Making the Transition: Comparing the Use of Narrative and Non-Narrative Messages to Increase Fruit and Vegetable Intake in Cancer Survivors

THESIS

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Abstract

More cancer survivors than ever before are living five years or longer past their initial diagnosis. Cancer and its treatment are often not the end of chronic health issues among survivors. The comorbidity of interest in this study is obesity. Cancer survivors often gain weight during treatment, and rarely return to their pre-treatment weight. The purpose of this study to explore how to best frame nutrition messages for cancer survivors, which may help to reduce obesity and ultimately improve the quality of life among survivors. Utilizing the Integrated Model of Behavioral Prediction (IMBP), it was predicted that messages would predict attitudes, norms, and perceived behavioral control, which would in turn predict fruit and vegetable intentions. A mixed methods design was used to test the effectiveness of two message formats, narrative and non-narrative. Messages were pre-tested among (N = 10) cancer survivors using semi-structured interviews. The message pre-test revealed that both narrative and non-narrative formats were equivalent in content. The main study utilized an experimental design whereby (N=211) saw either the experimental (narrative) or control (non-narrative) message on fruit and vegetable consumption. Results indicated no significant differences between condition. Of the determinants of intention in the IMBP, only perceived behavioral control predicted fruit and vegetable intentions at follow-up. Future research in this area should consider tailoring narrative formats, and focus on the multifaceted nature of energy balance
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Chapter 1: Introduction

There were an estimated 1.6 million new cancer cases in 2015 (American Cancer Society, 2015) and, as of 2014, an estimated 12 million cancer survivors living in the United States (Department of Health and Human Services, 2016). More people than ever before are surviving five years or longer past their initial diagnosis (Institute of Medicine, 2006), meaning that cancer and its treatment are often not the end of chronic health issues among survivors. The vast majority of survivors experience at least one comorbidity unrelated to cancer that can impact treatment, survival, and the later effects of cancer (Institute of Medicine, 2006). Obesity is the comorbidity of interest in this study as it may increase a survivor’s risk of death from all types of cancer (Patlak, Nass, 2012), and it is linked to a variety of comorbidities that are common during survivorship (Irwin, 2010). Furthermore, Survivors are at an increased risk of recurrent cancer and secondary cancers (Demark Wahnefried, et al., 2007) as well as cardiovascular disease (Sprujit-Metz, Nguyen-Rodriguez, Davis, 2010).

In order to improve the overall quality of life of cancer survivors, reduce the number of survivor deaths caused by comorbidities and recurrent cancers, and manage the side effects of treatment several health institutions have issued reports outlining guidelines of best practice for survivorship care. The Centers for Disease Control outlined a national action plan for survivorship care (2004). Additionally, in 2006 the Institute of Medicine released a groundbreaking report outlining ten recommendations for
survivorship care and treatment for practitioners and policy makers, which has acted as an invaluable tool for those dealing with survivorship on a personal or professional level (Institute of Medicine, 2006). The nutritional component of survivorship was specifically highlighted at an American College of Sports Medicine roundtable on survivorship diet and exercise (Schmidt et al., 2010) and, as of 2014, the American College of Surgeons has required that all certified hospitals offer a survivorship care plan to all survivors after they have finished treatment (Patlak, Nass, 2012). Despite these efforts, a great deal of work still needs to be done to meet survivorship specific objectives outlined in Healthy People 2020, which outlines the Nation’s health agenda. These goals include improving quality of life for survivors, and increasing the total number of survivors that live five years past their diagnosis (Department of Health and Human Services, 2015).

The purpose of this study is to explore how to best frame nutrition messages for cancer survivors, which may help to reduce obesity and ultimately improve the quality of life among survivors. Specifically, narrative as a tool for increasing fruit and vegetable intake was examined. Previous literature has identified the use of narratives as a vehicle for behavior change within the context of cancer prevention (Green, 2006) and survivorship specifically (Wise, Han, Shaw, McTavish & Gustafson, 2008). The mechanisms of narrative success using the Integrative Model of Behavioral Prediction were also explored. Comparisons between narrative and non-narrative interventions within the context of the Integrative Model of Behavioral Prediction are rare, with only a single study identified which utilizes IMBP alongside previously validated measures of transportation and identification (Banerjee, Greene, 2012). This study hopes to further develop the
understanding of background variables and their influence on the intentions of cancer survivors to consume fruits and vegetables.
Chapter 2: Literature Review

**Cancer Survivorship**

Immediately after diagnosis, many survivors are focused on treatment and its immediate consequences. After treatment, cancer survivors are often left to manage their health and the side effects of treatment largely on their own (Institute of Medicine, 2006). However, there are many late effects of cancer and treatment that can impact the lives of survivors including lingering complications from surgery, co-morbidities, psychological effects of a cancer diagnosis and a second form of cancer (Institute of Medicine, 2006). These effects can impact survivors for years after treatment has ended, yet survivorship care plans include only two years following the conclusion of treatment (Aziz, Rowland, 2003). Decades can elapse where the survivor is without comprehensive care, while simultaneously living with late effects of treatment.

To combat the lack of comprehensive survivorship care, the Institute of Medicine issued a report that made ten recommendations for the future of survivorship care. These recommendations include long term care plans and the creation of comprehensive healthcare policy ensuring that all survivors have access to care (2006). Ten years after this report, survivorship care planning remains limited. An analysis of treatment summaries for cancer survivors revealed that fewer than half of the institute’s recommendations for care plans were incorporated into treatment summaries (Stricker, et al., 2011).
After treatment ends, there exists a limited window of time where survivors are typically open to lifestyle changes including weight loss and weight maintenance (Patlak, Nass, 2012). However, the physicians of recently diagnosed survivors are more likely to discuss survivorship care plans with their patients before the initial cancer treatment has ended (Morey, et al., 2009); During the window that survivors are most open to overall lifestyle changes, physicians do not focus on lifestyle changes such as nutrition (Institute of Medicine, 2006). Thus, many survivors do not participate in activities designed to maintain energy balance and reduce obesity.

**Energy Balance and its Role in Survivorship**

Energy balance is essential to healthy weight maintenance and the treatment of obesity. Energy balance refers to the consumption of calories equal to what a person will burn in a day through metabolic activity and physical activity (Demark-Wahnefried, et al., 2012). Energy balance is obtained through a healthy diet and regular physical activity (Irwin, 2010). The CDC suggests that survivors increase fruit and vegetable intake and decrease red meat intake as a part of energy balance maintenance (Centers for Disease Control, 2014).

There exists a relationship between increased risk of cancer reoccurrence or morbidity and being obese or overweight at the time of cancer diagnosis (Irwin, 2010). This finding is especially troubling since weight gain is a common side effect experienced by patients undergoing chemotherapy. It is not uncommon for survivors to report moderate weight gain during chemotherapy treatment, and this is often due in part to decreases in physical activity during treatment (Institute of Medicine, 2006).
Additionally, many patients undergoing chemotherapy report a decreased sense of taste, which may lead to overeating (Irwin, 2010).

Very few survivors who gain weight during treatment return to their pre-treatment weight during survivorship (Irwin, 2010). Additionally, due to the fact that many survivors decrease their levels of physical activity, proper nutrition becomes extremely important especially for those with limited mobility during and after treatment. A transition from a typical western diet which is high in fat and red meat (Serdula, Gillespie, Kettle-Khan, Farris, Seymour, Denny, 2004) to one that is high in fruits, vegetables and dietary fiber has been linked to significant decreases in mortality during survivorship (Irwin, 2010). These findings are specifically outlined by two crucial nutritional interventions which targeted cancer survivors.

The Women’s Healthy Eating and Living Study (WHEL) compared the effectiveness of a high produce, low fat diet among breast cancer survivors to a typical western diet. Findings from this study suggest that those in the high fruit and vegetable condition experienced decreases in mortality (Pierce, et al., 2007). However, baseline fruit and vegetable consumption in this study was high, so the full impact of these findings remain unclear. The Women’s Intervention Nutrition Study (WINS) compared two groups: a low dietary fat condition and a control group (Chlebowski, et al., 2006). Those in the low fat condition were less likely to experience a second form of cancer. Both the WHEL and the WINS focused on a series of communication tools designed to influence healthy eating including personalized materials, frequent phone counseling, as well as in person counseling. Despite the success of these clinical trials, further work
must be done in order to isolate the effects of media interventions on cancer survivors’ dietary intentions.

**Narrative as a Health Communication Tool for Cancer Survivors**

To determine the most optimal way to deliver fruit and vegetable intervention messages to survivors that will impact their diet and improve overall health, two popular health communication approaches are compared: the use of narratives versus a traditional didactic, numbers based, education approach. For the purpose of this study, narrative will be defined as a story that includes a beginning, middle and end. During the course of the story, a conflict is introduced to the characters, and the characters attempt to solve this conflict (Green, Brock, 2000). Narratives within the health context can consist of entertainment media with health messages, as well as informational testimonials (Hinyard, Kreuter, 2007).

Narrative may be an especially effective way to communicate cancer risk due to the strong emotions that cancer evokes (Green, 2006). In the realm of survivorship, narratives can influence preventive behaviors, foster a sense of social support, and help patients confront psychological and emotional issues surrounding cancer and this is thought to be due to the ability of narratives to increase response efficacy (Hinyard, Kreueter, 2007).

The use of narrative persuasion in cancer prevention and control has been widely applied in both applied and basic communication research. In the realm of applied work, a popular soap opera featured a storyline whereby a much beloved character was diagnosed as having breast cancer. After this storyline aired, calls to the Cancer Information Service hotline increased (Beck, 2004). Although the author implies this
behavior was brought about due to identification with the much beloved character, the exact mechanisms leading to effects within this intervention were unmeasured (Beck, 2004). Two possible mechanisms by which narratives successfully influence behavioral intention are identification and transportation.

Identification describes the ability of a narrative to remind the audience of their own personal experiences (Dunlop, Wakefield, Kashima, 2008; Hinyard & Kreueter, 2007). Through the process of identification with a character, a risk is made more salient, and audience members can actually imagine being affected by a specific health issue (Hinyard, Kreueter, 2007). An analysis of qualitative interviews conducted with fans of a popular prime-time drama identified character identification as a possible factor for increasing ovarian cancer screenings (Sharf, Freimuth, 1996). However, validated quantitative measures of identification were not used during data collection making these findings difficult to generalize.

Another mechanism through which narratives foster behavioral change is transportation. Transportation is described as, “a mechanism through which audience members experience reception and interpretation of the text from the inside as if the events were happening to them,” (Cohen, 2001, p. 245). Transportation is believed to reduce counter arguing, or the ability to formulate rebuttal arguments to the message, and this has been supported in tests measuring the effectiveness of narrative based breast cancer information videos (Kreuter, et al., 2010).

Although transportation and identification are more likely to be evoked by narrative, narrative alone is not enough to induce these mechanisms. Personal experiences with cancer may make a narrative more effective by making the risk of
cancer more salient because audiences can imagine being affected by cancer (Kreuter, et al., 2008; McQueen & Kreuter, 2009). Additionally, many narrative interventions have targeted specific types of cancer including breast, cervical, and colorectal, and prostate cancers increasing identification (Kreuter, et al., 2008; McQueen, Kreuter, Kalesan, Alcaraz, 2008; Erwin, Spatz, Tuturro, 1992; Coreil, Behal, 1999; McGregor, et al., 2015; Borrayo, 2004).

Narrative may act as a way of addressing health literacy gaps experienced by cancer survivors. Health literacy describes a series of cognitive demands including numeracy and comprehending medical terminology (Gal, 2000). An estimated 36% of adults have health literacy levels of “basic” or “below basic” meaning they lack the adequate skills to determine drug interactions based on written instructions or interpret at what age a child should receive a vaccine based on an age chart (Kunter, Greenberg, Jin, Paulsen, 2006). Americans are more likely to experience gaps in health literacy than gaps in general literacy (Kunter et al., 2006).

Cancer survivors may be lower in health literacy than the average population, due to the fact that a majority of cancer survivors are over the age of 55, and older adults are more likely to experience health literacy issues (Reyna, Nelson, Han, Dieckmann, 2009). Previous studies have used narrative as a specific alternative form of risk communication for populations low in health literacy (Borrayo, 2004; Sheridan, Halpern, Viera, Berkman, Donahue, Crotty, 2011). The use of narratives is expected to be an effective approach in reaching cancer survivors, since individuals who are low in health literacy and numeracy are less likely to perceive their risk accurately (Betsch, Haase, Renkewitz, Schmidt, 2015).
Narrative Versus Non-Narrative Information

Comparisons of narrative and non-narrative information have been used to communicate risk information in a wide variety of experimental settings; however, the findings of these studies are largely mixed. This is due, in part, to the wide variety of potential mediators identified by these studies, making consistency and comparability across studies difficult to obtain. For example, Baesler and Burgoon found that statistical evidence was more persuasive than narrative information, but these findings were mediated by information vividness (1994). Others have indicated the importance of issue commonality and complexity as moderators which significantly influence the persuasive success of narrative (Lundell, Niederdeppe, Clarke, 2013).

A meta-analysis of twelve studies comparing the use of statistic and narrative information to persuade readers in a variety of contexts replicated Baesler and Burgoon’s finding (Allen & Priess, 1997). However, a large body of health and risk psychology research suggests that narrative information can be more persuasive than numeric or non-narrative information (Betsch, Ulschofer, Renkewitz, Betch, 2011; Dieckmann, Slovick, Peters, 2009; Das, DeWit, Vet 2008; Ubel, Jepsen, Baron, 2001).

Framing has also been found to influence narratives’ effectiveness such that loss frame narratives were more effective than gain frame narrative, and both forms of narrative being more influential than statistical evidence in increasing mammogram intentions (Cox & Cox, 2001). Finally, practitioners have tested the effectiveness of non-narrative information against the effectiveness of a combination of narrative and non-narrative information in survivors’ healthcare participation intentions. These findings
indicated that a combination of both formats was more effective than non-narrative information alone (Wise, Han, Shaw, McTavish & Gustafson, 2008).

Possible explanations for these mixed findings are that narrative information is better at holding readers’ attention, whereas non-narrative interventions are better at disseminating information and prompting action (Goulding, Krimsey, Plough, 1992). Others suggest that specific mediators such as vividness influence these finding, and that vivid narrative information is more likely to be recalled in the long term (Taylor & Thompson, 1982). Narratives are also associated with a higher level of processing than numeric information, which could be due in part to identification and transportation (Cohen; Green & Brock, 2000).

Relevant to the current context, narratives have compared to the use of non-narrative cancer screening interventions. Much like the general literature, these findings are also mixed (Steinhard & Sharipo, 2015). A comparison of traditional education materials to “enhanced” educational materials (narratives plus support group) found no difference in colorectal cancer screening intentions between conditions (Hwang, Ottenbacher, Graham, Thomas, Street & Vernon, 2013). A similar finding indicated no differences in colorectal cancer screening intentions in a test of a narrative intervention compared to a risk calculation tool (Larkey, et al., 2015). A comparison of a number based decision aid and narrative based decision aid yielded no differences in treatment choice among breast cancer patients (Shaffer, Tomek & Husley, 2014).

Both narrative transportation and identification have been identified with stronger liking of a narrative screening message as opposed to a non-narrative screening message (McQueen & Kreuter, 2009; Murphy, Frank; Chatterjee & Baezconde-Garbanati, 2013),
yet it is unclear whether identification and transportation act as mediators or moderators of the effects of message exposure on behavioral intentions. Some prior narrative intervention studies have suggested that transportation and identification act as mediators (Green & Brock, 2000). Other studies have indicated narrative transportation (Kreuter, et al., 2007) and identification (van den Hende, Dahl, Schoormans, Snelders, 2012; Slater, Buller, Waters, Archibeque, LeBlanc, 1994) moderate the effect of narrative message exposure on message evaluation whereby exposure was related to message clarity and believability when identification and transportation were also high. However, no previous studies have assessed the extent to which identification and transportation moderate the effects of message exposure on cognitions (i.e., attitudes, norms and perceived behavioral control) and their effect on behavioral intentions. This study proposes that survivors in the narrative condition (versus those in the non-narrative condition) will exhibit more positive attitudes, greater perceived subjective norms and higher perceived behavioral control when transportation (H1) and identification (H2) are also high.

In the realm of fruit and vegetable intentions, the findings are clear regarding the impact of narrative exposure. Narratives have been an effective tool for increasing fruit and vegetable intake in a variety of populations including female factory workers, African American Children, and healthy adults (Campbell, et al., 2002; Baranowski, Cullen, DeMoor, Rittenberry, Herbert, & Jones, 2002; Irvine, Ary, Grove & Gilfillian-Morton, 2004). Therefore, it is expected that survivors in the narrative condition will report greater intentions to consume fruits and vegetables than those in the non-narrative condition (H3).
The Integrative Model of Behavioral Prediction

The integrative model of behavioral prediction (IMBP) utilizes variables from three previously validated theories of health behavior: the health belief model, social cognitive theory, and the theory of planned behavior. For a full explanation of the model, please see Appendix A. In pulling key variables from these theories, a robust theoretical approach to behavior and behavior change is provided (Fishbein, 2000). At the core of the theory are three key determinants of behavioral intention: attitudes, subjective norms, and perceived behavioral control. These determinants of intention influence behavioral intention and behavior. These concepts are taken from the theory’s predecessor, the Theory of Planned Behavior (TPB) (Fishbein, Yzer, 2003). Attitudes refer to an individual’s level of approval or disapproval towards an object or abstract concept. Subjective norms describe individual perceptions of how significant people would interpret the individual’s behavior (Fishbein, Ajzen, 1975). Perceived behavioral control describes an individual’s belief that he or she can perform a specific behavior. Perceived behavioral control stems from the concept of self-efficacy, which is a key variable in social cognitive theory (Bandura, 2000). Behaviors may be motivated by different determinants of intention across contexts. For example, a behavior that is efficacy driven in one context may be normatively driven in another (Fishbein, Yzer, 2003).

The IMBP builds upon the TPB by identifying a number of distal variables that are believed to influence beliefs (Yzer, 2011). These background variables include culture, interpersonal communication, socioeconomic status, individual differences, and media interventions (Fishbein, Yzer, 2003; Busse, Fishbein, Bleakley, Hennessy, 2010; Fishbein, Capella, 2006). Media interventions are of specific interest within this study
due to their ability to influence behavioral intentions across the cancer spectrum including prevention, screening, and treatment (Green, 2006).

The IMBP has been used as a guiding behavioral framework in a variety of health contexts including sugary drink consumption, renal transplant treatment adherence, smoking behavior, H1N1 flu vaccination, and HIV/AIDS prevention and treatment compliance (Barragan, et al., 2012; Schmidt-Mohler, Thut, Wuthrich, Denhaerynck, Geest, 2009; Fishbein, Yzer, 2003; Yang, 2014; Fishbein, 2000). Through empirical testing of IMBP, media interventions have been causally linked to a variety of health outcomes via attitudes, subjective norms, and perceived behavioral control. Analysis of media exposure of sub Saharan African populations reveals that exposure to HIV testing messages increases the intention to get tested (Bekalu, Eggermont, 2014). Sexual content in the media also has been linked to adolescents’ sexual activity, with attitudes, subjective norms, and perceived behavioral control acting as the mechanisms behind these behaviors (Blekley, Hennessy, Fishbein, Jordan, 2011).

Within the context of cancer, IMBP has been used to develop a deeper understanding of disease prevention and screening. For example, in a study of media and audience attitudes in the United Kingdom, the IMBP was used as a framework for understanding increases in unsafe sun exposure behaviors (Kemp, Eagle, Verne, 2010). Distal variables including individual differences, medical history, uncertainty, and culture have been also been shown to significantly predict information seeking behavioral intentions via attitudes, norms, and perceived behavioral control (Smith-McLallen, Fishbein & Hornick, 2011; Kim, Kim & Niederdeppe, 2015; Kaplan, Crespi, Saucedo, Connor, Litwin & Saigal, 2014; Vanderpool & Huang, 2010). Cancer risk perception and
emotions are also shown to predict attitudes, norms, and perceived behavioral control, which subsequently predict screening behavior (Chae, 2015). Narrative transportation and identification have been used to predict screening intentions via perceived behavioral control (Chen, McGlone, Bell, 2015), but no studies have tested the IMBP with media exposure as a distal variable of interest.

The determinants of intention proposed by the IMBP (attitudes, norms, and perceived behavioral control) have been shown to predict weight loss in cancer survivors through dietary interventions (Hong, et al., 2007; Stull, Snyder, Demark-Wahnefried, 2007). Narratives are also shown to influence attitudes towards fruit and vegetable consumption (Slater, Buller, Waters, Archibeque, LeBlanc, 2003), establish fruit and vegetable consumption as normative (Slater, 2002), and increase self-efficacy to consume fruits and vegetables (Lu, Thompson, Baranowski, Buday, Baranowski, 2012).

Therefore, it is expected that survivors in the narrative condition (versus those in the non-narrative condition) will report more positive attitudes (H4), higher perceived subjective norms (H5), and greater perceived behavioral control (H6) to consume fresh fruits and vegetables that will be associated with increased fruit and vegetable intentions (H7-H10).
Chapter 3: Method

Participants and Design

An online study was conducted to test the main study hypotheses. Survivors (N=211) completed a baseline survey measuring individual characteristics and determinants of intention from the IMBP. Participants were randomized to view a narrative (intervention) or non-narrative (control) nutrition message and, following exposure to the message, completed a short follow-up survey.

Message Pre-Testing

Prior to running the main online study a small pilot study was conducted (N=10) with cancer survivors to pre-test and gauge responses to the stimuli used in the main study (i.e., narrative and non-narrative messages). Participants were recruited for the pre-test through the James Care for Life, a local survivorship organization. Eligible pre-test participants were emailed a recruitment message. Interested participants contacted the researcher and set up an appointment for an interview to be conducted in person at the School of Communication or by phone. Semi-structured interviews were conducted in order to refine and validate stimuli used in the main study. Each interview lasted approximately twenty minutes. Following informed consent, pre-test participants were asked to read the narrative and non-narrative texts and answer questions about those texts. Notes were taken regarding the content and clarity of the messages.
Participants were asked what they thought the main points of each article were, what the main nutritional tips were in each article, and if they enjoyed the article. For a
full list of pre-test questions, see Appendix B. Participants were also asked to compare the two articles to ensure they contained more or less the same nutritional information. All participants were compensated with a ten dollar gift card to a major U.S. retailer for their time.

Once the semi-structured interviews were complete, interview responses were analyzed to assemble themes relevant to the similarities and differences between the pieces. The majority of participants found the nutritional information in both articles to be more or less the same (n = 6). However, the bulk of participants reported that the information in the non-narrative condition was more specific (n = 8), while the narrative condition was often regarded as more enjoyable and relatable (n = 7) than the non-narrative condition (n = 5). A number of participants also found the piece relatable (n = 6) despite having had a different type of cancer. These findings were consistent with the desired goals in stimuli creation such that pre-test participants found the characters in the narrative condition to be relatable, which is key for establishing identification (Cohen, 2001). Furthermore, the narrative piece was largely regarded as enjoyable and realistic, which is critical in assessing narrative transportation (Green & Brock, 2000). Based upon these findings, the content of neither message was modified.

Main Study

After study quotas were met by Qualtrics, the researcher downloaded a de-identified data set with 220 complete surveys. Time taken to complete the study was analyzed, and cases with less than 9 minutes of total time were removed from the dataset.
Additionally, those with questionable or incomplete data were also removed. In total nine participants’ responses were removed, for a final $N=211$.

Participants ($N=211$) in the main study were men and women, age eighteen or older, who had received a diagnosis of any type of cancer at any point in their lives. Participants were recruited through Qualtrics, Inc. Participants received compensation for their participation in the study. Participants were randomly selected to participate in one of two groups: narrative (experimental) or non-narrative (control) message condition. Participants were asked to complete a baseline (T1) and follow-up (T2) survey measuring the determinants of intention from the IMBP (attitudes, subjective norms, and perceived behavioral control), intentions to eat at least five servings of fruits and vegetables daily, past fruit and vegetable intake, and a variety of individual characteristics. Upon completion of the follow-up survey, participants were directed to a debriefing form. The debriefing form contained links to The James Care for Life’s webpage containing nutritional tips for survivors.

**Messages**

Depending on the condition, participants saw either a narrative testimonial from a cancer survivor (intervention) or technical information about dietary needs during survivorship and serving size information (control) that was embedded into the online survey (Appendix C). Text-based narratives were deemed suitable for this study for several reasons. First, text-based messages are easily edited and provided ample opportunity to ensure message similarity across conditions. Second, reading requires undivided attention; therefore, it is more likely to evoke transportation or identification (Cohen, 2001). The stimulus text was entered into a popular blogging platform in order to
ensure its realism. So that participants would focus on the text, it contained no visual cues (pictures, graphics) and minimal white space.

In the narrative condition, the stimulus told the story of a survivor’s diagnosis of cancer, weight loss, and dietary change. The story also focused on personal events in the main character’s life such as her engagement and wedding. The narrative was a transcribed and modified version of MD Anderson Cancer Center’s video, *Glendolyn’s Story* (MD Anderson, 2016), that was available via their public website. Utilizing the key points from a survivors’ actual experience with dietary change and weight loss, stimulus creation utilized a grounded point of view wherein stories from the target population shaped the resulting stimulus (Larkey, Heckt, 2010). The narrative was told from the first person point of view, which evidence suggests are more effective at inciting changes in behavioral intention (Winterbottom, et al., 2008)

In the non-narrative condition, participants were given an edited version of MD Anderson Cancer Center’s *Nutrition Guidelines for Cancer Survivorship* (MD Anderson, 2012). The webpage consisted of the American Cancer Society’s guidelines for survivor nutrition, as well as information about portion control and basic nutrition information. The text mirrored the narrative in that it emphasized an increase in fruit and vegetable intake, as well as a decrease in red meat and dietary fat intake. Technical guidelines such as those presented in the non-narrative condition are authoritative, fact based, and impersonal reflecting the moderators that are linked to didactic information’s success (Goulding, Krimsey, Plough, 1992). Thus, technical guidelines act as an adequate control to narrative interventions.
Main Study

Study measures were taken from Ajzen (2006) and others. A full copy of the survey is included in Appendix C. Unless noted, items were measured on a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

Demographic and Individual Characteristics

A variety of demographic measures were used, including gender (1=female, 0=male) race/ethnicity, education (continuous variable), income (continuous variable), and age (continuous variable). Demographic measures were from the Behavioral Risk Factor Surveillance System survey (BRFSS, Centers for Disease Control, 2014).

Health Characteristics

Several individual health characteristics were also measured including type of cancer and time since diagnosis. These variables were used to describe the sample only and were not included in the final models tested. To assess BMI, height and weight were recorded in order to create a continuous measure of body mass index. Health insurance status was assessed (1=yes, 0=no). Self-rated health was measured using three items. The first asked participants to rate their overall health from “poor” to excellent. An additional two items asked participants to report how many days within the past month they had been physically or mentally unwell (Centers for Disease Control, 2014). Finally, the number of days per week participants engaged in physical activity, as well as the length of time they typically engaged in physical activity was recorded (Centers for Disease Control, 2014).

Health Literacy

The Newest Vital Sign (Weiss, et al., 2005) is a six item measure of health literacy. Participants were shown a nutrition label and then asked open ended questions on this
label. Sample items include, “If you eat this entire container of ice cream how many calories will you eat,” and “If you are allowed to have 60 grams of carbohydrates as a snack, how much ice cream can you have,” (Weiss, et al, 2005, p. 517). Items were coded as correct or incorrect (Weiss, et al., 2005) before being summated into a composite measure ($M=3.36$, Range 0-6). Answers of 0-1 suggest a high likelihood of limited health literacy, scores of 2-3 indicate the possibility of limited health literacy, while scores of 4-6 indicate adequate health literacy (Weiss, et al., 2005).

**Numeracy**

Subjective numeracy describes an individual’s self-reported confidence working with and interpreting numbers (Peters & Bjalkenbring, 2014). Subjective numeracy was measured through the use of an eight item Likert scale with responses ranging from 1 (not at all good) to 7 (extremely good) for items relating to cognitive ability, and responses ranging from 1 (not at all) to 7 (extremely) for preference for display of numeric information. Sample items include “how good are you at working with percentages,” and “when reading the newspaper, how helpful do you find tables and graphs that are parts of a story?” (Fagerlin, Zikmund-Fisher, Ubel, Jankovich, Derry, Smith, 2007, p. 677). Reliability for subjective numeracy items was acceptable ($\alpha = .86$, $M = 6.26$, $SD = .82$) and mean scores were used in analysis.

**Dependent Variables**

*Fruit and Vegetable Intentions & Behaviors*

Items measuring behavior and behavioral intention asked respondents to indicate (a) if they had eaten five servings of fruits and vegetables in the past week, month, and three months and (b) how likely they were to eat five servings of fruits and vegetables daily in
the next week, month, and three months Reliability for these items were acceptable for behaviors at baseline ($\alpha = .97, M = 3.80, SD = 2.10$) and intentions at follow up ($\alpha = .98, M = 4.79, SD = 2.04$) (Azjen, 2006). In order to create a measure of baseline behavior, past week, month and three month’s consumption were summated and the mean score was taken in order to create a single measure of baseline behavior. For both baseline behaviors and behavioral items, the mean of the items was used in the analysis.

**IMBP Variables**

The following measures (attitudes, subjective norms, and perceived behavioral control) are all previously validated from Ajzen (2006), unless otherwise noted.

**Attitudes**

Items assessed participant attitudes regarding fruit and vegetable intake using semantic differential scales. In order to assess affective attitudes, the following pairs were measured: pleasant-unpleasant, enjoyable-unenjoyable, boring-interesting. In order to assess instrumental attitudes, the following pairs were measured: healthy-unhealthy, foolish-wise, harmful-beneficial (Rhodes, Courneya, 2004). Prior confirmatory factor analysis (CFA) has indicated that instrumental and affective attitudes function as the same construct (Rhodes, Courneya, 2004). Reliability for attitude items were acceptable at baseline ($\alpha = .86, M = 6.26, SD = .82$) and at follow-up ($\alpha = .87, M = 6.30, SD = .84$). The mean was used as an indicator of baseline and follow-up attitudes.

**Perceived Subjective Norms**

Items assessed perceived subjective norms for fruit and vegetable consumption. Sample items included, “Most people who are important to me think that I should eat five servings of fruits and vegetables daily,” and “It is expected of me that I eat five servings
of fruits and vegetables daily.” Reliability for subjective norm items were acceptable at baseline ($\alpha = .73, M = 5.50, SD = 1.23$) and follow up ($\alpha = .78, M = 5.60, SD = 1.17$). All items were retained and mean scores were calculated to make single measures of fruit and vegetable subjective norms at baseline and follow-up.

**Perceived Behavioral Control (Self-Efficacy)**

Perceived behavioral control is a multi-dimensional measure which incorporates feelings of confidence and control (Yzer, 2012). Items measured the participant’s perceived capability to consume five servings of fruits and vegetables per day. Sample items included “It is up to me to eat five servings of fruits and vegetables daily,” and “I am confident that I can eat five servings of fruits and vegetables daily in the next week.” Reliability for these items were acceptable at baseline ($\alpha = .74, M = 5.37, SD = 1.30$) and follow up ($\alpha = .78, M = 5.45, SD = 1.34$) baseline and follow-up mean scores were calculated in order to create single measures of perceived behavioral control at baseline and follow-up.

**Potential Moderators of Narrative Message Success**

In order to test hypothesis surrounding transportation and identification, following measures were used. These items aided in understanding why narrative messages may be more effective.

**Transportation**

All respondents in the narrative condition were asked to complete items regarding narrative transportation and identification. Transportation was measured using a twelve item Likert scale with responses ranging from 1 (not at all) to 7 (very much). Sample items included, “while I was reading the narrative, I could easily picture the events in it
Taking place,” and “while I was reading the narrative, activity going on in the room around me was on my mind,” (Green & Brock, 2000, p.704). Reliability for the items were acceptable ($\alpha = .87$, $M = 4.26$, $SD = 1.22$). Mean scores were calculated in order to create a single measure of transportation.

**Identification**

Identification was measured using subset of items from a previously validated scale (Cohen, 2001). Items included, “while reading, I felt as if I was part of the action,” and “while reading, I forgot myself and was fully absorbed” and were measured on a scale from 1 (not at all) to 7 (very much) (Cohen, 2001, p. 256). The items were reliable, ($\alpha = .84$, $M = 4.35$, $SD = 1.67$). Means scores were calculated in order to create a single measure of identification.

**Analysis**

Descriptive analyses and correlations between model variables (Table 1) were run to examine the data. Absolute values of correlations ranged from <.01 to .87. To assess main study hypotheses, multiple linear regression analyses were conducted in SPSS 22.0. Models examining the effect of message condition on determinants of intention (attitudes, subjective norms, and perceived behavioral control) were tested first to see if the messages had effects on attitudes, subjective norms, or perceived behavioral control. To assess moderation, identification and transportation scores were multiplied by condition (0=non-narrative, 1=narrative) to create an interaction term. All assessments at follow-up controlled for baseline. Assessments of mediation using tests of indirect effects were conducted using the PROCESS macro version 2.14 (Hayes, 2015).
Chapter 4: Results

**Participant Characteristics**

Approximately 90% of the sample identified as non-Hispanic white \((n = 189)\). The rest of the sample was 4% Hispanic or Latino \((n = 9)\), 3% African American \((n = 7)\), 1.5% Asian \((n = 3)\), 1% American Indian or other unlisted group \((n = 2)\), and one participant declined to answer \((n = 1)\). Breast cancer was the most common type of cancer diagnosis within the sample, \((24% \ n = 50)\), followed by prostate cancer \((20% \ n = 43)\), lung cancer \((8.5% \ n = 18)\), melanoma \((8.5% \ n = 18)\), colorectal cancer \((7%, \ n = 15)\), cervical cancer \((6%, \ n = 13)\) and other types of cancer \((26% \ n = 54)\) of cancer survivors. BMI scores ranged from 10.9 to 50.07 \((M = 27.23, SD = 6.29)\) with most of the sample \((n = 135)\) having a BMI greater than 25 indicating most participants were overweight or obese.

**Main Study Hypotheses**

Multiple regression analyses were used to examine the predictors of attitudes, subjective norms and perceived behavioral control at baseline and follow-up, as well as the moderating effects of transportation and identification (Table 2). The attitude model was significant at baseline \((F (6, 203) = 6.06, r^2 = .15, p < .001)\). Baseline predictors of attitudes included age, sex, and health literacy \((p < .01)\) whereby those with higher numeracy had more positive attitudes \((p < .05)\). The model for subjective norms was
significant at baseline ($F = (6, 203) = 7.39, r^2 = .18, p < .001$). Significant predictors of subjective norms included sex, education and numeracy whereby those with more education and higher numeracy viewed fruit and vegetable consumption as more normative ($p < .05$). The perceived behavioral control model was significant at baseline ($F (6, 203) = 7.66, r^2 = .18, p < .001$) with sex, subjective numeracy, and health literacy as significant predictors ($p < .05$).

At follow-up, models predicting attitudes ($F (11, 197) = 66.66, r^2 = .78, p < .001$), subjective norms ($F = (6, 203) = 7.39, r^2 = .18, p < .001$) and perceived behavioral control ($F (11, 198) = 51.45, r^2 = .74, p < .001$) were significant. However, no significant interactions were detected between condition identification and transportation in the models tested for attitudes, norms, or perceived behavioral control ($p > .05$, H1 and H2 not supported).

Only age and baseline attitudes predicted attitudes at follow-up ($p < .001$, H4 not supported). Likewise, age and baseline subjective norms predicted subjective norms at follow-up ($p < .001$; H5 not supported) and baseline perceived behavioral control was the only predictor of perceived behavioral control at follow-up ($p < .001$; H6 not supported).

Multiple regression analyses were used to examine fruit and vegetable intentions at baseline ($F (9, 200) = 25.30, r^2 = .53, p < .001$) and follow-up ($F (10, 198) = 50.32, r^2 = .72, p < .001$; Table 3). At baseline, no significant differences in intention were found based on condition ($p > .05$). Baseline fruit and vegetable intentions were higher among
those with greater perceived behavioral control, and more education \((p < .05)\); Health literacy also was negatively associated with fruit and vegetable intentions such that those with higher health literacy were less likely to consume fruits and vegetables \((p < .05)\).

At follow-up, controlling for baseline, no differences were detected in fruit and vegetable intention based on condition \((p > .05, H3 \text{ unsupported})\). Perceived behavioral control remained a significant predictor of intentions at follow-up \((H9 \text{ supported})\), along with baseline fruit and vegetable behavior, education and subjective numeracy \((p < .001)\). Attitudes and Subjective norms were not significantly associated \((p > .05, H7 \text{ and } H8 \text{ unsupported})\).

Finally, to assess whether attitudes, norms and perceived behavioral control mediated the effects of media exposure on intentions, a test of indirect effects was conducted using PROCESS. The indirect effect was tested using a bootstrap estimation approach with 1,000 samples. As suggested by previous regression analyses, results showed no indirect effect of narrative exposure on fruit and vegetable intention via attitudes \((\text{est.} -.03, 95\% \text{ CI} [-.13, .01])\), subjective norms \((\text{est.} .02, 95\% \text{ CI} [-.03, .12])\), or perceived behavioral control \((\text{est.} .07 95\% \text{ CI} [-.30, .50])\); thus, \(H10\) was not supported.
Chapter 5: Discussion

The goal of this study was to compare the effectiveness of narrative messages on cancer survivors’ fruit and vegetable intentions versus non-narrative information. Narratives tested here had minimal impact on cognitions or fruit and vegetable behavioral intentions. Results demonstrate the need for messages that are purposefully designed to evoke narrative transportation and identification in order to affect cancer survivors’ fruit and vegetable intentions.

First, the results showed no difference in fruit and vegetable intention between narrative and non-narrative condition at follow-up, suggesting that narrative messages are no more effective than non-narrative messages at increasing fruit and vegetable intentions. This study is not the first to find no significant differences in behavioral intention after exposure to either a narrative or non-narrative message (Hwang, et al., 2013; Larkey, et al., 2015; Shaffer, et al., 2014) in a cancer context. There are several possible explanations for this finding. During the message pre-test, most participants reported that the nutritional content within the messages were more or less the same. When pre-test participants reported differences between the two messages, they indicated that the narrative message held their interest better than the non-narrative message. However, respondents felt that the non-narrative message was easier to read because it was straight forward. Finally, some participants had difficulty relating to the narrative message, with several respondents reporting that they did not feel the story adequately captured the emotional difficulty of receiving a cancer diagnosis. Other respondents
could not relate to the story because they were divorced or unmarried. These differences could have influenced the levels of narrative transportation and identification between conditions and explain the null findings for H3.

Results indicated no difference between narrative transportation and identification across conditions, and the properties of the message used could have influenced this. Narrative persuasion literature suggests that a longer passage that requires more attention, takes longer to read, and contains a more complex narrative may be more effective at inducing transportation and identification than messages that do not display these properties (Kreuter, et al., 2007). Within this study, participants were asked to read a five hundred word passage. Average time spent on the stimuli page was a mere 1.9 minutes. Additionally, the plot of the narrative used was very simplistic. There were only two characters introduced, and the main conflict in the story stemmed from weight loss. Future work may benefit from the use of more complex narratives as they may be more effective in producing significant differences between narrative and non-narrative conditions.

The intervention also used a single narrative focused on colorectal cancer, even though participants from the sample represented survivors of breast, prostate, colorectal, lung, melanoma, and other types of cancer. These individual differences could have contributed to the lack of message effects. The use of a single character with a single type of cancer in the narrative condition could have influenced the insignificance of identification in the narrative condition. Identification is strongly associated with similarity between the audience and the character, and an inconsistency between
character and reader diagnosis could have made the character less identifiable (Cohen, 2001).

Message content may also have impacted transportation and identification, which were not shown to moderate the effects of message exposure on cognitions. Transportation describes a process whereby the participants imagine the narratives’ events happening to them (Green, Brock, 2000). The narrative message discussed a cancer survivors’ diagnosis in the months leading up to her wedding. The sample had a mean age of sixty, and a majority of participants were older adults age sixty or older ($N = 141$). Additionally, many survivors in the sample had been diagnosed as having cancer within the past ten years ($N = 132$). A narrative about a woman about to be married and dealing with cancer at the same time may not have been relatable or imaginable to older participants within the sample.

Another explanation for the narrative ineffectiveness is that survivors in this sample had strong positive attitudes towards fruit and vegetables at baseline ($M = 6.27$, $SD = .81$) and viewed the consumption of fruits and vegetables as highly normative at baseline ($M = 5.67$, $SD = 1.14$). Survivors in the sample also reported high levels of perceived behavioral control at baseline to eat five servings of fruits and vegetables ($M = 5.37$, $SD = 1.30$). Although mean scores for attitudes, subjective norms, and perceived behavioral control did increase from baseline to follow-up, no significant differences were found.

The IMBP posits that attitudes, subjective norms, and perceived behavioral control predict behavioral intention. Previous studies have used attitudes, subjective norms and perceived behavioral control to predict between 30% to 60% of variance in
fruit and vegetable intentions (Bogers et al., 2004). In this study, only perceived behavioral control acted as a significant predictor; this variable is often the strongest predictor of behavioral intention (Armitage & Connor, 2001; Lien, et al., 2002; Bogers, Brug, Assema, & Dagnelie, 2004; Conner, et al., 2004).

As in other studies, attitudes and subjective norms did not predict fruit and vegetable intentions (Lien, Lytle & Komro, 2002; Blanchard, et al., 2009; Conner, Bell & Norman, 2002; 2004 Lien, et al., 2002). However, the findings of this study suggest participants held positive attitudes and norms towards fruits and vegetables at baseline and follow-up. Health literacy and numeracy also appear to be important factors to consider when crafting messages for survivors. Numeracy was a significant predictor of attitudes, norms, and perceived behavioral control at baseline. This finding suggests that messages need to be accessible to those with lower numeracy for maximum effectiveness.

At baseline, health literacy and education significantly predicted fruit and vegetable behaviors. At follow-up, only education remained significant; however, education is closely linked to both health literacy and numeracy (Lipkus, Samsa & Rimer, 2001; Viswanath, et al., 2006). These results showed that those with higher health literacy had lower fruit and vegetable intentions. Within our sample, age was significantly correlated with health literacy such that as patients aged, their health literacy increased. However, age and fruit and vegetable consumption were negatively correlated such that as patients aged, their fruit and vegetable consumption decreased. This provides one possible explanation for the negative relationship between health literacy and fruit and vegetable intake. In general, we know little about the impact of health literacy on
behaviors, and further research must be conducted to fully understand the relationship between these variables (Berkman, Sheridan, Donahue, Halperm, Crotty, 2011).

**Limitations & Future Research**

The present study was not without limitations. Future research should consider these limitations and adapt accordingly. First, the narrative condition focused on a survivor of a single type of cancer regardless of the type of cancer the participant was diagnosed as having. Future studies should consider tailoring narrative formats so that the characters within the narrative are diagnosed with the same type of cancer as the reader.

Future study designs should consider the use of a longitudinal design where a second set of follow-up measures are administered several days or weeks after exposure to the message. Utilizing a longitudinal design would provide two distinctive benefits to future research. First, survivorship cohorts are underutilized (Institute of Medicine, 2006), and the use of longitudinal design would increase this scant body of literature. Furthermore, media suggestions administered over time, with multiple follow-ups have revealed changes in screening intentions even when there were no differences in effects between narrative and non-narrative messages (Hwang, et al., 2013).

Finally, energy balance is a status that is dependent upon healthy eating as well as physical activity. This study indicated possible ceiling effects for attitudes, norms, and perceived behavioral control around intentions for fruit and vegetable intake. Future studies should assess the attitudes, subjective norms, and perceived behavioral control of cancer survivors in order to see if media interventions would be more useful within the exercise domain.
Conclusion

A decade after the Institute of Medicine’s recommendation for comprehensive survivorship care was released, healthcare institutions still have much to accomplish in order to meet the goals of the Institute of Medicine’s report (Stricker, et al., 2011). The previous study adds to the literature comparing the ability of narrative and non-narrative information to incite behavior change via the determinants of intention outlined in IMBP and by default the theory of planned behavior (TPB) and theory of reasoned action (TRA). The previous study also attempted to identify two mechanisms by which media interventions may influence attitudes, subjective norms, and perceived behavioral control: transportation and identification. Despite the lack of significant findings in this domain, there may be additional mechanisms which influence survivors’ intentions to consume fruits and vegetables after media exposure. Future health communication research should attempt to identify these mechanisms in order to improve the quality of life of cancer survivors.
Bibliography


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https://issuu.com/mdandersoncancercenter/docs/survivorship_nutrition_guide_final_nov28_2011


### Table 1
Zero Order Correlations for Variables of Interest

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**Note:** Sex was coded as “0” = male and “1” = female. Condition was coded “0” = non-narrative and “1” = narrative.
* indicates a significant correlation at the .05 level. ** Indicates a significant correlation at the .001 level.
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*Note: Sex was coded as “0” for male and “1” for female

* indicates significance on the $p < .005$ level    ** indicates significance at the $p < .001$ level
Table 3
Determinants of Intention Predict Fruit and Vegetable Intentions

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<td>Baseline Behavior</td>
<td></td>
<td>.40</td>
<td>.05</td>
</tr>
</tbody>
</table>

\[ F \quad 25.30 \quad (9, \quad 200)^{**} \quad 50.32 \quad (10, \quad 198)^{**} \]

\[ R^2 \quad .53 \quad .72 \]

* Note: Sex was coded as “0” for male and “1” for female
  * indicates significance on the \( p < .005 \) level  ** indicates significance at the \( p < .001 \) level 
Appendix B: The Integrative Model of Behavioral Prediction (Yzer, 2012)
Appendix C: Message Pre-Test Questionnaire

Pretest Questionnaire

1. What is your prior experience with cancer? How long ago did you receive your diagnosis? What kind of cancer were you diagnosed with? What kind of treatment did you receive?

I would like for you to read a short piece called “My Journey Down the Path of Good Nutrition During Survivorship” to get your feedback on the information.

2. Can you identify some of the key points made in this article?
What were some of the nutritional tips given in this article?
   a. Did everything in the article make sense?
   b. Did you notice any errors or typos?
   c. Did you enjoy reading the article?
   d. Did you feel connected to the character in any way?
   e. How do you think this story might impact other cancer survivors?

Next, I would like for you to read a short piece called, “The Importance of Good Nutrition During Survivorship,”

2. Can you identify some of the key points made in this article?
   a. What were some of the nutritional tips given in this article?
   b. Did everything in the article make sense?
   c. Did you notice any errors or typos?
   d. Did you enjoy reading the article?
   e. Did you feel connected to the character in any way?
   f. How do you think this article might impact other cancer survivors?

3. Think about the nutritional information given in both of the passages that you read. Do you think that the information was more or less the same?

4. If not, what are some key differences between the two passages that you noticed?

5. Do you have any other additional thoughts about either of the two passages?