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Expressive writing improves subjective health among testicular cancer survivors: a pilot study

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The present pilot study examined the efficacy of a brief expressive writing intervention for helping testicular cancer (TC) survivors manage psychological, relational, and health complications associated with treatment and recovery. 48 men reported on mental health, quality of life, and sexual health, then took part in a 5week expressive writing intervention. Afterward, all participants again reported on the same measures used in the pre-test. A total of 28 men completed at least two writing sessions and were included in the analysis. Results revealed that, compared to men in both the negative expression and control conditions, men in the positive expression group experienced improvements in their mental health over the course of the 5-week trial.

Keywords: testicular cancer, expressive writing, cancer survivorship, quality of life

I guess the most negative thing about having TC [testicular cancer] was that no one ever mentioned that it was something that should be checked for. With all the health classes and such that were mandatory with kids in school, not once was it brought up that young men should be checked for TC. We were never even informed we could get it, but even worse was that they still are not teaching young men about it. They always tell women to check for breast cancer and how it is done, and all ages are aware of what needs to be checked and how it should be checked. Teachers don't take the time to inform young men that this is something that needs to be done. Why is it all right to talk about breasts but not about testicles? Why not tell young men that it is all right to examine the testicle and what changes can take place? If there are changes, know what you should do about it and don't let it go any longer that it has to. Cancer is one of those words that when you get it people look uneasy, and even when you are a survivor they don't look at you like you know anything. Then as a survivor when you go to the doctor and complain about how you are feeling you are told, "Well at least you have survived."

--"Ben," a 54 year-old testicular cancer survivor

For men diagnosed with testicular cancer, the battle they face is fought on two fronts. The first is the medical treatment front, which entails numerous visits to the doctor and decisions regarding surgery, radiation therapy, or chemotherapy. As with every form of cancer, the news of the diagnosis is traumatic and the treatment that follows can often produce serious and potentially long-term side effects. The second front, which is somewhat specific to testicular cancer, is the shame and discomfort that comes from experiencing cancer in such an intimate part of the body. Some types of cancer in highly personal regions of the body, such as cervical cancer or breast cancer, have gained levels of awareness that have removed some of the embarrassment that patients experience as a result of their diagnoses. As the excerpt above suggests, however, testicular cancer lags behind many comparable cancers of the female body in terms of public consciousness and social acceptability. Although diagnoses of high-profile celebrities such as Lance Armstrong have helped to raise awareness in recent years (Oliver, 2001), testicular cancer remains a taboo topic for many men. Hopefully, the very public disclosures of Lance Armstrong and others dealing with testicular cancer will start a new conversation about testicular cancer, one that will enable men in future generations to discuss testicular cancer without fear of shame.

The early onset and low mortality rate of testicular cancer make issues of survivorship and quality of life especially salient. Since the typical patient contracts testicular cancer early in adulthood and undergoes successful treatment, he can expect to live a long life as a testicular cancer survivor (Travis, 2005). As a survivor, however, he must deal with the strain of follow-up examinations, the threat of cancer recurrence, and the potential for infertility, each of which can diminish his quality of life.

The present study applies an existing communication-based intervention, expressive writing, to a population of testicular cancer survivors. We propose that expressive writing, a relatively simple intervention that can be completed in complete privacy, will significantly improve the quality of life of testicular cancer survivors. Because testicular cancer is a topic that is particularly difficult for

many men to discuss, we believe that expressive writing will provide some of the same benefits that survivors of other illnesses can obtain from traditional group therapies.

TESTICULAR CANCER AND QUALITY OF LIFE

According to the American Cancer Society, over 8,400 men in the United States will have been diagnosed with testicular cancer (TC) in the year 2010 alone (American Cancer Society, 2010), and data from the last 30 years shows that rates of TC have risen steadily (Holmes et al., 2008). Worldwide, the highest rates of TC are reported for white Caucasian populations in industrialized countries, particularly in western and northern Europe, whereas the disease is comparatively rare in non-Caucasian populations (Richiardi et al., 2004).

The good news for many of these men is that TC is one of the most treatable types of cancer. The ten-year survival rate for men with testicular cancer is more than 95% (Travis et al., 2010), and if the cancer has not metastasized and spread outside of the testes, that rate jumps to 99% (American Cancer Society, 2010). As a result, an estimated 140,000 American men have survived a bout with TC in their lifetime. Research on European populations also reports that whereas incidence rates for TC are rising, mortality rates for the disease are falling (Bray, Richiardi, Ekblom, Pukkala, Cuninkova, & Moller, 2006).

Despite the favorable medical prognosis, TC often takes a toll on patients' quality of life, in the forms of threats to mental, relational, and physical health both during and after treatment. Travis et al. (2010) explicate multiple comorbidities common in post-treatment TC patients, including cardiovascular disease, neurotoxicity, hypogonadism, and decreased fertility. In terms of mental health, TC also has serious and lasting implications for men's self image. Gascoigne, Mason, and Roberts (1999) reported that men overwhelmingly lost a sense of masculinity--their perception of what it means to be a man--because of their experiences with TC. Men in this study felt that both peers and sexual partners might see them as less masculine because they were missing one or both testicles. The deleterious effects of TC on mental health are not related to self-esteem or body image alone; patients and their partners both experience a significant increase in stress-related symptoms as well as a decrease in both their physical and social functioning as a result of treatment (Tuinman et al., 2007). Previous studies have also determined that TC survivors have higher levels of depression following treatment compared to non-affected, age-matched peers (Shinn, Basen-Engquist, Thornton, Spiess, & Pisters, 2007; Siafaka et al., 2008).

Relationally, TC has profound effects on both the patients and their spouses. Tuinmann, Fleer, Sleijfer, Hoekstra, and Hoestra-Weebers (2005) found that almost one quarter of wives who had gone through the experience of TC with their husbands reported low levels of relational satisfaction that are typically indicative of relationship problems. At least part of this decline in relational quality is due to the physical complications associated with TC. As a cancer of the male reproductive system, TC commonly affects men's sexual ability. When comparing TC survivors and their spouses to non-affected, age-matched peers, Tuinmann et al. (2005) found that TC survivors and their wives reported lower levels of sexual satisfaction despite the fact that the groups did not differ in terms of their general relational satisfaction. Overall, men who undergo some type of medical procedure for TC experience lower levels of sexual desire as well as problems with sexual performance when compared to TC survivors whose only treatment is surveillance (Huddart et al., 2005). These problems are particularly pronounced among patients who are treated through some combination of chemotherapy and/or radiation therapy.

In addition to physical problems related to sexual health and performance, at least one study has found that TC survivors can have additional problems with the quality of their overall physical health. Shinn et al. (2007) reported that TC survivors did not engage in regular exercise (almost 50% reported inactive lifestyles compared to 15% who engaged in strenuous physical activity three or more times a week) and nearly 60% of the men aged 40 or older in their sample had not engaged in routine cancer screening tests. This last statistic is particularly troubling given that men who had already survived one battle with cancer were not vigilant in screening for additional cancers.

Managing Threats to Quality of Life

Given the significant tolls levied by having and treating TC, it is important that patients not only treat the physical entity of cancer but also deal successfully with its emotional and psychological aspects. One treatment avenue that has proven effective in helping people deal with these challenges when facing other medical conditions is a peer support group (Helgeson & Gottlieb, 2000). Support groups provide a unique therapeutic environment in which information (usually from a trained counselor or medical professional) is blended with conversation with similarly situated peers in an environment that is conducive to disclosing personal information. In a review of studies that have examined the efficacy of support groups for cancer patients and survivors, Helgeson and Cohen (1996) found that support groups were useful in improving both subjective and objective measures of health. That is, support group participants indicated that they felt better as a result of the group and they experienced tangible benefits including reductions in symptom severity, fewer doctor visits, and in at least one study (Fawzy et al., 1993), support group participants outlived non-support group peers by an average of 18 months.

Although support groups have proven efficacious for patients with other cancers and conditions, there is reason to question their efficacy for TC. Compared to women, men are less willing to disclose their health problems to others (Gabbard-Alley, 1995), and when facing a condition such as TC that has been associated with shame and embarrassment, this trend is likely to be even stronger. Indeed, for men who are uncomfortable about discussing problems with their reproductive organs (and the related sexual side effects) with other men, support groups might prove detrimental to the health and quality of life of TC survivors. Given that TC is an uncomfortable topic for men to discuss and given that it can produce significant health and relational detriments for years following treatment, we set out to find an alternative outlet that would allow men to express themselves and emotionally come to terms with their TC experience in a non-threatening environment. Toward this end, we tested the efficacy of Pennebaker's (1993) expressive writing paradigm as an intervention for TC survivors. Our goal in the present study was to see if expressive writing could be used as a therapeutic technique to produce the same tangible benefits for TC survivors that support groups have yielded for survivors of other cancers. Our hope was that this exercise would allow men the opportunity to express both their private pain and struggle without

fearing comments such as, "Well, at least you have survived."

The Expressive Writing Paradigm

In over twenty years of research, Pennebaker and colleagues (Pennebaker, 1993; Pennebaker & Seagal, 1999) have developed the expressive writing paradigm as an intervention designed to help people disclose information about emotionally traumatic experiences. The expressive writing technique was designed as a therapeutic intervention that could help individuals manage their affective responses to highly emotional situations with minimal expense and no professional intervention. Originally, Pennebaker and colleagues used the expressive writing intervention as a tool that allowed participants to disclose about traumatic events, such as the death of a loved one or a serious injury, or about difficult life adjustments such as beginning college (Pennebaker, 1993). In a series of three to five writing sessions, participants are instructed to write as much about their assigned topic as they are able.

Health benefits of expressive writing. Researchers have examined a number of health-related outcomes in the context of expressive writing. The most commonly measured outcomes occur in four main areas: self-reported health, psychological well-being, physiological functioning, and general functioning (Frattaroli, 2006; Smyth, 1998). Compared to participants in control groups, those completing expressive writing tasks have experienced significant reductions in their blood pressure (Davidson, Shwartz, Sheffield, McCord, Lepore, & Gerin, 2002), improved immune system functioning as indicated by an increase in T-cell responses and decreased health center visits (Pennebaker, Kiecolt-Glaser, & Glaser, 1988), improved psychological health and fewer doctor visits among breast cancer survivors (Stanton & Danoff-Burg, 2002), increased lung capacity among asthmatic patients (Smyth, Stone, Hurewitz, & Kaell, 1999), decreased joint pain among arthritic patients (Smyth et al., 1999), increased CD4+ counts among HIV patients (Petrie, Fontanila, Thomas, Booth, & Pennebaker, 2004), and reduced total cholesterol (Floyd, Mikkelsen, Hesse, & Pauley, 2007). Meta-analyses have confirmed that these health improvements have significant implications for participants; effect size estimates of the average improvement attributable to expressive writing range from 7.5% (Frattaroli, 2006) to 23% (Smyth, 1998).

Writing about positive emotions. The expressive writing paradigm, as described by Pennebaker (1993), focused participants' writing on experiences associated with difficult life transitions and personal tragedies. Until recently, researchers of expressive writing outcomes focused primarily on these negative topics. In a review of studies, however, Pennebaker, Mayne, and Francis (1997) found that one of the primary predictors of health improvements in expressive writing interventions was participants' description of positive emotion. As a result, researchers began to study the health effects of positive emotional disclosure. King and Miner (2000) included experimental conditions that incorporated a set of instructions that focused participant writing on positive aspects of previous traumas. One quarter of participants wrote as much as possible about a previous trauma (the traditional expressive writing technique), one quarter wrote only about positive aspects of a previous trauma, one quarter were given hybrid instructions in which they split their time evenly between each experimental topic, and the final quarter were given innocuous control topics. Results revealed that all experimental conditions yielded similar benefits for participants. At three- and five-month follow-ups, participants in all three experimental conditions experienced fewer health center visits than in the month preceding the experiment.

Causal mechanisms. The prevailing theory for the efficacy of expressive writing is that creating a written explanation of a previous traumatic event helps individuals cognitively organize events into a coherent, meaningful narrative. When people fail to take the time to cognitively organize the meaning of events, they often devote significant amounts of time and energy to ruminating about the unresolved issues surrounding them (Pennebaker & Seagal, 1999). Perpetually dwelling on events and emotions associated with complicated and often tragic events can exact a psychological toll on individuals. Pennebaker and Seagal (1999) speculate that organizing disparate thoughts into an organized whole helps ease some of the stress that comes with ruminating about an unresolved topic. The authors argue that one of the key elements in this process is the synthesis of thoughts, memories, and feelings relevant to past experiences.

Indeed, mounting evidence is supporting the notion that it is the integration of emotion, particularly positive emotions, into narratives about troubling past experiences that brings about many of the health benefits associated with the expressive writing paradigm (Lepore, Greenberg, Bruno, & Smyth, 2002). Pennebaker, Mayne, and Francis (1997) found that two particular aspects of participant narratives predicted improvements in total health: the use of positive emotion words and an increase in the number of causal words over time. Compared to participants who focused primarily on negative emotions of past traumas, those who focused on the positive experienced better physical (but not mental) health outcomes after the intervention. Likewise, participants who increased the use of causal statements (cause, effect, because, etc.) over the course of the writing sessions experienced improvements in total health indices (immune markers and/or doctor visits) relative to participants whose use of those words remained constant.

Lepore et al. (2002) have suggested that one possible causal mechanism at work in the benefit of positive expressive writing is Fredrickson's (Fredrickson, Mancuso, Branigan, & Tugade, 2000) undoing hypothesis. The undoing hypothesis suggests that by focusing on positive emotions, individuals are able to minimize and potentially reverse the adverse effects of a negative emotional experience. In an empirical test of the theory, Fredrickson et al. (2000) demonstrated that following a period of stress-induced arousal, participants who were exposed to a brief, positive emotion film clip experienced a significantly faster reduction in their physiological arousal relative to participants that viewed an emotion-neutral film clip. In essence, the positive clip "undid" the negative, stress-induced emotions and helped participants to move beyond their initial stress response. For TC survivors, focusing their attention on the positive aspects of their treatment and recovery might facilitate a process wherein they would be able to undo some of the negative effects of painful and difficult memories.

Applications to cancer and cancer treatment. In the context of testicular cancer a few previous studies are particularly salient. In a study of 60 women who had just completed treatment for stage I or II breast cancer, Stanton and Danoff-Burg (2002) found tangible, health-related benefits as a result of the expressive writing intervention. Women in the study were randomly assigned to one of three conditions: expressive disclosure (sharing deepest thoughts and feelings about breast cancer), benefit finding (describing any positive outcomes of breast cancer and treatment), and fact control (objectively describing the experience of breast cancer treatment in detail). Participants in all conditions were instructed to complete four writing sessions of twenty minutes over the span of three weeks. Results demonstrated that women assigned to either of the expressive writing conditions experienced improved total health

as measured by number of doctor visits. Three months after the experiment, women who completed the expressive disclosure and benefit finding tasks all visited their doctor less than once a month whereas women who completed the fact control task visited their doctor more than twice a month.

In a secondary analysis using data collected by Stanton and Danoff-Burg (2002), Creswell, Lam, Stanton, Taylor, Bower, and Sherman (2007) sought to determine the underlying mechanisms responsible for the improvements in breast cancer survivors following the expressive writing intervention. According to their analyses, the relationship between positive emotion and health was mediated by the use of self-affirmation in their narratives. It is interesting to note that the instructions for the manipulation did not specify that participants should include these types of statements in their writing; self-affirmations simply emerged in a number of participant narratives. The authors offered two speculative explanations for this finding. The first potential explanation was that affirmations bolstered both self-esteem and self-efficacy, enabling participants to manage the physical challenges brought on by an experience with cancer. The other potential explanation is that self-affirmations buffered participants' stress response. By creating narratives about their cancer experiences, participants likely constructed the cognitive schema that enabled them to reduce their anxiety regarding treatment outcomes.

Implications for testicular cancer. The previous studies validate the implementation of the expressive writing paradigm as a viable treatment for improving both the quality of life and physical health of people suffering from a variety of conditions including cancer. In terms of testicular cancer, findings and implications drawn from previous studies suggest that expressive writing might be a particularly beneficial form of therapy for TC survivors. In a review of recent investigations of TC survivors, Luckett, Butow, King, and Oliver (2008) note that demographic variables are only able to account for between four and twenty-two percent of the variance in survivors' quality of life. According to Luckett et al., these small effect sizes make it "clear that internal processes relating to meaning making, coping and adaptations are likely to explain at least some of the remaining variance" in survivors' post-treatment quality of life (p. 129). Given that one of the prevailing explanations for the effectiveness of expressive writing is its ability to help individuals cognitively restructure and find meaning in their previous traumas, we expect that expressive writing might aid TC survivors in coming to terms with their experiences in a private and efficient manner.

A second aspect of TC survival that might help to bolster the effects of the expressive writing technique is the aforementioned embarrassment and discomfort that occurs as a result of TC and its invasive treatments. When it comes to health, research has reliably demonstrated that, compared to women, men are at a disadvantage in terms of seeking care, disclosing health problems to others, and obtaining verbal and nonverbal support from healthcare providers (Gabbard-Alley, 1995). These problems are only compounded by the threat of TC. In a qualitative study of men receiving treatment for TC, Gascoigne et al. (1999) reported that one respondent delayed treatment for six months after identifying a testicular tumor because of persistent fears related to mortality and the loss of both testes. Other men in the study reported that they denied or minimized their symptoms because they were embarrassed to admit to their friends, family members, and in some cases, their doctors, that they were experiencing pain and problems with their reproductive organs. An important finding from this study was the role that spousal support played in men's decisions to seek treatment for their TC. For half of the men in the study, their wives' insistence that they pursue treatment was one of the most important factors in their ultimate decision to pursue health care services.

Given that this discomfort and embarrassment brought on by TC leads to lapses in both healthcare and disclosure, it is reasonable to assume that men will continue to conceal their struggles with TC even when treatment is complete. Whereas traditional forms of group support and therapy would not provide an environment conducive to expressing personal thoughts about such an intimate topic, expressive writing affords TC survivors the opportunity to deal with their experiences without losing face publicly.

Hypotheses and Research Questions

The primary objective of the present study is to examine the efficacy of the expressive writing paradigm as a brief intervention for improving quality of life for TC survivors. Previous studies have demonstrated that expressive writing has been a promising treatment option for individuals in a number of health contexts. With this strong research precedent, we propose the following hypothesis:

H1: For testicular cancer survivors, expressive writing leads to significant improvements in (a) general mental health; (b) general quality of life; and, (c) sexual health over a 5-week period.

One feature of expressive writing that has been associated with improvements in health and quality of life is the use of positive words in participant narratives (Pennebaker, Mayne, & Francis, 1997). At least one previous study (King & Miner, 2000) has directly tested the benefits of positive expressive writing by instructing participants to focus on the most positive aspects of a traumatic experience and comparing their outcomes to participants who were instructed simply to write as much as possible about a previous trauma. One of the goals of the present study is to apply this innovative variation of the writing paradigm in a context with serious health and self-presentation ramifications: recovery from testicular cancer. To that end, we propose the following research question:

RQ1: Do positive or negative writing instructions lead to greater improvements in participants' (a) general mental health; (b) general quality of life; and, (c) sexual health over a 5-week period?

METHOD

Participants

Forty-eight adult men completed an initial pre-qualification questionnaire and were invited to participate in the study. These men ranged in age from 26 to 60 years ($M = 40.98$ years, $SD = 8.12$) and represented substantial diversity in terms of time spent in recovery; time since treatment ranged from 6 to 387 months ($M = 6.72$ months, $SD = 6.21$). Participants were from every region of the United States and three (6.25%) were European (two from the UK and one from Spain). The vast majority of participants ($n = 43$, 89.6%) self-identified as heterosexual, whereas three (6.2%) reported that they were homosexual and two identified as bisexual. The

majority of participants reported that they were currently cohabiting with a romantic partner ($n = 37, 78.7\%$). Most men reported a combination of treatments for TC: 44 (86.3%) had had surgery, 26 (51%) had undergone chemotherapy, 11 (21.6%) had received radiation therapy, and 7 (13.7%) included surveillance in their treatment regimen. Relapse was relatively low, with only three men (6.4%) reporting a recurrence of TC after initial treatment.

Recruitment and Procedure

Participants were recruited from the internet and asked to take part in a study of quality of life issues for testicular cancer survivors. Calls for participants were sent to online newsgroup and email distribution list (listserv) moderators whose membership consisted primarily of TC survivors. Of the moderators contacted with information about this study, only one agreed to post a recruitment announcement to his group's members. The listserv used to recruit in the present study is relatively active (more than 10 messages per day) and boasts more than 700 members, making it the largest of all groups contacted. The recruitment announcement concluded with a link to an online questionnaire that was used to qualify participants. In addition to demographic questions, participants were asked about the nature of their TC treatment. Items on this questionnaire included the type of treatment participants received (surgery/orchiectomy, chemotherapy, radiation therapy, and/or surveillance), time since the conclusion of treatment, and the type of diagnosis (seminomatous or nonseminomatous). For this study, we invited everyone who indicated having undergone some type of physician-supervised treatment for TC to participate.

The study consisted of a pre-test questionnaire administered at Time 1 (T1) containing measures of expressiveness, general quality of life, general mental health, and sexual health. All participants completed the same questionnaire. Participants were then randomly assigned to one of three treatment conditions: positive expressive writing, negative expressive writing, and innocuous writing (used as a comparison group). Random assignment to conditions was done using a computerized random-numbers generator. On three consecutive Monday mornings, participants were emailed a writing topic and were instructed to complete their writing assignment within one week. Participants completed and submitted each writing activity online through a commercial data collection service. Although collecting data online is not an orthodox application of the expressive writing intervention, it has been applied successfully in previous studies (Sheese, Brown, & Graziano, 2004).

Following the weekly writing activities, participants were emailed a link to a follow up questionnaire at Time 2 (T2) containing the same measures of expressiveness, general quality of life, mental health, and sexual health. At the conclusion of the study, all participants were paid \$100US in exchange for their participation.

Measures

General quality of life was measured using the 30-item Quality of Life Questionnaire (QLQ-30: Aaronson et al., 1993). The QLQ-30 was designed to measure specific quality of life indicators that are commonly associated with treatment and recovery from cancer. The measure contains three subscales: global health, daily functioning, and symptomology. In the present study, we combined the subscales into one aggregate measure for use as an assessment of overall quality of life. Reliability was high, $[\alpha] = .93$.

Mental health was measured using the 12-item version of the General Health Questionnaire (GHQ-12: Goldberg et al., 1997). The GHQ-12 has been used as a reliable indicator of overall mental health in hundreds of studies that assessed both clinical and nonclinical populations. Items from the GHQ-12 include "Have you recently been able to concentrate on what you're doing?" and "Have you been able to face up to your normal problems?" Reliability was good, $[\alpha] = .89$.

Sexual health and performance was assessed with a six-item measure created by the authors for this study. The scale was intended to work as two separate subscales, one measuring performance and the other measuring sexual desire. Items for each subscale can be seen in Table 1. Reliability estimates showed that the scale was stronger with all six items grouped together. With the subscales combined, reliability for this measure was only moderate with $ct = .66$.

Expressiveness was measured for use as a covariate using the 20-item Assertiveness/Responsiveness scale (Richmond & McCroskey, 1990). The measure consists of two subscales, one for each trait, with 10 items each. Both scales ask respondents to rate how much they identify with a list of representative behaviors. Behaviors for the Assertiveness scale include items like "defend own beliefs" and "have strong personality" whereas items from the Responsiveness scale include items like "sympathetic" and "sensitive to the needs of others." Reliability for each of these items was high with Assertiveness at $[\alpha] = .88$ and Responsiveness at $[\alpha] = .92$. This item was included as a measure of comfort with emotional communication. Some studies have indicated that participants' tendency to repress their emotion can moderate the effectiveness of expressive writing (Lumley, Tojek, & Macklem, 2002), so we included this measure as a potential covariate.

On all measures, higher scores reflect greater levels of the variable.

Writing Manipulations

Participants assigned to the positive expressive writing conditions were instructed to write about any aspects of their cancer experience that they would characterize as positive, whereas those assigned to the negative writing condition were asked to indicate what was negative about their experience. In both conditions, based on Pennebaker's work, participants were instructed to write for 20 minutes at a time on three consecutive weeks. Exact writing instructions appear in Appendix A.

Participants assigned to the comparison group were instructed to write on the same schedule about innocuous topics, such as events of the day, the layout of their homes, or the responsibilities at their current positions. Exact writing instructions appear in Appendix A.

Manipulation Check

Participants in the two experimental conditions were instructed to write about their thoughts, emotions, and memories related to TC, whereas those in the comparison group were instructed to write about innocuous topics. If these disparate instructions were successful, therefore, the written narratives produced by these groups should differ significantly in their use of particular linguistic features, including pronouns, cognition terms, and positive and negative emotion terms. Conversely, the narratives produced by the groups should not differ in structural linguistic properties such as the total number of words. To check the manipulation, we submitted participants' narratives to a series of linguistic analyses using the Linguistic Inquiry and Word Count (LIWC) software (Pennebaker, Francis, & Booth, 2001). Reliability and validity data for LIWC appear in Pennebaker and Francis (1996) and Pennebaker et al. (2001).

RESULTS

Participant Attrition

All 48 men who completed the qualification questionnaire were invited to participate in the study. Of this original group, a total of 34 completed the T1 questionnaire. Of that group, a total of 28 participants completed a minimum of two of the three writing activities (20 completed all three). We conducted a series of two-tailed t-tests to examine: (1) whether participants who withdrew from the study after the questionnaire systematically differed from participants who completed a minimum of two writing activities; and, (2) whether participants who completed only two writing activities systematically differed from participants who completed all three writing activities. For each of these tests, we compared the groups to determine their equivalency at T1 on each of the primary outcome measures: mental health, general quality of life, and sexual health.

The first series of t-tests determined that participants who withdrew from the study after the T1 questionnaire were not significantly different from participants who completed at least two of the writing activities on measures of mental health, $t(31) = -.40, p = .69$, general quality of life, $t(30) = .81, p = .43$, or sexual health, $t(32) = .75, p = .46$. The second series of t-tests revealed that participants who completed two writing activities did not differ from participants who completed all three on measures of mental health, $t(25) = .22, p = .83$, general quality of life, $t(25) = -.52, p = .61$, or sexual health, $t(26) = -.352, p = .73$. Given that the sample size for this study was relatively small and the individual comparisons on primary outcome measures were all non-significant, we decided to include all 28 individuals who completed a minimum of two writing activities in subsequent analyses.

Manipulation Check

The number of pronouns used in narratives differed as a function of group membership, $F(2, 27) = 11.01, p < .001$, with participants in the positive ($M = 12.64, SD = 2.00$) and negative ($M = 14.78, SD = 3.41$) expression conditions using significantly more pronouns than participants in the comparison group ($M = 8.96, SD = 1.42$). The number of cognition words used in participant narratives also differed as a function of group membership, $F(2, 27) = 14.23, p < .001$, with participants in the comparison group ($M = 3.51, SD = 1.26$) using significantly fewer cognition terms than participants in the positive expression group ($M = 6.09, SD = 1.66$) who in turn used fewer cognition terms than participants in the negative expression group ($M = 7.71, SD = 1.79$).

The use of positive and negative emotion words provided a direct test of the degree to which participants adhered to the instructions for the writing activities. Across all writing activities, participants assigned to the positive expression condition showed a greater level of positive emotion in their writing ($M = 3.19, SD = 1.02$) than did participants in the negative expression ($M = 1.76, SD = 1.08$) and comparison ($M = 1.53, SD = .45$) groups, $F(2, 27) = 8.48, p = .002$. Likewise, the average display of negative emotion across all writing activities was higher in the negative expression condition ($M = 2.40, SD = .92$) than in either the positive expression ($M = 1.14, SD = .50$) or comparison ($M = .86, SD = .66$) groups, $F(2, 27) = 12.04, p < .001$. These findings confirm that the manipulation succeeded in eliciting different emotional responses from participants as a function of their group assignment.

As expected, participants' writing samples did not differ in total number of words as a function of condition, $F(2, 27) = .38, p = .69$.

Moderating Variable

Previous research using the expressive writing paradigm has demonstrated that the level of comfort individuals have with emotional disclosure can moderate the effectiveness of the intervention (Lumley, Tojek, & Macklem, 2002). In a review of studies that have examined the effects of emotional repression on expressive writing-related outcomes, Lumley et al. reported that studies have generally found emotional repression to have a moderating effect on the outcomes of expressive writing. In the present study, emotional discomfort brought on by disclosure is not one of the outcome variables we directly tested; however, given that previous studies have shown a reliable moderating effect, we incorporated participants' scores on responsiveness, measured with Richmond and McCroskey's (1990) responsiveness scale, into our analyses as a covariate. Richmond and McCroskey define the concept of responsiveness as a substitute for feminine gender role; people who score high on responsiveness have greater comfort with emotions and emotional expressions.

Hypothesis and Research Question

The hypothesis predicted that positive and negative emotional writing produces improvements in mental health, quality of life, and sexual health not paralleled by innocuous writing. To test the prediction, we first assessed T1 equivalency across conditions for each of our outcome variables. Next, we computed change scores for each of the dependent measures by subtracting participants' T1 scores from their T2 scores on the measures of mental health, general quality of life, and sexual health. The resulting change scores were therefore positive when the value of the variables increased from T1 to T2 and negative when the value decreased. Each prediction was tested using an ANCOVA with group assignment as the independent variable, the change score for the relevant outcome as the dependent variable, and responsiveness as the covariate. Finally, we conducted a series of planned contrasts using the change scores on each of the outcome measures. In line with our predictions, the positive and negative writing conditions were each assigned a contrast coefficient of 1 and the comparison group was assigned a coefficient of -2.

To test H1a, scores on general mental health were compared using an ANCOVA with change scores as the dependent variable, group assignment as the independent variable, and responsiveness as a covariate. The ANCOVA revealed a nonsignificant main effect of condition, $F(2, 20) = 3.64, p = .05$, partial $[\eta^2]_{sup.2} = .31$, observed power = .59. Due to the directional nature of the hypothesis, we proceeded with the planned contrast despite the nonsignificant omnibus effect. The contrast comparing both expressive writing groups to the control group was significant, $t(17) = 2.12, p = .049$, indicating that participants in the expressive writing conditions experienced greater positive changes in their general mental health than did participants assigned to the comparison group. The mean change scores for each group revealed that participants assigned to the positive expression condition experienced a large increase in scores on the GHQ-12 ($M = .34, SD = .47$), participants in the negative expression condition experienced no change ($M = .00, SD = .46$), and participants in the comparison group experienced a decrease ($M = -.29, SD = .39$). These means demonstrate that H1a was partially supported; participants in the positive expression group experienced improvements in their mental health as a result of the manipulation, whereas those in the negative expression group did not.

To test H1b, scores on the general quality of life were compared using the same techniques. Results demonstrated a nonsignificant main effect of condition on quality of life, $F(2, 19) = 1.26, p = .31$, partial $[\eta^2]_{sup.2} = .14$, observed power = .23. The planned contrast also failed to reveal a significant group effect, $t(16) = .87, p = .395$. H1b was not supported.

To test H1c, scores on sexual health were compared using the same techniques. As with H1b, the ANCOVA revealed a nonsignificant main effect of group condition on change in sexual health, $F(2, 21) = .64, p = .54$, partial $[\eta^2]_{sup.2} = .07$, observed power = .14. The planned contrast also failed to reveal any significant between-groups differences, $t(18) = .36, p = .719$. H1c was not supported.

Research Question

Research question one inquired whether positive or negative expressive writing would produce more beneficial results for participants on measures of general mental health, general quality of life, and sexual health. To explore these questions, we conducted a series of ANCOVAs with group membership as the independent variable and general mental health (RQ1a), general quality of life (RQ1b) and sexual health (RQ1c) as individual outcome variables. For each of the three tests, we used participants' responsiveness scores and T1 scores on the relevant dependent measures as covariates.

Table 1
Items for Sexual Health and Performance Scale

<i>Sexual Desire Subscale</i>
1. I am not finding sexual relations very satisfying.*
2. I am not feeling sexual desire.*
3. I am not having sexual intercourse or engaging in sexual activities.*
<i>Sexual Performance Subscale</i>
1. I am able to ejaculate normally.
2. I am not able to get or keep an erection.*
3. I am able to reach orgasm through sexual activity.

* reverse-scored.

RQ1a asked which set of writing instructions (positive or negative) would produce the largest improvement in mental health. The ANCOVA revealed a significant main effect of condition, $F(2, 20) = 5.60, p = .02$, partial $[\eta^2]_{sup.2} = .43$. Comparison of the estimated marginal means revealed that participants in the positive expression condition ($M = 5.40, SE = .154$) had higher T2 mental health scores than participants in the negative expression ($M = 5.04, SE = .17$) and comparison ($M = 4.70, SE = .16$) groups. Given that this finding is in concert with the results of H1a, it seems that the positive expressive writing condition produced the greatest positive effects for mental health outcomes in the present study.

RQ1b inquired about the efficacy of the different expressive writing conditions for improving participants' quality of life. The ANCOVA revealed a nonsignificant main effect of condition on quality of life, $F(2, 19) = 1.35, p = .29$, partial $[\eta^2]_{sup.2} = .16$, observed power = .24. Estimated marginal means indicated that participants in the negative expression group ($M = 2.86, SE = .21$) scored higher on quality of life than did participants in the comparison ($M = 2.52, SE = .21$) and positive ($M = 2.38, SD = .19$) writing conditions, although the differences were nonsignificant.

RQ1c inquired about the efficacy of the expressive writing conditions for improving participants' scores on the measure of sexual health. Results of the ANCOVA revealed a nonsignificant main effect of condition, $F(2, 22) = .60, p = .60$, partial $[\eta^2]_{sup.2} = .07$, observed power = .13. As with mental health, the estimated marginal means indicated that participants in the positive expressive writing condition ($M = 6.05, SE = .28$) scored higher on the measure of sexual health than did participants in the negative expression ($M = 5.68, SE = .28$) and comparison ($M = 5.66, SE = .32$) conditions, although the differences were nonsignificant.

DISCUSSION

TC survivors face a number of challenges personally and relationally. In previous studies, men have reported that TC affects their self-image by raising fears of mortality and compromising their masculine identity. Empirical studies have additionally found that TC survivors' intimate relationships are often hampered because of sexual problems and low levels of relational satisfaction. Whereas traditional forms of group therapy are effective in helping survivors of other cancers deal with these and other challenges, TC survivors' shame, embarrassment, and reluctance to disclose about their experiences can render group techniques ineffective. As an alternative to traditional group therapies, we examined the efficacy of a brief, expressive writing intervention for improving health and quality of life outcomes for testicular cancer survivors. We hypothesized that TC survivors who engaged in expressive writing about their experiences would experience improvements in their general mental health, quality of life, and sexual health relative to

participants who wrote about innocuous control topics for the duration of the study. As an additional feature, we extended the model introduced by King and Miner (2000) and had half of the experimental participants write only about the most positive experiences with TC whereas the remaining experimental participants focused on the negative experiences with TC.

Results demonstrated that participants assigned to the positive expressive writing condition experienced a net improvement in their self-reported mental health compared to participants in the other groups. Participants in the negative expression condition experienced no net change in their mental health over the five-week trial, and participants assigned to the comparison group actually experienced a modest reduction in their mental health. We were unable to detect any effects of the expressive writing condition on participants' reported sexual health or quality of life. Although we were optimistic that expressive writing might have yielded improvements in each of these outcomes, the fact that mental health was the only outcome affected by the writing intervention was not entirely surprising. In her meta-analysis, Frattaroli (2006) reported a larger effect size for mental health outcomes (particularly those based on the GHQ) than for outcomes based on self-reported expression of symptoms (as measured by the QLQ-30). No comparable studies included indices of sexual health, but measures assessing general assessments of daily functions such as work, relationships, and cognitive ability (of which sexual function would likely be a topic) had rather small effect sizes as well.

The fact that men in the positive expression condition experienced improvements in their mental health following the writing intervention supports both the cognitive structuring (Pennebaker & Seagal, 1999) and undoing (Fredrickson, Mancuso, Branigan, & Tugade, 2000) hypotheses. The cognitive structuring hypothesis posits that the benefits of expressive writing are attributable to its assistance in helping participants organize their thoughts and emotions into a coherent narrative format. This organizing process is thought to reduce the stress associated with persistent rumination about unresolved emotions associated with traumatic events.

Pennebaker's research has revealed two features of participant narratives are able to discriminate between participants who benefit from expressive writing and those who do not: the number of positive emotion words and the number of words that demonstrate causal relationships (Pennebaker, Mayne, & Francis, 1997). In the present study, participants assigned to the positive expression condition did use the most positive emotion words; however, participants assigned to the negative expression condition used the greatest number of words that demonstrated cognition. Given that cognition words were greater in the negative expression condition, it is possible that the heightened use of positive emotion alone was sufficient to induce some of the positive changes in mental health that occurred following the intervention. If this was indeed the case, the findings of the present study support Fredrickson's undoing hypothesis. Encouraging men to write only about the most positive aspects of their experiences with TC might have helped to replace (and subsequently undo) the effects of lingering bad memories associated with treatment and recovery.

These findings also corroborate the findings of Stanton and Danoff-Burg (2002) and Creswell et al. (2007), who reported that positive emotion expression was associated with decreased symptoms among breast cancer patients. In subsequent analyses, Creswell et al. determined that self-affirmation mediated the relationship between positive emotion and health improvements; cognitive words had no effect on participant health outcomes. Future studies of cancer patients and survivors should continue to explore the relationships between positive emotions, increased self-efficacy, and health improvements in the context of expressive writing interventions.

Practical Applications

As with many forms of cancer, impairments in mental and emotional health are common co-morbidities for TC patients and survivors (Fossil, Dahl, & Loge, 2003). Standard allopathic interventions are highly effective at arresting the growth of the cancer itself, resulting in a low rate of relapse (Feldman, Bosl, Sheinfeld, & Motzer, 2008), but they offer little in the way of treatment for impaired quality of life. The present study's finding that a positive emotion writing intervention resulted in improved mental health has at least three practical implications for TC patients and survivors, their clinicians, and people in their social networks.

First, emotionally expressive writing may be an effective adjuvant to allopathic treatments for TC. Because TC usually strikes in early adulthood and is usually treated successfully, most patients must negotiate the physical, psychological, and relational effects of their TC for decades as post-treatment survivors. As a complement to their medical treatments, TC survivors may use expressive writing exercises to enhance their mental health and, in the process, to acquire the emotional tools to cope successfully with the trauma of TC and its treatment. According to Fredrickson (2004; Fredrickson & Branigan, 2005), improvements in one's emotional state broaden one's thought-action repertoire, allowing one to perceive previously elusive opportunities for responding to challenges (such as cancer), and build a storehouse of cognitive and psychological resources for doing so successfully. In concert with medical therapies, and during the protracted post-treatment period, therefore, TC patients may be able to use emotionally expressive writing as a tool for improving mental and emotional health and enhancing their resilience as a result.

Second, writing independently about the positive aspects of TC may offer an alternative means of enhancing coping for men who are unable or unlikely to participate in traditional support groups. Traditional support groups are effective at helping patients cope successfully with many medical conditions, including other malignancies such as breast cancer (Goodwin et al., 2001) or skin cancer (Lamberg, 1997). As we noted above, however, there is reason to question their efficacy for TC. In particular, men are less likely than women to seek care from social network members (Gabbard-Alley, 1995) in the first place, and the potentially emasculating nature of TC may especially inhibit them from seeking the support of other men, as they would in a traditional support group. One consequence of these factors is that many men would be unwilling to participate in a traditional support group for TC. In a randomized controlled trial offering a social support intervention to newly diagnosed TC patients, for instance, Moynihan, Bliss, Davidson, Burchell, and Horwich (1998) reported that only 40% of eligible men agreed to take part. A second consequence is that those men who do take part may actually find the support group to be a stress-inducing experience, rather than a stress-alleviating one, which may account for Moynihan et al.'s failure to identify any significant benefit of the social support intervention once they accounted for disease progression. In contrast, because the emotionally expressive writing activity is solitary, it may offer a greater sense of privacy, independence, and self-efficacy for TC patients who may not benefit from a support group experience.

Finally, as an adjuvant therapy, emotionally expressive writing is exceedingly cost effective. Compared to traditional support groups or individual psychotherapy, expressive writing can be performed with no supervision and at a minimum expense. As the procedure in

the current study demonstrated, it can also be administered effectively to a geographically dispersed population. Given rising concerns over the cost of health care in the United States, and given that many complementary therapies are not reimbursed by insurance plans, the availability of an effective therapy that is nearly free of cost is surely advantageous.

Limitations and Considerations

The present study extends the application of the expressive writing technique to a new patient population that could potentially benefit a great deal from an intervention that allows them to express their emotional experiences privately. Although the findings are encouraging, they must be interpreted in light of some of the study's shortcomings. Without question, the greatest obstacles we encountered in conducting this study were related to the participant population. When recruiting, we experienced a very poor response from listserv moderators, and all of the participants used in the present study were ultimately recruited from the same distribution list. These men were part of a large group of TC survivors who were used to receiving several messages related to TC treatment and recovery on a daily basis. It is important to note that this was not an online support group in the sense that men did not disclose information and seek support from fellow group members. Still, the fact that all participants chose to subscribe to this list might reflect an interest in TC that other survivors would not share.

After recruiting, the next major problem we experienced was participant attrition. Of the 48 men who started the study, 28 completed at least two of the three writing activities, and only 20 saw the study through to completion. From a methodological standpoint, the reasons for attrition are clear: even when compared to other experimental studies, expressive writing interventions last for several days or weeks (the current study lasted five weeks); participants are instructed to write about the same topic for multiple writing sessions (leading to fatigue); and in the present study, participants were responsible for their own follow-through as they were recruited and subsequently wrote online. Frattaroli (2006) noted that participant attrition is a common problem in expressive writing studies. Of the 146 studies included in the meta-analysis, 25% had attrition rates of greater than twenty percent. In the present study, fewer than half of the participants completed each phase of the process.

Notable, however, were the effect sizes identified in our analyses, which ranged from .07 to .43. The largest effects were observed for general mental health (average partial $[\eta^2]_{\text{sub}.2} = .37$), with general quality of life (average partial $[\eta^2]_{\text{sub}.2} = .22$) and sexual health (average partial $[\eta^2]_{\text{sub}.2} = .07$) producing smaller but still notable effects. Although many of these effects failed to achieve significance, their magnitudes clearly suggest beta errors produced by attenuation due to the low N rather than the lack of a meaningful effect to be found. Replication of these tests in an experiment with greater statistical power is therefore warranted.

We are encouraged by the results of the present study and consider this a first step in developing a cognitive-emotional treatment that can help men deal with the lasting ramifications of testicular cancer. Of issue for researchers and practitioners both will be overcoming the challenges of recruitment and attrition. Although the recruitment strategy employed in the present study was targeted to TC survivors, it was limited to those who had already elected to take part in an online TC group, potentially leaving large numbers of otherwise qualified participants uninvited. Recruitment may be more successful if it takes a broader approach, not only targeting TC survivors but also including snowball and referral methods to reach potential participants not involved in online TC groups. An additional potential benefit of that approach is that participants who were referred to the study by other participants or by loved ones may have additional intrinsic incentive to complete the full study. Those possibilities await investigation, but they may help define the therapeutic applications of the present procedure.

The potential benefits of this intervention cannot be overlooked; hundreds of thousands of TC survivors struggle in silence with the same fears of mortality and loss of masculinity. We are optimistic that expressive writing can be used in the future to help these men deal more effectively with their struggles and move beyond their private pain.

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APPENDIX A

WRITING INSTRUCTIONS

Writing instructions given to participants in the positive writing condition read:

Think about any aspect of your experience with testicular cancer that you would characterize as positive. For the next 20 minutes, write about something that you think of as a positive aspect of having had testicular cancer or having been treated for it. It can be anything that you consider positive about your experience with testicular cancer. Don't worry about your spelling, punctuation, or grammar. Just write about your thoughts. If you get stuck while you're writing, simply write more about what you've already written. Just keep writing for the entire 20 minutes. At the end of that time, click on OK. Writing instructions given to participants in the negative writing condition were identical except that the word "negative" was substituted for the word "positive."

Writing instructions for those in the comparison group (administered in counterbalanced order within that condition) were:

Think about the things that have happened to you in the last week. Other than going to work and/or school, what sorts of things have you been doing over the last seven days? In the space provided, give a description of the events of the past week. Think about the house or apartment in which you currently live. What does your residence look like, what is the layout, what furnishings do you have, etc.? In the space provided, give a detailed description of your current residence. Think about your current job or the last job you held. What was your position? How did you spend your time at your job? What did your place of employment look like? In the space provided, give a detailed description of your how you spent your time at work and the environment in which you worked.

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Table 1 Items for Sexual Health and Performance Scale Sexual Desire Subscale 1. I am not finding sexual relations very satisfying. * 2. I am not feeling sexual desire. * 3. I am not having sexual intercourse or engaging in sexual activities. * Sexual Performance Subscale 1. I am able to ejaculate normally. 2. I am not able to get or keep an erection. * 3. I am able to reach orgasm through sexual activity. * reverse-scored.

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