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The role of hope in patients' use of cancer-related coping strategies

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THE ROLE OF HOPE IN PATIENTS' USE OF CANCER-RELATED COPING STRAGEGIES

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Abstract

Cancer patients' initial appraisal of the disease (i.e., as a threat, harm, or challenge), as well as their level of hope, has been linked to patients' coping strategies (i.e., approach or avoidance coping). However, it is unclear whether the well-established relationship between primary appraisals and coping is moderated by cancer patients' levels of hope. To determine if hope moderated this relationship, colorectal cancer patients (N=122) completed measures of appraisals and hope following their diagnosis and a measure of coping six-months later. Results indicated that patients appraised cancer as more of a challenge than a threat and reported high levels of baseline hope. Both challenge appraisals and baseline higher hope predicted approach coping six-months later, however, hope did not moderate the relationship between appraisals and coping. This study highlights many of the conceptual, design, and psychometric problems present when measuring appraisals, hope, and coping among cancer patients.

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The Role of Hope in Patients' Use of Cancer-Related Coping Strategies

Colorectal cancer is the second leading cause of death from cancer, with a five year survival rate of 62%. Within Canada, 1 in every 14 men and 1 in every 15 women will develop colorectal cancer in their lifetime. Regrettably, of those diagnosed, 1 in every 27 men and 1 in every 31 women will die from colorectal cancer. Despite the fact that the colon and rectum are the third most prevalent cancer sites, next to the lung and the breast for women and the lung and the prostate for men, psychological studies examining colorectal cancer patients are substantially underrepresented in the current cancer literature (Canadian Cancer Society, 2009).

Receiving a cancer diagnosis is considered to be a stressful life event which can cause significant psychological distress (Herschbach et al., 2004). Due to the high prevalence and mortality rate of colorectal cancer, as well as the accompanying distress at diagnosis, it is important to examine psychological factors that predict positive psychological functioning. As such, the goal of the present study is to investigate the psychological processes that occur when an individual receives a diagnosis of colorectal cancer. Specifically, the present study will examine the role of hope as a moderator of the relationship between the initial reactions to a diagnosis of cancer and the coping strategies patients utilize six-months later.

Primary Appraisals

When an individual is faced with a distressing event (i.e., diagnosis of cancer), appraisals of the stressor are made almost immediately. Appraisals refer to the judgments, interpretations, or perceptions made in reference to a stressful event. Consequently, appraisals determine an individual's evaluation regarding the personal relevance and demands of that particular stressor (Franks & Roesch, 2006).

According to Lazarus and Folkman's (1984) Stress and Coping framework, appraisals are thought to occur in a two-stage process, consisting of primary and secondary appraisals. During the primary appraisal stage, the meaning and personal relevance of the event is evaluated. During the secondary appraisal stage, the individual assesses his or her capability to successfully manage the situation. When making primary appraisals, the individual evaluates the stressful situation in terms of the threat, harm, or challenge the situation will produce. Making an appraisal of threat reflects the person's evaluation of the damage that could potentially occur within the future, whereas the appraisal of harm refers to the impairment that he or she believes has already occurred. Finally, when an appraisal of challenge is made, the individual recognizes that although harm is a potential outcome, the situation is viewed as a difficulty that needs to be overcome. Overall, primary appraisals represent what is at stake to the individual and are, therefore, essential components in determining psychological distress (Lazarus & Folkman, 1984). Therefore, for the purpose of the present study, primary appraisals are a central variable of interest.

Each of the aforementioned primary appraisals is a possible reaction to receiving a diagnosis of cancer. For example, cancer is a life-threatening illness, and, as such, receiving a diagnosis can generate *threat appraisals* ("The outcome of this situation will be negative."). However, when a patient focuses on the physical, social, economic, or other associated limitations of cancer, they may appraise their cancer in terms of what he or she believes to have already lost, thereby making a *harm appraisal* ("This is a totally hopeless situation."). In contrast, patients who make *challenge appraisals* may view their cancer as an obstacle that they need to overcome, and regard this process as a learning experience and/or an opportunity for personal growth ("I can become a stronger person because of this.") (Franks & Roesch, 2006; Peacock & Wong, 1990). Overall, in comparison to threat and harm appraisals, challenge appraisals are associated with

more positive cognitive and physiological responses in a population of healthy controls, such that individuals who perceive the potential stressor as a challenge have lower blood pressure, demonstrate more positive emotional reactions to the stressful event, and rate themselves as more able to cope with the stressor (Maier, Waldstein, & Synowski, 2003; Skinner & Brewer, 2002).

Specific to cancer patients, research examining the impact of appraising cancer as a threat, harm, or challenge supports the aforementioned findings. For example, Green and colleagues (2002) found that prostate cancer patients who made greater threat appraisals showed increased levels of distress, a decrease in physical functioning and a decrease in social and role functioning six months post-treatment. In contrast, patients who made lower threat appraisals reported higher levels of health-related quality of life six months after their treatment. Additionally, Burgess and Haaga (1998) found that within a sample of adolescent cancer patients, higher harm appraisals were associated with increased levels of anger and depression. Within a sample of older prostate cancer patients, Bjorck and colleagues (1999) found that higher harm and threat appraisals were associated with greater depression and anxiety, whereas challenge appraisals were unrelated.

Cancer-Related Coping Strategies

The types of primary appraisals that are made are also extremely important because they influence the type of coping behaviour an individual utilizes. According to Folkman's (1997) model of stress and coping, the primary appraisal of cancer as a threat, harm or challenge influences one's coping behaviour (for examples see Chang, 2000; Folkman et al., 1986; Folkman & Lazarus, 1980; McCrae, 1984). Coping, very generally, is defined as a cognitive and/or behavioural effort to manage and overcome situations which pose a challenge, threat, harm, loss or benefit to an individual (Lazarus, 1991).

Although there are a wide variety of dimensions used to categorize coping styles, one principal distinction has been between approach and avoidant coping strategies (Moos, 1995). Whereas some people cope with a threatening event by using a directive and purposeful style, termed an *approach coping style*, others cope with the event by denying or minimizing the potential impact it could have on their lives, termed an *avoidant coping style.* For example, active coping ("I've been taking action to try to make the situation better"), using emotional support ("I've been getting comfort and understanding from someone"), using instrumental support ("I've been getting help and advice from other people"), acceptance ("I've been accepting the reality of the fact that it has happened"), positive reframing ("I've been looking for something good in what is happening") and planning ("I've been trying to come up with a strategy about what to do") are types of approach coping behaviours. In contrast, self-distraction ("I've been turning to work or other activities to take my mind off things"), denial ("I've been refusing to believe that this has happened"), substance use ("I've been using alcohol or other drugs to make myself feel better"), self-blame ("I've been blaming myself for things that have happened"), venting ("I've been saying things to let my unpleasant feelings escape") and behavioural disengagement ("I've been giving up trying to deal with it") are all avoidant coping strategies (Carver, 1997).

Whether an approach or avoidant coping style is more adaptive and/or effective depends greatly on the severity and duration of the stressor (Lazarus, 1993; Lazarus & Folkman, 1984). A meta-analysis by Suls and Fletcher (1985) examined the contexts in which approach versus avoidant coping styles were most effective in reducing distress. Results from the meta-analysis indicated that avoidant coping strategies were likely to be more effective when dealing with less serious and relatively short-term threats, whereas approach strategies appeared to be most effective when the stressor was a serious and long term threat that would require making

adjustments in one's life. Considering that cancer is a serious and long term threat, particularly when fear of recurrence following treatment is included, it is expected that using an approach coping style would be the most effective strategy in reducing patient distress.

Within the cancer literature, the effects of approach versus avoidant coping on patient functioning have been well documented (Carver et al., 1993; Derogatis, Abeloff, & Melisaratos, 1979; Epping-Jordan, Compas, & Howell, 1994; Fawzy et al., 1993; Fawzy, Cousins, et al., 1990; Fawzy, Kemeny et al., 1990; Levy, Herberman, Maluish, Schlien, & Lippman, 1985; Lutgendorf et al., 2000, 2002; Manne et al., 1994; Osowiecki & Compas, 1998; Rogentine et al., 1979; Stanton & Snider, 1993; Stanton et al., 2002). Although there is some variability within the findings, likely due to the heterogeneous coping assessment measures used (Costanzo, Lutgendorf, Rothrock, & Anderson, 2006), the majority of the research suggests that for cancer patients, greater approach coping is related to less distress, whereas greater avoidant coping is related to higher levels of distress.

Generally, coping strategies which are directed towards active engagement with cancer-related stressors are associated with more positive adjustment, whereas coping strategies aimed at avoiding the cancer-related stressors are linked to greater distress (Osowiecki & Compas, 1998; Manne et al., 1994; Stanton et al., 2002). For example, in a sample of women with gynecological cancer, the approach coping behaviours of positive reframing, acceptance, and active coping predicted better quality of life ratings, better social well-being, and less distress, whereas patients who used avoidance or disengagement behaviours had poorer quality of life ratings, as well as higher levels of depression, anxiety and distress (Lutgendorf et al., 2000, 2002). Additionally, a longitudinal study by Epping-Jordan and colleagues (1994) found that in a sample of patients with varying cancer diagnoses and prognoses, greater avoidance behaviour predicted worse disease

status at one-year follow-up. Within breast cancer populations, Carver and colleagues (1993) found that using the approach coping strategy of acceptance prospectively predicted a decrease in distress, whereas using the avoidance strategy of denial predicted increased distress. Similarly, engaging in cognitive avoidance prior to surgery has been shown to be the most consistent predictor of post-surgery distress (Stanton & Snider, 1993).

The Relationship Between Primary Appraisals and Coping Strategies

As previously mentioned, primary appraisals are important determinants of which coping behaviours will be used to deal with a stressor (Lazarus & Folkman, 1984). The relationship between appraisals and coping behaviours has been documented in a number of studies (for example, Carver & Scheier, 1994; Folkman & Lazarus, 1980; McCrae, 1984; Stone & Neale, 1984). Specifically, individuals who appraise a potential stressor as threatening or uncontrollable (i.e., primary appraisals of threat or harm) are more likely to use avoidant coping strategies, whereas individuals who appraise the stressor as being challenging but controllable (i.e., primary appraisals of challenge) are more likely to use approach coping (Carver, Scheier, & Weintraub, 1989).

A recent meta-analysis by Franks and Roesch (2006) examined the relationship between primary appraisals of threat, harm, and challenge and the coping strategies most commonly used by cancer patients. The goal of the analysis was to determine if the primary appraisals reliably predicted patients' coping strategies. Fifteen studies, which examined appraisals and coping responses in populations of breast, prostate, lung, and multiple cancer patients, were included in the meta-analysis. Results indicated that, as expected, individuals who made greater harm appraisals were more likely to use avoidant coping behaviours. This finding suggests that since the individuals were focused on what they had already lost, they engaged in coping strategies

that allowed themselves to divert their focus away from the harm. As expected, individuals who made greater challenge appraisals were more likely to use approach coping behaviours, indicating that patients who viewed their cancer as a challenge were more likely cope with it in a direct and purposeful manner. Finally, in contrast to what was expected, greater appraisals of threat were related to an increased use of problem focused coping strategies. Typically, threat appraisals are associated with avoidant coping strategies because the individual perceives the stressor as being resistant to improvement (Folkman et al., 1986; McCrae, 1984). However, the present analysis found that threat appraisals led to more directive coping methods which manifest themselves similar to what has been conceptualized as approach coping strategies.

As this unexpected finding implies, additional psychological variables likely play a role within the appraisal-coping relationship. The authors suggest that it was likely that patients who view their cancers as threatening to their future still maintained hope that their actions could bring about positive change (i.e., that the future harm and/or losses are not inevitable). This finding highlights that having a sense of hope may be an important construct within the relationship between primary appraisals and coping strategies.

The Role of Hope in Cancer

Hope may have a particular relevance to the appraisal and coping process as it allows people to generate and maintain positive psychological states in the presence of stressors (Folkman, 1997). Hope, generally, reflects an individual's anticipated future desires (Clarke & Kissane, 2002; Van Dongen, 1998). One of the most empirically supported and widely accepted theories of hope has been developed by Snyder and colleagues (Snyder, 1994; 2002). According to this theory, hope is viewed as a positive motivational state that reflects an individual's perception of their capability to conceptualize goals, develop strategies to achieve goals, and

sustain the required motivation to use such strategies (Snyder, Lopez, Shorey, Rand, & Feldman, 2003). Although hope is hypothesized to remain quite stable, hope can be threatened by acute external factors such as illness and major life changes. As such, hope is conceptualized as a state (versus a stable trait) (Rustoen & Wiklund, 2000), however, no data exist as to how transient of a state hope is. Further support for the state-like quality of hope comes from research examining the effectiveness of hope interventions. Such research has demonstrated that levels of situational hope are modifiable and can be enhanced through the use of hope interventions ranging from one week to eight weeks in length (e.g., Duggleby, et al., 2007; Herth, 2000; Rustoen, Wiklund, Hanestad, & Moum, 1998; Tollett, & Thomas, 1995). Fortunately, the positive effects of hope inducing interventions tend to be quite stable post-intervention, with longitudinal studies reporting higher levels of hope nine months after the intervention (Duggleby, et al., 2007; Herth, 2000).

Research comparing individuals high in hope to those low in hope have found interesting differences between these groups. For example, individuals who have high hope (versus low hope) not only believe that they are able to create alternative problem solving routes when faced with a problem, but are actually able to generate more alternative routes to achieving a goal when instructed to do so (Snyder, 1994; Snyder et al., 1991). In addition, Snyder, LaPointe, Crowson, and Early (1998) found that self-talk was an important component of sustaining motivation to achieve desired goals. The process of self-talk was identified as involving the use of self-affirming phrases such as "I will find a way to solve this" and "I won't give up". In a study by these researchers, undergraduate students who were deemed as high-hopers were found to endorse the self-affirming phrases and preferred to listen to positive and goal-pursuant audio recordings more often than low-hopers.

Overall, it appears that individuals who are high in hope are better able to confront potential stressors due to their increased motivation and ability to generate multiple pathways to goals. From this it can be hypothesized that individuals who are high in hope would be more likely to approach a stressor such as cancer by using more engaged coping strategies (i.e., an approach versus avoidance coping style) than would individuals with low hope. For example, students high in hope used fewer disengagement coping strategies, such as social withdrawal and problem avoidance, when faced with stressful academic situation (Chang, 1998). Furthermore, high-hopers in the same study were found to have greater problem-solving abilities when confronted with both stressful academic and interpersonal situations.

Within cancer populations, hope has been conceptualized as a resource that strengthens patients' beliefs that problems are manageable and motivates patients to confront such problems (Lazarus & Folkman, 1984). Hope has been identified by cancer patients as being one of the most essential elements in their lives and has been linked to increased quality of life, perceived control over one's cancer, and psychological adjustment to cancer (Ballard, Green, McCaa, Logsdon, 1997; Bulsara, Ward, & Joske, 2004; Chapman & Pepler, 1998; Herth, 1990; Lee, 2001; Rustoen, 1995). Accordingly, the level of hope has been found to be relatively high in cancer populations and tends to remain stable across the disease trajectory (Ballard, Green, McCaa, Logsdon, 1997; Herth, 1990; Herth, 2000).

It is important to note, however, that the majority of research on hope in cancer patients has sampled predominately female patients with breast cancer (Felder, 2004). Colorectal cancer patients represent a distinct group whose demographics, symptomatology, and prognosis differ substantially from breast cancer patients, suggesting that the findings from breast cancer research may not generalize to colorectal cancer patients. In contrast to breast cancer, colorectal cancer

occurs equally across genders, tends to occur in older individuals, involves different surgical procedures and recovery, and has a significantly lower five-year survival rate than breast cancer (62% versus 87%, respectively) (Canadian Cancer Society, 2009). It is likely that such differences between breast and colorectal cancer populations impact patients' level of hope at the time of diagnosis. Additionally, within studies that look at hope and general cancer diagnoses, only a small amount have included colorectal cancer in the sample (Felder, 2004; Rustoen & Wiklund, 2000; Vellone, Rega, Galletti, & Cohen, 2006). To date, no research has examined hope exclusively in a colorectal cancer population.

Within the cancer literature, hope has also been linked to the way in which patients cope with a cancer diagnosis. Recall that hope refers to a goal-directed determination and ability to conceptualize goals, generate multiple pathways to achieve such goals, and maintain the necessary motivation to pursue the goals (Snyder, 2002). Therefore, theoretically, if a patient has high hope following a diagnosis of cancer, the patient should be able to mobilize their resources effectively while coping with the diagnosis and subsequent treatment of the cancer (Stanton, Danoff-Burg, & Huggins, 2002). Correspondingly, Herth (1989) found that higher levels of hope were related to increased coping effectiveness and the use of more coping responses. In support of Herth's (1989) findings, Felder (2004) found a positive correlation between level of hope and coping style use and effectiveness in a sample of cancer patients, indicating that patients high in hope were able to identify effective coping strategies. However, Felder did not report the relationship between hope and individual coping techniques.

The research looking at the relationship between hope and specific coping strategies is limited, however. In one of the few studies examining this relationship, Wonghongkul et al. (2000) found that high hope among breast cancer survivors was associated with an increase in the

use of positive reappraisal (an approach coping strategy). Additionally, Stanton and colleagues (2002), found that using religion as a coping strategy was more effective for breast cancer patients who were low in hope versus patients who were high in hope. In contrast, for women who were high in hope, engaging in positive reinterpretation and support seeking at diagnosis predicted lower fear of cancer recurrence and less distress, respectively. Taking into account both the theoretical and experimental information on the relationship between hope and coping, it appears as though higher hope is associated with more approach oriented coping, whereas lower hope is associated with more avoidance oriented coping.

Summary of the Literature

Overall, the current cancer literature suggests that primary appraisals of cancer as a threat or harm are linked to avoidance coping behaviours, whereas appraisals of cancer as a challenge are associated with more adaptive approach coping behaviours. Additionally, the aforementioned studies examining the relationship between hope and coping suggests that high-hopers engage in more approach coping behaviours, whereas low-hopers engage in more avoidance coping behaviours. It is unclear, however, whether the well-established relationship between primary appraisals and coping is moderated by cancer patients' levels of hope regarding their illness. As such, the purpose of the present study is to examine the role of hope as a moderator of the relationship between primary appraisals of cancer and the coping strategies used by colorectal cancer patients.

The construct of hope is a clinically useful variable to examine because, unlike stable personality traits, hope is situation-based and modifiable. Previous research has demonstrated that levels of situational hope can be altered through the use of hope interventions in a variety of populations, such as palliative care patients, homeless veterans, seniors, and recurrent and non-

recurrent cancer patients (e.g., Duggleby, et al., 2007; Herth, 2000; Rustoen, Wiklund, Hanestad, & Moum, 1998; Staats, 1991; Tollett, & Thomas, 1995). Specific to cancer patients, hope inducing interventions increase patient hope and quality of life immediately following the intervention and the gains remain stable across time (Duggleby, et al., 2007; Herth, 2000). Therefore, if hope is found to be associated with the coping strategies used by cancer patients, intervention programs can be developed to help foster high levels of hope within these individuals.

Purpose and Hypotheses

1. The first aim of this study was to confirm the relationship between primary appraisals of cancer and the strategies used to cope with cancer. The present study was intended to extend the current literature on primary appraisals and coping by longitudinally examining this relationship in a population of colorectal cancer patients. Based on Lazarus and Folkman's (1984) model and the aforementioned studies linking primary appraisals and coping strategies, it was hypothesized that:

    1a. At baseline (i.e., the period of time between receiving a diagnosis of colorectal cancer and undergoing surgery), higher primary appraisals of cancer as a threat would be associated with greater use of avoidance coping strategies and less use of approach coping strategies six months later.

    1b. At baseline, higher primary appraisals of cancer as a harm would be associated with greater use of avoidance coping strategies and less use of approach coping strategies six months later.

1c. At baseline, higher primary appraisals of cancer as a challenge would be associated with less use of avoidance coping strategies and greater use of approach coping strategies six months later.

2. The second aim of this study was to confirm the relationship between hope and the strategies used to cope with cancer. The present study was intended to extend the current literature on hope and coping by longitudinally examining this relationship in a population of colorectal cancer patients. Based on the aforementioned studies linking hope and coping strategies, it was hypothesized that:

    2a. At baseline, higher levels of hope would be associated with greater use of approach coping strategies and less use of avoidance coping strategies six months later.

    2b. At baseline, lower levels of hope would be associated with greater use of avoidance coping strategies and less use of approach coping strategies six months later.

3. The third aim of this study was to examine whether a patient's level of hope (high versus low) moderated the relationship between primary appraisals and coping. See Table 1 for a summary of the predicted relations and Figure 1 for a diagram of the proposed model. Specifically, we hypothesized the following:

    3a. The relationship between primary appraisals of cancer as a threat and the use of avoidance coping strategies would be significant for patients low in hope, but not for patients high in hope.

3b. The relationship between primary appraisals of cancer as a harm and the use of avoidance coping strategies would be significant for patients low in hope, but not for patients high in hope.

3c. The relationship between primary appraisals of cancer as a challenge and the use of approach coping strategies would be significant for patients high in hope, but not for patients low in hope.

4. The influence of hope on the relationships between 1) primary appraisals of threat and approach coping, 2) primary appraisals of harm and approach coping, and 3) primary appraisals of challenge and avoidance coping were also examined. However, because previous research does not support that such relationships would be observed, no specific predictions were advanced at this time.

Table 1

Summary of Specific Aim 3 and 4 Hypotheses

Hypothesis	Primary Appraisal	Coping Strategy	Moderating Role of Hope
3a	Threat	Avoidance	Significant for low-hope patients; Non-significant for high-hope patients
3b	Harm	Avoidance	Significant for low-hope patients; Non-significant for high-hope patients
3c	Challenge	Approach	Significant for high-hope patients; Non-significant for low-hope patients
4a	Threat	Approach	No prediction made
4b	Harm	Approach	No prediction made
4c	Challenge	Avoidance	No prediction made

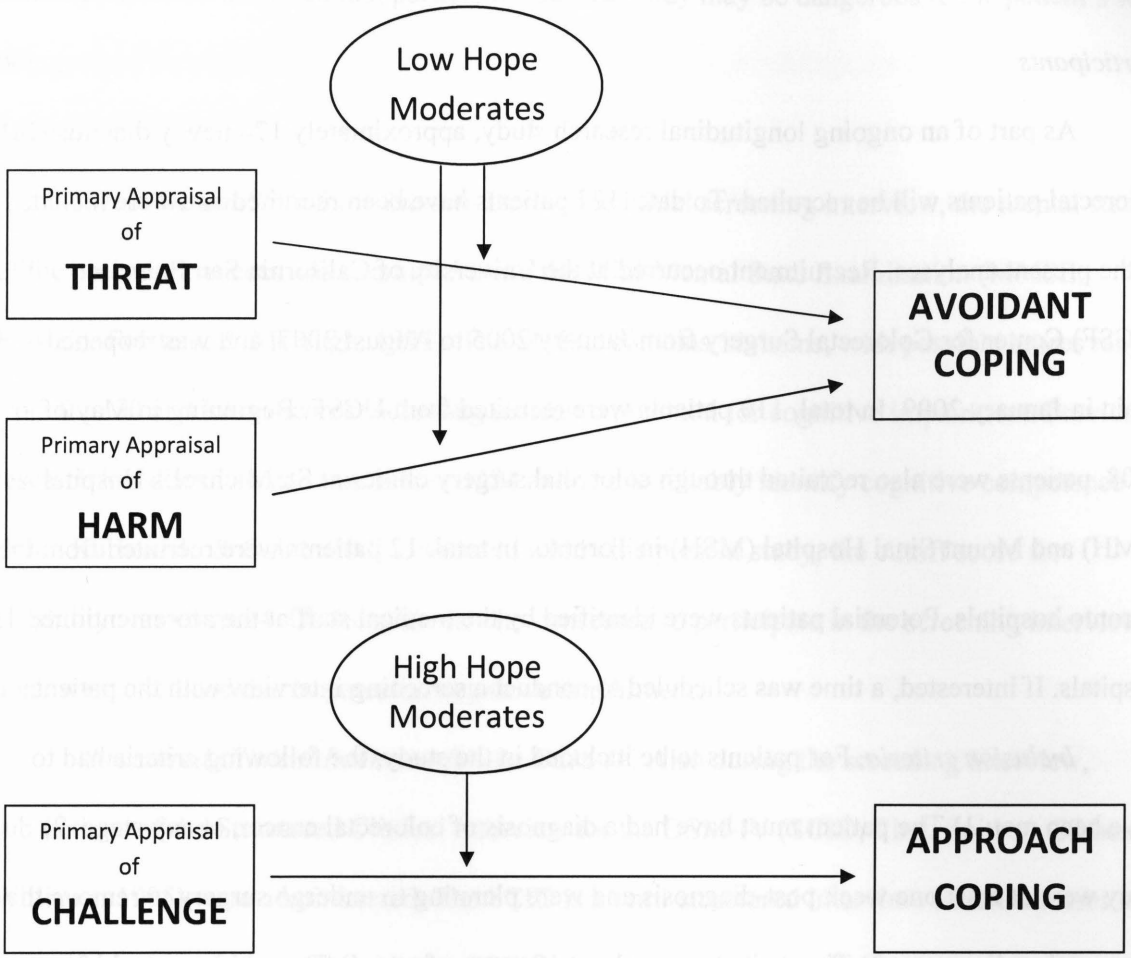

Figure 1. Proposed Model of Specific Aim 3 Hypotheses.

Method

Participants

As part of an ongoing longitudinal research study, approximately 170 newly diagnosed colorectal patients will be recruited. To date, 122 patients have been recruited and were included in the present analyses. Recruitment occurred at the University of California San Francisco (UCSF) Center for Colorectal Surgery from January 2005 to August 2007, and was reopened again in January 2009. In total, 110 patients were recruited from UCSF. Beginning in May of 2008, patients were also recruited through colorectal surgery clinics at St. Michael's Hospital (SMH) and Mount Sinai Hospital (MSH) in Toronto. In total, 12 patients were recruited from the Toronto hospitals. Potential patients were identified by the medical staff at the aforementioned hospitals. If interested, a time was scheduled to conduct a screening interview with the patient.

Inclusion criteria. For patients to be included in the study, the following criteria had to have been met: 1) The patient must have had a diagnosis of colorectal cancer, at any stage. 2) They were at least one week post-diagnosis and were planning to undergo surgery to remove the colorectal malignancy. 3) The patient was at least 18 years of age. 4) The patient was able to speak and read English. 5) The patient was able to give informed consent.

Exclusion criteria. Patients were excluded from participating in the study for any of the following reasons: 1) The cancer diagnosis was a recurrence of previously treated malignancy. 2) The patient already received surgery to remove the colorectal cancer. 3) The patient met DSM-IV criteria for active psychosis or mania, current substance abuse, or current posttraumatic stress disorder (PTSD) from trauma prior to the cancer diagnosis. 4) The patient had active and severe suicidality (ideation, plan and intent). 5) The patient met criteria for cognitive impairment. 6) The

treating physician indicated that participation in the study may be dangerous to the patient's well-being.

Measures

Mini-Mental State Examination. During the initial screening interview, the mental status of the potential patients was examined using the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975). The MMSE contains 11-items, with possible scores ranging from 0 to 30 and lower scores indicating increased potential for cognitive impairment. Previous research has demonstrated that scores of 24 and above reliably identify cognitive competence (Kim, Karlawish, & Caine, 2002). As such, within the present study, the cutoff score for eligibility was set at 24. Of the patients who consented to participate in the screening interview, none were excluded due to potential cognitive impairment.

Structured Clinical Interview for the DSM-IV. Also during the screening interview, subsections of the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1995) were administered. The SCID is a semi-structured interview which assesses nine areas of psychopathology. Overall, the SCID has demonstrated adequate psychometric properties (Rogers, 2001). For the purpose of the present study, patients were administered modules assessing current and past mania and hypomania, psychotic symptoms, substance use, and posttraumatic stress disorder. Any patients meeting criteria for active psychosis, mania, or current substance abuse were excluded from the study as these disorders could interfere with the patient's ability to provide unbiased answers on the questionnaires. In addition, patients who met criteria for PTSD for a traumatic stressor *other than cancer* (e.g., a life-threatening accident) in the last year were excluded from the study, as the main goal of the larger study was to examine PTSD development to the diagnosis of cancer.

Patient Characteristics. Patients completed a self-report questionnaire which asked for information regarding age, gender, ethnicity, income, education, and marital status. The stage of cancer, date of diagnosis, type of surgery, radiation therapy, and chemotherapy were assessed using a self-report questionnaire and were confirmed by a medical chart review.

Stress Appraisal Measure. Primary appraisals of the cancer diagnosis were assessed using selected items from the Stress Appraisal Measure (SAM; Peacock & Wong, 1990). At baseline, patients were asked to rate their appraisals of their cancer diagnosis on a five-point Likert-type scale ranging from "not at all" to "considerably." The patient's perceptions of cancer as a threat, harm, or challenge was to be assessed with the corresponding subscales of the SAM, consisting of four, three, and four items, respectively. However, the harm subscale demonstrated extremely poor reliability (α = -.09) and, as such, could not be included in the analyses. In contrast, the threat (α = .77) and challenge (α = .70) subscales demonstrated acceptable reliabilities. Nonetheless, the subscale reliabilities are still lower than expected, with the internal consistency reported in previous research to be between .81 and .88 (Feldman, Cohen, Hamrick, & Lepore, 2004).

Herth Hope Index. The patient's level of hope was measured at baseline using the Herth Hope Index (HHI; Herth, 1992). The HHI consists of 12-items which ask patients to rate statements related to their beliefs following their cancer diagnosis on a four-point Likert-type scale ranging from "Strongly Disagree" to "Strongly Agree". Examples of questions include "I have a positive outlook toward life" and "I believe that each day has potential." The HHI total score ranges from 12 to 47, with higher scores indicating higher levels of hope in the patient. The HHI has demonstrated excellent psychometric properties, with Cronbach's coefficient alphas ranging from .91 to .97 (Herth, 1992). Within the present study, the internal reliability of the HHI was also excellent (α = .87).

The Brief COPE. Individual coping strategies used by patients were assessed six months after surgery using the Brief COPE (Carver, 1997). The Brief COPE includes 28 items and asks patients to rate how frequently they engage in a variety of coping strategies on a four-point Likert-type scale ranging from "I haven't been doing this at all" to "I've been doing this a lot." Fourteen coping strategy subscales are generated from the 28 items (each comprised of two items), including, Active Coping, Planning, Use of Emotional Support, Use of Instrumental Support, Positive Reframing, Acceptance, Religion, Humour, Venting, Denial, Substance Use, Behavioural Disengagement, Self-Distraction, and Self-Blame. Cronbach's coefficient alphas for each individual subscale range from .50 to .90 (Carver, 1997).

For the purpose of the present study, approach and avoidance coping strategies were the variables of interest, thus requiring a factor analysis. At the suggestion of the measure's author (Carver, 1997), a principal factors extraction with a Varimax rotation was conducted. Principal components extraction was used prior to principal factors extraction to estimate the number of factors. Inspection of the Scree plot suggested extraction of two factors. Visual analysis of the content of each factor was consistent with the constructs of approach and avoidance coping. See Table 2 for the factor loadings of each item. Items with loadings of less than .40, or with .40 or greater on multiple factors were dropped. Consequently, seven of the 28 items did not load on either of the two factors. Factor 1 included items related to approach coping (i.e., Active Coping, Using Emotional Support, Using Instrumental Support, Positive Reframing, Planning, and Acceptance) and Factor 2 items were suggestive of more avoidance coping strategies (i.e., Denial,

Table 2

Summary of Exploratory Factor Analysis Results for the Brief COPE (N = 122)

	Factor Loadings	
Item	Approach Coping	Avoidance Coping
Looking for something good in what is happening	**.73**	-.12
Taking action to try to make the situation better	**.72**	.11
Getting help and advice from other people	**.72**	-.10
Getting comfort and understanding from someone	**.69**	-.14
Thinking hard about what steps to take	**.67**	.30
Getting emotional support from others	**.66**	-.09
Trying to get advice or help about what to do	**.64**	-.05
Concentrating my efforts on doing something about the situation	**.64**	.15
Trying to see it in a different light, to make it seem more positive	**.64**	-.13
Trying to come up with a strategy about what to do	**.57**	.36
Accepting the reality of the fact that it has happened	**.49**	.24
Learning to live with it	**.49**	.14
Trying to find comfort in my religion or spiritual beliefs	**.43**	-.33
Saying things to let my unpleasant feelings escape	**.43**	.28
Making jokes about it	**.42**	**.41**
Praying or meditating	.39	-.38
Doing something to think about it less	.33	-.05

	Factor Loadings	
Item	Approach Coping	Avoidance Coping
Turning to work or other activities to take my mind off things	.32	.06
Giving up trying to deal with it	-.28	.10
Giving up the attempt to cope	-.17	-.12
Using alcohol or other drugs to make myself feel better	-.03	**.60**
Criticizing myself	.03	**.56**
Using alcohol or other drugs to help me get through it	.07	**.54**
Saying to myself "this isn't real."	.21	**-.52**
Refusing to believe that it has happened	.01	**-.48**
Making fun of the situation	.25	**.41**
Expressing my negative feelings	.29	**.40**
Blaming myself for things that happened	-.10	**.40**
Eigenvalues	6.23	2.80
% of variance	22.25	10.01

Note. Factor loadings over .40 appear in bold.

Self-Blame, Substance Use, and Venting). Internal reliability for the approach subscale was good ($\alpha = .88$), however, the internal reliability for the avoidance subscale was poor ($\alpha = .41$).

Although the authors of the Brief COPE (Carver, 1997) state that the constructs of approach and avoidance coping are orthogonal, thus requiring a Varimax rotation, it is also reasonable to conceptualize these coping strategies as related. Specifically, it is conceivable that the more likely a person is to engage in approach coping strategies, the less likely they are to use avoidance coping strategies. Therefore, a principal factors extraction with an Oblimin rotation was also conducted. Similar to the Varimax rotation results, inspection of the Scree plot suggested extraction of two factors and visual analysis of the content of each factor was consistent with the constructs of approach and avoidance coping. Again, items with loadings of less than .40, or with .40 or greater on multiple factors were dropped, resulting in the loss of ten items. In comparison to the results from the Varimax rotation, the approach coping subscale demonstrated identical reliability ($\alpha = .88$), however, the internal consistency of the avoidance subscale was substantially lower ($\alpha = .16$).

The fact that neither of the rotation strategies produced an acceptably reliable scale for avoidance coping suggests that avoidance coping may not be a unitary construct within a newly-diagnosed colorectal cancer population. Instead, it appears as though patients engaging in avoidance coping may only engage in selected avoidance strategies. As such, it was decided that the avoidance subscales would be examined independently. Internal reliabilities for the avoidance subscales of Denial ($\alpha = .90$), Self-Blame ($\alpha = .77$), Substance Use ($\alpha = .96$), and Venting ($\alpha = .65$) were acceptable, however, the subscales of Behavioural Disengagement ($\alpha = .34$), and Self-Distraction ($\alpha = .51$) demonstrated unacceptably low reliability and were not used in the analyses.

Procedure

Patients provided informed consent and subsequently underwent an audio-taped screening interview with a trained assessor to determine whether they met eligibility criteria. If eligible to participate in the study, patients completed a self-report package of measures at baseline and a similar questionnaire package again six months later. All questionnaire packages were mailed to patients and included self-addressed stamped return envelopes for the completed questionnaires. As reimbursement for their time, patients were compensated $25.00 for each questionnaire package completed.

Statistical Analyses

Hypotheses 1a-1c. To examine whether primary appraisals of cancer (threat versus challenge) were significantly associated with the subscales reflecting avoidance coping (i.e., Venting, Self-Blame, Denial, and Substance Use) and approach coping (i.e., Instrumental Support, Acceptance, Emotional Support, Active Coping, Planning, and Positive Reframing) at six months, Pearson product correlations were conducted.

Hypotheses 2a-2b. To examine whether hope was significantly associated with the subscales of avoidance coping and approach coping at six months, Pearson product correlations were conducted.

Hypothesis 3a. To examine whether the relationship between threat appraisals and avoidance coping was moderated by hope, a multiple regression analysis was conducted with two steps of predictors. The outcome variables were the avoidance coping subscales of Denial, Self-Blame, Substance Use, and Venting. In the first step, threat and hope were entered into the equation. In the second step, an interaction term of threat appraisals x hope was entered. A significant interaction term is suggestive of a moderation effect for hope, and would be

decomposed by plotting the two slopes between threat appraisals and avoidance coping for high hopers and low hopers (dichotomized by a median split) (Baron & Kenny, 1986).

Hypothesis 3b. To examine whether the relationship between challenge appraisals and approach coping was moderated by hope, a multiple regression analysis was conducted with two steps of predictors. The outcome variable was the approach coping scale total score. In the first step, challenge and hope were entered into the equation. In the second step, an interaction term of challenge appraisals x hope was entered. A significant interaction term is suggestive of a moderation effect for hope, and would be decomposed by plotting the two slopes between challenge appraisals and approach coping for high hopers and low hopers (dichotomized by a median split).

Exploratory Analyses. To examine the influence of hope on the relationships between 1) primary appraisals of threat and approach coping, and 2) primary appraisals of challenge and avoidance coping, multiple regression analyses using the analytic procedures specified above were conducted. Although analyses examining the role of hope on the relationship between primary appraisals of cancer as a harm and the use of coping strategies was intended to be examined, poor reliability of the harm subscale prevented such analyses from being conducted. As previously stated, because such analyses were exploratory, no specific predictions were made.

Results

Sample Characteristics

In total, 122 colorectal cancer patients completed questionnaires for the present analyses. Table 3 displays the demographic and medical characteristics of the sample. Gender was approximately equally represented in the sample, with 69 (56.6%) male and 53 (43.4%) female patients. Patients completed the baseline questionnaires an average of 62.12 days post diagnosis (SD =42.50, range = 6 to 148). The prevalence of rectal cancer (61.5%) was higher than colon cancer (38.5%) in the sample and the patients' age ranged from 28 to 89 years old (M = 58.80, SD = 13.83). The majority of the sample was Caucasian (73.8%), married (70.5%; mean length of marriage = 36.46 years, SD = 16.21 years), employed (50.0%) or retired (32.8%), and college educated or higher (63.1%).

The vast majority of patients were recruited from San Francisco (90.16%). The patients from both recruitment sites demonstrated similar characteristics with the exception of patient age, with the San Francisco patients being younger (M = 57.68, SD = 13.62) than the Toronto patients (M =69.00, SD = 11.80), $t(120) = -2.77$, $p < .01$. However, it is important to note that the demographic analyses comparing recruitment sites was limited by the small number of patients recruited from Toronto (N=12). Specifically, chi-squared analyses could not be conducted for the variables of income, education, ethnicity and employment status as the expected values in the cells was less than five. As more Toronto patients continue to be enrolled in the study, further analyses will be conducted to examine whether any differences between the recruitment sites exist. Importantly, however, no differences were observed between the Toronto and the San Francisco patients on any of the key variables used in the present analyses.

Table 3

Sample Demographics at Baseline (N=122)

Variable	Percent	*M*	*SD*
Age (years)		58.8	13.8
Gender			
Male	56.6		
Female	43.4		
Cancer Diagnosis			
Rectal	61.5		
Colon	38.5		
Recruitment Site			
San Francisco	90.2		
Toronto	9.8		
Ethnicity			
Caucasian	73.8		
Asian	11.5		
African American	7.4		
Hispanic/Latino	5.7		
Native American	0.8		
Other	0.8		

Variable	Percent	*M*	*SD*
Employment status			
Employed Full-time	39.3		
Employed Part-time	10.7		
Retired	32.8		
Disability	9.0		
Unemployed	6.6		
Student	0.8		
Education			
High school or below	15.5		
Some college	21.3		
College	26.2		
Graduate/professional	36.9		
Marital Status			
Married/partnered	70.5		
Single	17.2		
Widowed	7.4		
Divorced/Separated	4.9		

Completers versus Non-Completers

Of the patients who completed the baseline assessment questionnaires (n = 122), 92 patients (75.41%) completed the six-month questionnaires. There were no significant differences between completers and non-completers on age, gender, ethnicity, marital status, employment status, income, education, or type of cancer diagnosis (i.e., colon versus rectal cancer).

Descriptive Information on Key Variables

Descriptive information is provided for the key variables and subscales used in the present study. Table 4 provides the means, standard deviations, and ranges for the subscales of the Stress Appraisal Measure (Peacock & Wong, 1990), the subscales and approach coping composite score of the Brief COPE (Carver, 1997), and the total score of the Herth Hope Index (Herth, 1992). Further descriptive information on these measures is outlined below.

Primary Appraisals

Due to the fact that only select items from the Stress Appraisal Measure (Peacock & Wong, 1990) were included in the present study, it was not possible to compare scores from this sample to those reported previously in the scientific literature. Average scores for the Threat and Challenge subscales were created, with possible scores ranging from 1 ("not at all") to 5 ("a great amount"). Results indicated that patients tended to appraise their cancer as a challenge ($M = 3.81$, $SD = 0.91$) more than they viewed it as a threat ($M = 3.32$, $SD = 0.87$), $t(115) = -4.29$, $p < .001$.

Approach Coping Strategies

Possible score ranges for the approach coping factor were 12-48. Patients in this sample reported a mean score of 33.40 ($SD = 7.86$). Patients reported engaging most frequently in Acceptance Strategies ($M = 6.57$, $SD = 1.64$), followed by the use of Emotional Support ($M = 6.06$, $SD = 1.87$), Active Coping ($M = 5.58$, $SD = 1.82$), Planning ($M = 5.27$, $SD = 1.91$),

Table 4

Means, Standard Deviations, and Actual Ranges for Key Variables

Key variable	*M*	*SD*	Actual Range
Primary appraisals			
Threat	13.27	3.50	3.00 – 20.00
Harm	–	–	–
Challenge	15.20	3.59	5.00 – 21.00
Coping strategies			
Approach coping composite score	33.40	7.86	12.00 – 48.00
Acceptance	6.57	1.64	2.00 – 8.00
Emotional support	6.06	1.87	2.00 – 8.00
Active coping	5.58	1.82	2.00 – 8.00
Planning	5.27	1.91	2.00 – 8.00
Positive reframing	5.03	1.86	2.00 – 8.00
Instrumental support	4.83	1.73	2.00 – 8.00
Avoidance coping composite score	–	–	–
Venting	4.00	1.64	2.00 – 8.00
Self-blame	2.93	1.27	2.00 – 8.00
Denial	2.59	1.36	2.00 – 8.00
Substance use	2.53	1.13	2.00 – 8.00
Hope	39.93	5.15	30.00 – 48.00

Note. Dashes indicate the variable was not used due to problems with scale reliability.

Positive Reframing (M = 5.03, SD = 1.86), and the use of Instrumental Support (M = 4.83, SD = 1.73). On average, patients reported "I've been doing this a medium amount" or "I've been doing this a lot" for all of the approach coping subscales examined.

Avoidance Coping Strategies

Possible score ranges for each of the avoidance coping subscales ranged from 2-8. Patients reported engaging most frequently in Venting (M = 4.00, SD = 1.64), followed by Self-Blame (M = 2.93, SD = 1.27), Denial (M = 2.59, SD = 1.36), and Substance Use (M = 2.53, SD = 1.13). Based on the averages, patients reported "I haven't been doing this at all" or "I've been doing this a little bit" for all avoidance coping subscales examined.

Hope

Overall, patients reported high levels of hope at baseline (M = 38.78, SD = 5.58, possible range 12-48). The mean of the patients in this sample was higher than the scale norms from a sample of hospitalized adults (M = 32.39, SD = 9.61). Furthermore, 85.25% of the sample reported scores that were higher than the scale mean of 32.39.

Hypothesis Testing

Correlations between Primary Appraisals and Coping Strategies

In Hypothesis 1, the associations between the primary appraisals reported at the time of diagnosis (i.e., threat or challenge) and the coping strategies used six months later were examined. It was predicted that patients who viewed cancer as a challenge would use more approach coping strategies, whereas patients who appraised cancer as a threat would engage in more avoidance coping strategies.

Results indicated that, as expected, challenge appraisals were associated with increased approach coping six months later, r = .35, p = .001. Furthermore, challenge appraisals were

significantly correlated with each of the individual subscales included within the approach coping index, with the exception of Instrumental Support ($r = .20$, $p = .07$). Specifically, challenge appraisals were associated with Acceptance ($r = .23$, $p = .03$), Emotional Support ($r = .21$, $p = .05$), Active Coping ($r = .23$, $p = .03$), Planning ($r = .25$, $p = .02$), and Positive Reframing ($r = .38$, $p < .001$).

In contrast to the prediction that threat appraisals would be associated with increased avoidance coping, patients who appraised cancer as a threat only engaged in using more Venting six months after surgery ($r = .25$, $p = .02$). No statistically significant correlations were observed between threat appraisals and Self-Blame ($r = .12$, $p = .28$), Denial ($r = .13$, $p = .24$), or Substance Use ($r = .16$, $p = .14$). Unexpectedly, threat appraisals were related to the approach coping strategy of Active Coping ($r = .27$, $p = .01$).

Correlations between Hope and Coping Strategies

In Hypothesis 2, the associations between level of hope at the time of diagnosis and the coping strategies used six months later were examined. It was predicted that patients with higher levels of hope would use more approach coping strategies, whereas patients with lower levels of hope would engage in more avoidance coping strategies.

Results indicated that, as expected, higher hope was associated with increased approach coping six months later ($r = .23$, $p = .03$). However, higher hope was only significantly correlated with the Positive Reframing subscale of the approach coping index ($r = .22$, $p = .04$). Although the Planning ($r = .20$, $p = .07$) and Instrumental Support ($r = .18$, $p = .09$) subscales appear to be approaching significance, the remaining subscales, namely, Acceptance ($r = .17$, $p = .12$), Emotional Support ($r = .14$, $p = .19$), and Active Coping ($r = .06$, $p = .58$) were not significantly

associated with having higher levels of hope at baseline. Correlations between all key variables used in the study can be seen in Table 5.

In contrast to the prediction that lower hope at baseline would be associated with increased avoidance coping, no statistically significant correlations were found for any of the avoidance coping subscales. Specifically, lower hope was not associated with Venting ($r = .07$, $p = .50$), Denial ($r = .01$, $p = .91$), Substance Use ($r = -.16$, $p = .14$), or Self-Blame ($r = -.20$, $p = .06$).

Hope as a Moderator between Primary Appraisals of Threat and Avoidance Coping

In Hypothesis 3a, it was predicted that the relationship between primary appraisals of cancer as a threat and the use of avoidance coping strategies would be significant for patients low in hope, but not for patients high in hope. To test for such moderation, a multiple regression analysis was conducted with two steps of predictors (i.e., threat appraisals and hope, and the interaction term of threat X hope) for each of the avoidance coping strategies (i.e., Venting, Self-Blame, Denial, and Substance Use). In contrast to the hypothesis, within each of the moderation analyses hope was not found to be a moderator. Specific results for each of the avoidance coping subscales are described below and summaries of the findings are displayed in Tables 6 through 9.

Venting. Multiple regression analyses showed that the use of venting as a coping strategy was predicted by threat appraisals ($\beta = .24$, $p = .01$), however, venting was not predicted by baseline lower hope ($\beta = .11$, $p = .23$), or the threat X hope interaction ($\beta = -.03$, $p = .85$). These predictors accounted for very little of the of the variance in venting (R^2adj = .04), and the regression model was not significant, $F(3, 110) = 2.37$, $p = .08$. Table 6 displays a summary of the findings.

Self-blame. Multiple regression analyses showed that the use of self-blame as a coping strategy was not significantly predicted by threat appraisals ($\beta = .13$, $p = .18$), baseline lower hope

Table 5

Correlation Matrix of Key Variables

				Approach Coping Strategies						Avoidance Coping Strategies			
	Challenge	Threat	Hope	IS	Acc	ES	AC	Plan	PR	Vent	SB	Den	SU
Challenge	**1.00**	.07	.38**	.20	.23*	.21*	.23*	.25*	.38**	.15	.03	.12	.05
Threat		**1.00**	-.21*	.07	.17	.13	.27*	.11	.11	.25*	.18	.15	.19
Hope			**1.00**	.18	.17	.14	.06	.20	.22*	.07	-.20	.01	-.16
IS				**1.00**	.31**	.48**	.57**	.56**	.48**	.33**	-.08	.18	-.01
Acc					**1.00**	.37**	.38**	.35**	.38**	.17	.02	-.19	-.01
ES						**1.00**	.45**	.29*	.39**	.26*	.01	.16	-.06
AC							**1.00**	.58**	.52**	.28**	.01	-.02	.17
Plan								**1.00**	.46**	.36**	.13	-.08	.19
PR									**1.00**	.32**	-.02	.16	-.02
Vent										**1.00**	.32**	-.17	.04
SB											**1.00**	-.11	.17
Den												**1.00**	.05
SU													**1.00**

Note. IS=Instrumental Support; Acc=Acceptance; ES=Emotional Support; AC=Active Coping; Plan=Planning; PR=Positive Reframing; Vent=Venting; SB=Self Blame; Den=Denial; SU=Substance Use.
*$p < .05$, **$p < .01$.

Table 6

Hierarchical Regression Analysis for Threat and Hope Predicting Venting (N = 114)

Variable	B	SE B	β
Step 1			
Threat (z score)	.35	.14	.24*
Hope (z score)	.16	.14	.11
Step 2			
Threat X Hope	-.03	.14	-.03

Note. $R^2 = .06$ for Step 1; $\Delta R^2 < .001$ for Step 2.

*$p < .05$, **$p < .01$.

(β = -.15, p = .12), or the threat X hope interaction (β = -.03, p = .74). These predictors accounted for very little of the of the variance in self-blame (R^2adj = .02), and the regression model was not significant, $F(3, 110) = 1.79$, p = .15. Table 7 displays a summary of the findings.

Denial. Multiple regression analyses showed that the use of denial as a coping strategy was not predicted by threat appraisals (β = .14, p = .15), baseline lower hope (β = .04, p = .15), or the threat X hope interaction (β = .01, p = .93). These predictors accounted for very little of the of the variance in denial (R^2adj = -.01), and the regression model was not significant, $F(3, 110)$ = .714, p = .55. Table 8 displays a summary of the findings.

Substance use. Multiple regression analyses showed that the use of substances as a coping strategy was not predicted by threat appraisals (β = .14, p = .14), baseline lower hope (β = -.11, p = .28), or the threat X hope interaction (β = .11, p = .24). These predictors accounted for very little of the of the variance in substance use (R^2adj = .02), and the regression model was not significant, $F(3, 110) = 1.89$, p = .14. Table 9 displays a summary of the findings.

Hope as a Moderator between Primary Appraisals of Challenge and Approach Coping

In Hypothesis 3b, it was predicted that the relationship between primary appraisals of cancer as a challenge and the use of approach coping strategies would be significant for patients high in hope, but not for patients low in hope. To test for moderation, a multiple regression analysis was conducted with two steps of predictors (i.e., challenge appraisals and hope, and the interaction term of challenge X hope) with approach coping as the outcome variable. Results showed that, as predicted, the use of approach coping strategies was predicted by challenge appraisals (β = .28, p = .005), however, contrary to the hypothesis, approach coping was not predicted by baseline higher hope (β =.09, p = .33), or the challenge X hope interaction (β = .04, p

Table 7

Hierarchical Regression Analysis for Threat and Hope Predicting Self-Blame (N = 114)

Variable	B	SE B	β
Step 1			
Threat (z score)	.14	.11	.13
Hope (z score)	-.17	.11	-.15
Step 2			
Threat X Hope	-.04	.14	-.03

Note. R^2= .05 for Step 1; ΔR^2 = .001 for Step 2.

*$p < .05$, **$p < .01$.

Table 8

Hierarchical Regression Analysis for Threat and Hope Predicting Denial (N = 114)

Variable	B	SE B	β
Step 1			
Threat (z score)	.17	.11	.14
Hope (z score)	.05	.11	.04
Step 2			
Threat X Hope	.01	.11	.01

Note. $R^2 = .02$ for Step 1; $\Delta R^2 < .001$ for Step 2.

$^*p < .05$, $^{**}p < .01$.

Table 9

Hierarchical Regression Analysis for Threat and Hope Predicting Substance Use (N = 114)

Variable	B	SE B	β
Step 1			
Threat (z score)	.14	.09	.14
Hope (z score)	-.10	.09	-.11
Step 2			
Threat X Hope	.11	.09	.11

Note. R^2= .04 for Step 1; ΔR^2 = .01 for Step 2.

*$p < .05$, **$p < .01$.

= .68). The regression model was, however, significant, $F(3, 110) = 4.46$, $p = .005$. Table 10 displays a summary of the findings.

Exploratory Analyses

In Hypothesis 4, the influence of hope on the relationships between 1) primary appraisals of threat and approach coping and 2) primary appraisals of challenge and the avoidance coping subscales (i.e., Venting, Self-Blame, Denial, and Substance Use) were examined. No specific predictions were advanced as these analyses were exploratory in nature. Due to the high number of hypotheses and analyses examined in the present study, to help control for Type I error, the overall alpha level was set at $\alpha = .01$ for the exploratory analyses.

Hope as a Moderator between Primary Appraisals of Threat and Approach Coping

To examine whether hope was a moderator in the relationship between primary appraisals of threat and approach coping, a multiple regression analysis was conducted with two steps of predictors (i.e., threat appraisals and hope, and the interaction term of threat X hope) with approach coping as the outcome variable. Results indicated that approach coping was not significantly predicted by threat appraisals ($\beta = .22$, $p = .02$), however, approach coping was predicted by baseline higher hope ($\beta = .25$, $p = .01$). Nonetheless, the threat X hope interaction did not prove to be a predictor of approach coping ($\beta = -.09$, $p = .32$), R^2adj = .07, $F(3, 110) = 3.89$, $p = .02$. A summary of the findings are displayed in Table 11.

Hope as a Moderator between Primary Appraisals of Challenge and Avoidance Coping

To examine whether hope was a moderator in the relationship between primary appraisals of cancer as a challenge and the avoidance coping strategies, a multiple regression analysis was conducted with two steps of predictors (i.e., challenge appraisals and hope, and the interaction term of challenge X hope) for each of the avoidance coping strategies (i.e., Venting, Self-Blame,

Table 10

Hierarchical Regression Analysis for Challenge and Hope Predicting Approach Coping (N =14)

Variable	B	SE B	β
Step 1			
Challenge (z score)	1.89	.66	.28**
Hope (z score)	.64	.66	.09
Step 2			
Challenge X Hope	.27	.65	.04

Note. R^2= .11 for Step 1; ΔR^2 = .001 for Step 2.

*$p < .05$, **$p < .01$.

Table 11

Hierarchical Regression Analysis for Threat and Hope Predicting Approach Coping (N = 114)

Variable	B	SE B	β
Step 1			
Threat (z score)	1.50	.63	.22*
Hope (z score)	1.67	.63	.25**
Step 2			
Threat X Hope	-.63	.63	-.09

Note. $R^2 = .09$ for Step 1; $\Delta R^2 = .01$ for Step 2.

*$p < .05$, **$p < .01$.

Denial, and Substance Use). Within each of the moderation analyses, hope was not found to be a moderator. Specific results for each of the avoidance coping subscales are described below.

Venting. Multiple regression analyses showed that the use of venting as a coping strategy was not predicted by challenge appraisals ($\beta = .14$, $p = .19$), baseline lower hope ($\beta = .01$, $p = .91$), or the challenge X hope interaction ($\beta = .15$, $p = .13$). These predictors accounted for very little of the of the variance in venting (R^2adj = .01), which was not significant, $F(3, 110) = 1.51$, $p = .22$. A summary of the findings are displayed in Table 12.

Self-blame. Multiple regression analyses showed that the use of self-blame as a coping strategy was not predicted by challenge appraisals ($\beta = .11$, $p = .30$), baseline lower hope ($\beta = -.21$, $p = .04$), or the challenge X hope interaction ($\beta = .07$, $p = .50$). The regression model accounted for very little of the variance in self-blame (R^2adj = .02), which was not significant, $F(3, 110) = 1.68$, $p = .18$. A summary of the findings are displayed in Table 13.

Denial. Multiple regression analyses showed that the use of denial as a coping strategy was not predicted by challenge appraisals ($\beta = .11$, $p = .27$), baseline lower hope ($\beta = -.03$, $p = .76$), or the challenge X hope interaction ($\beta = -.10$, $p = .33$). These predictors accounted for very little of the variance in denial (R^2adj = .02), which was not significant, $F(3, 110) = .74$, $p = .53$. A summary of the findings are displayed in Table 14.

Substance use. Multiple regression analyses showed that the use of substances as a coping strategy was not predicted by challenge appraisals ($\beta = .11$, $p = .26$), baseline lower hope ($\beta = -.18$, $p = .08$), or the challenge X hope interaction ($\beta = .01$, $p = .89$). These predictors accounted for very little of the variance in substance use (R^2adj < .01), which was not significant, $F(3, 110) = 1.11$, $p = .35$. A summary of the findings are displayed in Table 15.

Table 12

Hierarchical Regression Analysis for Challenge and Hope Predicting Venting (N = 114)

Variable	B	SE B	β
Step 1			
Challenge (z score)	.19	.15	.14
Hope (z score)	.02	.15	.01
Step 2			
Challenge X Hope	.22	.15	.15

Note. $R^2 = .02$ for Step 1; $\Delta R^2 = .02$ for Step 2.

$^*p < .05$, $^{**}p < .01$.

Table 13

Hierarchical Regression Analysis for Challenge and Hope Predicting Self-Blame (N = 114)

Variable	B	SE B	β
Step 1			
Challenge (z score)	.12	.11	.11
Hope (z score)	-.24	.11	-.21*
Step 2			
Challenge X Hope	.07	.11	.07

Note. $R^2 = .04$ for Step 1; $\Delta R^2 = .004$ for Step 2.

*$p < .05$, **$p < .01$.

Table 14

Hierarchical Regression Analysis for Challenge and Hope Predicting Denial (N = 114)

Variable	B	SE B	β
Step 1			
Challenge (z score)	.13	.12	.11
Hope (z score)	-.04	.12	-.03
Step 2			
Challenge X Hope	-.12	.12	-.10

Note. $R^2 = .01$ for Step 1; $\Delta R^2 = .01$ for Step 2.

$^*p < .05$, $^{**}p < .01$.

Table 15

Hierarchical Regression Analysis for Challenge and Hope Predicting Substance Use (N = 114)

Variable	B	SE B	β
Step 1			
Challenge (z score)	.11	.10	.11
Hope (z score)	-.18	.10	-.18
Step 2			
Challenge X Hope	.01	.10	.01

Note. $R^2 = .03$ for Step 1; $\Delta R^2 < .001$ for Step 2.

$^*p < .05$, $^{**}p < .01$.

Summary of Findings

In summary, hope did not moderate the relationship between appraisals and coping in any of the aforementioned analyses. However, analyses revealed that colorectal cancer patients tended to view their cancer more as a challenge than a threat and reported high levels of hope at baseline. Additionally, appraisals of cancer as a challenge were related to the use of approach coping at six months, whereas threat appraisals were related to increased venting and active coping at six months. Furthermore, regression analyses revealed that baseline higher hope was a predictor of approach coping at six-months.

Discussion

The principal aim of the present study was to determine whether hope moderated the relationship between the primary appraisals of cancer and the way which patients coped with cancer six months later. A secondary aim was to determine if the previously established relationships between primary appraisals and coping strategies, as well as the relationships between hope and coping strategies, would generalize to a newly diagnosed colorectal cancer population.

Current Findings

Relationship between primary appraisals and coping. In contrast to Hypothesis 1a, baseline appraisals of cancer as a threat were not significantly related to the majority of the avoidance coping subscales, namely, Self-Blame, Denial, or Substance Use. Patients who appraised their cancer as a threat did, however, engage in more venting six months later. Surprisingly, patients who made threat appraisals also used active coping techniques more frequently at the six month follow-up. Previous research has also demonstrated mixed findings in the relationship between threat appraisals and coping in both cancer populations and community samples. Threat appraisals have been linked with coping strategies that are consistent with approach coping (active coping, seeking instrumental support, social support seeking, medical compliance, suppression of competing activities, planning, and problem solving) as well as strategies that are consistent with avoidance coping (passive coping, religion, wishful thinking, and venting) (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Franks & Roesch, 2006; McCrae, 1984).

With regards to the relationship between threat appraisals and coping strategies, the inconsistency in the existing literature, as well as the lack of support for this relationship in the

current study, may suggest that there are other mediating or moderating variables involved. For example, it is possible that the perception of the construct of *threat* varies between patients. For some, cancer may be viewed as threatening, yet they may believe that future losses are not inevitable, and are therefore motivated to using approach coping strategies to promote positive outcomes. In contrast, for individuals who view cancer as threatening and believe future losses are inevitable, using avoidance coping strategies may be beneficial (Franks & Roesch, 2006).

Consistent with Hypothesis 1c, patients who appraised their cancer diagnosis as a challenge were more likely to engage in approach coping strategies six months later. Specifically, patients who made challenge appraisals at the time of diagnosis reported using the subscales of Acceptance, Emotional Support, Active Coping, Planning, and Positive Reframing significantly more often six months later. Contrary to what was expected, challenge appraisals were not related to using instrumental support at six months. With the exception of the lack of relationship between challenge appraisals and Instrumental Support, these findings are consistent, in a general sense, with research that has demonstrated a relationship between challenge appraisals and the use of approach coping behaviours among cancer patients (Franks & Roesch, 2006), indicating that patients who view their cancer as a challenge are more likely to cope with it in a direct and purposeful manner. The finding that challenge appraisals were not related to the use of Instrumental Support six months post surgery is most likely a reflection of the patients' stage of treatment. Six months after surgery, most patients are still in the process of completing their adjuvant treatments, specifically chemotherapy and radiation. Therefore, during this time, there may be less of a need to search out tangible help or information than there would have been when patients were making critical treatment decisions, undergoing surgery, and beginning adjuvant treatment. Overall, however, these findings extend the current cancer literature by demonstrating

that the relationship between challenge appraisals and approach coping is applicable to a colorectal cancer population and by establishing directionality through the use of a longitudinal design.

Interestingly, at baseline, patients appraised their cancer diagnosis as a challenge significantly more than they appraised it as a threat. This finding is somewhat surprising as cancer is a potentially fatal disease, and thus, represents an objective *threat* to one's life. However, studies of breast cancer patients and breast cancer survivors have also reported high levels of challenge appraisals and relatively low ratings of both threat and harm appraisals (Hughes, 1993; Mast, 1998; Wonghongkul, Moore, Musiil, Schneider, & Deimling, 2000). Although no research has empirically investigated the reasoning behind such findings, one speculation is that approaching cancer as a challenge may be perceived by cancer patients as being the most adaptive type of appraisal (Wonghongkul, Moore, Musil, Schneider & Deimling, 2000). Recall that challenge appraisals acknowledge that harm and loss are potential outcomes; however, challenge appraisals maintain the perception that the individual has the capacity to overcome such difficulties. Challenge appraisals, then, may be an important component for adapting to changing life circumstances, such as receiving a diagnosis of cancer and planning to undergo treatment. As such, challenge appraisals may provide more benefits to patients by increasing the patients' perception of their own capability to adapt and seek out available resources (Lazarus & Folkman, 1984; Wonghongkul, Moore, Musil, Schneider & Deimling, 2000). Therefore, making challenge appraisals may serve to enhance patients' self-efficacy and prepare them for the upcoming obstacles they will face in the cancer treatment, recovery, or maintenance stages. While no research has examined the possibility, another hypothesis is that patients endorse high levels challenge appraisals simply due to impression management. The challenge appraisal items from

the Stress Appraisal Measure (Peacock & Wong, 1990) clearly reflect the more positive items on the scale (e.g., "Is this situation going to have a positive impact on me?" and "To what extent can I become a stronger person because of this problem?"). Consequently, patients may also be demonstrating a response bias towards reporting a positive outlook in regards to their cancer diagnosis.

In general, the current findings lend partial support for Lazarus and Folkman's (1984) Stress and Coping framework. Specifically, as postulated by this framework, primary appraisals of cancer as a challenge were related to increased use of approach coping strategies, however, primary appraisals of cancer as a threat were not related to the majority of the avoidance coping subscales. Unfortunately, due to the low reliability of the harm subscale of the SAM, the relationship between harm appraisals and coping strategies could not be evaluated, thus limiting the ability to fully examine Lazarus and Folkman's model in a newly diagnosed colorectal cancer population. In an attempt to expand upon the current appraisal-coping literature, the current study examined the relationship between appraisals and coping longitudinally (Lazarus & Folkman, 1987). The longitudinal design of this study could be responsible for the lack of relationship found between threat appraisals and avoidance coping as coping behaviours have been shown to be variable over time (Dunkel-Schetter, Feinstein, Taylor, & Falke, 1992).

In examining predictors of coping strategies longitudinally, it is possible that other conceptual models could provide a more stable framework. For example, using Miller's (1990) Monitoring-Blunting model to examine whether patients have a tendency to "monitor" or to "blunt" information related to their cancer diagnosis may be more predictive of coping strategy use in the long-term, with "monitors" potentially being more likely to actively seek out information and use more approach coping strategies versus "blunters" who demonstrate a

tendency to avoid all threatening information (i.e. avoidance coping) (Miller, 1990). Additionally, examining individual differences in intolerance of uncertainty (e.g., Freeston, Rheaume, Letarte, Dugas & Ladouceur, 1994) could also prove to be a stable model for predicting coping behaviours in colorectal cancer patients. Research in the area of intolerance of uncertainty has found that the degree to which individuals are affected by unknown outcomes of a health threat (e.g., cancer) impacts the coping strategies they engage in. Specifically, patients with high trait levels of intolerance of uncertainty have been shown to have a tendency to use more approach oriented health behaviours, such as greater information seeking and adherence to appointments (Rosen, Knauper, & Sammut, 2007). As such, future research should consider examining predictors of coping behaviours in colorectal cancer patients using the frameworks provided by the Monitoring-Blunting model and the Intolerance of Uncertainty model.

Relationship between hope and coping. Consistent with Hypothesis 2a, higher baseline levels of hope were associated with an increase in the use of approach coping strategies six months later. However, in examining the subscales of approach coping, only Positive Reframing was significantly correlated with higher hope. Furthermore, in examining the effect size, the correlation between hope and positive reframing only reflects a small to medium effect size (Cohen, 1992). These findings are somewhat consistent with the work of Wonghongkul and colleagues (2000), who found that high hope among breast cancer survivors was only predictive of increased use of the coping strategy of positive reappraisal.

In contrast to the hypothesis that lower levels of baseline hope would be associated with greater use of avoidance coping strategies, no significant correlations were found for any of the avoidance coping subscales. Previous research has linked low hope to the avoidance coping strategy of turning to religion (Stanton, Danoff-Burg, & Huggins, 2002), however, due to the low

reliability of the religion subscale of the Brief COPE in the current study, religion was not included in the analyses, thus preventing any comparisons between the current findings and those by Stanton and associates.

Similar to the aforementioned finding of high appraisals of cancer as a challenge, patients in the present study reported very high levels of hope at baseline. High levels of hope can be viewed as surprising considering that a cancer diagnosis poses a threat to one's future. Although there is no established criterion for ascertaining "high hope" patients, previous research has found elevated levels of hope among cancer patients in comparison to scale norms. Wonghongkul and colleagues (2000), using the same measure of hope as the present study (i.e., HHI), found mean hope scores of breast cancer survivors to be even higher than what was seen in the present study ($M = 41.62$, $SD = 5.36$; possible range, 12-48). Such elevated hope levels could be attributed to the fact that the population was in the survivorship stage of their cancer, however, similar results have been observed in both newly diagnosed and advanced-stage cancer patients. For example, Rustoen and Wiklund (2000), in their examination of newly diagnosed cancer patients, found high levels of hope reported following diagnosis. Specifically, the vast majority of patients fell within the "moderately hopeful" (59.5%) and "hopeful" (27.5%) level of the Nowotny Hope Scale (Nowotny, 1989), with only eight percent reporting "little hope" and no patients reporting "hopelessness." Vellone and colleagues (2006) also reported high levels of hope on the Nowotny Hope scale in a population of Italian cancer patients, with 90% of hospitalized patients and 80% of at-home patients reporting hope within the "moderately hopeful" and "hopeful" categories. Finally, Felder (2004), using the Herth Hope Scale (Herth, 1991), found high levels of hope in a sample primarily comprised of advanced-stage cancer patients, suggesting that hope remains high, even at the end of the disease trajectory.

Hope as a moderator between primary appraisals and coping. Contrary to Hypotheses 3 and 4, hope was not found to be a significant moderator in any of the regression models. Despite this, regression analyses revealed that baseline higher hope was a predictor of approach coping at six-months. It appears that hope, perhaps due to the goal-directed nature of the construct (Snyder, 2002), inherently drives individuals to use approach coping strategies to actively achieve the goals they set forth.

It is, however, important to note that, based on the large amount of analyses conducted in this study, the aforementioned significant findings should be interpreted with caution. The possibility of Type I error is a concern within this data and may have produced false positives in the results. Although Type I error was attempted to be controlled for by setting the overall significance level for the exploratory analyses to $\alpha = .01$, the significant findings should still be considered carefully.

General Limitations of the Present Research

As discussed, hope was not found to exacerbate or attenuate the relationship between appraisals at baseline and the coping strategies used by colorectal cancer patients six-months later. Although it is possible that hope is simply not involved in the appraisal-coping process, there are a number of conceptual and design related factors that may have impacted the lack of findings in the present study.

Timing of assessments. Within the present study, patients completed the baseline assessment post-diagnosis but prior to their colorectal cancer surgery, and completed the second assessment six-months later. Such a longitudinal design was originally considered a strength of the present research, however, it may be the case that the timing of assessments negatively impacted the results in a variety of ways.

Specific to the timing of the baseline assessment, the study design may have allowed patients to complete the questionnaires too long after their diagnosis. On average, patients completed the baseline questionnaires two months after receiving a diagnosis of colorectal cancer. As such, the length of time from diagnosis to baseline completion may have impacted the results of the questionnaires which assessed patient primary appraisals and hope. It was anticipated that such questionnaires would capture patients' initial reactions to diagnosis, however, a great deal of change in the patients' view of their cancer and their level of hope could have occurred over the two month period. Having patients complete the baseline assessments immediately following diagnosis may have yielded different results.

Additionally, the timing of the six month assessment may have been too long from baseline to allow for any relationships between appraisals, hope, and coping to be observed. Both the appraisals and the coping strategies patients engage in have been shown to change depending on the development and outcome of the event, as well as the variability in the resources available to the individual (Folkman & Lazarus, 1980). Furthermore, cancer patients have been shown to use a wide variety of coping strategies and appear to modify their coping strategy based on the particular stressor (Dunkel-Schetter, Feinstein, Taylor, Falke, 1992). Due to this variability, the assessment of the relationship between primary appraisals and coping, as well as the moderating effect of hope, six months later may have been too long of an interval for such relationships to be observed. Monitoring these variables at monthly, or even weekly, intervals may provide better insight into the relationship between appraisals, hope, and coping.

A final issue regarding the timing of assessments relates to the retrospective reporting required when responding to the Brief COPE questionnaire. In the present study, patients were asked to recall the ways in which they had been coping with the stress associated with their

diagnosis of cancer. Within the coping literature, concerns have been raised about the accuracy of retrospective assessments of coping strategies (Parker & Endler, 1992; Schwarzer & Schwarzer, 1996). To assess retrospective coping reports, researchers have examined the correspondence among retrospective (e.g., examining how an individual coped within the last week), global (e.g., examining how an individual typically copes), and real-time (e.g., using palm pilots to capture coping as it occurs) assessments of coping. In a recent study evaluating such correspondence, Todd and colleagues (2004) assessed dispositional coping, retrospective coping over the past 30 days, and daily diary measures in a sample of community participants. Their results revealed weak concordance between all the measures, and extremely weak concordance between global and daily measures of coping. Within the present study, the measurement of coping used most closely resembles a global assessment of coping and, as such, may not accurately reflect the day to day coping strategies patients engaged in to cope with their cancer-related stress. Future studies should consider examining coping in cancer patients using ecological momentary assessment (EMA) techniques such as palm pilots. EMA methodologies have been successfully used in cancer populations undergoing active treatment (e.g., Hacker & Ferrans, 2007), however, the coping techniques used by cancer patients have yet to be evaluated via EMA.

Psychometric and conceptual issues. The present study contained a number of psychometric and conceptual problems which may have also impacted the results. Specifically, issues with scale reliability, validity concerns, and threshold effects are of particular concern.

As previously discussed, extremely low reliabilities prevented the use of two subscales in the analyses, namely, harm appraisals and avoidance coping. The low reliability of the harm subscale of the SAM is most likely a reflection of the inclusion of only selected items from the original SAM, and as such, is less of a psychometric concern. The low reliability of the avoidance

coping subscale of the Brief COPE, however, was not anticipated as previous studies examining avoidance coping from this measure in cancer populations have demonstrated acceptable reliability (Bellizzi & Blank, 2006; Park, Edmonson, Fenster, & Blank, 2008). However, it is important to note that those studies were conducted with cancer survivors and not cancer patients. The survivorship phase is inherently very different from the active treatment stage of cancer and likely involves very different types of stressors and coping strategies. Furthermore, given the nature of the cancer treatment process, there may be many items on the Brief COPE that are not applicable coping strategies for a cancer patient six months post-surgery simply because the patient does not have the option to engage in such strategies. For example, items such as "I've been saying to myself that this isn't real" or "I've been giving up trying to deal with it" probably do not apply to a population that has recently undergone cancer surgery and is currently recovering or still completing adjuvant therapies, like chemotherapy. The extremely low mean scores and small variance in patient responding for these items adds support to this hypothesis. Future research is needed to examine appropriate measures of coping for cancer populations at similar treatment stages to the present population. To date, no measure of coping strategies used specifically during cancer treatment has been created. The development of such a measure may be needed to accurately assess coping during this critical time point in patients' lives.

Another important finding to take into consideration is the high levels of challenge appraisals and high level of hope seen within this population. Although similar findings have been observed in previous cancer research (Hughes, 1993; Mast, 1998; Rustoen & Wiklund, 2000; Vellone et al., 2006; Felder, 2004; Wonghongkul, Moore, Musiil, Schneider, & Deimling, 2000), it is possible that such elevated scores are a reflection of a response bias among cancer patients. Within North American culture, a survivorship mindset towards cancer has developed which

portrays cancer as an obstacle that needs to be overcome (Rossman, 2003). For example, the very popular LIVESTRONG™ campaign, headed by Lance Armstrong, focuses on inspiring and empowering cancer patients to fight cancer head on, under the motto "*unity is strength, knowledge is power and attitude is everything*" (Lance Armstrong Foundation, 2009). This cultural perception may have accounted, in part, for why patients reported such high challenge appraisals and hope.

While viewing cancer as a challenge and being hopeful may, on the surface, appear to be an encouraging finding, researchers have warned that cancer patients often feel pressured to "stay positive," "have a positive outlook," and "look on the bright side of things" (Holland & Lewis, 2001). In a cultural phenomenon Holland and Lewis (2001) have termed the "Tyranny of Positive Thinking," the popular literature and media have capitalized on the notion that the way to survive cancer is to always be positive. The authors note that the pressure to be consistently positive often leads patients to experience increased distress and a sense of isolation. Additionally, research has demonstrated that breast cancer patients who repress negative emotions are more likely to be anxious, depressed, and confused following a cancer diagnosis than patients who expressed negative emotions (Iwamitsu et al., 2003). Furthermore, intervention studies have demonstrated that the expression of negative emotions in a supportive context is related to improvements in cancer patient quality of life (Spiegel et al., 1989).

Within the present study, it is unclear whether the high level of challenge appraisals and hope were the result of a response bias or an accurate reflection of patients' perceptions of their cancer. However, as the previous research demonstrates, if the patients were reporting challenge appraisals and hope as a result of feeling a sense of pressure to stay positive, the patients may

experience increased distress during their treatment process and, therefore, is an important finding to take into consideration.

Other considerations related to the high levels of challenge and hope seen in the current and previous research should also be taken into account. For example, it is also possible that the high levels of challenge appraisals and hope observed are influenced by selection biases. Specifically, it could be the case that only patients who were less distressed or more hopeful at the time of diagnosis agreed to participate in the study, thus influencing the patient characteristics in the sample. Unfortunately, because no data could be collected from the participants who declined to participate in the study, it unclear whether such patients were significantly more distressed than those who agreed to participate in the study. However, subjective observations from study staff responsible for patient recruitment indicate that many of the patients declining participation appeared to be highly distressed at the time that they were approached to participate in the study. As such, it is possible that the current findings may not be representative of all colorectal cancer patients, particularly those experiencing extremely high distress at the time of diagnosis.

Additionally, within the present study, the high level of challenge appraisals and hope could have been related to the timing of the assessments in this population. Specifically, hope was measured at baseline, prior to patients undergoing surgery. As such, at baseline, the patients likely had little information regarding their prognosis and potentially adopted an attitude of "hoping for the best."

Overall, the present study contained numerous psychometric and conceptual limitations which may have influenced the current findings. Issues such as potential positive response biases, a lack of reliability and questionable validity on the measures used in the present study are concerning. It is unlikely that such problems are specific to the present study. In all probability,

such issues generalize to the larger cancer literature, particularly when assessing newly diagnosed patients and patients undergoing adjuvant treatment. This study highlights the need for further research in the area, particularly surrounding the measurement of complex constructs such as appraisals, hope, and coping.

Directions for Future Research

Pending that the abovementioned measurement issues are improved upon, future research examining potential moderators of the relationship between primary appraisals of a colorectal cancer diagnosis and coping strategies would be advantageous. Examples of conceptual possibilities as moderators could include optimism and health related locus of control.

Given the potential response biases towards being hopeful in the face of cancer, perhaps assessing the more stable personality trait of optimism would allow for more variability in the sample than the state measurement of hope provided. In a meta-analysis examining dispositional optimism and coping strategies, Solberg Nes and Segerstrom (2006) found that optimism was positively associated with the use of approach coping strategies intended to manage stressors and their related distress, and negatively associated with avoidance coping strategies aimed at circumventing stressors and their related consequences. Future research should examine whether there is a moderating effect of optimism in the relationship between appraisals and coping.

A second potential moderating variable in the relationship between appraisals and coping which deserves exploration is health related locus of control which reflects a patient's perception of the controllability of cancer (Wallston, Wallston, & DeVellis, 1978). If, for example, patients have an external locus of control which they ascribe to others or ascribe to chance, they may exhibit more avoidance behaviours due to the lack of influence they believe their actions will have

over the outcome. In contrast, if patients have an internal locus of control, they may be more likely to use approach coping strategies in an attempt to achieve their goals.

Additionally, hope could also be examined as a mediator in the relationship between appraisals and coping. Originally, hope was conceptualized as a moderator because the necessary association between the predictor variable and the mediator (i.e., the relationship between primary appraisals and hope) had not been demonstrated in the literature (Baron & Kenny, 1986). However, the findings from the current research demonstrated that primary appraisals of cancer as a challenge were positively correlated with hope, whereas primary appraisals of cancer as a threat were negatively correlated with hope (see Table 5). Such findings suggest that hope may mediate the relationship between primary appraisals at baseline and the coping strategies used by patients six months later.

Clinical Significance

Despite and, in part, due to the aforementioned limitations, data obtained from the present study have important implications for patients, healthcare providers, and researchers. The current study identified that patients tend to view colorectal cancer as a challenge more than as a threat and that they were hopeful at the time of diagnosis. In general, such findings can be interpreted as encouraging, as challenge appraisals and hope have been shown to be positively associated with approach coping strategies. However, if such findings represent a response bias due to a perceived pressure to maintain positivity in the face of cancer, patients may be at risk for increased distress in the long run. Healthcare providers need to be aware of the possibility that the positivity patients express outwardly may not be an accurate reflection of their true feelings. Maintaining an open dialogue throughout the treatment process and discussing the pressure patients feel to maintain a positive attitude may help to alleviate some of this distress.

The present research also highlights a number of measurement concerns in the assessment of appraisals, hope, and coping among colorectal cancer patients. Further research in the area of scale development, measurement, and validation is warranted within this population. Additionally, researchers must be aware of the potential response biases and lack of applicability of certain measures when conducting research with cancer patients.

In conclusion, the present findings indicated that patients appraised cancer as a challenge more than a threat and also reported high levels of hope following the diagnosis of colorectal cancer. Additionally, both challenge appraisals and baseline higher hope predicted approach coping six-months later, however, hope was not found to moderate the relationship between primary appraisals of either threat or challenge and the approach or avoidance coping strategies patients engaged in six-months later. It is likely that many of the conceptual, measurement, and design issues outlined above significantly contributed to the current results. Further research in these areas is greatly needed to help identify and satisfy the needs of colorectal cancer patients, particularly during the diagnosis and treatment stages of their disease.

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