6-2017

Coping as a Mediator between Symptom Burden and Distress in Lung Cancer Patients

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by

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A Thesis submitted in partial satisfaction of
the requirements for the degree
Doctor of Philosophy in Clinical Psychology

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June 2017

Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree Doctor of Philosophy.

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ACKNOWLEDGEMENTS

I would like express my sincerest gratitude to Dr. Morrell for all of the exceptional knowledge, guidance, patience, and support that she continually offered me. Without her, this project would not exist. I could not imagine having a better advisor and mentor for this project.

I would also like to thank my committee members, Dr. Vermeersch and Dr. Boyd. I appreciate the guidance, kind words, and support that you both have offered me throughout this process.

To my family, your love, support, and patience has made my academic dreams possible. And especially to my daughter, Kaela, who continuously serves as an inspiration for me to try harder, go further, and achieve my goals.

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ABSTRACT OF THE THESIS

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by

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Doctor of Philosophy, Graduate Program in Psychology
Loma Linda University, June 2017
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Lung cancer is considered the leading cause of cancer death worldwide. An estimated 224,390 new cases of lung cancer are expected to be diagnosed and 158,080 Americans are expected to die from lung cancer in 2016 (National Institutes of Health, 2016; Siegel, Miller, & Jemal, 2016). Lung cancer patients also report the highest levels of psychological distress and symptom burden than any other forms of cancer (Linden, Vodermaier, MacKenzie, & Greig, 2012). Given the prevalence and impact of lung cancer, it is imperative to address the emotional toll this diagnosis can have on those suffering with the disease to develop helpful strategies for those coping with lung cancer. The goal of this study is to determine how much lung cancer patients' symptom burden affects their level of distress, and how much of this effect is mediated by approach and/or avoidance coping styles. Adults (N = 109, 57% female,) with an average age of 67 (SD = 10.1) diagnosed with lung cancer completed a questionnaire assessing for physical and psychological functioning at two medical centers in Southern California. ***Results:*** There was a significant positive relationship between total symptom burden and distress. Avoidance coping was a significant mediator of the relationship between total symptom burden and distress. Approach coping was not a significant mediator of this relationship.

Conclusions: Results suggest that a patient experiences more distress as his/her symptom burden increases, and this effect is partially explained by engaging in avoidant coping. Therefore, it is important to find ways to help patients cope more effectively to reduce their levels of stress. The findings of this study show the importance of continued research to find effective coping strategies and as well to inhibit patients from engaging in an avoidant coping style.

CHAPTER ONE

INTRODUCTION

Lung cancer is considered the most common cancer worldwide, accounting for 1.37 million deaths per year (American Lung Association, 2014). The National Institutes of Health (NIH) project that an estimated 158,080 people are expected to die in the United States from lung cancer in 2016. Consequently, the NIH estimates that cancer care cost in the United States was $147.5 billion in 2015, and $13.4 billion of those costs were due to lung cancer. Furthermore, lung cancer accounts for 26.5% of all cancer deaths (NIH, 2016). The American Cancer Society (2016) concludes that lung cancer is "by far the leading cause of cancer death among both men and women." Lung cancer is also considered to have a lower five-year survival rate (16.6%) than other leading types of cancer such as breast and prostate cancer (American Cancer Society, 2014). Although survival rates are higher when the disease is detected when it is still localized to the lungs (15.3%), this survival rate drops dramatically to 3.9% when the cancer has spread to other organs (American Lung Association, 2014). Furthermore, lung cancer is often not detected until a later stage when the cancer has often already metastasized or spread to other parts of the body (Jemal et al., 2011).

In addition to high commonality, mortality rate, and cost of the disease, it has also been found that lung cancer patients may also suffer significantly more distress than patients with other cancer diagnoses (Akechi et al., 2001). It has been theorized that these results could be due to the poor prognosis of the disease, in addition to the stigma attached to commonly held beliefs as to the origins of the disease (Zabora et al. 2001). Since lung cancer has a strong association with smoking, the belief that lung cancer is

due to a controllable behavior (smoking) and/or that patients have personal responsibility for their condition contributes to patients' feelings of regret and self-blame, regardless of past smoking behavior (Chapple, Ziebland, & McPherson, 2004).

Symptom Burden and Distress

Lung cancer patients face a barrage of difficulties related to their diagnosis causing emotional strain. For example, severe physical symptoms (pain, dyspnea, fatigue and cough), intrusive treatments (surgery, chemotherapy, and radiotherapy), and poor prognosis can lead to high levels of psychological distress (Linden et al., 2012; Shellekens et al., 2016). The high levels of distress can manifest as high rates of depressive disorders (11%; Linden et al., 2012) and other psychiatric disorders (15-19%; Akechi et al., 2001). Because lung cancer patients undergo so much physical and emotional distress, they often experience decreased quality of life, high rates of medical care attrition, prolonged hospital stays, and lower rates of survival (Shellekens et al., 2016). This all adds to the total symptom burden that is experienced by patients and can lead to distressing emotional and behavioral issues such as fear of recurrence, fatigue, sleep difficulties, and perceived vulnerability (Cho, Park, & Blank, 2013).

The level of distress or total symptom burden experienced by a patient can significantly impact his/her quality of life and ability to function (Aranson, 1991). A general diagnosis of any type of cancer can impact patients emotionally, socially, and physically (Plunket, Chrystal, & Harper, 2003), and can predict higher levels of depression, social withdrawal, and higher rates of mortality (Faller et al., 1999). In a review by Fletcher et al. (2012) analyzing the family caregiving experience of those with

cancer, patient pain, depression, and agitation (Weitzner et al., 2000), anxiety (Cotrim & Periera, 2008), neuropsychiatric disorders (Sherwood et al., 2006), and fatigue (Fletcher et al., 2009) were found to all contribute to the distress levels of patients and their families. In fact, a person's level of distress can even effect or interfere with a treatment's effectiveness, which has been observed in multiple foundational studies (Parsons, Bova, & Million, 1980; Parsons, Thar, Bova, & Millon, 1980). More specifically, multiple studies have shown that there is a significant relationship between symptom burden and level of distress in lung cancer patients (Akin, Can, Aydiner, Osdilli, & Durna, 2012; Iyer, Roughle, Rider, & Taylor-Stokes, 2014; Mohan, et al., 2011; Yang et al., 2012). More recently, Gonzalez and Jacobsen (2012) found that lung cancer patients with higher levels of perceived stigma, avoidant coping, poor social support, and dysfunctional attitudes were significantly more likely to exhibit higher levels of depressive symptoms. Lung cancer patients also report higher rates of the above-mentioned stressors and emotional distress than patients with other forms of cancer, mostly due to the poor prognosis (Shellekens et al., 2016).

Coping Strategies

Coping strategies may in part explain the relationship between symptom burden and distress among cancer patients, and thus may represent important targets for psychosocial interventions for this population. Lazarus and Folkman (1984) developed a model of stress and coping that serves as the most widely accepted and studied explanation of how people appraise a stressful situation and then generate a coping response. Their Transactional Model of Stress and Coping is described as a bidirectional

process that involves the introduction of environmental stressors perceived by an individual and the individual's appraisal and response to the stressors. Appraisal can be influenced by many personal factors and can be conscious or unconscious. If a perceived stressful event occurs, this triggers a cognitive appraisal of the situation which then leads to a coping response (cognitive and/or behavioral) to manage the stressful situation (Hulbert-Williams, Morrison, Wilkinson, & Neal, 2012). For example, if the phone rings while a person is driving, the person needs to decide whether to answer the phone and compromise their driving ability or ignore the call and continue focusing on the task of driving. This cognitive appraisal can be further compromised depending on the origin of the call, the emotional state of the driver, and even the conditions of the road, and lead to more perceived stress on the part of the driver. In the case of cancer, these coping strategies (cognitive and behavioral responses to stressors) are in response to each individual patient's appraisal of his/her diagnosis.

According to Lazarus and Folkman (1984), there are different types of coping such as problem focused coping and emotion focused coping. Problem focused coping is a response that is geared toward resolving the stressful situation or taking action to alleviate the stress and change the situation. Engaging in problem focused coping might entail removing the source of the stress or establishing an action plan to combat the stressful situation. For example, if students know they are on the borderline of a poor grade in a class, they might look for ways to fix their grades by hiring a tutor or asking for feedback from the professor, essentially taking an active role in combating the stressor to resolve the negative emotions (Pavani, Vigouroux, Kop, Congard, & Dauvier, 2016). Alternatively, emotion focused coping seeks to resolve the emotional response to a

stressor rather than focusing on eliminating or resolving the stressor itself. An emotion focused coping style might entail analyzing and confronting the feelings that arise when faced with the stressor (Lazarus & Folkman, 1987). For example, when patients are diagnosed with a terminal illness, their reaction is often emotion focused since the main stressor, the illness, cannot be eliminated or changed and they may seek to reduce their feelings of fear, anxiety, or depression by seeing a therapist, journaling, or talking with friends about their feelings. In addition, problem focused coping is typically utilized when an individual perceives that something can be changed about the outcome whereas, emotion focused coping is typically employed when an individual perceives that a stressor is something that must be endured as opposed to fixed or altered (Carver, Scheier, & Weintraub, 1989).

Roth and Cohen (1986) took Lazarus and Folkman's model of stress further and identified two common types of coping strategies that people tend to employ: approach and avoidance coping. These two coping strategies define a basic desire for humans to choose to either approach or avoid a situation. An approach strategy would be described as a likelihood of moving towards or engaging in an issue in hopes of obtaining a potential positive outcome (Elliot, Thrash, & Murayama, 2011), whereas a negative approach would be described as a general strategy of avoidance in an effort to stay away from a potentially negative outcome. Essentially, an avoidant strategy is the act of behaviorally disengaging or escaping from the threat or stress that is provoking the distress (Carver & Scheier, 1994). For example, a person with a disposition towards approach coping would focus on trying to do well in school, whereas a person with a disposition towards avoidance coping would try to avoid doing poorly in school (Elliot,

Sheldon, & Church, 1997). Additionally, approach and avoidance coping, in the face of terminal illness, are typically categorized as emotion focused coping strategies as they are utilized to resolve the negative feelings that arise in a stressful situation due to the uncontrollable outcome (Wright, 2012). However, some approach strategies such as problem solving, or researching methods to control pain, and utilizing avoidant methods such as distraction to reduce physical pain could be considered problem focused (Carver & Scheier, 1994).

Roth and Cohen (1986) not only defined avoidance coping as a general orientation away from threat, but also argued that this style could be advantageous for coping with short-term problems, since the avoidance of stress and prevention of anxiety could be beneficial. For example, avoidance coping strategies are effectively and regularly used by athletes during sporting events (Nicholls et al., 2006), as well for athletes recovering from an injury such as those suffering from anterior cruciate ligament injuries (Carson & Polman, 2009). However, recent research as to the benefit of avoidance coping in regards to cancer is minimal to nonexistent. Overall, avoidance coping can prove maladaptive for long-term problems due to its association with increased emotional and physical distress. Approach coping, however, is associated with problem acceptance and more help seeking behavior, proving more adaptive for more chronic problems (Roth & Cohen, 1986). Approach coping is considered advantageous when coping with long-term stressors because of its adaptive nature in the face of uncontrollable outcomes. However, approach coping can also prove maladaptive if patients stagnate in the ventilation of affect or the venting/expression of feelings, and do

not attempt to emotionally progress beyond this state (Quartana, Laubmeier, & Zakowski, 2006).

In specific regards to those suffering with a cancer diagnosis, approach and avoidance coping can be conceptualized as reactions on the part of the patient to either confront and "approach" the diagnosis or ignore and avoid the diagnosis and its implications. For example, those with an approach focus response may ask more questions of their doctor, plan ahead, and engage in positive appraisal and direct action to confront their diagnosis. In comparison, those with an avoidant strategy may turn to distracting themselves with work and other activities, or daydreaming; deny existence of the cancer diagnosis; and reduce effort in confronting symptoms.

Coping strategies have been shown to predict health outcomes among cancer patients in general, and in lung cancer patients more specifically (Zeiderner & Saklofske, 1996). Multiple studies have shown that the form of coping strategies that cancer survivors apply can predict their quality of life even more than medical or other treatment factors (Avis, Crawford, & Manuel, 2005; Lehto, Ojanen, & Kellokumpu-Lehtinen, 2005; Wenninger et al., 2013). In addition, recent findings have indicated that avoidance oriented coping may predict increases in cancer-related intrusive thoughts (Bauer, Yanez, Jorge, & Maggard-Gibbons, 2016). In a study analyzing coping strategies of lymphoma patients, positive changes such as benefit finding, stress-related growth, and adversarial growth, were associated with an approach coping style consisting of positive reappraisal, acceptance, and active coping. Conversely, an avoidant coping strategy such as distraction was found to be related to more negative changes such as diminished relationships, heightened awareness of physical limitations, and uncertainty in life

(Schroevers, Kraaij, & Amefski, 2011). It has also been found that survivors of testicular cancer who engage in avoidant coping strategies endorse more somatic and psychological symptoms than those that use an approach coping strategy (Rutskij et al., 2010). More negative expression or avoidant strategies were also associated with higher levels of grief in young adults dealing with an advanced stage of cancer (Trevino et al., 2013). Specifically among patients with lung cancer, studies have shown that coping styles can predict levels of psychological distress such as helplessness and hopelessness (Akechi et al., 1998), social withdrawal, depression and hope levels (Faller et al., 1995), and even survival rates (Faller et al., 1999). Overall, avoidant strategies are associated with poorer outcomes in all types of cancer related diagnoses.

Studies also suggest that, compared to avoidance coping, approach coping is associated with better outcomes in individuals with a variety of medical conditions, including lung cancer. Roesch and colleagues conducted multiple meta-analyses analyzing the associations among coping strategies and different illnesses such as diabetes (Duangdao & Roesch, 2008), prostate cancer (Roesch et al., 2005), and people coping with chronic illness (Roesch & Weiner, 2001). The results from these studies indicated that an approach coping method is associated with better psychological adjustment, whereas avoidant coping is associated with poorer psychological adjustment. In a review of these methods by Moskowitz et al. (2009), approach coping, overall, correlated with better outcomes, such as increased positive affect, better health behaviors, and better physical health. Alternatively, avoidance coping was related to poorer outcomes such as substance abuse, social isolation, and increased negative affect. With respect to coping with HIV, Moskowitz et al. (2009) found that approach coping is

correlated with higher levels of positive affect, better health behaviors, and better physical health, and avoidance coping is associated with the opposite effects. In addition, an approach oriented coping strategy in those diagnosed with lung cancer can lead to fewer depressive symptoms and an avoidant style can predict more severe depressive symptoms (Walker, Zona, & Fisher, 2006). Positive, approach-oriented coping strategies such as positive reframing and emotional approach coping are associated with a greater likelihood of lung cancer patients being able to identify benefits within their experience, such as posttraumatic growth and benefit finding (Thornton, et al., 2012). Examples of benefit finding would be finding greater spiritual meaning or deepening connections in interpersonal relationships due to the diagnosis. Identifying these benefits is in turn correlated with lower perceived cancer-related stress.

The bulk of research has shown that coping strategies, including avoidance and approach, can predict psychological adjustment, and more specifically that approach coping is associated with more positive outcomes whereas, avoidant coping is associated with more negative outcomes for patients confronting a terminal illness (Moskowitz et al., 2009). However, as stated above, there is a relative dearth of research examining whether approach or avoidance coping can explain, or mediate, the relationship between symptom burden and distress specifically among lung cancer patients (Moreno, Bauer, Jorge, Yanez, & Maggard-Gibbons, 2016). Much of the research has focused on describing the different types of coping strategies (Moreno, Bauer, Jorge, Yanez, & Maggard-Gibbons, 2016), analyzing the effect of coping strategies on social support or caregivers (Fletcher, Miaskowski, Given, & Schumacher, 2012; Islam et al., 2016; Schroevers, Kraaij, & Garnefski, 2011; Walker, Zona, & Fisher, 2006), and assessing

stigma in relation to lung cancer, such as how feelings of regret and stigmatization are associated with poor psychological outcomes (Criswell, Owen, Thornton, Stanton, 2015; Gonzalez & Jacobsen, 2012) for those with lung cancer. However, analysis specifically addressing the effect of avoidant versus approach coping strategies and how these strategies mediate the effect of distress on symptom burden lacking.

Hypothesis

Therefore, the authors of the current study aim to examine whether type of coping strategy (approach and avoidance) mediates the relationship between a patient's total symptom burden and distress in a sample of patients with lung cancer. Our hypothesis is that there will be a significant positive relationship between a patient's total symptom burden and distress, and that this relationship will be mediated by approach and avoidance coping. Essentially, as a participant's total symptom burden increases, so will his or her level of distress. Furthermore, approach coping will be associated with a lower level of distress and avoidance coping will be associated with a higher level of distress.

CHAPTER TWO

METHODS

Participants

Participants will include 109 adults (57% female) with a mean age of 67 (*SD* = 10.71). Of the participants, 82% were Caucasian, 7% Asian, 6% Hispanic, and 5% African American. A majority of the participants were married (65%), while 7% were single, 14% were divorced or separated, and 14% were widowed. The participants were all suffering from nonsmall cell or small cell lung cancer:15% were in stage one, 8% in stage two, 18% in stage three, and 31% in stage four; 28% were not sure of their stage of cancer.

Materials

Demographic Variables

Researchers asked patients to report their age, gender, ethnicity, marital status, education level, and stage of lung cancer.

Coping style

Participants' coping style was assessed by Carver et al.'s (1989) measure named COPE. This measure was developed to assess for the different ways that people respond to stress. The 60-item measure assesses a variety of coping styles and strategies. For this study, two COPE subscales were summed to create an approach-focused coping scale: coping through planning such as "I take additional action to try to get rid of the problem," and active coping efforts such as "I concentrate my efforts on doing something about it"

(four questions, $\alpha = 0.84$). The subscales of mental disengagement (e.g., "I turn to work or other substitute activities to take my mind of things"), behavioral disengagement (e.g., "I just give up trying to reach my goal"), and denial (e.g., "I say to myself 'this isn't real'") were combined to create an avoidant coping scale by summing all scores to create a total subscale score (12 items; $\alpha = 0.71$). All questions were rated on a Likert scale ranging from 1 ('I don't do this at all') to 4 ('I do this a lot'). These approach and avoidance coping subscales were constructed based on recommendations from previous studies (Criswell, Owen, Thornton, Stanton, 2015; Sanders et al., 2010; Thornton et al., 2012).

Distress

Distress was measured by one question referred to as "The Distress Thermometer" (DT). This item was created to asses for patients' level of distress experienced in the last week. Patients were instructed to "circle the number (0–10) that best describes how much distress [they] have been experiencing in the past week, including today." The DT was developed specifically for patients with cancer to quickly and easily screen for general distress (Schellekens et al., 2016), and it is notable for its sensitivity and ability to identify clinically significant distress levels (Roth et al., 1998).

Symptom Burden

The Memorial Symptom Assessment Scale – Short Form (MSAS-SF) was used to assess for patients' level of burden associated with lung cancer symptoms. The twelve symptoms that were assessed were pain, lack of energy, cough, dry mouth, nausea,

shortness of breath, lack of appetite, difficulty swallowing, dysgeusia, weight loss, constipation, and insomnia (Chang et al., 2000). A five-point Likert scale was used to assess for how much each symptom bothered the participant in the last week with scale anchors of zero for "no symptoms at all," and 4 for "almost constantly." In the present study, a total Symptom Burden score was created by using the twelve symptoms that assessed for the how much patients were bothered by present lung cancer symptoms. Patient's responses were summed across item ratings to create a total Symptom Bother score (Cronbach's $\alpha = 0.85$; Sanders et al., 2010). When used with cancer populations, the MSAS-SF shows good convergent validity (Chang et al., 2000).

Procedure

All participants were adult (over the age of 18) men and women diagnosed with primary carcinoma of the lung, specifically nonsmall cell and small cell lung cancer, and were recruited from either Loma Linda University Medical Center (LLUMC) or City of Hope (CoH). To be eligible, subjects had to be able to read and write in English, could not be suffering from a mesothelioma diagnosis, and had to feel well enough to take part in the study. In addition, CoH participants had to have received their diagnosis within six months prior to joining the study, although participants from LLUMC were not excluded based on time since diagnosis.

Each site engaged in different data collection procedures. Participants at LLUMC were recruited from the cancer registry and all patients diagnosed with lung cancer in the last 12 months were contacted via mailed pamphlets. After the pamphlets were mailed out, patients received a phone call assessing for interest in the study. If a patient was

interested, he or she was then mailed the questionnaire. Of those patients who received the mailed information pamphlet, approximately 40% were successfully contacted by a researcher. Sixty-three percent of those contacted by the researcher gave consent for participation in the study and 72% returned the questionnaire.

CoH patients were assessed for eligibility by the Project Coordinator (PC), clinic staff, and the attending physician prior to their clinic visit. After this initial screening, patients then met with the PC where the study was explained to them and consent was obtained. All CoH patients returned their completed questionnaires by mail. Of all the eligible patients, COH staff were able to contact 62% and obtain consent from 98.4% of those contacted. In addition, all of those who completed the questionnaire were compensated (CoH - $20 and LLUMC - $10). These recruitment procedures are the same as those presented in Sanders et al. (2010) and Criswell et al. (2016).

CHAPTER THREE

CONCLUSION

Results

Bivariate Pearson correlations were run to determine which demographic and medical characteristic variables (age, years of education, gender, and stage of cancer) would be included as covariates in a multiple mediation model. Years of education ($p >$ .05), gender ($p > .05$), and stage of cancer ($p >$.05) were not significantly associated with levels of distress; however, age ($r = -.230$, $p < .001$) was significantly inversely associated with levels of distress. Therefore, age was added as a covariate in the multiple mediation model.

Using bootstrapping to conduct a multiple mediation analysis, we tested whether total symptom burden would predict a participant's level of distress and whether this effect would be mediated by approach and/or avoidance coping strategies, while controlling for the effect of age on distress levels. The mediation model was significant, $F(4,182) = 44.72$, $R^2 = .48$, $p < .001$ (see Figure 1). The total effect of symptom burden on distress was significant, $t = 11.76$, $p <$ 001. The direct effect of total symptom burden on distress in the presence of the two mediators (approach and avoidance coping) was significant as well, ($c' = 2.17$, $p < .05$). However, the effect of age as a covariate was not statistically significant, ($p > .05$). There was a significant positive association between total symptom burden and avoidance coping ($a = 2.11$, $p < .001$), and a significant positive association between avoidance coping and distress ($p < .004$). Avoidance coping ($M = 20.43$, $SD = 5.26$) was a significant mediator of the relationship between symptom burden and distress, after controlling for the effects of age and approach coping. As total

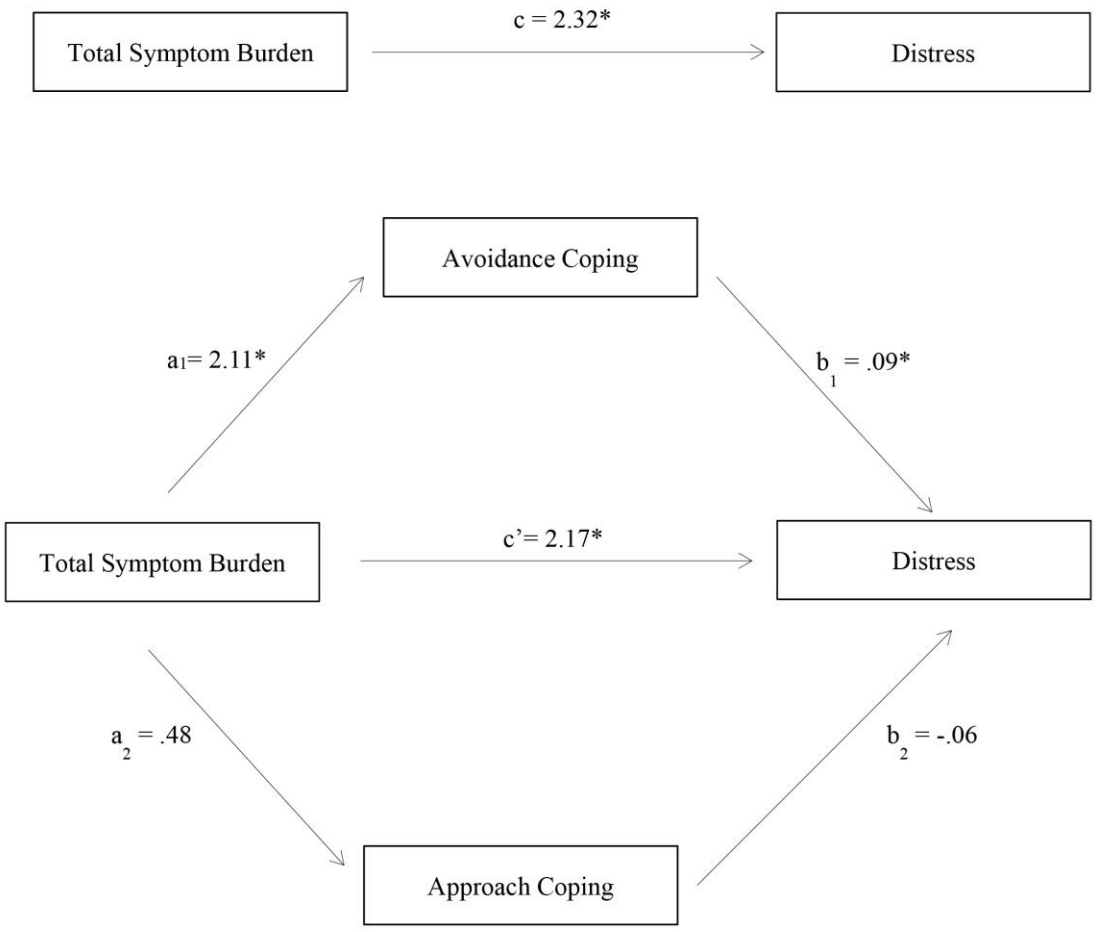

Figure 1. Results of analysis testing avoidance coping and approach coping as mediators of the relationship between total symptom burden and distress among patients with a diagnosis of lung cancer. (All effects are significant at $p < .05$.)

symptom burden increased by one point, distress increased by .182 points through the effect of avoidance coping (*ab* = .182, 95% CI [.067, .347], $p < .05$). In addition, avoidance coping was a significantly stronger mediator than approach coping (*b* = .2090, 95% CI [.070, .396], $p < .05$). Approach coping (*M* = 21.44, *SD* = 5.86) was not a significant mediator, $p < .001$ (see Table 1). More specifically, symptom burden did not significantly predict approach coping, and also did not predict distress, *p*s > .05. A post hoc power analysis was conducted using the software package GPower (Erdfelder, Faul,

& Buchner, 1996). The sample size of 109 was used for the statistical power analyses and a three predictor variable equation was used as a baseline. The recommended effect sizes used for this assessment were as follows: small (f^2 = .02), medium (f^2 = .15), and large (f^2 = .35). The alpha level used for this analysis was .05. The post hoc analyses revealed the statistical power for this study was .20 for detecting a small effect, whereas the power exceeded .93 for the detection of a moderate to large effect size. Thus, there was more than adequate power (i.e., power ≥ .80) at the moderate to large effect size level, but less than adequate statistical power at the small effect size level.

Table 1. Results of Multiple Mediation Analysis Predicting Distress from Total Symptom Burden

Mediated Effect	Point Estimate	SE	95% BCI
Total Indirect Effect	**.1558**	**.0637**	[**.0026, .3283**]
Avoidance Coping	**.1824**	**.0551**	[**.0671, .3476**]
Approach Coping	-.0266	.0532	[-.1437, .0290]
Contrast of avoidance versus approach	**.2090**	**.0876**	[**.0707, .3956**]

Note. Significant effects are in bold

Discussion

The goal of the current study was to examine whether the relationship between lung cancer patients' levels of distress and symptom burden was mediated by the use of coping strategies (approach and avoidance). As hypothesized, there was a significant

relationship between total symptom burden and distress: as a patient's total symptom burden increased so did his or her levels of distress. As hypothesized, avoidance coping was a significant mediator of the relationship between symptom burden and distress, in that participants' level of distress increased with their level of total symptom burden through avoidance coping. However, contrary to our hypothesis, approach coping did not significantly mediate the relationship between symptom burden and distress.

As mentioned above, a significant relationship between total symptom burden and distress was found. This confirms previous research that the greater symptom burden a patient experiences, the higher his or her levels of distress will be (Linden et al., 2012; Shellekens et al., 2016). As a result, it can be postulated that one's approach towards coping with symptom burden may influence distress. This has important implications for clinical application, specifically in a health related psychological practice, because clinicians and doctors can look at the reduction of symptom burden as a means for reducing distress when applicable.

Avoidance coping mediated the effect of symptom burden on distress, and was associated with a higher level of distress. More specifically, greater symptom burden was associated with greater avoidance coping, and greater avoidance coping was in turn associated with greater distress. This result suggests that, in coping with their diagnosis and its related symptom burden using avoidant strategies, lung cancer patients may experience more distress. This finding confirms previous research examining the effects of avoidance coping in the face of terminal illness and relates it specifically to those with lung cancer (Schroevers, Kraaij, & Amefski, 2011). Perhaps patients who deny their diagnosis or attempt to ignore symptoms end up feeling more stressed due to the

accumulation and severity of symptoms that they can no longer ignore. Essentially, they may have a harder time ignoring or denying their disease, thus creating more distress for themselves as their symptoms increase and their prognosis becomes worse. In addition, perceived loss of control when facing a terminal diagnosis could be compounded by an avoidant coping style, thus leading to higher levels of distress. This could be explained by the idea that denying the existence of their cancer diagnosis or attempting to ignore symptoms leads to less behavioral activation in regards to treatment, higher levels of intrusive thoughts (Bauer, Yanez, Jorge, & Maggard-Gibbons, 2016), more psychological symptoms (Rutskij et al., 2010), and overall poorer outcomes (Moskowitz et al., 2009; Roesch et al., 2005). The implications for this finding are important for developing effective treatment modalities for those with lung cancer, since coping strategies can predict quality of life more so than medical or other treatment factors, (Avis, Crawford, & Manuel, 2005; Lehto, Ojanen, & Kellokumpu-Lehtinen, 2005; Wenninger et al., 2013). Given this information, some ideas for future application include providing psychoeducation upon diagnosis, or shortly after, as to the long-term effects of avoidance on wellbeing.

The fact that approach coping did not significantly mediate the relationship between symptom burden and distress was surprising, given the amount of literature attesting to approach coping being associated with better outcomes (Duangdao & Roesch, 2008). The results of the current study suggest that symptom burden is not associated with approach coping. Therefore, symptom burden only predicts avoidance coping and not approach coping among lung cancer patients. Approaching the illness with coping through planning and other more active strategies does not seem to mitigate the stress that

a patient feels, but ignoring or denying the existence of lung cancer does appear to increase stress. Therefore, the results suggest that an approach coping strategy does not explain how symptom burden influences distress. Additionally, approach coping does not appear to affect the level of distress a person with lung cancer feels due to their burden of symptoms. This could be due to the idea that symptoms such as pain, coughing, lethargy, and invasive treatments exist regardless of the coping strategy that is employed, and therefore expecting approach coping to mediate the relationship between these symptoms and distress may be unrealistic. In addition, another potential explanation is that both coping through planning and active coping may not be effective strategies for those in later stages of cancer because of the severity of the disease and the poor prognosis at that point. Furthermore, patients may not believe these strategies to be useful due to the perceived hopelessness of their prognosis, in addition to the pain levels and fatigue they are experiencing. Correspondingly, it is possible that an approach coping strategy may take more physical effort on the part of the patient, causing him/her to feel overwhelmed and therefore inhibiting an approach strategy. This highlights the importance of a strong support system that includes both healthcare providers and caregivers. By educating members of these support systems on the importance and application of these coping strategies, more helpful and directed support could be provided for those suffering in later stages of lung cancer. In addition, an idea for future research would be to investigate more emotion based approach coping strategies to evaluate their impact on distress specifically for those in later stages.

Furthermore, another idea for future research would be to analyze the impact of diagnosis timing on effectiveness of coping strategies. Essentially, the idea would be to

assess the coping strategies that lung cancer patients use at a variety of time points following their diagnosis, and then evaluate if this timing will have any effect on the strength of impact coping strategies have on distress. In addition, it would be helpful to examine the data to assess for the presence and effect of different types of coping strategies at different time points. Examining different time points could be helpful in assessing for how patients generally tend to employ coping strategies and assess for their impact and those specific times. For example, approach coping could be more commonly utilized at the beginning stages when patients are beginning to understand the impact of their diagnosis and perhaps more likely to engage in more active coping strategies, whereas avoidance coping maybe more commonly utilized in later stages of lung cancer when patients are potentially greater severity of their symptoms and poorer prognosis. It may also be useful to test avoidance and approach coping as moderators of the relationship between symptom burden and distress, because the strength of the relationship between symptom burden and distress may depend on the use of approach versus avoidance coping.

The results of the current study should be interpreted in light of several limitations. First, there was a relative lack of diversity within the study sample. The participants of this study were primarily Caucasian and recruited from one geographic location. The lack of diversity within the population could affect the overall generalizability of the study. In addition, the cross-sectional design of this study only allows us to make inferences about association and not causation between symptom burden and distress and the corresponding mediators. Furthermore, the lack of a longitudinal design precludes drawing conclusions about the development and

application of coping strategies over time for those with lung cancer. In addition, coping strategies are often categorized as bidirectional (Lazarus & Folkman, 1984), and therefore this process of coping and outcomes my not be fully captured using a cross-sectional design. Additionally, given the power analysis, non-significant effects might be the result of Type II error due to low power for detecting a small effect. Furthermore, coping strategy subscales were grouped based on previous research of archived data and my not truly encapsulate the full range of approach or avoidance coping strategies. Another limitation is that all of the data were based on self-report measures, and using self-report measures introduces the possibility of response bias. It is also possible that there is a confounding variable that would explain the lack of effect of approach coping on distress, such as hopelessness or fatigue.

These findings suggest that coping strategies, specifically avoidance coping, can have a clinically significant influence on those diagnosed with lung cancer even in later stages. Because a lung cancer patient's level distress, choice of coping strategy, and overall emotional wellbeing can have such a significant impact on quality of life and medical outcomes, it is imperative to research this idea further. In addition, this study shows the power of avoidance coping even over the impact of approach coping, which is important when developing effective treatment modalities. Early identification of patients' preferred coping strategies by psychological screening or brief coping strategy surveys could help clinicians to identify patients with maladaptive coping strategies who could benefit from psychoeducation and social support. Identifying and treating such patient may improve their overall wellbeing and in the long run increase the effectiveness of medical treatments.

Overall, the findings from this study emphasize the importance of finding effective coping strategies to help those suffering with a lung cancer diagnosis. Additional studies are needed to replicate the findings of this study in a larger and more diverse sample, including continuing to assess how the adoption of an avoidance or approach coping style can affect emotional wellbeing, treatment outcomes, and overall quality of life for those with lung cancer. In addition, even though our findings regarding approach coping were contrary to our prediction, the findings still have clinical implications to aid clinicians when assessing helpful modalities to use for those with lung cancer. To know what does not work is just as important as knowing what does work. However, it is important to conduct additional research to replicate the current findings, to assess for why patients with lung cancer may be less likely to use approach coping, to determine whether lung cancer patients are more likely to use approach coping at different stages of their disease, and to identify any elements of approach coping that do have impact on emotional wellbeing in those with a lung cancer.

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