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Causal attribution among cancer survivors of the ten most common cancers

Leah M. Ferrucci¹, Brenda Cartmel², Yasemin E. Turkman¹, Maura E. Murphy¹, Tenbroeck Smith⁴, Kevin D. Stein⁴, and Ruth McCorkle¹

¹ Yale University School of Nursing, New Haven, Connecticut

² Yale School of Public Health, New Haven, Connecticut

⁴ Behavioral Research Center, American Cancer Society, Atlanta, Georgia

Abstract

In an attempt to understand and cope with their diagnosis, individuals with cancer may develop beliefs about the cause of their illness and these causal attributions may impact psychosocial adjustment. Connecticut participants (n=775) from the American Cancer Society's Study of Cancer Survivors-I completed a self-administered questionnaire assessing beliefs of the cause of their cancer and if they had contemplated the question "why me?" regarding their diagnosis. Written causal belief responses were coded into thematic categories and defined as either in (modifiable) or out (fixed) of an individual's control. Using logistic regression, we examined associations between sociodemographic, clinical, and psychosocial measures and identifying modifiable causal attributions, as well as contemplating "why me." Most cancer survivors (78.2%) identified one or more causes. Lifestyle and biological factors were most common, whereas psychological factors were least common, with some variation by cancer type. After multivariate adjustment, only cancer type was associated with identifying modifiable causes. Participants who contemplated "why me" (47.5%) were more likely to be younger and reported a greater number of cancer-related problems. In conclusion, the majority of cancer survivors reported specific causal attributions and many had contemplated "why me." Understanding and assessing causal attributions and more general existential questions regarding diagnosis could aid in our understanding of survivor's adjustment and psychosocial well-being. Additional research in large populations is also needed to determine if other characteristics are associated with identifying modifiable causal attributions and asking "why me".

Keywords

cancer; survivorship; attribution; causal beliefs; psychosocial

Introduction

With increased screening and advances in treatment, the number of individuals living in the United States who have experienced a cancer diagnosis is growing. In 2007, there were approximately 11.7 million cancer survivors in the United States making up close to 4% of the total population (Altekruse SF). While there are some known risk factors for particular

Corresponding Author and Reprint Requests: Leah M. Ferrucci Ph.D., Yale University, 55 Church Street, Suite 801, New Haven, CT 06510, Phone: 203-764-9083, Fax: 203-764-5824, leah.ferrucci@yale.edu.

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cancers, individuals diagnosed with cancer may develop theories about the cause of their illness that may or may not be based on scientific knowledge. This process, in which human beings create common sense theories or attribute causes to events in an attempt to understand or make sense of the world is described within psychology as attribution theory (Kelley & Michela, 1980). Causal attributions can be classified by locus (internal or external) and controllability or modifiability.

Causal attributions may impact cancer survivors' quality of life, psychosocial adjustment, and distress levels. Broadly, developing specific causal attributions may increase one's perception of control (Berckman & Austin, 1993), which could impact overall adjustment to a cancer diagnosis. More specifically, several studies have found that modifiable causal attributions are associated with positive affect or adjustment (Lowery, Jacobsen, & DuCette, 1993; Taylor, Lichtman, & Wood, 1984). However, the data are inconsistent, as some studies have found modifiable causes to be correlated with negative affect (Bennett, Compas, Beckjord, & Glinder, 2005; Glinder & Compas, 1999; Lowery et al., 1993; Stewart, Cheung et al., 2001), while others have not observed an association (Gotay, 1985; Lavery & Clarke, 1996; Timko & Janoff-Bulman, 1985).

Beyond, causal attributions potentially affecting psychosocial well-being, some research suggests that individuals who perceive the cause of their cancer as within their control are more likely to change the behaviors they believe contributed to their disease (Costanzo, Lutgendorf, Bradley, Rose, & Anderson, 2005; Rabin & Pinto, 2006). A willingness to alter the behaviors one relates to disease has also been observed among family members of cancer survivors (Lemon, Zapka, & Clemow, 2004; Rabin & Pinto, 2006). Therefore, understanding more about which cancer survivors identify modifiable causal attributions for their disease could be relevant to the success of health promotion interventions, as cancer risk factors may be related to survival and prognosis.

The vast majority of research describing causal attribution and cancer has focused on breast (Arman, Backman, Carlsson, & Hamrin, 2006; Baider & Sarell, 1983; Bennett et al., 2005; Friedman et al., 2007; Glinder & Compas, 1999; Gotay, 1985; Houldin, Jacobsen, & Lowery, 1996; Kulik & Kronfeld, 2005; Lavery & Clarke, 1996; Lowery et al., 1993; Oba et al., 2009; Rabin & Pinto, 2006; Stewart, Cheung et al., 2001; Taylor et al., 1984; Timko & Janoff-Bulman, 1985) or lung (Berckman & Austin, 1993; Faller, Schilling, & Lang, 1995; Mumma & McCorkle, 1982; Salander, 2007) cancer survivors, with participants identifying a wide range of causes for their illness including stress, heredity, and smoking. However, with the exception of two population-based investigations of cancer survivors of various cancers (Lykins et al., 2008; Wold, Byers, Crane, & Ahnen, 2005), the existing studies have been limited by small samples sizes, often with convenience sampling. In addition, there is little information on how causal attribution may vary by cancer type, conflicting evidence on the association between modifiable causal attributions and survivors' psychosocial adjustment, and limited research on other characteristics of individuals who attribute to their cancer to modifiable causes or ask more general existential questions about their diagnosis. Therefore, we evaluated causal attributions among a diverse population-based sample of cancer survivors of the ten most common cancers from Connecticut (n=755) who participated in the American Cancer Society's Study of Cancer Survivors I (SCS-I). We examined a wide range of sociodemographic, clinical, and psychosocial correlates of attributing cancer to modifiable causes, as well as contemplating the more general existential question "why me" with regard to their cancer diagnosis.

Materials and Methods

Study Population

Subject for this analysis were Connecticut cancer survivors who participated in the American Cancer Society's SCS-I. SCS-I is a national, prospective study of quality of life among cancer survivors of one of the ten most common cancers in the United States. Population-based samples of survivors of bladder, colorectal, female breast, kidney, lung, non-Hodgkin's lymphoma (NHL), ovarian, prostate, skin melanoma, and uterine cancer were identified through 11 state cancer registry databases. Survivor inclusion criteria were: 1) diagnosis of one of the above cancers; 2) ≥ 18 years at time of diagnosis; 3) residence in the state from which they were sampled at the time of diagnosis; and, 4) ability to read/write English or Spanish. Stratified sampling was conducted by cancer type, age (<55, 55+), and ethnicity (in some states, but not Connecticut). The sampling and recruitment procedures, identification and selection of cases, and physician notification and consent are described elsewhere (Smith et al., 2007; Stein et al., 2006). All participants in SCS-I completed the self-administered National Quality of Life Survey (NQLS) questionnaire at baseline.

This analysis is restricted to SCS-I participants recruited in Connecticut who completed the NQLS questionnaire and Connecticut insert (2 page questionnaire pertaining to use of dietary supplements reported on previously (Ferrucci, McCorkle, Smith, Stein, & Cartmel, 2009) and causal attribution). The Connecticut insert was included in the NQLS and mailed only to Connecticut participants by researchers at Yale University. The Institutional Review Board (IRB) of Emory University and IRBs in each participating state approved SCS-I. In Connecticut, SCS-I was approved by the Connecticut Department of Public Health Human Investigation Committee and the individual hospital IRBs. All participated were consented into the study.

Assessment of Causal Attribution

Causal attribution was assessed among participants via two questions on the Connecticut insert. Participants were characterized as contemplators or non-contemplators based on their responses to the yes/no question: "Have you ever thought 'Why me?,' and specific causal attributions were based on responses to the open-ended question: "Why do you think you got your cancer?" Participants' written responses were coded independently by two authors (BC or RM or MM or YT) based on a list of 30 causal attributions (including "don't know") derived from the literature (Table I). If a response included multiple causal attributions, a separate code was assigned to each reason. The independent coding schemes were compared and any discrepancies (95% agreement) were evaluated by a third author to achieve consensus. Each causal attribution was categorized as being either internal (e.g. diet) or external (e.g. environmental exposure) to the individual, as well as in (modifiable) or out (fixed) of an individual's control; smoking is an example of an attribution within an individual's control, while family history is a fixed attribution, not within the individual's control. Responses other than "don't know" were condensed into 9 broader categories based on the causal attribution literature: lifestyle, biological, environmental, smoking, chance/luck, stress, existential, prior health condition, and psychological.

Demographic, Psychosocial, and Clinical Data

Demographic (e.g. age, gender, education, marital status, income, insurance status, race/ethnicity) and clinical information (e.g. comorbidities, cancer type, stage, treatment status, additional cancer) was collected via the NQLS, as well as cancer registry records. We also utilized several psychosocial self-report measures included in the NQLS. These included the: general health subscale from the SF-36 Health Survey (SF-36[®]), a widely used 36-item measure of physical and mental health status (Ware & Sherbourne, 1992), as well as the

Satisfaction with Life Domains Scale for Cancer (SLDS-C), which assesses the subjective quality of life of cancer survivors in 17 areas of life using seven faces (three smiling, one neutral, and three frowning) (F. Baker, Curbow, & Wingard, 1992). We also evaluated scores from the 12-item Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp12) that contains questions related to meaning, peace, and faith (Peterman, Fitchett, Brady, Hernandez, & Cella, 2002) and the 37 item Profile of Mood States Short Form (POMS-SF), which assesses one's affective state for a total mood disturbance score, as well as six factor based subscales: Tension–Anxiety, Depression–Dejection, Anger–Hostility, Fatigue–Inertia, Vigor–Activity, and Confusion–Bewilderment (F. Baker, Denniston, Zabora, Polland, & Dudley, 2002; Shacham, 1983). Finally, participants also completed the 31 item (29 original, 2 new) Cancer Problems in Living Scale Modified (CPILS-M), an inventory of problems commonly faced by cancer survivors using a three point Likert scale (0=not a problem, 1=somewhat of a problem, 2=a severe problem) (F. Baker, Denniston, Zabora, & Marcellus, 2003). The CPILS-M contains four factor based subscales: physical distress, emotional distress, employment and financial problems, and fear of recurrence (Zhao, Portier, Stein, Baker, & Smith, 2009).

Statistical Analysis

Simple descriptive statistics were used to characterize the population and determine the most common causal attributions for the total population and by cancer type. Restricting our sample to those survivors who identified only modifiable or only fixed causal attributions (i.e. excluding participants who listed both modifiable and fixed causes), we assessed the unadjusted association (χ^2 test for categorical variables, F-test for continuous variables) between demographic, clinical, quality of life, and psychosocial characteristics and identifying modifiable causal attributions. We evaluated potential differences by these same characteristics among individuals who had and had not contemplated “Why me?.” Multivariate logistic regression was performed to determine the independent effect of variables that were significant in the unadjusted associations. Using backward elimination, the significant characteristics were placed in the model and removed one at a time to derive the most parsimonious model. To ensure that there was no negative confounding or other significant characteristics, other non-significant variables were placed into the adjusted model one at a time. Variables significant at the 0.05 level were retained in the final multivariate models. All analyses were performed using SAS, Version 9.1.3 (SAS, Cary, NC).

Results

Of the 1,013 SCS-I Connecticut participants, 855 (84.4%) returned both questionnaires. Approximately 90% of the 855 cancer survivors provided a qualitative response to the open-ended causal attribution question, leaving us with an analytic population of 775. Just under two-thirds (61.8%) of the 775 cancer survivors were female (61.8%) and over half (56.4%) were 55 years of age or older (Table II). The population was predominantly white (88.8%) and married or in a marriage-like relationship (71.7%). The most common cancer diagnosis was breast (29.9%), followed by prostate (17.7%) then colorectal (14.6%). The mean time between cancer diagnosis and questionnaire completion was 18.8 months (standard deviation=4.1). Just over three-quarters of the participants (n=606, 78.2%) provided a specific causal attribution for why they thought they got their cancer. The remaining 169 participants (21.8%) only provided the reason “don’t know.” In addition, of the 606 who identified a specific reason, 68 participants also listed “don’t know.”

Among the 606 survivors, who identified specific causal attributions, the three most common broad category causal attributions were lifestyle (n=234, 38.6%), biological (n=214, 35.3%), and environmental (n=145, 23.9%) factors (Table II). The leading lifestyle

attributions identified by participants were hormone use (i.e. menopausal hormone therapy, oral contraceptives) (n=72), diet (n=53), and general lifestyle factors (n=41). Among participants who identified biological factors, the vast majority (n=189) listed heredity/genetics as a cause of their cancer. The most common reasons cited within the environmental category were general environment (n=50), toxins (n=41), and occupational hazards (n=29).

We examined variation in attributions across cancer type looking at the five most common cancers (breast, prostate, colorectal, lung, and NHL) and other cancers combined (the five less prevalent cancer types: bladder, uterine, skin, melanoma, ovarian, kidney) (Table III). Both breast cancer survivors and survivors of the less prevalent cancers attributed their illness most often to lifestyle, biological, and environmental factors. Prostate and colorectal cancer survivors were most likely to list biological reasons, while lung and NHL cancer survivors most often ascribed smoking and environmental factors, respectively, as the cause of their cancer.

We identified 187 individuals who listed only modifiable causal attributions and 268 who listed causal attributions only out of their control. Among these 455 cancer survivors, only age and cancer type were associated with identifying modifiable causal attributions in univariate analyses (Table IV). With multivariate modeling, only cancer type remained statistically significant ($p < 0.001$). Compared to breast cancer survivors, lung (OR=4.49, 95% CI=2.23–9.04) and melanoma (OR=3.11, 95% CI= 1.14–8.47) cancer survivors were 3 to 4 times more likely to identify modifiable causes. Kidney (OR=0.10, 95% CI=0.01–0.82), prostate (OR=0.31, 95% CI=0.16–0.60), NHL (OR=0.40, 95% CI=0.18–0.88), and colorectal (OR=0.45, 95% CI=0.23–0.90) cancer survivors were less likely than breast cancer survivors to identify causal attributions within their control.

Just under half of the 775 participants (n=368, 47.5%) were categorized as contemplators based on a positive response to “Have you ever thought ‘Why me?’”. In univariate analyses, age and all of the psychosocial measures were associated with being a contemplator (Table V). In the multivariate model, age and total CPILS-M scores remained statistically significant. Cancer survivors who had thought “why me” were less likely to be over age 55 (OR=0.57, 95% CI=0.42–0.79, p -value $= < 0.001$) and had higher scores on the CPILS-M (OR=1.05, 95% CI=1.03–1.06, p -value $= < 0.001$). Contemplators in our population were more likely to experience problems across all four factors of the CPILS-M (physical distress, emotional distress, employment and financial problems, and fear of recurrence) than non-contemplators (data not shown).

Discussion

In this population-based study of cancer survivors, the vast majority of participants identified specific causal attributions for their illness. Overall, the most common causal attributions were lifestyle (modifiable), biological (fixed), and environmental (fixed) factors, indicating many survivors identified causal attributions out of their control. We observed variation in causal attributions by cancer type. In our analysis of potential correlates of identifying modifiable causal attributions over non-modifiable reasons, there was an association with cancer type, but not with any of the other sociodemographic, clinical, or psychosocial measures. Finally, we observed that cancer survivors who had thought about the more general existential question of “why me” with regard to their cancer diagnosis were more likely to be under age 55 and experienced more cancer-related problems on the CPILS-M.

This is the largest investigation of causal attribution among cancer survivors and included individuals with several previously unstudied malignancies. However, other than cancer type, we did not identify clear correlates of making modifiable causal attributions. Thus far, few studies have investigated causal attribution in population-based samples (Lykins et al., 2008; Wold et al., 2005) and most research has focused on breast (Arman et al., 2006; Baider & Sarell, 1983; Bennett et al., 2005; Friedman et al., 2007; Glinder & Compas, 1999; Gotay, 1985; Houldin et al., 1996; Kulik & Kronfeld, 2005; Lavery & Clarke, 1996; Lowery et al., 1993; Oba et al., 2009; Rabin & Pinto, 2006; Stewart, Cheung et al., 2001; Taylor et al., 1984; Timko & Janoff-Bulman, 1985) and lung cancer survivors (Berckman & Austin, 1993; Faller et al., 1995; Mumma & McCorkle, 1982; Salander, 2007), with only a few studies among survivors of gynecological (Costanzo et al., 2005; Gotay, 1985; Stewart, Duff, Wong, Melancon, & Cheung, 2001) and childhood (Frank, Blount, & Brown, 1997) cancers, as well as some small studies of patients with a range of cancers (Linn, Linn, & Stein, 1982; Malcarne, Compas, Epping-Jordan, & Howell, 1995; Maskarinec, Gotay, Tatsumura, Shumay, & Kakai, 2001; Risberg, Wist, & Bremnes, 1998). Other research has assessed causal attribution and cancer in disease free populations, (Aiken, Fenaughty, West, Johnson, & Luckett, 1995; Blalock, DeVellis, Afifi, & Sandler, 1990; Breslow, Sorkin, Frey, & Kessler, 1997; Buxton et al., 2003; Darrow, Schoenfeld, Cummings, Wilkes, & Madoff, 1987; Greiner, Born, Nollen, & Ahluwalia, 2005; Kwate, Thompson, Valdimarsdottir, & Bovbjerg, 2005; Lipkus, Biradavolu, Fenn, Keller, & Rimer, 2001; Lipkus et al., 1996; McCaffery, Wardle, & Waller, 2003; Parrott, Silk, & Condit, 2003; Robb, Miles, & Wardle, 2007; Sanderson, Waller, Jarvis, Humphries, & Wardle, 2009; Shokar, Vernon, & Weller, 2005; Wang, Miller, Egleston, Hay, & Weinberg, 2009; Wardle, Waller, Brunswick, & Jarvis, 2001), yet it is important to distinguish between the type of population, as there is some evidence that the causal reasons an individual reports differs by one's family or personal history of cancer (Lykins et al., 2008).

While cancer survivors in our study did identify some factors, such as aging, heredity/genetics, diet, and lifestyle, that are hypothesized to be involved in some cancers, they also identified causes that are likely to have much smaller roles in carcinogenesis, such as oral contraceptives, environmental pollution/toxins, stress, and prior health conditions. Other population-based studies of causal attribution have also found that beliefs held by cancer survivors about the causes of their cancer differ from current scientific knowledge (Lykins et al., 2008; Wold et al., 2005).

Comparing our results to other studies, heredity/genetics has been a common attribution in multiple populations (Maskarinec et al., 2001; Risberg et al., 1998; Stewart, Cheung et al., 2001; Stewart, Duff et al., 2001; Taylor et al., 1984; Wold et al., 2005). Other studies of cancers survivors have also identified stress as a common attribution (Arman et al., 2006; Maskarinec et al., 2001; Oba et al., 2009; Stewart, Cheung et al., 2001; Stewart, Duff et al., 2001; Taylor et al., 1984; Wold et al., 2005), yet only 10% of our population cited this reason. This may reflect how responses may differ based on the way in which causal attributions are queried (open-ended question versus list). Smoking was most commonly cited by lung cancer survivors in our sample, yet smoking was also a reason given by survivors of other cancer types, a finding similar to several other studies (Linn et al., 1982; Wold et al., 2005). Survivors of lung, bladder, and skin melanoma cancers were most likely to attribute their cancers to modifiable factors, which is not surprising since there are well known modifiable risk factors for these cancer (smoking for bladder and lung, skin protection for melanoma).

Other than cancer type, we did not find any clear sociodemographic or clinical predictors for identifying modifiable causal attributions. It is important for additional studies to investigate if particular characteristics are associated with theorizing modifiable causes for cancer, as

some research suggests individuals who identify behaviors within their control as the cause of their disease may be more likely to change those behaviors (Costanzo et al., 2005; Rabin & Pinto, 2006). Beyond the cancer survivors themselves, there is also some evidence that family members of cancer survivors may also alter behaviors if they believe a behavior to be cause of their family member's illness (Lemon et al., 2004; Rabin & Pinto, 2006).

Assessing, causal attribution among cancer survivors in a clinical or research setting could help identify individuals willing to engage in health promotion activities, especially if the interventions target behaviors the survivors believe are related to their diagnosis.

Importantly, the behaviors survivors believe cause their cancer may also be important for survival and prognosis.

Similar to several other investigations, we did not observe an association between identifying modifiable causal attributions and psychosocial well-being (Gotay, 1985; Lavery & Clarke, 1996; Timko & Janoff-Bulman, 1985). However, the evidence is not consistent as several studies have found positive associations between modifiable causal attributions and positive affect or adjustment (Lowery et al., 1993; Taylor et al., 1984), while other investigations have observed modifiable causes to be correlated with negative affect (Bennett et al., 2005; Glinder & Compas, 1999; Lowery et al., 1993; Malcarne et al., 1995; Stewart, Cheung et al., 2001). In addition, a study that focused on self-blame found that those who blamed themselves for their breast cancer, identifying such causes as lack of exercise, difficult coping with stress, and not eating right, had higher mood disturbance and poorer quality of life (Friedman et al., 2007). The current discrepancies regarding the potential association between identifying modifiable causal attribution and psychosocial adjustment could be due to differences in the study populations (cancer type, time since diagnosis, convenience versus population based), as well as how both casual attribution and psychosocial well-being were assessed.

Few studies have assessed the broader existential question of "why me" (Gotay, 1985; Mumma & McCorkle, 1982); however, our finding of a greater number of problems related to living with cancer among contemplators may support some findings that forming any attribution is related to poorer psychological adjustment (Costanzo et al., 2005; Glinder & Compas, 1999; Kulik & Kronfeld, 2005; Taylor et al., 1984). While not the focus of this investigation, in this population those who stated a specific attribution regarding their cancer diagnosis compared to those who stated "don't know," were more likely to have poorer overall spiritual well-being as measured by the FACIT-Sp (OR=0.98, 95% CI = 0.96–0.99, p-value=0.02; data now shown) in the most parsimonious model controlling only for cancer type. Individuals who thought "why me" were more likely to be less than age 55 at diagnosis. Since most cancers are less common in younger people, these individuals may have been struggling more with the illness's impact on their lives and may have been more likely to be searching for an explanation. Other research suggests that younger cancer survivors experience greater distress compared to their older counterparts (Hoffman, McCarthy, Recklitis, & Ng, 2009; Zabora, BrintzenhofeSzoc, Curbow, Hooker, & Piantadosi, 2001).

Our study had several strengths including the large population-based sample size, extensive sociodemographic, clinical, and psychosocial measures, as well as the wide range of cancer diagnoses, many of which have not been previously investigated in relation to causal attribution. We were also able to evaluate both qualitative responses regarding causal attribution to capture all potential reasons theorized by participants and included a more general existential question of why me. However, this investigation is limited in some ways. Although the majority of SCS-I Connecticut participants completed the insert pertaining to causal attribution, the participation rate for SCS-I in Connecticut was 42.9%, while not ideal the overall response rates for SCS-I were comparable to other national surveys (Smith et al.,

2007). There is the possibility that those cancer survivors who participated in the study may have been differed from those who did not. Our population was predominantly white and highly educated; therefore, our results may not be generalizable to other cancer survivors. Another potential limitation is if participants had more than one primary cancer, they may have been reporting attributions for a type of cancer other than the cancer type identified for enrollment. However, only 8% of participants reported more than one cancer (including metastases) in the two years prior to enrollment and these diagnoses were not registry confirmed. In addition, causal attribution was assessed at the same time as the other characteristics, so we are unable to examine order of causation with regard to the psychosocial variables. Finally, while our question of “why me” did not explicitly state it was in relation to the cancer diagnosis, participants completed this within the context of a an extensive questionnaire relating specifically to their cancer. If future research were to investigate this question, the question may need to be framed in relation to the cancer depending on the context of the rest of the data collection.

In conclusion, we observed that in this population, cancer survivors commonly made specific causal attributions and many individuals had contemplated “why me.” Only cancer type was associated with modifiable causal attributions, while individuals who contemplated “why me” were more likely to be less than 55 years of age and experience more problems related to living with cancer. Interestingly, many of the reasons participants identified are not known risk factors for their cancers, an area that might be addressed by cancer prevention interventions. Further research in large populations is needed to determine if other characteristics are associated with identifying modifiable causal attributions and asking “why me”.

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Table I

Specific and broad causal attributions for coding qualitative responses to “Why do you think you got your cancer?” Each attribution is categorized as internal or external and within or out of an individual’s control

Broad Category	Individual Attribution Reasons	Internal or External	In or Out of Individual’s Control
Lifestyle	Alcohol/Tobacco Delay in healthcare Diet Use of hormones Lifestyle Reproductive history Harmful behavior Sun exposure	Internal	In
Biological	Aging Heredity/Genetics	Internal	Out
Environmental	Air pollution Asbestos Environment Household chemicals Occupational hazards Second-hand smoke Toxins	External	Out
Smoking	Smoking	Internal	In
Chance/Luck	Change/Luck	External	Out
Stress	Stress	Internal	In
Existential	God Predetermination Why not	External	Out
Prior health condition	Infection Previous medical condition Trauma/Injury	External	Out
Psychological	Character blame Deservedness Personality	Internal	Out

Table II

Sociodemographic characteristics of the Connecticut SCS-I participants (n=775)

Characteristic	n ^a (%)
Gender	
Male	296 (38.2)
Female	479 (61.8)
Age	
Less than 55	338 (43.6)
55 and over	437 (56.4)
Race/ethnicity	
White	688 (88.8)
Non-white	87 (11.2)
Marital Status	
Married/marriage-like	553 (71.7)
Divorced or separated	101 (13.1)
Widowed	62 (8.0)
Single	55 (7.1)
Education	
High school diploma or GED or less	240 (31.5)
Vocational school/some college	169 (22.2)
At least college degree	352 (46.3)
Income	
\$0–\$39,999	201 (30.8)
\$40,000 – \$74,999	194 (29.8)
\$75,000 or more	257 (39.4)
Cancer Site	
Breast	232 (29.9)
Prostate	137 (17.7)
Colorectal	113 (14.6)
Non-Hodgkin's Lymphoma	68 (8.8)
Lung	85 (11.0)
Uterine	32 (4.1)
Melanoma of skin	32 (4.1)
Ovarian	26 (3.4)
Bladder	23 (3.0)
Kidney	27 (3.5)
Broad Casual Attribution	
Cited a Specific Reason(s)	606 (78.2)
Don't Know Only	169 (21.8)
Specific Casual Attributions	
Lifestyle ^b	234 (38.6)
Biological ^b	214 (35.3)

Characteristic	n ^a (%)
Environmental ^b	145 (23.9)
Smoking ^b	80 (13.2)
Chance/Luck ^b	69 (11.4)
Stress ^b	66 (10.9)
Existential ^b	52 (8.6)
Prior Health Condition ^b	33 (5.4)
Psychological ^b	14 (2.3)

^aNumbers may not sum to total due to missing data.

^bPercentage calculated among those who identified a specific causal attribution (n=606). Participants could cite multiple reasons.

Specific causal attributions percentages by cancer type (n=606)

Reason	Cancer Type											
	Breast Cancer (n=189)		Prostate Cancer (n=101)		Colorectal Cancer (n=77)		Lung Cancer (n=76)		NHL (n=52)		Other ^a Cancers (n=111)	
	%	%	%	%	%	%	%	%	%	%	%	%
Lifestyle	60.8	18.8		37.7		10.5		21.2		46.8		
Biological	37.6	43.6		48.1		15.8		21.2		35.1		
Environmental	22.8	21.8		13.0		23.7		53.8		21.6		
Stress	14.3	7.9		6.5		10.5		13.5		9.9		
Existential	10.1	10.9		7.8		1.3		11.5		8.1		
Chance/Luck	6.9	23.8		15.6		2.6		13.5		9.9		
Prior Health Condition	3.7	4.0		6.5		0.0		15.4		8.1		
Psychological	3.2	1.0		1.3		2.6		1.9		2.7		
Smoking	1.6	1.0		6.5		76.3		5.8		9.0		

^aIncludes the five less prevalent cancer types in the population: bladder, uterine, melanoma, ovarian, and kidney.

Table IV

Univariate associations between sociodemographic, clinical, and psychosocial characteristics and having attribution reason classified as within one's control (n=455)

Characteristic	N	% In Control	p- value
Gender			0.153
Male	166	36.8	
Female	289	43.6	
Age			0.026
Less than 55	206	35.4	
55 and over	249	45.8	
Race/ethnicity			0.911
White	403	41.2	
Non-white	52	40.4	
Marital Status			0.119
Married/marriage-like	312	38.1	
Divorced or separated	71	50.7	
Widowed	33	39.4	
Single	36	52.8	
Education			0.640
High school diploma or GED or less	140	44.3	
Vocational school/some college	106	39.6	
At least college degree	200	39.5	
Income			0.993
\$0– \$39,999	119	42.0	
\$40,000 – \$74,999	124	41.9	
\$75,000 or more	145	41.4	
Cancer Site			<0.001
Breast	139	44.6	
Prostate	75	20.0	
Colorectal	56	26.8	
Non-Hodgkin's Lymphoma	41	24.4	
Lung	60	78.3	
Uterine	16	50.0	
Melanoma of skin	21	71.4	
Ovarian	21	28.6	
Bladder	13	61.5	
Kidney	13	7.7	
Time since cancer diagnosis			0.315
< 12 months	24	54.2	
12–23 months	387	39.8	
≥ 24 months	44	45.5	
Cancer stage			0.156

Characteristic	N	% In Control	p- value
<i>In situ</i> or localized	242	39.3	0.705
Regional	114	48.3	
Distant, recurrence, or metastasis	89	35.0	
Received treatment for most recent cancer			0.679
Yes	447	41.4	
No	7	28.6	
Non-cancer comorbidities being treated			0.618
0	201	41.8	
1	130	43.2	
≥ 2	124	37.9	0.308
Have you ever thought "Why me?"			
Yes	204	42.4	
No	246	39.8	0.503
General health rating			
Excellent	42	40.5	
Very good	164	42.1	
Good	168	39.3	
Fair	68	48.5	
Poor	12	16.7	
	In Control	Out Control	p-value
SLDS, Mean ± SD	91.7 ± 17.4	92.9 ± 16.5	0.503
FACIT-Sp, Mean ± SD	33.8 ± 8.9	33.7 ± 9.3	0.949
POMS-SF, Mean ± SD	11.4 ± 23.3	12.3 ± 23.4	0.700
CPILS-M, Mean ± SD	11.6 ± 10.0	11.5 ± 9.4	0.913

Table V

Univariate associations between sociodemographic, clinical, and psychosocial characteristics and contemplating “Why me?” (n=769)

Characteristic	N	% Contemplators	p- value
Gender			0.40
Male	294	45.9	
Female	475	49.1	
Age			<0.001
Less than 55	336	58.0	
55 and over	433	40.0	
Race/ethnicity			0.005
White	682	46.0	
Non-white	87	62.1	
Marital Status			0.26
Married/marriage-like	551	49.2	
Divorced or separated	100	51.0	
Widowed	60	38.3	
Single	54	40.7	
Education			0.61
High school diploma or GED or less	237	50.2	
Vocational school/some college	168	49.4	
At least college degree	350	46.3	
Income			0.40
\$0– \$39,999	197	45.2	
\$40,000 – \$74,999	193	44.0	
\$75,000 or more	256	50.0	
Cancer Site			0.76
Breast	230	50.0	
Prostate	137	42.3	
Colorectal	112	50.0	
Non-Hodgkin’s Lymphoma	67	53.7	
Lung	84	44.1	
Uterine	32	46.9	
Melanoma of skin	32	50.0	
Ovarian	25	48.0	
Bladder	23	56.5	
Kidney	27	37.0	
Time since cancer diagnosis			0.45
< 12 months	47	53.2	
12–23 months	657	48.1	
≥ 24 months	65	41.5	
Cancer stage			0.07

Characteristic	N	% Contemplators	p- value
<i>In situ</i> or localized	429	44.5	0.94
Regional	202	54.0	
Distant, recurrence, or metastasis	127	50.4	
Received treatment for most recent cancer			0.20
Yes	751	47.9	
No	17	47.1	
Non-cancer comorbidities being treated			0.43
0	335	49.3	
1	228	43.0	
≥ 2	206	51.0	
General health rating			0.43
Excellent	79	44.3	
Very good	281	45.9	
Good	284	48.9	
Fair	108	49.1	
Poor	16	68.5	
	Contemplators	Non-contemplators	p-value
SLDS, Mean ± SD	91.0 ± 17.5	95.3 ± 15.3	0.002
FACIT-Sp, Mean ± SD	33.0 ± 9.3	34.7 ± 9.0	0.012
POMS-SF, Mean ± SD	14.4 ± 24.9	8.1 ± 21.1	<0.001
CPILS-M, Mean ± SD	13.4 ± 9.6	9.3 ± 8.6	<0.001