors as a Predictor of Care Seeking

Moderated logistic regression was used to assess the third hypothesis, which stated that participants who did not seek care and had lower levels of negative affect would believe their health behaviors were more beneficial than those who did not seek care and had higher levels of negative affect. This assessed whether the relationship between perceived effectiveness of health behaviors and care seeking was moderated by level of anxiety, depression, or stress by entering perceived effectiveness into the first block, negative affect (anxiety, depression, or stress) in the second, and the interaction into the third block.

3.5.1 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Anxiety when Symptoms were First Noticed

The moderated logistic regression revealed that there were significant differences between the null and full models for taking over-the-counter medications, resting more, changing diet and exercise habits, and avoidant thoughts regarding their symptoms. It took four iterations in the full model to reach a final log likelihood of 95.24 for evaluations of taking over-the-counter medications. The null model had a 56.6% chance to correctly predict care seeking. The full model with all predictors had a 67.1% classification rate. A significant difference was observed between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2(3, N=76) = 8.80, p = .032$. Main effects for the evaluation of over-the-counter medication use and for anxiety were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between anxiety and perceived effectiveness of over-the-counter medications, indicating a moderation, did not significantly predict care seeking (see Table 3.5). Overall, these two predictors collectively accounted for about 14.7% of the variance in care seeking (Nagelkerke $R^2 = .147$).

Regarding evaluations of resting more, it took four iterations in the full model to reach a final log likelihood of 83.03. The null model had a 52.9% chance to correctly predict care seeking.

The full model with all predictors had a 69.1% classification rate. A significant difference was observed between the full and null model, $X^2(3, N=68) = 11.00, p = .012$. Main effects for resting more and for anxiety were not significant. Contrary to expectations, the interaction between anxiety and perceived effectiveness of resting more did not significantly predict care seeking (see Table 3.5). Overall, these two predictors collectively accounted for about 19.9% of the variance in care seeking (Nagelkerke $R^2 = .199$).

A significant difference was also observed between the full and null model for evaluation of exercise, $X^2(3, N=41) = 13.10, p = .004$. It took five iterations in the full model to reach a final log likelihood of 40.75. The null model had a 63.4% chance to correctly predict care seeking. The full model with all predictors had a 78.0% classification rate. Main effects for the evaluation of a change in exercise habits and for anxiety were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between anxiety and perceived effectiveness of changes in exercise habits, indicating a moderation, did not significantly predict care seeking (see Table 3.5). Overall, these two predictors collectively accounted for about 37.4% of the variance in care seeking (Nagelkerke $R^2 = .374$).

There was also a significant difference observed between the full and null model for evaluation of avoidant thinking, $X^2(3, N=65) = 10.84, p = .013$. It took four iterations in the full model to reach a final log likelihood of 78.52. The null model had a 55.4% chance to correctly predict care seeking. The full model with all predictors had a 67.7% classification rate. Anxiety was found to significantly predict care seeking; however evaluations of avoidant thinking were not significant (see Table 3.5). According to the Wald criterion, anxiety predicted whether or not participants sought care; one unit change in anxiety increased the probability of seeking care by 3.13 times. Contrary to expectations, the interaction between anxiety and perceived effectiveness of avoidant thinking did not significantly predict care seeking (see Table 3.5). Overall, these two

predictors collectively accounted for about 20.6% of the variance in care seeking (Nagelkerke $R^2 = .206$).

Lastly, it took four iterations in the full model to reach a final log likelihood of 36.57 for evaluations of changing diet. The null model had a 52.4% chance to correctly predict care seeking. The full model with all predictors had a 83.3% classification rate. A significant difference was observed between the full and null model, $X^2(3, N=42) = 21.56, p < .001$. Evaluations of dietary changes were found to significantly predict care seeking, however anxiety was not significant. According to the Wald criterion, dietary changes predicted whether or not participants sought care; however, one unit change in diet decreased the probability of seeking care by only 0.002 times. As expected, there was a significant interaction between evaluations of dietary changes and anxiety, indicating a moderation (see Table 3.5). Overall, these two predictors collectively accounted for about 53.6% of the variance in care seeking (Nagelkerke $R^2 = .536$). Post hoc tests were conducted to determine whether the evaluation of dietary changes predicted care seeking at different levels of anxiety. Specifically, the relationship between the evaluation of dietary changes and care seeking at low (-1 SD), medium (0 SD), and high (+1 SD) levels of anxiety were examined. It was revealed that evaluations of dietary changes significantly predicted care seeking when the level of anxiety was low, $B = -4.38, p = .001$, and moderate, $B = -2.58, p = .003$, but not when there was a high level of anxiety, $B = -.60, p = .611$. This suggests that at low and moderate levels of anxiety participants were more likely to seek medical care. Unfortunately, high levels of anxiety were not associated with care seeking.

Unfortunately there were no significant differences found between the null and full models in the evaluation of participants asking for advice; $X^2(3, N=26) = 1.11, p = .775$.

3.5.2 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Depression when Symptoms were First Noticed

The moderated logistic regression revealed that there were significant differences between the null and full models for taking changing diet. It took four iterations in the full model to reach a final log likelihood of 43.76. The null model had a 52.4% chance to correctly predict care seeking. The full model with all predictors had a 78.6% classification rate. A significant difference was observed between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2(3, N=42) = 14.37, p = .002$. Evaluations of dietary changes were found to significantly predict care seeking, however depression was non-significant. According to the Wald criterion, dietary change predicted whether or not participants sought care; however, one unit change in diet decreased the probability of seeking care by only 0.03 times. Contrary to expectations, the interaction between depression and perceived effectiveness of changing diet did not significantly predict care seeking (see Table 3.6). Overall, these two predictors collectively accounted for about 38.7% of the variance in care seeking (Nagelkerke $R^2 = .387$).

Unfortunately there were no significant differences found between the null and full models in both evaluations of taking over-the-counter, for resting more, changing exercise habits, for avoidant thinking regarding symptoms or for participants asking for advice: $X^2(3, N=76) = 6.74, p = .081$; $X^2(3, N=68) = 5.16, p = .160$; $X^2(3, N=41) = 7.06, p = .070$; $X^2(3, N=65) = 4.43, p = .219$; and $X^2(3, N=26) = 4.05, p = .256$, respectively.

3.5.3 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Stress when Symptoms were First Noticed

A moderated model in hierarchical logistic regression revealed that there were significant differences for evaluations of taking over-the-counter medications, resting and changing diet. It took four iterations in the full model to reach a final log likelihood of 95.24 for evaluations of

taking over-the-counter medications. The null model had a 58.1% chance to correctly predict care seeking. The full model with all predictors had a 67.6% classification rate. A significant difference was observed between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2(3, N=74) = 8.55, p = .036$. Main effects for the evaluation of over-the-counter medication use and for stress were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between stress and perceived effectiveness of over-the-counter medications, indicating a moderation, did not significantly predict care seeking (see Table 3.7). Overall, these two predictors collectively accounted for about 14.7% of the variance in care seeking (Nagelkerke $R^2 = .147$).

Regarding evaluations of resting more, it took six iterations in the full model to reach a final log likelihood of 80.66. The null model had a 52.2% chance to correctly predict care seeking and the full model had a 62.7% classification rate. A significant difference was observed between the full and null model, $X^2(3, N=67) = 12.09, p = .007$. Main effects for the evaluation of resting more and for stress were not significant. Contrary to expectations, the interaction between stress and perceived effectiveness of resting more did not significantly predict care seeking (see Table 3.7). Overall, these two predictors collectively accounted for about 22% of the variance in care seeking (Nagelkerke $R^2 = .220$).

Lastly, it took six iterations in the full model to reach a final log likelihood of 35.98 for evaluations of changing diet. The null model had a 52.4% chance to correctly predict care seeking and the full model had an 81% classification rate. A significant difference was observed between the full and null model, $X^2(3, N=42) = 22.15, p < .001$. Evaluations of dietary changes and stress were found to significantly predict care seeking (see Table 3.7). According to the Wald criterion, dietary change predicted whether or not participants sought care; however, one unit change in diet decreased the probability of seeking care by only 0.013 times. Additionally, one unit change in stress decreased the probability of seeking care by 0.19 times. Contrary to expectations, the

interaction between stress and perceived effectiveness of changing diet, indicating a moderation, did not significantly predict care seeking (see Table 3.7). Overall, these two predictors collectively accounted for about 54.7% of the variance in care seeking (Nagelkerke $R^2 = .547$).

There were no significant differences found between the null and full models in the evaluations of changing exercise habits, avoidant thinking regarding symptoms, and participants asking for advice: $X^2(3, N=41) = 6.06, p = .109$; $X^2(3, N=65) = 2.28, p = .516$; and $X^2(3, N=25) = 3.24, p = .356$, respectively.

Table 3.5 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with anxiety as a moderator when symptoms were first noticed

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>Df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Over-the-Counter Medications		-0.26	1.22	0.05	1	0.828	0.77	0.07	8.33
	Anxiety	0.59	0.45	1.74	1	0.187	1.80	0.75	4.31
	Interaction	-0.47	0.65	0.52	1	0.470	0.62	0.17	2.24
	Constant	0.34	0.40	0.71	1	0.399	1.41		
Resting More		-1.74	1.22	2.03	1	0.154	0.18	0.02	1.92
	Anxiety	0.48	0.41	1.38	1	0.241	1.62	0.73	3.60
	Interaction	0.33	0.55	0.37	1	0.544	1.39	0.48	4.08
	Constant	0.56	0.42	1.76	1	0.185	1.75		
Changing Diet		-6.13	2.05	8.98	1	0.003	0.00	0.00	0.12
	Anxiety	-0.14	0.48	0.09	1	0.770	0.87	0.34	2.22
	Interaction	1.76	0.85	4.26	1	0.039	5.78	1.09	30.63
	Constant	1.45	0.61	5.67	1	0.017	4.25		
Changing Exercise Habits		-3.13	1.77	3.13	1	0.077	0.04	0.00	1.40
	Anxiety	0.45	0.61	0.53	1	0.468	1.56	0.47	5.21
	Interaction	1.21	1.02	1.41	1	0.236	3.36	0.45	24.94

Table 3.5 – Continued

	Constant	1.22	0.58	4.48	1	0.034	3.38		
	Avoid Thinking About Symptoms	0.92	1.22	0.58		0.448	2.52	0.23	27.41
	Anxiety	1.14	0.46	6.19	1	0.013	3.13	1.27	7.68
	Interaction	-0.89	0.64	1.95	1	0.163	0.41	0.12	1.43
	Constant	-0.04	0.36	0.01	1	0.920	0.97		
	Ask Advice	-0.57	1.72	0.11	1	0.741	0.57	0.02	16.39
	Anxiety	0.24	0.48	0.25	1	0.620	1.27	0.50	3.23
	Interaction	-0.04	0.79	0.00	1	0.960	0.96	0.20	4.55
	Constant	0.61	0.63	0.92	1	0.337	1.84		

Note. **Bold** = significant

Table 3.6 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with depression as a moderator when symptoms were first noticed

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>Exp(B)</i>	95% CI	
								Lower	Upper
Over-the-Counter Medications		-1.21	1.07	1.29	1	0.257	0.30	0.04	2.42
	Depression	0.08	0.37	0.05	1	0.830	1.08	0.52	2.25
	Interaction	-0.01	0.63	0.00	1	0.985	0.99	0.29	3.42
	Constant	0.48	0.39	1.48	1	0.224	1.61		
Resting More		-0.48	1.13	0.18	1	0.674	0.62	0.07	5.71
	Depression	0.48	0.48	1.02	1	0.313	1.62	0.63	4.16
	Interaction	-0.26	0.57	0.21	1	0.648	0.77	0.25	2.36
	Constant	0.52	0.43	1.45	1	0.228	1.69		
Changing Diet		-3.64	1.59	5.22	1	0.022	0.03	0.00	0.60
	Depression	-0.06	0.55	0.01	1	0.911	0.94	0.32	2.77
	Interaction	0.67	0.71	0.89	1	0.346	1.95	0.49	7.77
	Constant	1.42	0.63	5.06	1	0.025	4.13		
Changing Exercise Habits		-3.24	1.78	3.32	1	0.069	0.04	0.00	1.28
	Depression	-0.23	0.71	0.10	1	0.749	0.80	0.20	3.21
	Interaction	1.29	1.02	1.60	1	0.206	3.63	0.49	26.83

Table 3.6 – Continued

	Constant	1.40	0.63	4.98	1	0.026	4.06		
Avoid Thinking About Symptoms		0.47	1.11	0.18		0.670	1.61	0.18	14.23
	Depression	0.61	0.42	2.09	1	0.148	1.83	0.81	4.16
	Interaction	-0.78	0.68	1.34	1	0.246	0.46	0.12	1.72
	Constant	0.04	0.33	0.01	1	0.908	1.04		
Ask Advice		2.33	2.01	1.35	1	0.245	10.31	0.20	527.02
	Depression	0.32	0.55	0.34	1	0.561	1.38	0.47	4.02
	Interaction	-2.16	1.36	2.50	1	0.114	0.12	0.01	1.68
	Constant	0.61	0.63	0.95	1	0.330	1.84		

Note. **Bold** = significant

Table 3.7 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with stress as a moderator when symptoms were first noticed

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Over-the-Counter Medications		-1.60	1.04	2.39	1	0.122	0.20	0.03	1.54
	Stress	-0.49	0.42	1.35	1	0.245	0.61	0.27	1.40
	Interaction	0.16	0.66	0.06	1	0.803	1.18	0.33	4.26
	Constant	0.54	0.41	1.78	1	0.182	1.72		
Resting More		0.18	1.33	0.02	1	0.892	1.20	0.09	16.18
	Stress	-0.54	0.49	1.22	1	0.269	0.59	0.23	1.51
	Interaction	-1.02	1.01	1.01	1	0.315	0.36	0.05	2.63
	Constant	0.76	0.42	3.18	1	0.075	2.13		
Changing Diet		-4.31	2.18	3.91	1	0.048	0.01	0.00	0.96
	Stress	-1.65	0.73	5.09	1	0.024	0.19	0.05	0.81
	Interaction	0.62	1.18	0.28	1	0.600	1.85	0.19	18.59
	Constant	2.53	1.00	6.34	1	0.012	12.50		
Changing Exercise Habits		-2.57	1.41	3.32	1	0.069	0.08	0.01	1.22
	Stress	-0.92	0.65	1.98	1	0.159	0.40	0.11	1.43
	Interaction	0.81	0.73	1.24	1	0.265	2.25	0.54	9.39

Table 3.7 – Continued

Constant	1.53	0.64	5.79	1	0.016	4.62		
Avoid Thinking About Symptoms	-0.41	1.09	0.14		0.705	0.66	0.08	5.57
Stress	-0.12	0.31	0.14	1	0.705	0.89	0.49	1.62
Interaction	-0.27	0.79	0.11	1	0.738	0.77	0.16	3.63
Constant	0.07	0.33	0.05	1	0.825			

Note. **Bold** = significant

3.5.4 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Anxiety when Symptoms were at Their Worst

A moderated model in hierarchical logistic regression revealed that there were significant differences for evaluations of taking over-the-counter medications, resting and changing diet. It took four iterations in the full model to reach a final log likelihood of 113.68. The null model had a 60.7% chance to correctly predict care seeking and the full model with all predictors had a 70.9% classification rate. A significant difference was observed for evaluations of taking over-the-counter medications between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2(3, N=103) = 16.98, p = .001$. Main effects for the evaluation of over-the-counter medication use and for anxiety when symptoms were at their worst were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between anxiety and perceived effectiveness of over-the-counter medications, indicating a moderation, did not significantly predict care seeking (see Table 3.8). Overall, these two predictors collectively accounted for about 21.1% of the variance in care seeking (Nagelkerke $R^2 = .211$).

Regarding evaluations of resting more, it took four iterations in the full model to reach a final log likelihood of 137.72. The null model had a 50% chance to correctly predict care seeking and the full model had a 61.3% classification rate. A significant difference was observed between the full and null model, $X^2(3, N=106) = 9.23, p = .026$. Main effects for the evaluation of resting more and for anxiety were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between anxiety and perceived effectiveness of resting more, indicating a moderation, did not significantly predict care seeking (see Table 3.8). Overall, these two predictors collectively accounted for about 11.1% of the variance in care seeking (Nagelkerke $R^2 = .111$).

Lastly, it took four iterations in the full model to reach a final log likelihood of 57.90 for evaluations of changing diet. The null model had a 53.8% chance to correctly predict care seeking and the full model had a 71.2% classification rate. A significant difference was observed between the full and null model, $X^2(3, N=52) = 13.88, p = .003$. Evaluations of dietary changes were found to significantly predict care seeking; however anxiety was not significant (see Table 3.8). According to the Wald criterion, dietary change predicted whether or not participants sought care; however, one unit change in diet decreased the probability of seeking care by only 0.022 times. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between anxiety and perceived effectiveness of changing diet, indicating a moderation, did not significantly predict care seeking. Overall, these two predictors collectively accounted for about 31.3% of the variance in care seeking (Nagelkerke $R^2 = .313$).

Unfortunately there were no significant differences found between the null and full models in the evaluation of taking prescription medications, changing exercise habits, avoiding thinking about symptoms, and participants asking for advice: $X^2(3, N=98) = 1.98, p = .587$; $X^2(3, N=68) = 4.64, p = .200$; $X^2(3, N=89) = 6.28, p = .099$; and $X^2(3, N=35) = 6.76, p = .080$, respectively.

3.5.5 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Depression when Symptoms were at Their Worst

A moderated model in hierarchical logistic regression revealed that there were significant differences for evaluations of taking over-the-counter medications, resting and changing diet. It took four iterations in the full model to reach a final log likelihood of 119.25 for evaluations of taking over-the-counter medications. The null model had a 67% chance to correctly predict care seeking and the full model with all predictors had a 72.8% classification rate. A significant difference was observed between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2(3, N=103) = 11.40, p = .010$. Main

effects for the evaluation of over-the-counter medication use and for depression were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between depression and perceived effectiveness of over-the-counter medications, indicating a moderation, did not significantly predict care seeking (see Table 3.9). Overall, these two predictors collectively accounted for about 14.6% of the variance in care seeking (Nagelkerke $R^2 = .146$).

Regarding evaluations of resting more, it took five iterations in the full model to reach a final log likelihood of 138.91. The null model had a 50% chance to correctly predict care seeking and the full model had a 59.4% classification rate. A significant difference was observed between the full and null model, $X^2 (3, N=106) = 8.04, p = .045$. Main effects for the evaluation of resting more and for depression were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between depression and perceived effectiveness of resting more, indicating a moderation, did not significantly predict care seeking (see Table 3.9). Overall, these two predictors collectively accounted for about 9.7% of the variance in care seeking (Nagelkerke $R^2 = .097$).

Lastly, it took four iterations in the full model to reach a final log likelihood of 59.05 for evaluations of changing diet. The null model had a 53.8% chance to correctly predict care seeking. The full model with all predictors had a 73.1% classification rate. A significant difference was observed between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2 (3, N=52) = 12.37, p = .005$. Evaluations of dietary changes were found to significantly predict care seeking; however depression was not significant (see Table 3.9). Contrary to expectations, in the full model, according to the Wald criterion, the interaction between depression and perceived effectiveness of changing diet, indicating a moderation, did not significantly predict care seeking. Overall, these two predictors collectively accounted for about 29% of the variance in care seeking (Nagelkerke $R^2 = .290$).

Unfortunately there were no significant differences found between the null and full models in the evaluation of taking prescription medications, changing exercise habits, avoiding thinking about symptoms, and participants asking for advice: $X^2(3, N=98) = 2.93, p = .403$; $X^2(3, N=68) = 1.51, p = .680$; $X^2(3, N=89) = 0.55, p = .907$; and $X^2(3, N=35) = 4.79, p = .188$, respectively.

3.5.3 Evaluations of Health Behaviors as a Predictor of Care Seeking Moderated by Stress when Symptoms were at Their Worst

A moderated model in hierarchical logistic regression revealed that there were significant differences for evaluations of taking over-the-counter medications and changing diet. It took five iterations in the full model to reach a final log likelihood of 118.42 for evaluations of taking over-the-counter medications. The null model had a 67% chance to correctly predict care seeking and the full model with all predictors had a 72.8% classification rate. A significant difference was observed between the full and null model, meaning that the two predictors, together, distinguished between participant care seeking, $X^2(3, N=103) = 12.23, p = .007$. Main effects for the evaluation of over-the-counter medication use and for stress were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between stress and perceived effectiveness of over-the-counter medications, indicating a moderation, did not significantly predict care seeking (see Table 3.10). Overall, these two predictors collectively accounted for about 15.6% of the variance in care seeking (Nagelkerke $R^2 = .156$).

A significant difference was also observed for evaluations of changing diet between the full and null model, $X^2(3, N=52) = 17.35, p = .001$. It took six iterations in the full model to reach a final log likelihood of 54.43. The null model had a 53.8% chance to correctly predict care seeking. The full model with all predictors had a 73.1% classification rate. Main effects for the evaluation of resting more and stress were not significant. Contrary to expectations, in the full model, according to the Wald criterion, the interaction between stress and perceived effectiveness

of changing diet, indicating a moderation, did not significantly predict care seeking (see Table 3.10). Overall, these two predictors collectively accounted for about 37.9% of the variance in care seeking (Nagelkerke $R^2 = .379$).

Unfortunately there were no significant differences found between the null and full models in the evaluation of taking prescription medications, resting, changing exercise habits, avoiding thinking about symptoms, and participants asking for advice: $X^2(3, N=98) = 4.50, p = .212$; $X^2(3, N=106) = 6.92, p = .075$; $X^2(3, N=68) = 2.60, p = .458$; $X^2(3, N=89) = 1.63, p = .653$; and $X^2(3, N=35) = 6.59, p = .086$, respectively.

Table 3.8 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with anxiety as a moderator when symptoms were at their worst

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Over-the-Counter Medications		-0.89	1.19	0.56	1	0.455	0.41	0.04	4.23
	Anxiety	0.76	0.50	2.30	1	0.129	2.14	0.80	5.73
	Interaction	-0.36	0.56	0.42	1	0.519	0.70	0.24	2.07
	Constant	0.51	0.47	1.14	1	0.287	1.66		
Prescription Medications		0.50	1.30	0.15	1	0.698	1.65	0.13	21.04
	Anxiety	0.53	0.52	1.03	1	0.311	0.70	0.61	4.73
	Interaction	-0.42	0.58	0.52	1	0.470	0.66	0.21	2.04
	Constant	1.26	0.58	4.79	1	0.029	3.52		
Resting More		-0.95	1.04	0.83	1	0.361	0.39	0.05	2.98
	Anxiety	0.39	0.38	1.04	1	0.308	1.47	0.70	3.11
	Interaction	-0.11	0.43	0.07	1	0.796	0.90	0.39	2.07
	Constant	0.87	0.49	3.12	1	0.077	2.39		
Changing Diet		-3.82	1.55	6.10	1	0.014	0.02	0.00	0.46
	Anxiety	-0.24	0.40	0.35	1	0.554	0.79	0.36	1.74
	Interaction	0.68	0.50	1.82	1	0.178	1.97	0.74	5.27

Table 3.8 – Continued

	Constant	1.27	0.62	4.26	1	0.040	3.58		
Changing Exercise Habits		0.26	1.10	0.06	1	0.810	1.30	0.15	11.23
	Anxiety	0.57	0.35	2.64	1	0.104	1.76	0.89	3.49
	Interaction	-0.23	0.44	0.27	1	0.603	0.80	0.33	1.89
	Constant	0.20	0.38	0.28	1	0.597	1.23		
Avoid Thinking About Symptoms		-0.52	0.95	0.30		0.586	0.60	0.09	3.84
	Anxiety	0.35	0.28	1.61	1	0.205	1.42	0.83	2.43
	Interaction	0.20	0.39	0.27	1	0.602	1.23	0.57	2.63
	Constant	-0.31	0.32	1.00	1	0.318	0.73		
Ask Advice		-2.57	1.66	2.41	1	0.212	0.08	0.00	1.96
	Anxiety	0.15	0.44	0.11	1	0.741	1.16	0.49	2.75
	Interaction	0.42	0.57	0.53	1	0.467	1.52	0.50	4.63
	Constant	0.93	0.62	2.25	1	0.134	2.54		

Note. **Bold** = significant

Table 3.9 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for evaluations of health behaviors with depression as a moderator when symptoms were at their worst

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Over-the-Counter Medications		-1.39	1.01	1.89	1	0.169	0.25	0.03	1.81
	Depression	0.15	0.41	0.13	1	0.720	1.16	0.52	2.57
	Interaction	-0.16	0.51	0.10	1	0.758	0.86	0.32	2.31
	Constant	0.52	0.46	1.29	1	0.257	1.68		
Prescription Medications		1.01	1.22	0.68	1	0.409	2.75	0.25	30.14
	Depression	0.83	0.64	1.68	1	0.195	2.29	0.66	7.99
	Interaction	-0.80	0.70	1.32	1	0.250	0.45	0.11	1.76
	Constant	1.17	0.59	3.91	1	0.048	3.23		
Resting More		0.04	1.16	0.00	1	0.972	1.04	0.11	10.16
	Depression	0.80	0.67	1.41	1	0.236	2.22	0.59	8.32
	Interaction	-0.78	0.70	1.24	1	0.266	0.46	0.12	1.81
	Constant	0.92	0.51	3.31	1	0.069	2.52		
Changing Diet		-2.81	1.34	4.42	1	0.036	0.06	0.00	0.83
	Depression	-0.49	0.43	1.27	1	0.259	0.62	0.26	1.43
	Interaction	0.35	0.55	0.40	1	0.528	1.41	0.48	4.15

Table 3.9 – Continued

Constant	1.38	0.62	4.97	1	0.026	3.98		
Changing Exercise Habits	0.66	1.05	0.40	1	0.529	1.94	0.25	15.09
Depression	0.45	0.40	1.28	1	0.258	1.56	0.72	3.39
Interaction	-0.45	0.48	0.85	1	0.356	0.64	0.25	1.65
Constant	0.19	0.38	0.25	1	0.619	1.21		
Avoid Thinking About Symptoms	0.32	0.84	0.15		0.700	1.38	0.27	7.09
Depression	0.17	0.30	0.30	1	0.583	0.18	0.65	2.13
Interaction	-0.27	0.42	0.42	1	0.517	0.76	0.33	1.74
Constant	-0.25	0.31	0.69	1	0.407	0.78		
Ask Advice	-2.56	1.52	2.82	1	0.093	0.08	0.00	1.53
Depression	-0.36	0.44	0.68	1	0.409	0.70	0.30	1.64
Interaction	0.48	0.54	0.80	1	0.372	1.62	0.56	4.65
Constant	1.32	0.74	3.20	1	0.074	3.74		

Note. **Bold** = significant

Table 3.10 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B)) for evaluations of health behaviors with stress as a moderator when symptoms were at their worst

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>Exp(B)</i>	95% CI	
								Lower	Upper
Over-the-Counter Medications		-0.77	1.20	0.41	1	0.520	0.46	0.04	4.87
	Stress	0.72	0.87	0.68	1	0.409	2.05	0.37	11.17
	Interaction	-0.72	0.90	0.64	1	0.424	0.49	0.08	2.85
	Constant	0.69	0.50	1.87	1	0.172	1.99		
Prescription Medications		1.15	1.20	0.92	1	0.338	3.15	0.30	32.73
	Stress	0.67	0.73	0.84	1	0.361	1.95	0.47	8.14
	Interaction	-1.04	0.77	1.84	1	0.175	0.35	0.08	1.59
	Constant	1.30	0.58	5.03	1	0.025	3.68		
Resting More		-1.25	0.90	1.91	1	0.166	0.29	0.05	1.68
	Stress	-0.17	0.35	0.24	1	0.622	0.84	0.43	1.66
	Interaction	-0.02	0.41	0.00	1	0.956	0.98	0.44	2.20
	Constant	1.05	0.51	4.28	1	0.039	2.86		
Changing Diet		-1.81	1.46	1.53	1	0.216	0.16	0.01	2.88
	Stress	-0.86	0.63	1.85	1	0.173	0.42	0.12	1.46
	Interaction	-0.22	1.05	0.05	1	0.831	0.80	0.10	6.21

Table 3.10 - Continued

Constant	1.10	0.56	3.82	1	0.051	3.00		
Changing Exercise Habits	0.94	0.98	0.91	1	0.340	2.55	0.37	17.36
Stress	0.67	0.52	1.71	1	0.191	1.96	0.71	5.37
Interaction	-0.76	0.61	1.55	1	0.213	0.47	0.14	1.54
Constant	0.31	0.38	0.67	1	0.415	1.36		
Avoid Thinking About Symptoms	0.62	0.77	0.66		0.417	1.87	0.41	8.42
Stress	0.22	0.24	0.85	1	0.356	1.25	0.78	2.01
Interaction	-0.48	0.41	1.36	1	0.243	0.62	0.27	1.39
Constant	-0.30	0.31	0.91	1	0.339	0.74		
Ask Advice	0.54	1.49	0.13	1	0.716	1.72	0.09	31.88
Stress	0.88	0.85	1.08	1	0.299	2.42	0.46	12.81
Interaction	-1.21	0.92	1.74	1	0.188	0.30	0.05	1.81
Constant	0.90	0.62	2.11	1	0.146	2.45		

Note. **Bold** = significant

3.6 Descriptive Characteristics of Avoidant Behaviors

Simple descriptive statistics (i.e. frequency data) were used to assess the reasons that individuals supplied for failing to seek medical care. As seen in Table 3.11, 127 participants indicated that they did not seek medical treatment for their most recent illness symptoms. The majority of participants indicated that the reasons they did not seek care was because they had the same symptoms previously and knew how to take care of them, they thought the symptoms would go away on their own, they did not believe their symptoms were serious enough, or they did not believe the doctor could help them. A smaller number of participants indicated that they disliked going to the doctors or they had other reasons for failing to seek care. Physical barriers such as a lack of time, transportation and finances as well as the inability to get an appointment did not appear to be a factor for most of the participants in this study. As well as understanding which negative emotions predict care seeking, it is important to determine if negative emotions predict specific avoidant behaviors. The more frequently cited reasons for failing to seek care were used to determine this. Additional avoidant behaviors found in Table 3.5 were excluded from analysis due to small observed cell size (i.e., cells with less than 10 observations; Peduzzi, et al., 1996).

Table 3.11 Avoidant behaviors frequency table (N = 127)

Variable		Frequency	Percent
Doctors cannot help	Yes	50	39.4
	No	77	60.6
No time	Yes	5	4.0
	No	122	96.0
Not serious enough	Yes	91	71.7
	No	36	28.3
Will go away on its own	Yes	93	73.2
	No	34	26.8
No transportation	Yes	2	1.6
	No	125	98.4
Too far to travel	Yes	3	2.4
	No	124	97.6
Financial concerns	Yes	1	0.8
	No	126	99.2
Could not get an appointment	Yes	1	0.8
	No	126	99.2
Does not want to know what's wrong	Yes	2	1.6
	No	125	98.4
Takes care of an ailing family member	Yes	1	0.8
	No	126	99.2
Is embarrassed	Yes	1	0.8
	No	126	99.2
Does not like to go to doctors	Yes	17	13.4
	No	110	88.6
Had before and knew what to do	Yes	96	75.6
	No	31	24.4
Doctor said it was not necessary	Yes	1	0.8
	No	126	99.2
Any other reason	Yes	18	14.2
	No	109	15.8

3.7 Hypothesis 4: Negative Affect as a Predictor of Avoidant Behaviors

3.7.1 *Negative Affect as a Predictor of Avoidant Behaviors when Symptoms were First Noticed*

Logistic regression was used to assess the last hypothesis, that negative affect (measured with three predictors: anxiety, depression, and stress) would predict avoidant behaviors (doctors cannot help, symptoms are not serious enough, belief that symptoms will go away on their own, does not like going to the doctors, and had the symptoms before and knew what to do) when symptoms were first noticed.

Logistic regressions were performed to determine if anxiety, depression and stress were good predictors of participants failing to seek care due to a belief that doctors cannot help them, that their symptoms were not serious enough, and that the symptoms would go away on their own. These models were not significant ($\chi^2 = (3, N=86) = 18.40, p = .307$; $\chi^2 = (3, N=86) = 2.69, p = .442$; and $\chi^2 = (3, N=86) = 3.09, p = .379$, respectively).

To determine if anxiety, depression and stress were good predictors of participants failing to seek care due to their dislike of going to the doctors, a logistic regression was performed. Five iterations were required to meet a log likelihood of 52.44, $\chi^2 = (3, N=264) = 13.03, p = .005$. The null model, without any predictors, had an 87.2% chance to correctly classify cases to failure to seek care due to a dislike of going to the doctors, whereas the full model, with three predictors, had an 89.5% classification rate. This increased 2.3% from the null model. Table 3.6 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, none of the predictors significantly predicted whether or not participants failed to seek care due to their dislike of doctors. Overall, these predictors collectively accounted for about 26.3% of the variance (Nagelkerke $R^2 = .263$).

Lastly, regression analysis was used to determine if anxiety, depression and stress were good predictors of participants failing to seek care due to their beliefs that they knew how to address their symptoms because they had them before. Six iterations were required to meet a log

likelihood of 87.28, $\chi^2 = (3, N=264) = 8.33, p = .040$. The null model, without any predictors, had a 75.6% chance to correctly classify cases to failure to seek care due their beliefs that they knew how to address their symptoms, whereas the full model, with three predictors, had a 74.4% classification rate. This decreased 1.2% from the null model. Table 3.12 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, none of the predictors significantly predicted whether or not participants failed to seek care due to their beliefs that they knew how to care for their symptoms. Overall, these predictors collectively accounted for about 13.8% of the variance (Nagelkerke $R^2 = .138$).

3.7.2 Negative Affect as a Predictor of Avoidant Behaviors when Symptoms were at Their Worst

Logistic regression was also used to assess if negative affect (measured with three predictors: anxiety, depression, and stress) predicted avoidant behaviors (doctors cannot help, symptoms are not serious enough, belief that symptoms will go away on their own, does not like going to the doctors, and had the symptoms before and knew what to do) when symptoms were at their worst. Before running the regression analysis, the assumptions of multicollinearity, linearity, and independence of errors were tested. The assumption of linearity was violated by the anxiety predictor in the models for symptoms going away on their own and the belief that the symptoms were not serious enough for medical attention. However, this model was run as originally proposed, since the alpha levels for these tests were .007 and .009 respectively (Tabachnick & Fidell, 2007).

Logistic regressions were performed to determine if anxiety, depression and stress were good predictors of participants failing to seek care due to a belief that their symptoms were not serious enough, and that the symptoms would go away on their own. These models were not significant ($\chi^2 = (3, N=126) = 7.67, p = .053$; and $\chi^2 = (3, N=126) = 5.59, p = .133$, respectively).

A logistic regression was also performed to determine if anxiety, depression and stress were good predictors of participants failing to seek care due to their belief that doctors could not

help them. Four iterations were required to meet a log likelihood of 155.35, $\chi^2 = (3, N=126) = 13.92, p = .003$. The null model, without any predictors, had a 60.3% chance to correctly classify cases to failure to seek care due their belief that doctors could not help them, whereas the full model, with three predictors, had a 64.3% classification rate. This increased 4% from the null model. Table 3.7 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, depression predicted whether or not participants failed to seek care due to their belief that doctors could not help them; one unit change in depression increased the probability of seeking care by 2.48 times. Anxiety and stress were not significant (see Table 3.7). Overall, these predictors collectively accounted for about 14.1% of the variance (Nagelkerke $R^2 = .141$).

To determine if anxiety, depression and stress were good predictors of participants failing to seek care due to their dislike of going to the doctors, a logistic regression was performed. Five iterations were required to meet a log likelihood of 86.26, $\chi^2 = (3, N=126) = 13.45, p = .004$. The null model, without any predictors, had a 86.5% chance to correctly classify cases to failure to seek care due to their dislike of going to the doctors, whereas the full model, with three predictors, had a 88.9% classification rate. This increased 2.4% from the null model. Table 3.13 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, anxiety predicted whether or not participants failed to seek care due to their dislike of doctors; one unit change in anxiety increased the probability of seeking care by 2.35 times. Depression and stress were not significant (see Table 3.13). Overall, these predictors collectively accounted for about 18.5% of the variance (Nagelkerke $R^2 = .185$).

Lastly, regression analysis was used to determine if anxiety, depression and stress were good predictors of participants failing to seek care due to their beliefs that they knew how to address their symptoms because they had them before. Six iterations were required to meet a log likelihood of 129.48, $\chi^2 = (3, N=126) = 8.84, p = .031$. The null model, without any predictors,

had a 76.2% chance to correctly classify cases to failure to seek care due their beliefs that they knew how to address their symptoms, whereas the full model, with three predictors, had a 76.2% classification rate. There was no change from the null model. Table 3.13 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, none of the predictors significantly predicted whether or not participants failed to seek care due to their beliefs that they knew how to care for their symptoms. Overall, these predictors collectively accounted for about 10.2% of the variance (Nagelkerke $R^2 = .102$).

Table 3.12 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with three predictors when symptoms were first noticed

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Doctor Cannot Help									
					1				
	Depression	0.14	0.51	0.08	1	0.781	1.15	0.43	3.10
	Anxiety	0.39	0.49	0.65	1	0.419	1.48	0.57	3.85
	Stress	-0.26	0.27	0.93	1	0.336	0.78	0.46	1.30
	Constant	-0.86	0.56	2.37	1	0.124	0.42		
Not Serious Enough									
	Depression	-0.44	0.54	0.67	1	0.413	0.64	0.22	1.85
	Anxiety	-0.06	0.52	0.01	1	0.915	0.95	0.34	2.64
	Stress	0.09	0.27	0.12	1	0.734	1.10	0.64	1.88
	Constant	1.59	0.59	7.20	1	0.007	4.92		
Go Away on Own									
	Depression	0.20	0.62	0.10	1	0.747	1.22	0.36	4.15
	Anxiety	0.48	0.59	0.66	1	0.417	1.61	0.51	5.08
	Stress	-0.13	0.25	0.27	1	0.606	0.88	0.53	1.44
	Constant	0.15	0.68	0.05	1	0.828	1.16		

Table 3.12 – Continued

Does Not Like Going to Doctors

Depression	1.25	0.69	3.29	1	0.070	3.50	0.91	13.37
Anxiety	0.10	0.70	0.02	1	0.887	1.11	0.28	4.40
Stress	-0.39	0.47	0.70	1	0.403	0.67	0.27	1.70
Constant	-3.57	0.88	16.52	1	0.000	0.03		
Had Before								
Depression	-0.77	0.72	1.14	1	0.285	0.46	0.11	1.90
Anxiety	1.39	0.80	3.00	1	0.083	4.00	0.83	19.19
Stress	0.79	0.57	1.90	1	0.168	2.20	0.72	6.72
Constant	-0.71	0.92	0.60	1	0.440	0.49		

Table 3.13 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with three predictors when symptoms were at their worst

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Doctors Cannot Help					1				
	Depression	0.91	0.37	5.97	1	0.015	2.48	1.20	5.15
	Anxiety	-0.08	0.31	0.06	1	0.802	0.93	0.50	1.71
	Stress	-0.06	0.20	0.09	1	0.763	0.94	0.64	1.39
	Constant	-1.59	0.47	11.31	1	0.001	0.21		
Not Serious Enough									
	Depression	0.20	0.34	0.34	1	0.560	1.22	0.63	2.35
	Anxiety	-0.66	0.31	4.62	1	0.032	0.52	0.28	0.94
	Stress	-0.03	0.19	0.02	1	0.887	0.97	0.67	1.42
	Constant	1.87	0.47	15.83	1	0.000	6.51		
Go Away on Own									
	Depression	0.21	0.42	0.26	1	0.613	0.24	0.55	2.80
	Anxiety	0.45	0.36	1.51	1	0.219	0.56	0.77	3.17
	Stress	-0.18	0.20	0.79	1	0.374	0.84	0.57	1.24
	Constant	0.29	0.52	0.32	1	0.573	1.34		
Does Not Like Going to Doctors									
	Depression	-0.05	0.39	0.01	1	0.904	0.96	0.45	2.03
	Anxiety	0.86	0.37	5.26	1	0.022	2.35	1.13	4.89
	Stress	0.13	0.23	0.30	1	0.583	1.14	0.72	1.79
	Constant	-3.70	0.67	30.05	1	0.000	0.03		

Table 3.13 – Continued

Had Before									
	Depression	-0.18	0.41	0.19	1	0.663	0.84	0.38	1.86
	Anxiety	-0.05	0.36	0.02	1	0.887	0.95	0.47	1.92
	Stress	1.05	0.54	3.75	1	0.053	2.84	0.99	8.19
	Constant	0.23	0.69	0.11	1	0.743	1.26		

Note. **Bold** = significant

Chapter 4

Discussion

The current study aimed to elucidate the emotional and behavioral predictors for older adults seeking care, and to describe the reasons that they chose not to seek medical care. Previous work indicated that it is not unusual for individuals to delay seeking care and that interpretation and perception of symptoms informs this decision (Adamson, et al, 2003; Zola, 1973). However, the ways in which negative emotions play a role in the decision making process of older adults has been unclear. This study focused on the participants' actions by using retrospective questionnaires about negative emotions and care seeking to determine responses based on the perception of their symptoms. Unfortunately, results did not support all of the hypotheses. Engaging in health behaviors was not always associated with seeking care, negative affect did not always predict care seeking and it was not a moderator between perceived effectiveness of health behaviors and care seeking, and lastly negative affect was not always a good predictor of reasons participants failed to seek care. Although negative affect was able to occasionally predict care seeking and reasons participants failed to seek care, the results were limited based on time point (when symptoms were first noticed versus when they were at their worst).

The first hypothesis was partially supported. Care seeking was positively associated with taking prescription medications before participants sought care from their doctor, when the symptoms were first noticed and at their worst. This was supported by past research which showed that participants who sought regular care (e.g. transplant patients) were more likely to confront the problem (Lindqvist & Sjoden, 1998; Lindqvist et al., 2004). It was possible that these individuals were non-adherent and only took previously prescribed medications when they experienced symptoms, or that they were less healthy overall and had more prescriptions than those individuals who did not seek care. These results were consistent with Leventhal's Common-Sense Model of Self-Regulation (Leventhal et al., 1998), which suggested that individuals will engage in various

action plans and then evaluate their effectiveness before revising their plans. In this instance, participants tried taking past prescriptions before visiting their doctor, in an effort to reduce their symptoms. Additionally, non-care seeking was positively associated with taking over-the-counter medications when symptoms were at their worst. Lindqvist et al., (2004) states that participants who do not seek regular care (i.e. the general population) are more likely to respond evasively. By taking non-prescription medications, these older adults were able to avoid medical care for their symptoms, which is consistent with previous literature and the Common-Sense Model. Unexpectedly, and contrary to previous research, there were no differences between care seekers and non-care seekers on taking vitamins, asking for advice, reading about their symptoms, avoidant thinking regarding symptoms, changing diet and exercise habits, or resting at either time point. This could be due to differences in experimental design. The current study only included individuals who were experiencing illness symptoms, whereas previous studies compared individuals seeking regular care to the general population, who may or may not have experienced illness symptoms. This could explain why a large number of participants in the current study, both care seekers and non-care seekers, engaged in health behaviors. Given these mixed results, future research is warranted to further investigate this construct and the factors that may affect it (i.e. care seeking).

Although past research indicated that symptoms of depression and anxiety were positively associated with healthcare utilization (de Boer et al., 1997; de Boer et al., 1999; Luber et al., 2001; Proensky et al., 2009), the second hypothesis was only partially supported. Specifically, anxiety was found to be a significant predictor of care seeking when symptoms were first noticed. Contrary to expectations, depression and stress did not predict care seeking. When symptoms were at their worst, both anxiety and depression predicted care seeking; however, stress was not a significant predictor. As levels of anxiety increased, so did the likelihood of the participant seeking medical care when symptoms were at their worst. However, as levels of

depression increased, the likelihood of the participant seeking care decreased. These results supported the Common-Sense Model, which stated that emotional reactions to illnesses (such as anxiety or depression) will impact a person's health behaviors. These findings may potentially be attributed to either severity or timeline associated with symptoms. Previous research shows that depression is associated with more severe conditions and symptoms (van Manen et al., 2002), and is often noted later in the disease progression (Kimmel & Peterson, 2006). Additionally, anxiety has been linked to acute conditions and symptoms, whereas depression follows at a later stage (Konstram, Moser, & Jong, 2005). The results of the current study support these previous findings. It is possible that individuals did not experience depression regarding symptoms when they were first noticed due to the perception of participants that their symptoms were not severe. Both anxiety and depression may have been significant when symptoms were at their worst because the symptoms were then perceived as more severe and due to the progression of the illness symptoms. This is consistent with past research which indicates that severity and perception of need predict care seeking in the elderly (de Boer et al., 1997; Fernandez-Olano et al., 2006).

The third hypothesis was not supported. Negative affect did not moderate the relationship between perceived effectiveness of health behaviors and care seeking. Perceived effectiveness of health behaviors was measured with a self-report question, on which participants indicated if they believed their actions (such as taking over-the-counter medications) made them feel better or the same as prior to their behavior. Although evaluations of health behaviors have not previously been used to predict care seeking, this finding was unexpected. According to the Common-Sense Model of Self-Regulation (Leventhal et al., 1998), the ways in which individuals appraise their coping responses to threats should influence their future health behaviors. Actions and appraisals are influenced by emotional responses to the threat, which would suggest that an interaction between evaluations (appraisals) and negative affect (emotions) should predict care seeking. However, these findings suggest that there is not a significant interaction between these factors. In fact, the

only significant interaction was found between low and moderate levels of anxiety on the perceived effectiveness of dietary changes and care seeking when symptoms were first noticed. Since this interaction was not found when symptoms were at their worst, and anxiety was not found to be a significant moderator for other evaluations of health behaviors, this finding needs to be interpreted cautiously. Although the CSM would suggest that emotions influence the relationship between appraisals of coping behaviors and future health actions, this was not supported. Small sample sizes could have influenced the results; some of the health behaviors were not frequently engaged. Additionally, very few participants indicated that their behaviors worsened their symptoms, which led the researcher to remove it from analysis. Enlarging the sample size could allow future researchers to further examine the relationship between evaluations of health behaviors and care seeking.

Past research has focused primarily on the demographic reasons why individuals go to the doctors, however few studies have examined the reasons that individuals failed to seek care. Descriptive statistics revealed that the main reasons participants failed to seek care was due to beliefs that their doctor could not help them, that their symptoms were not serious enough, that their symptoms would go away on their own, or that they knew how to respond to their symptoms because they had them before. These subjective beliefs that participants held were common reasons why participants from previous studies delayed care seeking (Weissman et al., 1991). This could have been explained by Andersen's general model of total patient delay (Andersen, 1968) and her behavioral model of health service usage (Andersen et al., 1995) which stated that perceived need directly influences an individual's decision to seek medical care. These participants indicated that they did not need medical help due to their beliefs regarding their symptoms. Contrary to previous research, typical barriers to care seeking, such as lack of time/transportation/money, did not appear to be a factor in this sample (Weissman et al., 1991). This inconsistency could be explained by the study sample, which included individuals who

resided in a private residential community for older adults. The residential community itself was expensive, and its occupants might not be an accurate representation of the general population.

The fourth hypothesis was partially supported. When symptoms were first noticed, negative affect did predict participants' failure to seek care due to their dislike of going to the doctors and their beliefs that they had the symptoms before and knew how to respond to them. Unfortunately, due to small cell sizes, analyses were not run to determine if negative affect predicted other reasons often cited for delaying care seeking (such as time and money). When symptoms were at their worst, negative affect predicted participants' failure to seek care due to their belief that doctors could not help them, and that they had the symptoms before and knew how to respond to them, as well as their dislike of going to the doctors. Overall, negative affect did predict failure to seek care due to the subjective beliefs that participants had about their symptoms, their knowledge, and their medical providers. Previous research surrounding delay or care seeking and care avoidance has primarily been descriptive. Nevertheless, according to Andersen et al's (1995) Model of Total Patient Delay and Leventhal's CSM, there are multiple stages when failing to seek care can occur, and emotions directly influence the behaviors participants engage in as well as the reasoning behind them. Again, these findings could be contrary to expectations due to the demographic characteristics of the sample. Negative affect may not have predicted the physical barriers of failure to seek care because those barriers were minimal in this population. Further research would be warranted to determine if these outcomes (failing to seek care from physical barriers such as lack of money or transportation) are prevalent in a more generalizable population (i.e. not an affluent residential community).

Taken together these findings suggest that care seekers and non-care seekers do engage in some different health behaviors at various points in their illness progression, and negative affect (specifically anxiety and depression) can predict care seeking at various time points. Additionally, negative affect can be used to predict some of the subjective reasons that individuals fail to seek

care. However, it is important to caution that this study was limited by several factors. First and foremost, this study utilized secondary data analyses and therefore the hypotheses were designed around existing data. Duplicating these data in a study that is designed specifically to evaluate the impact negative affect has on care seeking is highly recommended. Future studies would benefit from utilizing predeveloped scales to measure negative affect (specifically stress, anxiety, and depression) which are both reliable and valid. The single item measures which were employed in the current study for depression, anxiety, and stress were limited in their ability to distinguish between these phenomenon. It is possible that participants did not have an accurate understanding of these concepts, which could not be captured with a single item. Furthermore, a large amount of missing data could not be accounted for, which could have influenced the results and affected the power of the analyses. More detailed coding of missing data should be utilized in future studies, specifically differentiating between data which was intentionally skipped due to the format of the questionnaire and questions that participants refused to answer. Additionally, the study was unable to run analyses on several variables due to insufficient cell sizes. These difficulties could have been the result of using a sample population that is not generalizable to the overall population. Therefore, it is recommended that future studies incorporate a wider range of participants. This study may have yielded better results had participants been more diverse. Specifically, more than 80% of participants indicated that their health was good or better which may have influenced their decisions to seek care. Lastly, participants' illness symptoms were not standardized. Participants were asked if they had any illness symptoms and to reflect on those for the survey. However, their illness symptoms and conditions were not defined. Therefore, participants could have had a wide range of symptoms which differed in length and severity amongst other factors. Future studies should attempt to isolate specific illness symptoms to minimize the discrepancies between participants.

Regardless, it is important to note that the current study has furthered the research examining the impact health behaviors and emotions have on care seeking. Past research has primarily focused on descriptive characteristics and trait emotions that influence care seeking. The current study was able to go a step further and use state negative affect to predict care seeking as well as reasons individuals failed to seek care. Unlike previous studies, the current study was able to highlight a sample of individuals who did not merely delay going to the doctors, but failed to go altogether. This unique sample was compared to individuals who sought care and differences between groups were identified. Nevertheless, it is essential to further study this population and explore the ways in which emotions (both positive and negative) impact on a person's decision to seek medical care. This research may lead to advances in the ways in which medical care is presented to elderly populations, thereby treating and enhancing the lives of individuals on multiple levels.

Appendix A

Negative Affect as a Predictor of Care-Seeking: A Five Predictor Model

Negative Affect as a Predictor of Care-Seeking when Symptoms were First Noticed

Logistic regression was used to assess the second hypothesis, which measured the association between negative affect and care seeking when symptoms were first noticed and at their worst. It was hypothesized that higher levels of negative affect (nervousness, depression, anxiety, sadness, and stress) would predict care seeking when symptoms were first noticed.

A binary logistic regression was performed to determine if nervousness, depression, anxiety, sadness, and stress were good predictors of participants seeking medical care. Four iterations were required to meet a log likelihood of 249.68, $\chi^2 = (5, N=193) = 15.59$, $p = .008$. The null model, without any predictors, had a 55.4% chance to correctly classify cases to care-seeking or not. The full model, with five predictors, had a 59.1% classification rate, which increased 3.7% from the null model. Table A.1 shows regression coefficients, Wald statistics, and odds ratios for all five predictors in the full models. According to the Wald criterion, anxiety predicted whether or not participants sought care; one unit change in anxiety increased the probability of seeking care by 2.04 times. Nervousness, depression, sadness and stress, however, were not significant predictors of seeking care (see A.1). Overall, these predictors collectively accounted for 10.4% of the variance (Nagelkerke $R^2 = .104$).

Negative Affect as a Predictor of Care-Seeking when Symptoms were at Their Worst

A binary logistic regression was performed to determine if nervousness, depression, anxiety, sadness, and stress were good predictors of participants seeking medical care when symptoms were at their worst. Four iterations were required to meet a log likelihood of 346.92, $\chi^2 = (5, N=264) = 18.52$, $p = .002$. The null model, without any predictors, had a 52.3% chance to correctly classify cases to care-seeking or not. The full model, with five predictors, had a 60.6% classification rate, which increased 8.3% from the null model. Table A.2 shows regression coefficients, Wald statistics, and odds ratios for all five predictors in the full models. According to

the Wald criterion, none of the predictors predicted whether participants sought care, although nervousness approached significance. Overall, these predictors collectively accounted for about 9% of the variance (Nagelkerke $R^2 = .090$).

Table A.1 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with five predictors when symptoms were first noticed

Variable	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
							Lower	Upper
Nervous	0.17	0.24	0.52	1	0.472	1.19	0.74	1.90
Anxious	0.71	0.28	6.46	1	0.011	2.04	1.18	3.52
Depressed	-0.50	0.30	2.77	1	0.096	0.60	0.33	1.09
Sad	-0.03	0.27	0.01	1	0.914	0.97	0.57	1.65
Stressed	-0.28	0.19	2.20	1	0.138	0.76	0.53	1.09
<i>Constant</i>	-0.11	0.38	0.08	1	0.772	0.90		

Note. **Bold** = significant

Table A.2 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with five predictors when symptoms were at their worst

Variable	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
							Lower	Upper
Nervous	0.34	0.19	3.15	1	0.076	1.41	0.97	2.05
Anxious	0.28	0.20	1.97	1	0.160	1.32	0.90	1.94
Depressed	-0.24	0.22	1.23	1	0.267	0.79	0.51	1.20
Sad	-0.14	0.22	0.38	1	0.537	0.87	0.57	1.34
Stressed	-0.10	0.14	0.60	1	0.440	0.90	0.69	1.17
<i>Constant</i>	-0.36	0.29	1.46	1	0.227	0.70		

Appendix B

Negative Affect as a Predictor of Avoidant Behaviors: A Five Predictor Model

Negative Affect as a Predictor of Avoidant Behaviors when Symptoms were First Noticed

Logistic regression was used to assess the last hypothesis, that negative affect (measured with five predictors: nervous, anxious, depressed, sad, and stressed) would predict avoidant behaviors (doctors cannot help, symptoms are not serious enough, belief that symptoms will go away on their own, does not like going to the doctors, and had the symptoms before and knew what to do) when symptoms were first noticed.

Logistic regressions were performed to determine if nervousness, anxiety, depression, sadness and stress were good predictors of participants failing to seek care due to a belief that doctors cannot help them, that their symptoms were not serious enough, that they had the symptoms before and knew what to do for them, and that the symptoms would go away on their own. These models were not significant ($\chi^2 = (5, N=86) = 10.82, p = .055$; $\chi^2 = (5, N=86) = 2.93, p = .711$; $\chi^2 = (5, N=86) = 8.58, p = .127$; and $\chi^2 = (5, N=86) = 4.72, p = .452$, respectively).

To determine if nervousness, anxiety, depression, sadness and stress were good predictors of participants failing to seek care due their dislike of going to the doctors, a logistic regression was performed. Six iterations were required to meet a log likelihood of 50.60, $\chi^2 = (5, N=86) = 15.17, p = .010$. The null model, without any predictors, had a 87.2% chance to correctly classify cases to failure to seek care due their dislike of going to the doctors, whereas the full model, with three predictors, had a 90.7% classification rate. This increased 3.5% from the null model. Table B.1 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, none of the predictors significantly predicted whether or not participants failed to seek care due to their dislike of doctors. Overall, these predictors collectively accounted for about 30.3% of the variance (Nagelkerke $R^2 = .303$).

Negative Affect as a Predictor of Avoidant Behaviors when Symptoms were at Their Worst

Logistic regression was used to assess the last hypothesis, that negative affect (measured with five predictors: nervous, anxious, depressed, sad, and stressed) would predict avoidant

behaviors (doctors cannot help, symptoms are not serious enough, belief that symptoms will go away on their own, does not like going to the doctors, and had the symptoms before and knew what to do) when symptoms were at their worst.

Logistic regressions were performed to determine if nervousness, anxiety, depression, sadness and stress were good predictors of participants failing to seek care due to a belief that their symptoms were not serious enough, and that the symptoms would go away on their own. These models were not significant ($\chi^2 = (5, N=126) = 8.39, p = .136$; and $\chi^2 = (5, N=126) = 7.05, p = .217$, respectively).

A logistic regression was also performed to determine if nervousness, anxiety, depression, sadness and stress were good predictors of participants failing to seek care due their belief that doctors could not help them. Four iterations were required to meet a log likelihood of 154.01, $\chi^2 = (5, N=126) = 15.26, p = .009$. The null model, without any predictors, had a 60.3% chance to correctly classify cases to failure to seek care due their beliefs that doctors could not help them, whereas the full model, with three predictors, had a 66.7% classification rate. This increased 6.4% from the null model. Table B.2 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, none of the predictors significantly predicted whether or not participants failed to seek care due to their belief that doctors could not help them. Overall, these predictors collectively accounted for about 15.4% of the variance (Nagelkerke $R^2 = .154$).

To determine if nervousness, anxiety, depression, sadness and stress were good predictors of participants failing to seek care due their dislike of going to the doctors, a logistic regression was performed. Five iterations were required to meet a log likelihood of 81.25, $\chi^2 = (5, N=126) = 18.45, p = .002$. The null model, without any predictors, had a 86.5% chance to correctly classify cases to failure to seek care due their dislike of going to the doctors, whereas the full model, with three predictors, had a 90.5% classification rate. This increased 4% from the null model. Table B.2

shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, nervousness predicted whether or not participants failed to seek care due to their dislike of doctors; one unit change in nervousness increased the probability of seeking care by 3.68 times. Depression, anxiety, sadness and stress were non-significant (see Table B.2). Overall, these predictors collectively accounted for about 24.9% of the variance (Nagelkerke $R^2 = .249$).

Lastly, regression analysis was used to determine if nervousness, anxiety, depression, sadness and stress were good predictors of participants failing to seek care due their beliefs that they knew how to address their symptoms because they had them before. Six iterations were required to meet a log likelihood of 126.43, $\chi^2 = (5, N=126) = 11.89, p = .036$. The null model, without any predictors, had a 76.2% chance to correctly classify cases to failure to seek care due their beliefs that they knew how to address their symptoms, whereas the full model, with three predictors, had a 74.6% classification rate. There was a decrease of 1.6% from the null model. Table B.2 shows regression coefficients, Wald statistics, and odds ratios for all three predictors in the full model. According to the Wald criterion, none of the predictors significantly predicted whether or not participants failed to seek care due to their beliefs that they knew how to care for their symptoms. Overall, these predictors collectively accounted for about 13.5% of the variance (Nagelkerke $R^2 = .135$).

Table B.1 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with five predictors when symptoms were first noticed

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Exp(<i>B</i>)	95% CI	
								Lower	Upper
Doc Cannot Help									
	Nervous	-0.88	0.55	2.53	1	0.112	0.42	0.14	1.23
	Depressed	-0.16	0.56	0.08	1	0.774	0.85	0.28	2.57
	Anxious	1.50	0.60	6.18	1	0.013	4.48	1.37	14.63
	Sad	-0.05	0.49	0.01	1	0.922	0.95	0.37	2.48
	Stressed	-0.38	0.30	1.63	1	0.202	0.69	0.39	1.22
	Constant	-0.56	0.59	0.89	1	0.345	0.57		
Not Serious Enough									
	Nervous	-0.14	0.48	0.08	1	0.776	0.87	0.34	2.22
	Depressed	-0.38	0.50	0.57	1	0.450	0.69	0.26	1.83
	Anxious	0.15	0.53	0.08	1	0.783	1.16	0.41	3.29
	Sad	-0.13	0.46	0.08	1	0.772	0.88	0.36	2.15
	Stressed	0.08	0.28	0.07	1	0.785	1.08	0.63	1.85
	Constant	1.63	0.61	7.10	1	0.008	5.10		
Go Away on Own									
	Nervous	0.65	0.55	1.42	1	0.234	1.91	0.66	5.58
	Depressed	0.54	0.69	0.61	1	0.436	1.71	0.44	6.63
	Anxious	-0.36	0.61	0.35	1	0.554	0.70	0.21	2.29
	Sad	-0.11	0.60	0.03	1	0.860	0.90	0.28	2.91
	Stressed	-0.10	0.26	0.14	1	0.706	0.91	0.55	1.50
	Constant	0.05	0.68	0.01	1	0.937	1.06		

Table B.1 – Continued

Does Not Like Docs									
	Nervous	-0.44	0.67	0.43	1	0.515	0.65	0.17	2.40
	Depressed	0.09	0.72	0.02	1	0.897	1.10	0.27	4.52
	Anxious	0.76	0.73	1.08	1	0.298	2.13	0.51	8.89
	Sad	0.93	0.66	0.99	1	0.158	2.54	0.70	9.24
	Stressed	-0.53	0.53	0.99	1	0.320	0.59	0.21	1.68
	Constant	-3.39	0.89	14.50	1	0.000	0.03		
<i>Had Before</i>									
	Nervous	0.49	0.60	0.67	1	0.412	1.63	0.51	5.27
	Depressed	-0.47	0.64	0.54	1	0.462	0.62	0.18	2.20
	Anxious	0.95	0.72	1.76	1	0.185	2.60	0.63	10.63
	Sad	-0.36	0.82	0.19	1	0.661	0.70	0.14	3.45
	Stressed	0.78	0.58	1.82	1	0.177	2.19	0.70	6.82
	Constant	-0.70	0.94	0.56	1	0.456	0.50		

Note. **Bold** = significant

Table B.2 Regression coefficients (B), standard error (S.E), Wald statistics, and odds ratio (Exp(B))
for negative affect with five predictors when symptoms were at their worst

Avoidant Behavior	Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	<i>Exp(B)</i>	95% CI	
								Lower	Upper
Doc Cannot Help									
	Nervous	-0.32	0.37	0.74	1	0.390	0.73	0.35	1.50
	Depressed	0.18	0.35	0.25	1	0.614	1.20	0.60	2.39
	Anxious	0.31	0.37	0.67	1	0.413	1.36	0.65	2.83
	Sad	0.65	0.33	3.76	1	0.053	1.91	0.99	3.66
	Stressed	-0.05	0.20	0.06	1	0.806	0.95	0.65	1.40
	Constant	-1.59	0.49	10.62	1	0.001	0.21		
Not Serious Enough									
	Nervous	-0.46	0.34	1.78	1	0.182	0.63	0.32	1.24
	Depressed	-0.16	0.37	0.20	1	0.655	0.85	0.41	1.74
	Anxious	-0.14	0.38	0.13	1	0.721	0.87	0.41	1.85
	Sad	0.29	0.33	0.81	1	0.368	1.34	0.71	2.54
	Stressed	-0.02	0.20	0.01	1	0.941	0.99	0.67	1.45
	Constant	1.86	0.48	15.24	1	0.000	6.41		
Go Away on Own									
	Nervous	0.37	0.43	0.75	1	0.386	1.45	0.63	3.36
	Depressed	-0.26	0.40	0.40	1	0.526	0.78	0.35	1.70
	Anxious	0.18	0.44	0.16	1	0.689	1.19	0.50	2.82
	Sad	0.50	0.40	1.51	1	0.219	1.64	0.75	3.61
	Stressed	-0.15	0.20	0.56	1	0.455	0.86	0.58	1.28
	Constant	0.12	0.58	0.04	1	0.834	1.13		

Table B.2 - Continued

Does Not Like Docs									
	Nervous	1.30	0.48	7.28	1	0.007	3.38	1.43	9.46
	Depressed	0.62	0.51	1.15	1	0.218	1.87	0.69	5.05
	Anxious	-0.75	0.63	1.41	1	0.235	0.47	0.14	1.63
	Sad	-0.29	0.40	0.53	1	0.465	0.75	0.34	1.64
	Stressed	0.15	0.25	0.33	1	0.564	1.16	0.71	1.90
	Constant	-3.84	0.70	30.38	1	0.000	0.02		
<i>Had Before</i>									
	Nervous	-0.59	0.41	2.14	1	0.143	0.55	0.25	1.22
	Depressed	-0.53	0.46	1.30	1	0.254	0.59	0.24	1.46
	Anxious	0.71	0.52	1.85	1	0.174	2.03	0.73	5.66
	Sad	0.10	0.40	0.16	1	0.810	1.10	0.51	2.40
	Stressed	1.09	0.56	3.78	1	0.052	2.96	0.99	8.83
	Constant	0.29	0.71	0.17	1	0.680	1.34		

Note. **Bold** = significant

References

- Adamson, J., Ben-Shlomo, Y., Chaturvedi, N., & Donovan, J. (2003). Ethnicity, socio-economic position and gender – do they affect reported health - care seeking behavior? *Social Science and Medicine*, 57, 895-904.
- Administration on Aging, US Department of Health and Human Services. Older Americans 2010: Key Indicators of Well-Being. Washington, DC: US Government Printing Office; 2010.
- Andersen, R. (1968). Behavioral Model of Families' Use of Health Services. Chicago, IL: Center for Health Administration Studies, University of Chicago.
- Andersen, R. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior*, 36, 1-10.
- Andersen, B., Cacioppo, J., & Roberts, D. (1995). Delay in seeking a cancer diagnosis: Delay stages and psychophysiological comparison processes. *British Journal of Social Psychology*, 34, 33-52.
- Bernstein, A., Hing, E., Moss, A., Allen, K., Siller, A., & Tiggle, R. (2003). Health care in America: Trends in utilization. Hyattsville, Maryland: National Center for Health Statistics.
- Burgess, C., Hunter, M., & Ramirez, A. (2001). A qualitative study of delay among women reporting symptoms of breast cancer. *British Journal of General Practice*, 51(473) 967-971.
- Cameron, L., Leventhal, E., & Leventhal, H. (1993). Symptom representations and affect as determinants of care seeking in a community-dwelling, adult sample population. *Health Psychology*, 12(3), 171-179.
- Chang, K., Tseng, M., & Tan, T. (2004). Prehospital after acute stroke in Kaohsiung, Taiwan. *Stroke*, 35, 700-704.

- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159.
- Costa, P., & McCrae, R. (1987). Neuroticism, somatic complaints, and disease: Is the bark worse than the bite? *Journal of Personality*, 55, 299-316.
- Daly, J., Elliott, D., Cameron-traub, E., Salamonson, Y., Davidson, P., Jackson, D., Chin, C., & Wade, V. (2000). Health status, perceptions of coping, and social support immediately after discharge of survivors of acute myocardial infarction. *American Journal of Critical Care*, 9, 62-69.
- de Boer, A., Wijker, W., & de Haes, H. (1997). Predictors of health care utilization in the chronically ill: A review of the literature. *Health Policy*, 42, 101-115.
- de Buijs, E., Beekman, A., van Balkmon, A., Deeg, D., van Dyck, R., & van Tilburg, W. (1999). Consequences of anxiety in older persons: its effect on disability, well-being and use of health services. *Psychological Medicine*, 29, 583-593.
- Dracup, K., Moser, D., Eisenberg, M., Meischke, H., Alonzo, A., & Braslow, A. (1995). Causes of delay in seeking treatment for heart attack symptoms. *Social Science and Medicine*, 40(3), 379-392.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149-1160.
- Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175-191.
- Fernandez-Olano, C., Hidalgo, J., Cerda-Diaz, R., Requena-Gallego, M., Sanchez-Castano, C., Urbistondo-Cascales, L., & Otero-Puime, A. (2006). Factors associated with health care utilization by the elderly in a public health care system. *Health Policy*, 75, 131-139.
- Finnegan, J., Meischke, H., Zapka, J., Leviton, L., Meshack, A., Benjamin-Garner, R,

- Estabrook, B., Johnston, N., Schaeffer, S., Smith, C., Weitzman, E., Raczynski, J., & Stone, E. (2000). Patient delay in seeking care for heart attack symptoms: Findings from focus groups conducted in five U.S. regions. *Preventive Medicine, 31*, 205-213.
- Fleming, C., Fisher, E., Chang, C., Bubolz, T., & Malenka, D. (1992). Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for medicare and veterans affairs hospitals. *Medical Care, 30*(5), 377-391.
- Hale, E., Treharne, G., & Kitas, G. (2007). The common-sense model of self-regulation of health and illness: How can we use it to understand and respond to our patients' needs? *Rheumatology, 46*, 904-906.
- Jalowick, A., Murphy, S., & Powers, M. (1984). Psychometric assessment of the Jalowiec Coping Scale. *Nursing Research, 33*(3), 157-161.
- Janz, N., & Becker, M. (1984). The health belief model: A decade later. *Health Education Quarterly, 11*(1), 1-47.
- Kimmel, P., & Peterson, R. (2006). Depression in patients with end-stage renal disease treated with dialysis: Has the time to treat arrived? *Clinical journal of the American Society of Nephrology, 1*, 349-352.
- Konstam, V., Moser, D., & Jong, M. (2005). Depression and anxiety in heart failure. *Journal of Cardiac Failure, 11*(6), 455-463.
- Leslie, W., Urie, A., Hooper, J., & Morrison, C. (2000). Delay in calling for help in myocardial infarction: Reasons for the delay and subsequent pattern for accessing care. *Heart, 84*, 137-141.
- Leventhal, H., Diefenback, M., & Leventhal, E. (1992). Illness cognition: Using common sense to understand treatment adherence and affect cognition interactions. *Cognitive Therapy & Research, 16*(2), 143-163.

- Leventhal, H., Leventhal, E., & Contrada, R. (1998). Self-regulation, health, and behavior: A perceptual-cognitive approach. *Health and Psychology, 13*, 717-733.
- Lindqvist, R., Carlsson, M., & Sjöden, P. (2004). Coping strategies of people with kidney transplants. *Journal of Advanced Nursing, 45*, 47-52.
- Lindqvist, R., & Sjöden, P. (1998). Coping strategies and quality of life among patients on continuous ambulatory peritoneal dialysis (CAPD). *Journal of Advanced Nursing, 27*, 312-319.
- Luber, M., Meyers, B., Williams-Russo, P., Hollenberg, J., DiDomenico, T., Charlson, M., & Alexopoulos, G. (2001). Depression and service utilization in elderly primary care patients. *American Journal of Geriatric Psychiatry, 9*(2), 169-176.
- Mandelzweig, L., Goldbourt, U., Boyko, V., & Tanne, D. (2006). Perceptual, social, and behavioral factors associated with delays in seeking medical care in patients with symptoms of acute stroke. *Stroke, 37*, 1248-1253.
- Mora, P., Robitaille, C., Leventhal, H., Swigar, M., & Leventhal, E. (2002). Trait negative affect relates to prior weak symptoms, but not to reports of illness episodes, illness symptoms and care seeking. *Psychosomatic Medicine, 64*, 436-449.
- Nerenz, D., & Leventhal, H. (1983). Self-regulation theory in chronic illness. In: Burish TG, Bradley LA, eds. *Coping with Chronic Disease Research and Applications*. New York: Academic Press, 13-37.
- Peduzzi, P., Concato, J., Kemper, E., Holford, T., & Feinstein, A. (1996). A simulation study of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology, 49*, 1373-9.
- Porensky, E., Dew, M., Karp, J., Skidmore, E., Rollman, B., Shear, M., and Lenze, E. (2009). The burden of late-life generalized anxiety disorder: Effects on disability, health-related

- quality of life, and healthcare utilization. *The American Journal of Geriatric Psychiatry*, 17(6), 473-482.
- Roos, N., & Shapiro, E. (1981). The Manitoba longitudinal study on aging: Preliminary findings on health care utilization by the elderly. *Medical Care*, 19(6), 644-657.
- Safer, M., Tharps, Q., Jackson, T., & Leventhal, H. (1979). Determinants of three stages of delay in seeking care at a medical clinic. *Medical Care*, 17(1), 11-29.
- Snih, S., Markides, K., Ray, L., Freeman, J., Ostir, G., & Goodwin, J. (2006). Predictors of healthcare utilization among older Mexican Americans. *Ethnicity and Disease*, 16, 640-646.
- Tabachnick, B., & Fidell, L. (5th Ed.). (2007). *Using Multivariate Statistics*. Boston, MA: Pearson, Allyn, & Bacon.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2010). *Summary health statistics for U.S. adults: National health interview survey, 2009* (DHHS Publication No. 2011-1577). Retrieved from http://www.cdc.gov/nchs/data/series/sr_10/sr10_249.pdf
- US National Center for Health Statistics (2010). Health, United States.
- Usala, P., & Hertzog, C. (1989). Measurement of affective states in adults: Evaluation of an adjective rating scale instrument. *Research on Aging*, 11(4), 403-426.
- van Manen, J., Bindels, P., Dekker, F., IJermans, C., van der Zee, J., & Schade, E. (2002). Risk of depression in patients with chronic obstructive pulmonary disease and its determinants. *Thorax*, 57, 412-416.
- Verbrugge, L., & Ascione, F. (1987). Exploring the iceberg: Common symptoms and how people care for them. *Medical Care*, 25(6), 539-569.
- Watkins, K., Klem, L., Connell, C., Hickey, T., Fitzgerald, J., & Ingersoll-Dayton, B. (2000). Effect of adults'

- Weissman, J., Stern, R., Fielding, S., & Epstein, A. (1991). Delayed access to health care: Risk factors, reasons, and consequences. *Annals of Internal Medicine*, 114, 325-331.
- Ybarra, M., & Suman, M. (2006). Help seeking behavior and the internet: A national survey. *International Journal of Medical Informatics*, 75, 29-41.
- Zola, I.K. (1973). Pathways to the doctor: From person to patient. *Social Science and Medicine*, 7, 677-689.

Biographical Information

Hollie Pellosmaa is a third year graduate student and graduate teaching assistant at the University of Texas at Arlington. She is currently working on research regarding cultural differences in health behaviors in diabetic patients, illness beliefs, and emotional predictors of health behaviors.

Hollie received her Bachelor of Arts in Psychology and English from Albion College in 2006, as well as her Masters in Human Services in Rehabilitation Counseling from Griffith University in 2007.