Satisfaction with Ability and Reported Functional Impairment in Cancer Survivors with Chronic Illness-Related Fatigue

by

Jessica Dawn Eversen Pike

Bachelor of Arts
Psychology
Rollins College
2008

Master of Science
in Clinical Psychology
Florida Institute of Technology
2012

A doctoral research project submitted to the School of Psychology at Florida Institute of Technology in partial fulfillment of the requirements for the degree of

Doctor of Psychology
in
Clinical Psychology

Melbourne, Florida
January 2014
We, the undersigned committee,
having examined the attached dissertation,
“Satisfaction with Ability and Reported Functional Impairment in Cancer Survivors with Chronic Illness-Related Fatigue,” by Jessica Dawn Eversen Pike
hereby indicate its unanimous approval.

____________________________________
Thomas Harrell, Ph.D., Major Advisor
Professor, School of Psychology
Director, Fatigue Management Institute

____________________________________
Barbara Paulillo, Psy.D., Committee Member
Professor, School of Psychology
Director, Clinical Training

____________________________________
John Deaton, Ph.D., Committee Member
Professor, College of Aeronautics
Director of Research and Chair, Human Factors

____________________________________
Mary Beth Kenkel, Ph.D.
Dean, Psychology and Liberal Arts
Abstract

Satisfaction with Ability and Reported Functional Impairment in Cancer Survivors with Chronic Illness-Related Fatigue

by

Jessica Dawn Eversen Pike
Major Advisor: Thomas Harrell, Ph.D.

Long-term consequences of cancer have assumed more importance than ever before as cancer survival rates have increased over the past few decades. As a result, cancer has been conceptualized more recently as a chronic illness, meaning it can require some form of management. Cancer-related fatigue (CRF) is the most frequent and distressing symptom that cancer survivors face. There is limited research on CRF to date, therefore, it is important to examine the influence of factors that affect cancer-related fatigue as CRF's impact on quality of life can be strongly negative, pervasive, and even chronic. In research on other chronic illnesses, both functional limitations and satisfaction with one's capabilities have been found to be related to chronic illness fatigue. This study was designed to investigate the relative and unique contribution of functional impairment and (a new construct among cancer survivors) satisfaction with abilities on CRF. Seventy-four study participants voluntarily completed a self-report questionnaire, many of whom later took part in a cancer fatigue self-management workshop.

It was proposed that as functional impairment levels increased and satisfaction with ability levels decreased, reported CRF would increase. It was also hypothesized that while both functional impairment and satisfaction with ability would be associated with a significant degree of unique variance in cancer-related fatigue, satisfaction with abilities would actually have a greater independent impact on CRF. Correlations and multiple regressions demonstrated these propositions were correct with one exception. Although satisfaction with ability was shown to uniquely impact CRF, the sample average demonstrated a stronger influence from functional impairment. The practical importance of better understanding the impact of both limitations and perceptions of functioning is that with this information, self-management strategies and interventions for fatigue management can be more effectively developed and tailored to individual patients.
Table of Contents

Acknowledgements ........................................................................................................... v

Introduction ......................................................................................................................... 1

Review of the Literature ................................................................................................. 5
  Cancer-Related Fatigue ................................................................................................. 5
  Prevalence of Cancer-Related Fatigue ........................................................................ 6
  Measurement of Cancer-Related Fatigue .................................................................... 7
  CRF and Functional Impairment .................................................................................. 9
  Satisfaction with Ability ............................................................................................... 14

Statement of Purpose ........................................................................................................ 17

Method ............................................................................................................................... 19
  Participants ................................................................................................................... 19
  Instruments ................................................................................................................... 20
    Demographics ............................................................................................................ 20
    Cancer-Related Variables ......................................................................................... 20
    Impairment in Activities of Daily Living ................................................................... 20
    Valued Activity Impairment ...................................................................................... 21
    Fatigue ....................................................................................................................... 21
    Satisfaction with Ability ........................................................................................... 22

Procedure .......................................................................................................................... 22

Results ............................................................................................................................... 23
  Participant Demographics ........................................................................................... 23
  Other Important Health Characteristics of the Sample ............................................... 24
  Prior and Current Cancer Treatment Characteristics ............................................... 25
  Fatigue Characteristics and Measures ......................................................................... 25
  Functional Impairment .................................................................................................. 26
    Activities of Daily Living ........................................................................................... 26
    Valued Activity Impairment ....................................................................................... 27
    Overall Functional Impairment .................................................................................. 28
  Satisfaction with Ability ............................................................................................... 28
  Relationship Between Functional Impairment, Satisfaction with Ability, and Cancer-Related Fatigue .......................................................... 29

Discussion .......................................................................................................................... 31

References ......................................................................................................................... 37

Appendix – Tables ............................................................................................................. 44
Acknowledgments

To Dr. Thom Harrell, my chair advisor, professor, mentor and friend: I offer you my sincerest gratitude for the past four years, not only for everything you give but for who you are. Thank you. Your patient guidance, thoughtful training, sound advice, and kind encouragement will be remembered and appreciated, always.

– Your proud student

To my husband, Brandon Pike: I feel lucky every day to be a part of your life. Your character and integrity inspire me. Your love and support sustain me through every challenge. And your capacity for caring and goodness teach me things I am sometimes stupid enough to assume I already knew. Twelve years with you makes me wish we could have a hundred more. Thank you for taking me by the hand in this, and all our endeavors.

– As ever, your loving friend and wife
Introduction

In the United States in 2009, there were approximately 12.5 million people with a history of some type of diagnosed cancer (U.S. National Institutes of Health, 2012). Many of the short-term hardships stemming from initial diagnosis and cancer treatments have become relatively common knowledge among the general population. However, with advances in treating various cancers, the potential for long-term, non-cancer difficulties among cancer patients has become a topic of increasing interest (Wallis & Park, 2007). Long-term consequences of cancer have also assumed greater importance as cancer survival rates have increased 50% over the past 30 years (Ng, Alt, & Gore, 2007). As cancer survivorship has swelled over the last two decades, so too has research examining the long-term and continuing consequences of cancer and cancer treatment regimens. Research suggests that cancer is not a discrete event, but that there are potentially lifelong repercussions associated with survivorship. “People are effectively well but could never be considered cured,” according to Hubbard and Forbat (2012, p. 2038). This conceptualization of cancer places it in the domain of chronic illness, a disease whose effects are long-term in nature, are often associated with some form of management, and one that does not simply disappear (Webster’s Medical Dictionary, 2012).

A review of the current literature demonstrates that as many as 30% of cancer survivors report ongoing difficulties associated with cancer or its treatments, five years or more post diagnosis (Foster, Wright, Hill, Hopkinson, & Roffe, 2009). Similar to other chronic illnesses such as diabetes, rheumatic disorders, and cardiovascular
diseases; cancer and cancer treatments have the potential to affect multiple domains of everyday life. Quality of life can be negatively impacted by symptoms that range from pain, fatigue, and physical impairments to psychosocial domains of living including financial, social, and psychological dysfunction (Hubbard & Forbat, 2012). This study focuses on what is considered the most common and distressing symptom associated with cancer and its treatments: cancer-related fatigue (CRF; Holley, 2000; Piper, Olson, & Hagelin, 2011).

CRF is a different type of fatigue that goes beyond tiredness, as its onset is demonstrated to be more rapid, unexpected, intense, and of longer duration than typical fatigue. Additionally, CRF has been found to be pervasive, affecting every aspect of life. It is not proportional to recent activity and often cannot be relieved by rest (Holley, 2000; Piper et al., 2011). CRF most frequently is experienced in initial diagnosis and treatment of cancer, affecting nearly all cancer patients (Piper et al., 2011), with prevalence varying dependent on cancer type and associated treatment (Schmidt et al., 2012). Cancer-related fatigue has been shown to be particularly difficult for some cancer survivors, who may experience CRF for ten years or more beyond the original diagnosis and treatment of their cancer (Reinertsen et al., 2010). Chronic illness-related fatigue has consistently been demonstrated to negatively impact psychological well-being, above and beyond the influence of functional impairment and pain (Torres-Harding & Jason, 2005).

When cancer-related fatigue is present, it often impacts every domain of life, in some cases even the ability to engage in basic daily functioning, similar to the impact
of fatigue in other chronic conditions (Swain, 2000). Reduced functioning, or functional impairment, has been associated with decreased psychological well-being in a wide range of medical disorders. Thus, fatigue is implicated in diminished psychological well-being via both its direct impact and via its relationship with functional impairment.

In addition to actual functional limitations, CRF may also have an impact on patients’ perceptions of their functional capabilities. Satisfaction with abilities refers to the degree to which the person is comfortable with their level of functioning, despite limitations. Neugebauer, Katz, and Pasch (2003) examined the significance of satisfaction with one’s abilities, in addition to actual functional impairment, with regard to psychological well-being. The authors found that in rheumatoid arthritis (RA) patients, low satisfaction with abilities was the most important predictor of depressive symptoms, and that satisfaction with ability mediated the impact of functional limitations. Thus, both actual functional impairment and satisfaction with level of functioning impacted psychological well-being, with higher satisfaction with ability associated with a reduced impact of physical limitations.

Most prior research has examined the impact of CRF on functional status and psychological status such as depression. However, the relationship between CRF and what are typically evaluated as outcomes, is likely to be bidirectional; because changes in those outcomes over time might then reciprocally influence perceived CRF levels.

The purpose of this study is to examine the relative impact of reported functional impairment and satisfaction with functional ability on CRF. It is proposed
that satisfaction with one's ability will have a greater influence on CRF than functional impairment, demonstrating a pattern similar to that found between satisfaction with ability and depression in RA patients. Examining satisfaction with ability and actual reported functional status in the cancer population is a necessary step in understanding the pathway of factors that impact fatigue in cancer survivors. This understanding can contribute to the development of better interventions for individuals that suffer from ongoing CRF, and has the potential to improve the quality of life for cancer survivors struggling from the long-term disabling effects of CRF.
Review of the Literature

The following review examines cancer-related fatigue (CRF), functional impairment related to cancer and its treatments, and satisfaction with ability in chronic illness.

Cancer-Related Fatigue

Over the past several years, a consensus has been sought on specifying criteria for a "case definition" of CRF for the purpose of comparisons across studies and populations (Piper et al., 2011, p.23). However, there is currently no such consensus, which creates challenges and limitations in gathering information about CRF for clinical and research purposes. That being said, generally, definitions of CRF given have the primary purpose of differentiating CRF from "healthy fatigue."

For diagnostic purposes, criteria of CRF can be found in the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). Additionally, numerous health organizations offer their own definitions of CRF typically with only small variations. The National Comprehensive Cancer Network (NCCN), creators of the clinical practice guidelines in oncology, provided what is currently the most commonly used definition of CRF: "CRF is a distressing persistent subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer or cancer treatment that is not proportional to recent activity that interferes with usual functioning" (Piper et al., 2011, p.23).

Healthy fatigue is considered acute, results from some source of exertion, and can be relieved with rest or sleep (National Cancer Institute, 2013). Fatigue related to
cancer is defined as being none of these things. Instead, it is the most common and most distressing symptom reported by cancer patients. It is reported that CRF creates even more distress than pain, nausea, or vomiting related to cancer and its treatments (Ng et al., 2007; Piper et al., 2011). Persistence is another element specific to CRF that goes beyond typical fatigue, as sleep and rest are not found to be completely restorative. Studies suggest that CRF actually tends to be exacerbated by lack of activity or extended rest (Piper et al., 2011).

Defining CRF is additionally complicated as it is suggested that CRF can be classified into phenotypes. Phenotypes are appropriate, and likely necessary, as symptoms may manifest differently across the illness and at various points of treatment. For instance, CRF presents differently during active treatment when compared to survivorship. Both of these additionally contrast with CRF in terminal cancer patients receiving palliative end-of-life care. Patients with later stage disease tend to experience significantly greater severity of CRF symptoms (Piper et al., 2011).

**Prevalence of cancer-related fatigue.** CRF is widely prevalent during diagnosis and treatment of cancer, with rates ranging from 60% to nearly all cancer survivors reporting experience with it (Piper et al., 2011). The rates of prevalence vary depending on cancer type, factors of cancer treatment, and stage of illness. The timing of assessment and methods used to measure CRF in a given population, likewise, affects the prevalence rates found in the literature (Piper et al., 2011). Individuals with stage IV cancer as well as survivors with comorbid diseases evidence the highest rates of CRF (Oerlemans et al., 2013). However, many cancer survivors without other
chronic medical conditions continue to experience CRF long after successful
treatment has ended and their cancer is in remission. The pattern of fatigue in breast
cancer survivors has been reported as continuing up to five years after completion of
adjuvant treatment (Minton & Stone, 2009). And in a recent study by Oerlemans et al.
(2013), six out of ten non-Hodgkin’s lymphoma survivors who were matched by age
and sex with the normative population reported experiencing constant fatigue for up
to ten years following diagnosis.

**Measurement of cancer-related fatigue.** Fatigue, similar to pain, is a self-
reported symptom that necessitates measuring CRF by subjective means (National
Cancer Institute, 2013). Multiple self-report survey tools and questionnaires are
available to assess and measure CRF because there is no single instrument that suits
the needs of every clinician, researcher, and patient circumstance. There are several
assessment tools for CRF. The simplest measures such as the Visual Analog Scale-
Fatigue (VAS-F), Numeric Rating Scale (NRS), and Brief Fatigue Inventory (BFI) are
commonly used as screening tools. The VAS-F consists of 18 questions, 13 in relation
to fatigue and 5 inquiring about energy level. It utilizes a 100-mm visual analog to
evaluate perception of fatigue. This method differs from a Likert-type scale and tends
to be used less often both in clinical and research settings. However, some have
suggested the visual analog system may provide a superior opportunity for patients to
qualify symptoms, potentially creating more accurate and/or objective quantification
of symptomology for investigators (Schwartz, 2002). The simple NRS is suggested by
the NCCN guidelines to screen for presence and severity of CRF. This scale ranges
from “0” meaning no fatigue to “10” indicating worst fatigue and should pertain to
the past 7 days for monitoring purposes. The established severity levels of fatigue in
these guidelines are as follows, 0 = none, 1-3 = mild, 4-6 = moderate, and 7-10 =
severe. Multiple investigators have recommended a cut score of ≥4 to be indicative of
significant cancer-related fatigue (Piper et al., 2011). The BFI is made up of nine
questions utilizing the more popular Likert scale with 11 points. The BFI accounts for
current, overall, and worst fatigue experienced with its first three questions. This is
followed by an inquiry of six categories detailing how a patient’s mood, general activity
level, ability to walk, engagement in work, interpersonal interactions, and enjoyment of
life may have been interfered with by CRF in the last 24 hours (Schwartz, 2002).
Other complicating factors regarding how CRF is measured relate to the dimensions
of fatigue intended to be studied and the validity demonstrated for use specifically
with the cancer population.

Minton and Stone (2008) systematically reviewed fatigue measurement studies
to uncover the best validated and most widely accessible instruments to measure CRF.
They examined 116 studies involving fatigue instruments that were either originally or
subsequently validated with the cancer population. They analyzed both
unidimensional and multidimensional instruments, meaning they examined self-report
questionnaires that measured either one or multiple factors of CRF in its scope. Based
on their findings, Minton and Stone (2008) recommended the Functional Assessment
of Cancer Therapy Fatigue subscale (FACT F) and the Fatigue Questionnaire (FQ).
The FQ offers measurements of both physical and mental factors affected by CRF on
its 11-item scale, whereas the 13-item FACT F primarily provides one dimension of information relating to physical impairment only. Studies like these highlight the need for their sensitivity in measuring changes in fatigue, in addition to benefits of robust psychometric properties when assessing CRF.

The impact CRF has on an individual encompasses social, emotional and physical factors, culminating in what is perceived to be a great burden on CRF sufferers. CRF interferes with individuals’ ability to function on a daily basis limiting their capacity for handling responsibilities as well as engaging in activities they enjoy. It is imperative to examine the relationship between such functional impairments and CRF in order to better understand fatigue pathways and treat illness-related fatigue in the cancer population.

**CRF and Functional Impairment**

CRF symptoms resulting from malignancy and treatment of cancer are distressing and debilitating, both during treatment and sometimes for months or years following remission. The current literature suggests that CRF consistently and negatively impacts cancer survivors’ daily functioning and enjoyment of life (Hofman, Ryan, Figueroa-Moseley, Jean-Pierre, & Morrow, 2007). Functional limitations related to cancer and cancer treatment effects can interfere with quality of life in myriad ways. Both basic life activity limitations and interference with valued activity functioning will be examined in this study.

Impairment in functioning is determined by deficiencies in an individual’s ability to “meet basic needs, fulfill usual roles, and maintain health and well-being”
(Ahlberg, Ekman, & Gaston-Johansson, 2005, p.635). Examples of functional impairment relating to activities of daily living are trouble dressing, difficulties preparing food, light lifting, using stairs, completing household chores (ranging from washing dishes to shoveling snow), walking moderate distances, and participating in social events with friends and family (Hofman et al., 2007; Sweeney et al., 2006). Functional impairment also relates to disruption of important pleasurable or valued activities (Zeiss et al., 1996), which may include any form of hobby, socializing, recreation, or role-fulfillment that falls outside the realm of basic activities of daily living. Investigating the current research literature on functional impairment can be somewhat confusing, as researchers have generated various alternative titles for the term: functional loss, functional limitations, performance impairments, and function-limiting impairments.

The incidence of cancer itself has been shown to impact functional abilities. One study compared functional ability longitudinally in elderly women with a positive or negative history of cancer. The authors, Sweeney et al. (2006), found that women with history of cancer diagnosis demonstrated significantly greater functional limitations than elderly women who never had cancer. They also noted that those who had been diagnosed within the past two years experienced limitations at a higher prevalence rate than those who had been diagnosed more than two years prior to the study. Although their study suggested that a majority of women showed great improvements in physical functioning five years post-diagnosis, there was an overall trend showing that women who had any history of cancer were much more likely to
have difficulty with long-term functional abilities than elderly women without that history. Sweeney et al’s (2006) study demonstrated the greatest discrepancy between the two groups involved abilities that require strength and mobility.

Although there are a number of studies demonstrating associations between CRF and overall quality of life measures (i.e., combinations of functioning across multiple domains of physical, social, and emotional wellness), far fewer studies have been published examining CRF and impairment specific to physical ability or activities of daily living. Generally, as CRF symptoms are reported to increase, quality of life indices show an overall decline for survivors of most cancer types in comparison to cancer survivors without fatigue, and to the general population (Norton et al., 2012). Disease-related fatigue and overall life quality are most often negatively impacted in the 4-6 weeks following a course of primary cancer treatment (Piper et al., 2011). However, it has been established that some cancer survivors experience CRF, with associated reduced quality of life, for 1-5 years or more following treatment. This extended period of fatigue and impairment has been documented in survivors of cancer of the breast, prostate, ovaries/endometrium/uterus, Hodgkin’s lymphoma, and other forms of cancer (Ahlberg, Ekman, Wallgren, & Gaston-Johansson, 2004; Flechtner et al., 1998; Holzner et al. 2003; Monga, Kerrigan, Thornby, Monga, & Zimmermann, 2005; Schmidt et al., 2012).

The findings from the limited number of studies that have examined specific correlations between CRF and physical functioning in cancer survivors demonstrate a similar pattern to overall life quality. When measures of CRF are examined in
conjunction with measures of physical impairment in this population, there is an inverse correlation, where increasing levels of CRF coincide with diminished physical functioning (Hofman et al., 2007). Mallinson, Cella, Kashy, & Holzner (2006) demonstrated this finding using a self-report questionnaire. Patients in their study who evidenced greater fatigue (on a subscale of the Functional Assessment of Chronic Illness Therapy) demonstrated lower physical functioning on a health survey. In a study examining a specific activity of daily living, Brown, McMillan, and Milroy (2005) employed timed chair-rise as an indicator of physical functioning. The authors found chair-rise time was significantly greater in patients reporting greater frequency and severity of CRF symptoms.

Although the majority of research on lasting functional deficits relating to cancer and CRF has focused on breast cancer survivors (Harrington et al., 2010), there is literature on these topics relating to other forms of cancer. Harrington and coworkers (2010) described longitudinal and cross-sectional findings in their systematic review of studies published between 2000 and 2008 on long-term symptoms in cancer survivors. The review included the most common groups of cancer survivors: breast, prostate, colorectal, and gynecologic. All participants from every study received a standard primary treatment for cancer, being either surgery, chemotherapy, radiation, hormone therapy or some combination of these. A few studies showed null findings between cancer survival, functional limitations and fatigue. However, a majority of the studies evidenced significant rates of functional limitations and fatigue in each cancer subgroup, impacting breast and prostate cancer
patients most notably. In the first six months of treatment for breast cancer 26-47% of patients evidenced problems with CRF and functional limitations. Also among breast cancer, 19-41% of survivors were experiencing these difficulties two to five years post-treatment. For prostate cancer, over half of survivors in the studies reviewed by Harrington et al. (2010) had experienced fatigue with functional problems five years or more following treatment.

Another focus of study in this area has been on form of cancer therapy rather than cancer type. In their 2000 study, Curt et al. found that 88% of 379 cancer survivors previously treated with chemotherapy felt that CRF had changed their daily routine. Ninety-one percent of those treated with chemotherapy and evidencing CRF reported their fatigue was preventing what participants considered a “normal life,” as only 55% of their usual daily activities could be completed when fatigued. The most difficult daily activities identified were walking distances, household cleaning/chores, social activities, and food preparation. The study indicated chemotherapy-related CRF was most negatively impactful with older patients (aged 55-64 years) and those who were more active prior to diagnosis and treatment.

Eighty percent of patients have reported fatigue with radiotherapy for lung, prostate, cervical, and other cancers (Ahlberg et al., 2005). CRF incidence and severity is variable with this treatment as the organs involved, the volume of irradiation, and the length of treatment can differ widely. Ahlberg and colleagues (2005) suggested that functional status declines tend to be associated with radiotherapy-induced CRF during and immediately following treatment. However, their findings indicated that,
following radiotherapy, the variance found among longer-lasting CRF and its impact on daily functioning may be partially explained by a patient’s general fatigue prior to treatment. The authors cited other studies that support this, noting a trend in research that suggests assessing fatigue at baseline may be the best predictor for post-treatment CRF and associated functional problems.

Some research has suggested certain populations are at higher risk of experiencing CRF and functional limitations. Sweeney et al. (2006) emphasized that CRF and functional problems are particularly concerning in the aging population, as the elderly are more likely to have comorbid conditions such as diabetes or cardiac problems, in addition to their cancer survivor status. Further, the authors stated multiple co-occurring health problems in the elderly increase their susceptibility for physical functioning declines and disease-related fatigue. Other cancer survivor subgroups that show higher incidence of CRF and functional losses are those with exposure to cigarette smoke and those with a higher body mass index. These elements are suggested to be compounding factors, as each is an independent predictor of both cancer and functional limitations.

**Satisfaction with Ability**

Satisfaction with ability is a unique chronic illness measure that was developed in the last twenty years. The construct of satisfaction with ability refers to an individual’s perception of their capabilities, given that they experience some physical limitations. Satisfaction with ability is typically measured in conjunction with the
patient's actual functional impairment, as satisfaction reflects the individual's *reactions* to the functional impairment they experience.

Dr. Patricia Katz is a leading researcher examining satisfaction with ability, with a focus on the effect of rheumatic conditions on daily life. In particular, she and her colleagues have studied how functional difficulties affect various measures of psychological well-being in persons with rheumatoid arthritis (Katz & Neugebaur, 2001; University of California, 2003). There are few authors who have explored the general construct of satisfaction with ability. A review of the literature demonstrated that Katz and her coworkers are the only published research team specifically examining satisfaction with ability and chronic illness. Among the RA population, it has been established that less satisfaction with ability is a mediating psychological factor for depressive symptoms and poorer well-being, and that while correlated, satisfaction with ability and actual functional impairment are separate constructs (Katz & Neugebaur, 2001).

Prior research has demonstrated that cancer is also a chronic illness in which CRF can have negative effects on psychological well-being and functional ability in some, but not all people (Ng et al., 2007). Although evidence shows that functional declines are very much associated with both temporary and chronic CRF (Hofman et al., 2007), there is no research examining the impact of satisfaction with ability on CRF. In light of Katz's research, the impact of satisfaction with ability in the cancer population should be explored concurrently with functional impairment related to cancer. In order to assess satisfaction with ability as a factor that may impact CRF
symptoms, it is necessary to gauge both physical declines as well as an "individual's interpretation of the decline" (Katz & Neugebauer, 2001, p.263). The Satisfaction with Abilities and Well-Being Scale, or SAWS, developed by Katz & Alfieri (1997) is a valid and reliable scale that will be used in the present study to evaluate satisfaction with ability in cancer survivors with CRF.
Statement of Purpose

The review of the literature indicates cancer-related fatigue is the most distressing symptom of cancer malignancy as well as the most disturbing side effect of the methods used to treat cancer (Piper et al., 2011). There is ample evidence demonstrating the functional losses associated with CRF across social, emotional, and physical domains of daily living (Foster et al., 2009; Ng et al., 2007; Holley, 2000). These problems are found in cancer survivors while actively undergoing cancer treatment and in many individuals, in the weeks and months that follow. However, a significant number of individuals suffer from ongoing fatigue of a chronic nature, impeding their ability to complete activities of daily living or engage in activities they enjoy; and this may continue for years after treatment and remission (Reinertsen et al., 2010; Piper et al., 2011).

It has been previously noted that CRF is the most troubling symptom that cancer survivors face (Piper et al., 2011). Despite its high rate of occurrence, the impact that CRF has on people’s lives is very diverse, with some struggling with the condition more severely or chronically than others (Holley, 2000). CRF has been found to affect survivors with various forms of cancer and across all types of cancer treatments (Ahlberg et al. 2005; Curt et al., 2000; Harrington et al., 2010). The findings sufficiently demonstrate CRF has an extraordinary scope of impact, placing significant burden on the lives of many cancer survivors.

Due to the limited research on CRF to date, it is important to examine the impact of other factors present following cancer diagnosis on CRF. In research on
other chronic illnesses, both functional limitations and satisfaction with one's capabilities have been found to be related to chronic fatigue. This study is designed to investigate the relative and unique contribution of actual functional impairment and satisfaction with abilities on CRF in a sample of cancer survivors. It is important to study these factors in conjunction, as two cancer survivors may demonstrate equivalent functional capabilities, yet their perception of those deficits (satisfaction) can be widely divergent. The practical importance of better understanding the impact of both limitations and perceptions of functioning is that with this information, self-management strategies and interventions for fatigue management can be more effectively developed and tailored to individual patients.

Hypotheses include:

1. Level of functional impairment will be significantly positively related to levels of cancer-related fatigue.

2. Degree of satisfaction with ability will be significantly negatively related to levels of cancer-related fatigue.

3. Both functional impairment and satisfaction with ability will be associated with a significant degree of unique variance in cancer-related fatigue, after controlling for shared variance.

4. Satisfaction with abilities will have a greater independent impact on cancer-related fatigue relative to the impact of functional impairment.
Method

Participants

This study utilized a sample of subjects who voluntarily participated in the Cancer Fatigue research project at Florida Tech either by attending a Fatigue Management Training program or by simply completing the packet of questionnaires. Participants were recruited for participation from the general community, (including local senior centers, independent and assisted living facilities, cancer treatment facilities, community cancer support groups, and retirement communities in East Central Florida), via newspaper announcements and via health fairs.

Eligibility criteria for the participants included: (a) a prior medical diagnosis of cancer; (b) the ability to read and complete the questionnaires; and (c) willingness to participate; including understanding and signing the informed consent form. Participants did not receive any compensation for their participation. Potential participants were considered ineligible for inclusion in the study if they met any of the following criteria: (a) the presence of significant cognitive impairment and/or (b) language, speech, or hearing problems that would preclude informed interaction with experimenters.

The total sample obtained for the study consisted of 74 participants. Demographic characteristics of the obtained participants are described in the Results section.
Instruments

**Demographics.** Demographic measures included age, gender, marital status, education, current living status, ethnic background, religion, and employment status.

**Cancer-related variables.** Measures obtained from the sample include length of time elapsed since cancer diagnosis, methods used to treat cancer (i.e., surgery, radiation, chemotherapy, hormone therapy, other), and whether or not participants are currently taking medication to treat their cancer. Participants were asked to list both current treatment they are receiving and treatment they have previously received. For previous treatments, participants were asked to describe the number of months elapsed since receiving the treatment. Other variables asked participants about other medical aspects, such as health status. Participants were asked to describe their current health status as excellent, very good, good, fair, or poor, and to compare their health to that of other people their age, with the following response options: much better, somewhat better, about the same, somewhat worse, and much worse. Participants were also asked to rate their overall satisfaction with their health as very satisfied, somewhat satisfied, not sure, somewhat unsatisfied, and not at all satisfied.

**Impairment in activities of daily living.** The Health Assessment Questionnaire (HAQ) (Fries, Spitz, Kraines, & Holman, 1980) measures physical impairment in activities of daily living among persons with arthritis. Activities are rated on a four-point scale ranging from 0 (no difficulty) to 3 (unable to do). The HAQ has demonstrated good validity and reliability as a measure of physical impairment (Ramey, Raynauld, & Fries, 1992) and HAQ scores have been shown to be correlated
with independent observations of physical performance (Fries et al., 1980; McDowell & Newell, 1996). Because of the demonstrated relationship with independent observations, the HAQ is widely used as an objective measure of functional impairment in adults. As the items cover all the primary activities of daily living, the HAQ has been used in studies examining a diverse range of medical conditions.

**Valued activity impairment.** The Valued Activity Impairment score was developed as a measure of how CRF has impacted/disrupted valued activities. Using a 10-point Likert-type scale, ranging from 1 (not at all) to 10 (a great deal), participants were asked to rate impairment in ability to complete valued activities. Valued activities on the instrument include cooking, visiting or socializing with friends or family, engaging in sexual activity, taking part in leisure or recreational activities, shopping and completing errands, walking, and exercise (other than walking). Responses to the 7 items are averaged to obtain a Valued Activity Impairment score, which can range from 1 to 10.

**Fatigue.** The Fatigue Impact index score was used as a measure of the overall impact of fatigue on survey participants. The Fatigue Impact score was calculated by statistically rescaling the fatigue frequency item, and adding it to the fatigue severity index score, then dividing by the two total items to obtain a final score on the same scale as the original items. The Impact score is based on frequency and severity of reported cancer-related fatigue, but not functional impairment related to fatigue, which would be a confound in the present study as we are specifically examining the relationship between impairment and fatigue. A
number of measures of illness-related fatigue, including a longer form of the Fatigue Impact index, do include functional impairment items in the actual fatigue measure. Good internal consistency and divergent validity of the two fatigue items has been established in chronically ill patients, and the measure has been used in a number of prior studies (Belza, 2006).

**Satisfaction with ability.** The Satisfaction with Ability and Well-Being Scale (SAWS; Katz & Alfieri, 1997) consists of 13 items that measure individual satisfaction with ability and characteristics related to health. Response options are presented on a five-point scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). Eight of the items comprise the satisfaction with ability subscale, and only these items were used. In this form and in the context of the proposed study, satisfaction with ability was also conceptualized as a measure of adaptation to health-related disability, and hence a unique dimension of psychological well-being. The validity, reliability, and internal consistency of the SAWS in adults with arthritis have been well established (Katz & Alfieri, 1997; Neugebauer et al., 2003).

**Procedure**

All participants completed a questionnaire packet that included the research measures described above. Participants who were obtained via their participation in a fatigue management training program completed the questionnaires prior to program participation.
Results

Participant Demographics

The sample for this study consisted of 74 participants. Some participants failed to respond to each item, and in those cases the n was less than 74. The overall sample was inclusive of individuals from a representative age range from 28 to 85 years, and a mean age of 66.01 years (SD = 11.67). Table 1 summarizes the demographic characteristics of the sample. The sample consisted primarily of females, comprising 77.0% of the sample. The sample appeared to be adequately representative of marital status in the U.S., with 50.0% of participants indicating they were married, 20.3% indicating they were divorced, 16.2% widowed, and 10.8% were single and never married. Approximately 72% of the sample reported having some college or graduating from college; an additional 8.1% reported obtaining a graduate degree. The sample appeared to somewhat underrepresent minority groups (Caucasian = 85.1%), although it did include respondents from multiple ethnic backgrounds, including Hispanic (9.5%) and African American (4.1%). With regard to religion, the sample appeared to be adequately representative of diverse groups (37.8% Protestant, 32.4% Catholic, 2.7% Jewish, and 27.0% indicating other religion or faith).

In terms of employment and economic variables, 18.9% of the participants were currently employed, whereas 59.5% were retired, and 8.1% identified themselves as disabled. Financial status varied, with 56.7% having an annual income that they categorized as ‘adequate’ or ‘more than adequate’ to their needs. The remaining 43.2% of the sample reported an annual income that was ‘less than adequate’ or ‘just barely
adequate' to their needs. Additionally, a great majority, 97.3% of the sample was living in a private home setting either in a home they owned or with a parent, friend, or relative. Only 1.4% were living in a retirement community.

Other Important Health Characteristics of the Sample

Participants were asked to indicate if they had any disabilities, defined as medical problems that continually interfere with ability to function, other than cancer. Nearly one-half, 48.6% (n = 36), of the sample indicated they had disabling conditions other than cancer, and 47.3% (n = 35) had no other disabling conditions. The mean number of disabling conditions other than cancer was 1.66 (SD = 1.32). With regard to type of disability, responses included: cardiovascular (n = 7), pulmonary (n = 3), neurological (n = 4), orthopedic (n = 14), endocrine (n = 2), psychological (n = 2), and other (n = 6).

Individuals' perceived health indexes were based on the average of responses to three health perception items. Each item was rated on a 5-point Likert-type scale. Participants were asked to describe their current health status as excellent (1), very good, good, fair, or poor (5), and to compare their health to that of other people their age, with the following response options: much better (1), somewhat better, about the same, somewhat worse, and much worse (5). Participants were also asked to rate their overall satisfaction with their health as very satisfied (1), somewhat satisfied, not sure, somewhat unsatisfied, and not at all satisfied (5). The mean perceived health score was 2.95 (SD = .94), indicating that on average, perceived health was considered to be good. However, the distribution of scores indicated 28.8% of the sample perceived their health as only fair or poor.
Among the participants, the mean length of time since diagnosis was 54.51 months (SD = 72.16), approximately 4.5 years. The standard deviation indicated a significant degree of variation in length of time since diagnosis in the sample.

**Prior and Current Cancer Treatment Characteristics**

Information regarding the prior and current cancer treatment of the sample is summarized in Table 2. Respondents frequently left these questions blank. Rather than infer a blank was indicative of “no” in Table 2, we identified blanks as “not known.” Almost half of the sample, 45.9%, indicated they currently take medications related to their cancer history, and 35.1% indicated they did not. The majority of the sample was not currently receiving either radiation therapy (91.9%) or chemotherapy (74.3%). However, most of the sample had previously received treatment for their cancer, such as radiation therapy (44.6%), chemotherapy (37.8%), or surgery (39.2%).

**Fatigue Characteristics and Measures**

Table 3 provides a summary of the fatigue characteristics reported by the sample. In reporting fatigue frequency over the previous month, only a small minority of the sample (5.4%) indicated feeling fatigued “hardly any days.” Among 39.2% of the sample, individuals reported feeling fatigued “most, but not all days” over the past month. Occasional fatigue affected 29.7% of the sample. Nearly a quarter of participants (23.0%) reported experiencing fatigue every day of the past month. Reported fatigue over the past week demonstrated that much of the sample had experienced it every day (43.2%). Twenty-three percent indicated having fatigue most days and 21.6% had it occasionally within the previous week.
Examining severity revealed that nearly half (48.6%) of the respondents described their fatigue as moderate. Mild fatigue was found among 31.1% of the sample, while severe fatigue and very severe fatigue over the previous month was reported by 14.9% and 5.4%, respectively. Respondents were asked if they considered their fatigue to be a disability. Many responded “no” (48.6%), though 37.8% responded “yes” and 12.2% answered “I don’t know.”

Measures related to fatigue are summarized in Table 4. The average number of days that fatigue affected respondents ability to work or engage in their usual activities over the past six months was substantial. The mean of the sample showed they missed 36.19 days of work or typical functioning due to fatigue, but this report varied strongly (SD = 47.37). Over the previous month, the sample indicated a mean of 3.26 episodes of severe fatigue (SD = 1.47). A combined measure of fatigue frequency and severity, known as the Fatigue Index score, had a mean score of 3.88 (range = 1.29 - 6.14, SD = 1.27). This indicated that the impact of fatigue was fairly mild for 22% of participants, moderate for 59%, and had a strong impact on 19% of the sample.

**Functional Impairment**

**Activities of daily living.** Limitations relating to activities of daily living were assessed by asking respondents to indicate to what degree their fatigue affected their ability to carry out certain activities over the past week. They included: dressing, standing up from a straight chair, getting in and out of bed, cutting food, climbing up five steps, showering and drying off, getting on and off
the toilet, bending down to pick up items from the floor, opening a car door, 
opening a previously opened jar, turning faucets on and off, running errands and 
shopping, getting in and out of a car, doing chores, and visiting/socializing.

Ability to carry out activities was rated on a four-point scale ranging from 0 (*no
difficulty*) to 3 (*unable to do*). A mean score of .44 (SD = 0.38) was obtained;
indicating that on average, respondents experienced relatively minimal impairment 
in completing these types of tasks. Although 9.6% of respondents reported they 
experienced greater difficulty in completing daily tasks over the past week, most 
respondents indicated they experienced minimal or no difficulty.

**Valued activity impairment.** After examination of the functional 
limitation scores revealed there were minimal limitations in the sample with regard 
to activities of daily living, valued activity impairment was computed and used in 
subsequent analyses.

Valued activity impairment was assessed by directing respondents to rate 
how fatigue has inferred with their ability to engage in activities of value outside 
tasks of daily living. Often these involve more complex actions and combinations 
of activities of daily living as measured by the HAQ. Valued activities assessed 
include: cooking, visiting or socializing with friends or family, engaging in sexual 
activity, engaging in leisure or recreational activities, shopping and doing errands, 
walking, and exercise (other than walking). Perceived level of this type of 
impairment was measured on a ten-point Likert-type scale ranging from 1 (*not at 
all*) to 10 (*a great deal*). Responses to the seven items were averaged to calculate a
Valued Activity Impairment Score with a possible range from 1 to 10. A mean score of 4.34 was obtained (SD = 2.34) which indicated, on average, participants experienced some impairment in valued activities due to fatigue. Across respondents, however, there was a wide range of scores (range = 1.00 - 9.43) demonstrating much variability in how participants experience disruption in completing valued activities. Approximately 26% of the sample indicated fatigue interfered with valued activities to a meaningful degree, making it much more impactful and variable on individuals in comparison to activities of daily living.

**Overall functional impairment.** An overall functional impairment score was derived by averaging the assessments for daily activity impairment and valued activity impairment. The obtained range varied from 0.50 to 4.94 with a sample mean of 2.39 (SD = 1.27). This indicated on average a moderate degree of functional impairment overall with 46.4% having largely mild functional problems, 35.1% reporting more moderate levels of impairment, and 18.2% near the highest level of functional impairment across valued activities and those of daily living.

**Satisfaction with Ability**

Participants were asked to rate their degree of satisfaction or dissatisfaction within eight domains of ability (housework, shop/errands, family responsibilities, social activities, hobbies/leisure activities, ability to plan activities in advance, get around the community, and to take care of self) using a 5-point scale where 1 indicated very dissatisfied and 5 indicated very satisfied. The domain ratings were averaged and the overall mean rating was 2.93 (SD = 0.94), with scores ranging from 1 to 5. Because
only eight of the thirteen original items in the Satisfaction with Ability and Well-Being Scale were used, we examined the internal consistency of the scale in this sample. Cronbach’s Alpha was .929, and the obtained Guttman Split-Half coefficient was .879; indicating the reliability of the eight items was equivalent to that of the full scale. Among the sample, 52.8% reported being dissatisfied or very dissatisfied with their abilities. Approximately a quarter of the sample indicated they were neither satisfied nor dissatisfied with their functional capability (25.2%). The remaining 22.3% of the sample reported they were satisfied or very satisfied with their abilities.

**Relationship Between Functional Impairment, Satisfaction with Ability, and Cancer-Related Fatigue**

The relationships between overall functional impairment, satisfaction with ability and cancer-related fatigue were initially investigated with Pearson correlation coefficients. The correlation matrix is presented in Table 5. There were significant correlations at the p < .01 level between fatigue and each independent variable. Negative correlations were found between satisfaction with ability and functional impairment (r = -.59), as well as satisfaction with ability and fatigue (r = -.56). A relatively strong positive correlation was found between fatigue and overall functional impairment (r = .63). The correlational findings supported Hypotheses 1 and 2.

The unique relationships between the two independent variables (functional impairment and satisfaction with ability) and cancer-related fatigue were examined using a multiple regression procedure.
First, the assumptions of multiple regression were examined using the obtained data. Calculated minimum sample size was 66, so the obtained n of 68 was minimal, but acceptable. The two independent variables were correlated, and the correlation fell below 0.70. The measures did not include any overlapping items. Tolerance and VIF values did not suggest multicollinearity for either independent variable. Examination of the normal probability plot and the scatter plot indicated there were no violations of the assumptions of normality, linearity, or homoscedasticity. No significant outliers were present in the sample. Thus, all multiple regression assumptions were met.

Cancer-related fatigue was regressed on overall functional impairment and satisfaction with ability. The obtained model was significant, \( F (2, 65) = 26.73, p < .001 \), and the total R for the model was .672. Standardized beta weights and the percent of variance accounted for associated with each independent variable are displayed in Table 6. Both variables were significantly related to fatigue among this cancer survivor sample. Overall functional impairment accounted for a greater amount of variance in fatigue (13.8%), while satisfaction with ability accounted for 5.6% of the variance.

Hypothesis 3 was supported, as both variables were uniquely and significantly associated with cancer-related fatigue. However, Hypothesis 4 was not supported. Overall functional impairment accounted for over twice the variance of satisfaction with ability.
Discussion

The purpose of this study was to examine the relationship between satisfaction with ability and CRF, in conjunction with the relationship between functional impairment and CRF; in order to determine the relative and unique contributions of satisfaction with ability and actual functional impairment to fatigue in cancer survivors. As two survivors with similar levels of functioning may experience dissimilar levels of satisfaction with their capabilities; each of these variables may be a contributing factor in CRF. It was hypothesized that both variables would be significantly and uniquely related to CRF, and that greater functional impairment would be associated with significantly higher levels of fatigue, while greater satisfaction with ability would be related to significantly less reported fatigue. It was also hypothesized that satisfaction with ability would have a greater impact on fatigue than actual functional impairment.

The sample of 74 adults, ranging from 28 to 85 years, was representative of the general population in terms of age. Participants were diverse in regard to marital status, religion, and socioeconomic status. To some degree, the sample underrepresented males, Hispanics, and African Americans. However, these groups did have representation within the sample. Perceived health was quite variable among the population. Most considered their health to be good on average, although approximately one-quarter of the sample believed their health to be only fair or poor.

The findings indicated fatigue was quite common across participants. Approximately 95% of participants reported experiencing fatigue regularly. A wide range of fatigue severity was represented, ranging from mild to very severe, with nearly
half describing their typical fatigue as moderate. Fatigue was found to be quite disruptive to activity as participants reported missing work and/or other usual functioning for the equivalent of roughly five weeks out of the past six months in relation to their fatigue. Respondents typically experienced relatively minimal limitations in completing tasks of daily living. However, a majority of the sample experienced some impairment in valued activities, and 26% indicated fatigue led to significant interference with valued activities.

In this sample, overall functional impairment and satisfaction with ability were significantly but not overly correlated with each other, and each demonstrated a significant correlation with cancer-related fatigue. The fairly strong positive correlation between impairment and fatigue, and the moderate negative correlation between satisfaction with ability and fatigue, supported the first two hypotheses of the study. Greater functional impairment and less satisfaction with ability were associated with increased fatigue. The third hypothesis was also supported, as functional impairment and satisfaction with ability each accounted for a unique and significant degree of the variance in the fatigue measure. However, the final hypothesis was not supported, as overall functional impairment accounted for over twice the variance of satisfaction with ability.

The findings of this study are largely commensurate with prior research regarding the impact of functional limitation on fatigue in chronic illness populations. Cancer-related fatigue is widely prevalent among survivors, across various types of
cancer and treatment (Piper et al., 2011), and reduced functioning or functional impairment is strongly associated with increased fatigue (Swain, 2000).

Satisfaction with ability had not specifically been examined in cancer survivors prior to this study. Research relating to the construct of satisfaction with ability has focused on patients with rheumatoid arthritis, and the relationships between illness-related fatigue, depression, and satisfaction with ability (Neugebauer, Katz, and Pasch, 2003). As in the rheumatoid arthritis research, the present study found satisfaction with ability to be a meaningful construct, unique from functional impairment, and related to a negative outcome, fatigue, in cancer survivors. With the knowledge that satisfaction with ability is related to health status outcomes in both rheumatoid arthritis and cancer survivor samples, the study suggests satisfaction with ability is a meaningful construct across chronic illnesses.

The findings also demonstrated that satisfaction with ability uniquely contributed to the fatigue experienced by cancer survivors. In the sample as a whole, the contribution of satisfaction with ability was considerably less than that of actual functional impairment, although satisfaction with ability did account for 5.6% of the variance in fatigue. The finding suggests that on an individual basis, some individuals’ level of satisfaction with their ability may play a greater role in their fatigue than does functional impairment. Overall, the results clearly indicated that satisfaction with ability plays a moderating role in the fatigue experience of cancer survivors, and that in some individuals it may be more related to fatigue than functional impairment.
With regard to management of fatigue by cancer survivors, the findings of this study are quite informative. Fatigue management training programs are a relatively new development, and the most important elements of effective management have not been clearly identified. This study indicates the role of satisfaction with ability is greater than previously thought, and that satisfaction could be an important intervention target in fatigue management training. Because satisfaction is a “state of mind” or a belief, it can be altered, even when functional limitations are unchangeable and cannot be altered. Thus, the findings provide support for interventions designed to increase satisfaction with patient’s current and restricted abilities when functional limitations are permanent. Also, the findings imply that for at least some individuals, diminished satisfaction may play a greater role in one’s sense of impairment than functional limitations; and thus programs that do not address satisfaction with ability are likely to be quite ineffective among individuals for whom satisfaction is so salient.

With regard to understanding CRF, the findings support the possibility that satisfaction with one’s status can moderate the pathways of CRF, about which little has been empirically determined. CRF is generally thought to be based in physiological changes related to cancer itself and to cancer treatments. However, without medical treatments that effectively eliminate CRF, it is even more important to identify cognitive and emotional processes that can influence CRF, and which may eventually aid in understanding CRF processes. Prior research indicates the extensive prevalence of fatigue, indicating 76-99% of cancer survivors complain of CRF (Ng, Alt, & Gore, 2007). However, current treatments for fatigue in cancer survivors are
very limited and not effective despite the evident burden of fatigue on patients. Research documenting CRF's negative impact on overall quality of life is extensive (Hubbard & Forbat, 2012), and therefore, it is necessary to clinically address any identified moderators of fatigue in cancer patients.

There were limitations to this study that suggest possible changes and improvements for subsequent studies. The sample underrepresented males, Hispanics, and African Americans to a degree, and future studies might examine ethnic and gender differences in the impact of functional limitations and satisfaction with ability on fatigue in cancer survivors. Time since diagnosis varied widely among the participants in this study. As there could be considerable differences in the relationship between fatigue, impairment, and satisfaction with ability related to time since diagnosis, future studies might sample specific time ranges. Participant variables such as variations in treatment regimen and recurrence might also influence the nature and degree of relationships found in this study, and would be valuable additions to future investigations. Future studies might also examine whether relationships vary between fatigue and satisfaction with ability across CRF phenotypes. It would also be important to replicate the findings of this study in a younger sample, perhaps focusing on middle age adults, especially considering the fact that satisfaction with ability can vary with age and perceived health or vitality. Additionally, there is the potential for much less satisfaction with ability as a consequence of rather small changes in limitations in a younger sample, as they are likely to have had fewer or no functional limitations prior to their cancer. Individuals at retirement age are likely to have
accommodated a number of age-related functional changes before cancer, and therefore previously learned how to better accommodate limitations.

There were also several strengths of the present study. The statistical findings were generally quite robust, demonstrating clearly significant relationships. The study was unique in its examination of a concept among one chronic illness-related fatigue population in another, and expands consideration of the importance of satisfaction with abilities from rheumatic disorders to cancer survivors. The findings also provide initial empirical support for the importance of satisfaction with ability among cancer survivors, and thereby add a new dimension to fatigue management strategies for those with cancer.
References


Holzner, B., Kemmler, G., Meraner, V., Maislinger, A., Kopp, M., Bodner, T.,
...Sperner-Unterweger, B. (2003) Fatigue in ovarian carcinoma patients: A
neglected issue? Cancer, 97, 1564–1572. doi: 10.1002/cncr.11253

Hubbard, G., & Forbat, L. (2012). Cancer as biographical disruption: Constructions of
living with cancer. Support Care Cancer, 20, 2033-2040. doi: 10.1007/s00520-
011-1311-9

science-oriented multilevel assessment instrument. Journal of Gerontology, 37,
91-99.

Liang, J., Shaw, B. A., Krause, N. M., Bennett, J. M., Blaum, C., & Kobayashi, E,
status among older adults in Japan: Successful and usual aging. Psychology and
Aging, 18, 684-695.

Development and evaluation of a scale to measure self-efficacy in people

McDowell & C. Newell (Eds). Measuring Health: A guide to rating scales and


University of California (2003). Association of Rheumatology Health Professionals President’s Award.


Appendix – Tables
<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>23.0</td>
</tr>
<tr>
<td>Female</td>
<td>57</td>
<td>77.0</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, never married</td>
<td>8</td>
<td>10.8</td>
</tr>
<tr>
<td>Married</td>
<td>37</td>
<td>50.0</td>
</tr>
<tr>
<td>Separated</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Divorced</td>
<td>15</td>
<td>20.3</td>
</tr>
<tr>
<td>Widowed</td>
<td>12</td>
<td>16.2</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>High school graduate</td>
<td>13</td>
<td>17.6</td>
</tr>
<tr>
<td>Some college</td>
<td>30</td>
<td>40.5</td>
</tr>
<tr>
<td>College graduate</td>
<td>24</td>
<td>32.4</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>63</td>
<td>85.1</td>
</tr>
<tr>
<td>African American</td>
<td>3</td>
<td>4.1</td>
</tr>
<tr>
<td>Hispanic</td>
<td>7</td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protestant</td>
<td>28</td>
<td>37.8</td>
</tr>
<tr>
<td>Catholic</td>
<td>24</td>
<td>32.4</td>
</tr>
<tr>
<td>Jewish</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>27.0</td>
</tr>
</tbody>
</table>
Table 1, continued

*Demographics of Sample*

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td>14</td>
<td>18.9</td>
</tr>
<tr>
<td>Retired</td>
<td>44</td>
<td>59.5</td>
</tr>
<tr>
<td>Homemaker</td>
<td>5</td>
<td>6.8</td>
</tr>
<tr>
<td>Disabled</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>Looking for employment</td>
<td>4</td>
<td>5.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Annual Income</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than adequate to needs</td>
<td>14</td>
<td>18.9</td>
</tr>
<tr>
<td>Just barely adequate to needs</td>
<td>18</td>
<td>24.3</td>
</tr>
<tr>
<td>Adequate to needs</td>
<td>34</td>
<td>45.9</td>
</tr>
<tr>
<td>More than adequate to needs</td>
<td>8</td>
<td>10.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Residence</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home owner</td>
<td>72</td>
<td>97.3</td>
</tr>
<tr>
<td>Retirement apartment</td>
<td>1</td>
<td>1.4</td>
</tr>
</tbody>
</table>
Table 2

Prior and Current Cancer Treatment

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently taking medications for cancer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34</td>
<td>45.9</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>35.1</td>
</tr>
<tr>
<td>Not Known</td>
<td>14</td>
<td>19.0</td>
</tr>
<tr>
<td>Currently receiving radiation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>8.1</td>
</tr>
<tr>
<td>No</td>
<td>68</td>
<td>91.9</td>
</tr>
<tr>
<td>Not Known</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Previously received radiation therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33</td>
<td>44.6</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>32.4</td>
</tr>
<tr>
<td>Not Known</td>
<td>17</td>
<td>23.0</td>
</tr>
<tr>
<td>Currently receiving chemotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>25.7</td>
</tr>
<tr>
<td>No</td>
<td>55</td>
<td>74.3</td>
</tr>
<tr>
<td>Not Known</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Previously received chemotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28</td>
<td>37.8</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>32.4</td>
</tr>
<tr>
<td>Not Known</td>
<td>22</td>
<td>29.7</td>
</tr>
<tr>
<td>Currently receiving surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>4.1</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>33.8</td>
</tr>
<tr>
<td>Not Known</td>
<td>46</td>
<td>62.1</td>
</tr>
<tr>
<td>Previously received surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>29</td>
<td>39.2</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>10.8</td>
</tr>
<tr>
<td>Not Known</td>
<td>37</td>
<td>50.0</td>
</tr>
</tbody>
</table>
Table 2, continued

_Prior and Current Cancer Treatment_

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previously received hormone therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>12.2</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>25.7</td>
</tr>
<tr>
<td>Not Known</td>
<td>46</td>
<td>62.1</td>
</tr>
<tr>
<td>Currently receiving other treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>16.2</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>28.4</td>
</tr>
<tr>
<td>Not Known</td>
<td>41</td>
<td>55.4</td>
</tr>
</tbody>
</table>
Table 3

_Fatigue Characteristics_

<table>
<thead>
<tr>
<th>Frequency of fatigue over past month</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Every Day</td>
<td>17</td>
<td>23.0</td>
</tr>
<tr>
<td>Occasionally but not most days</td>
<td>22</td>
<td>29.7</td>
</tr>
<tr>
<td>Most, but not all days</td>
<td>29</td>
<td>39.2</td>
</tr>
<tr>
<td>Hardly any days</td>
<td>4</td>
<td>5.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fatigue severity</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>23</td>
<td>31.1</td>
</tr>
<tr>
<td>Moderate</td>
<td>36</td>
<td>48.6</td>
</tr>
<tr>
<td>Severe</td>
<td>11</td>
<td>14.9</td>
</tr>
<tr>
<td>Very Severe</td>
<td>4</td>
<td>5.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fatigue considered a disability</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>28</td>
<td>37.8</td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>48.6</td>
</tr>
<tr>
<td>I Don’t Know</td>
<td>9</td>
<td>12.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency of fatigue over past week</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardly any days</td>
<td>4</td>
<td>5.4</td>
</tr>
<tr>
<td>Occasionally, but not most days</td>
<td>16</td>
<td>21.6</td>
</tr>
<tr>
<td>Most, but not all days</td>
<td>17</td>
<td>23.0</td>
</tr>
<tr>
<td>Every day</td>
<td>32</td>
<td>43.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree to which health status is affected by fatigue</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very affected</td>
<td>27</td>
<td>36.5</td>
</tr>
<tr>
<td>Somewhat affected</td>
<td>28</td>
<td>37.8</td>
</tr>
<tr>
<td>Not Sure</td>
<td>11</td>
<td>14.9</td>
</tr>
<tr>
<td>Somewhat unaffected</td>
<td>5</td>
<td>6.8</td>
</tr>
<tr>
<td>Very unaffected</td>
<td>1</td>
<td>1.4</td>
</tr>
</tbody>
</table>
Table 4

*Fatigue Measures*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days unable to work in past 6 months due to fatigue</td>
<td>36.19</td>
<td>47.37</td>
</tr>
<tr>
<td>Episodes of severe fatigue in past month</td>
<td>3.26</td>
<td>1.47</td>
</tr>
<tr>
<td>Fatigue Index</td>
<td>3.88</td>
<td>1.27</td>
</tr>
</tbody>
</table>
Table 5

*Correlations among Fatigue, Overall Impairment, and Satisfaction with Ability Measures*

<table>
<thead>
<tr>
<th></th>
<th>Functional Impairment</th>
<th>Satisfaction with Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>.63**</td>
<td>-.56**</td>
</tr>
<tr>
<td>Functional Impairment</td>
<td></td>
<td>-.59**</td>
</tr>
</tbody>
</table>

Note: **p < .01
Table 6

Regression Analysis Examining the Impact of Overall Functional Impairment & Satisfaction with Ability on Fatigue in Cancer Survivors

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Beta</th>
<th>$r_{part}^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Functional Impairment</td>
<td>.459</td>
<td>.138**</td>
</tr>
<tr>
<td>Satisfaction with Ability</td>
<td>-.291</td>
<td>.056*</td>
</tr>
</tbody>
</table>

Note. Beta values represent unique effects for each variable. The $r_{part}^2$ is the proportion of variance accounted for when controlling for all other predictors in the equation.  
* $p < .05$. ** $p < .01$.  

51