
The Relation of Cancer-prone Personality to Exceptional Recovery from Cancer:
A Preliminary Study

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Running title: Cancer-prone Personality

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Key words: cancer-prone personality, cancer, coping with cancer, unusual recoveries from
cancer

Preparation of this article and the research reported in it were supported by Research Grant MH 01293 and Research Scientist Award 5 K05 MH00363 from the National Institutes of Mental Health to Seymour Epstein

Submitted April 24, 2005

Abstract

An exceptional cancer-recovered group (N = 7) was compared to two other recovered groups, a non-exceptional cancer-recovered group (N = 27) and a non-exceptional heart-disease (HD) recovered group (N = 31). In support of the hypothesis that mitigation of a cancer-prone personality is associated with very unusual recoveries from cancer, the exceptional cancer group reported a greater prevalence of attributes of a cancer-prone personality before diagnosis and a greater decrease in these attributes from before diagnosis to after recovery than the other groups reported. Both cancer groups reported greater stress from life events within the two year period preceding diagnosis, particularly for loss or threatened loss of a close relationship, than the HD group reported. The high internal-consistency reliability of a Cancer-prone Personality Inventory (CPPI) and its discrimination of the two cancer groups from the heart-disease group make it a promising measure of a cancer-prone personality.
The primary purpose of the present study was to conduct a preliminary investigation of the relation of very unusual recoveries from terminal cancer and mitigation of a cancer-prone personality. Highly unusual recoveries from cancer are often labeled as spontaneous remissions and, once having been so labeled, considered as anomalies and given little further consideration. This is unfortunate, for, at the very least, such cases can provide useful hypotheses for further investigation. Unfortunately, such cases, by definition, are very rare, making it extremely difficult to conduct research with adequate samples. Consider what would be required to obtain a sample of patients with exceptional recoveries if the criterion for exceptional was less than a one-percent likelihood of recovery according to actuarial data for a particular type and stage of cancer. One hundred cases of cancer, on average, would have to be considered for every experimental subject obtained, and not all of these would agree to participate. To obtain an experimental sample of 30 exceptional patients, over 3,000 records would have to be examined.

We chose to follow a course that was more practical for us, namely obtaining within a limited time period a sample of patients with the most unusual recoveries from cancer we could locate who agreed to participate. We included the best controls we could implement, evaluated our data quantitatively, and tested specific hypotheses. We nevertheless identify our procedure as preliminary because it has obvious limitations, the most important of which is relying on self-report information. However, this does not mean the study is without value. At the very least, to the extent that we can verify our hypotheses, it would provide justification for conducting prospective research that would be much more costly in expense, time, and effort. The major
strengths of our study are the extreme sample of exceptionally recovered cancer patients that we examined and the hypothesis that we proposed about their recovery. It remains, of course, for more rigorous investigations to verify our results. Our initial findings are sufficiently promising to warrant conducting such investigations.

Before proceeding further, we wish to emphasize that we are not suggesting that psychological factors are important in all cases of cancer. Other factors that can contribute to the acquisition and progression of cancer are genetic factors, external environmental factors (e.g., pollutants, radiation), nutrition, smoking, alcohol and other drug abuse, and viruses. There is nothing magical or even esoteric about the assumption that psychological factors can play a significant role in certain cases of cancer. It is based on the consideration that psychological factors can be a source of depression, feelings of helplessness, or suppression of emotional expression, and that such reactions can have important biological consequences, including immune- and endocrine-system dysfunction. This, of course, is no more than to acknowledge the fundamental premise of psychoneuroimmunology.

The Cancer-prone Personality

One source of psychological factors that has been proposed as possibly influencing the onset and course of cancer is a constellation of cancer-prone personality attributes. Following is a list of the attributes that have been suggested from various sources (e.g., Antoni & Goodkin, 1988; Dunkel-Schetter, 1984; Eysenck, 1988; Greer & Watson, 1985; Gil, 1989; Jansen & Muenz, 1984; Kune, et al.1991; LeShann, 1977; Levy, 1985; Temoshok, 1987; Temoshok & Dreher, 1992; Temoshok & Heller, 1984): (a) unable or unwilling to express emotions, particularly
hostility, (b) feeling hopeless, helpless, and deeply despairing, or lacking interest in or commitment to important issues in one’s life, (c) being unassertive and unable to express or fulfill one’s own needs, yet eager to please others and fulfill their needs, (d) feeling socially isolated, unwanted and/or unloved, and (e) maintaining a stoic facade of well-being.

Although there has been agreement among a number of practitioners and researchers since ancient times (see historical review by LeShan, 1959) that psychological factors may be implicated in cancer, there has been less agreement about what to call this influence. Some, such as Eysenck (1988), refer to a “cancer-prone personality,” whereas others, such as Temoshok (1992) take vigorous exception to this terminology. Temoshok objects to its use because she believes it implies an inherent, unchanging behavioral pattern that is the essence of a person’s identity.

We define a “cancer-prone personality” as a personality that includes a constellation of attributes (shortly to be operationalized) that is relatively stable under normal circumstances, on which individuals differ reliably, and which increases the likelihood of a future diagnosis of cancer. By “relatively stable” we do not mean that a trait is inborn or that it is otherwise not subject to change, but only that under normal circumstances people are relatively consistent in their behavior over extended periods of time. It is widely recognized that under certain conditions, such as psychotherapy and extreme or unusual circumstances, including the diagnosis of a fatal illness, people’s personalities do change. This is well illustrated in many of the cases described by Temoshok and Dreher (1992). In addition, our definition does not assume that a cancer-prone personality is the person’s total personality. What it does assume is that a
significant component of a cancer-prone personality is a constellation of attributes that makes a person who possesses it more vulnerable to cancer than others. In this respect, it is no different from any other personality attribute. For example, no one assumes that people who have extroverted personalities are totally defined by their extroversion attribute. Although they share a common attribute with each other, they also differ in important other ways. In like manner, the constellation of attributes that define the cancer-prone personality is only one component of an overall personality that makes the person vulnerable to cancer.

Although a widely used scale, the Mental Adjustment to Cancer scale (MAC, Watson, Greer, & Bliss, 1989), was available for measuring people’s coping behavior in reaction to their diagnosis of cancer, we required an instrument for identifying people’s vulnerability to cancer before their diagnosis. Since there was no available measure of the cancer-prone personality, we had to construct our own.

In marked contrast to the characteristics attributed to the cancer-prone personality are the following characteristics attributed to cancer patients with unexpectedly favorable outcomes: (a) openly expressing anger and hostility when confronted with frustrating situations, (b) having a high degree of determination and a "fighting spirit," (c) having a positive outlook, particularly with regard to one’s treatment, (d) assuming an active role in one’s treatment, (e) taking charge of one’s life and being “true to oneself” and assertive in fulfilling one’s needs, and (f) having a deep and satisfying relationship with one or more people (Cunningham, 1992; Cunningham & Watson, 2004; Derogatis, Abeloff, & Melisaratos, 1979; A. Epstein, 1989; Greer, Morris, & Pettingale, 1979; Rogentine et al., 1979; Roud, 1990;
There is also some evidence that psychological interventions can prolong survival time (e.g., Fawzy et al., 1993; Grossarth-Maticke et al., 1983; Richardson et al., 1990; Spiegel et al., 1989). Given the favorable results with patients treated with relatively modest forms of psycho-social interventions, it seems plausible that yet more favorable results could be achieved with more intensive psychological interventions that specifically address the attributes that may have contributed to the development or progression of cancer (e.g., Temoshok & Dreher, 1992). This is what happened in the case of Alice Epstein (1989), who had a hypernephroma that had metastasized to both lungs. During psychotherapy conducted on a daily basis, she rapidly experienced a major personality transformation, including an amelioration of her cancer-prone personality attributes. Within a few months after beginning therapy, her tumors began to shrink, and in less than a year she was completely free of all signs of cancer. The chance of remission, let alone recovery, from the state of her disease was less than 4 in 1000 at the time of her illness (DeVita, Hellman, and Rosenberg, 1985). We treat her case as a prototypical representative of our exceptional cancer group because of the detailed and compelling evidence provided in her autobiographical book.

Up to this point, we have cited studies and clinical observations favorable to our hypotheses. However, there is another side to the picture. Several studies have failed to find significant effects associated with psycho-social interventions (e.g., Edward et al., 1990; Gellert, Maxwell, & Siegel, 1993; Illyckyj et al, 1994; Linn, Lin, & Harris, 1982). (For more thorough reviews of studies on the effect of psychological interventions on cancer outcomes, see
Andersen, 2002; Nezu et al., 2003; & Temoshok & Dreher, 1992.)

If our assumption is correct that psychological factors can play a role in at least some cases of cancer onset and progression, how is it possible to account for why support for this relation rests mainly on subjective evidence, such as clinical observation and autobiographical accounts, whereas well-controlled studies produced more mixed results? An obvious possibility is that the subjective data are less trustworthy, being based on selective and biased observation, and the controlled studies that produced positive results are methodologically flawed. Another possibility, however, is consistent with the hypothesis that psychological factors are of primary importance in only a subset of cancer patients. Assuming this is true, it can account for the inconsistent results in research, as the particular patients included in a sample and the appropriate targeting of the treatment to the sample could affect the results (Andersen, 2002; Cunningham & Edmonds, 1996; Cunningham et al., 2000; Kemeny, as reported in DeAngelis, 2002).

It should be noted that the hypotheses in the present study primarily concern a very exceptional subset of cancer-recovered people, namely those with extremely unusual recoveries. Our main interest is in why these people had remarkable recoveries that went far beyond reasonable expectations. We speculated that exceptional recoveries such as they experienced are most likely in people for whom psychological factors, such as a cancer-prone personality, played an important role in the onset and development of their cancers and that they exhibited dramatic recoveries because, for some reason or another, there was an amelioration of the psychological factors. The amelioration could have been produced for a variety of reasons, including psychotherapy, self-initiated psychological changes, changes in life-style, and changes in the
environment (see Cunningham & Watson, 2004 for an independently derived similar hypothesis that just came to our attention).

Personality attributes are not the only psychological influence that can affect vulnerability to cancer or its progression. Another possibility is the occurrence of stressful life-events. Some investigators and clinicians who have worked intensively with cancer patients believe that stressful events, particularly events associated with loss, can facilitate the development and/or progression of cancer (e.g., Cunningham, 1992; Eysenck, 1988; LeShan, 1977; Temoshok & Dreher, 1992). LeShan arrived at his views about psychological factors in cancer from treating many cancer patients with intensive psychotherapy. He proposed a stress-diathesis model in which people sensitized to loss by early childhood experiences, such as death of a parent, develop cancer-prone personalities and are devastated when they experience another significant loss when they are adults. In addition to having this sensitivity, he assumed that those with cancer-prone personalities are presumed to cope particularly poorly with loss if they avoid expressing their emotions, particularly the anger aroused by the loss. The result is an enduring state of helplessness and hopelessness. At the same time, the person with a cancer-prone personality is said to present an uncomplaining and compliant front in order to please others and avoid rejection. Temoshok and Dreher (1992), among others, are in essential agreement with LeShan. Based on her research and clinical observation of patients with melanoma, Temoshok concluded that life events that produce a state of hopelessness in a person with an inability to express emotions can have a significant influence on the onset and development of cancer. Some findings consistent with this view are provided by a prospective study by Cooper and Faragher
(1993) of 2,163 women who attended a breast-screening clinic. They found that the women who had experienced a major aversive life event, particularly bereavement or some other significant loss, and who failed to express their emotions or to seek help from others, had an increased likelihood of being subsequently diagnosed with breast cancer.

Hypotheses

To test our hypothesis about a relation between exceptional recoveries from cancer and amelioration of a cancer-prone personality, we compared a group of patients with exceptional recoveries from cancer to two other recovered groups, a group with non-exceptional recoveries from cancer and a heart-disease recovered group. The exceptional cancer group, which was the group we were primarily interested in, consisted of people whose recoveries were very unusual based on what could be expected from their diagnosis and medical treatment. We were also interested in the role of psychological factors in the recoveries of the non-exceptional cancer-recovered group. That their recoveries were not unusual does not mean they were routine. Many with their diagnosis and stage of illness do not recover. As our non-exceptional cancer group had done relatively well, we considered the possibility that psychological factors may have played a role in their recoveries, albeit we expected to a lesser extent than in those with exceptional recoveries.

Our three major hypotheses were as follows: (1) A cancer-prone personality is a more common precursor of a diagnosis of cancer than it is of a diagnosis of other life-threatening diseases, such as heart disease. (2) A cancer-prone personality is a more common precursor of a diagnosis of cancer in those with exceptional recoveries from cancer than in those with non-
exceptional recoveries from cancer. (3) There is a direct relation between mitigation of a cancer-prone personality and exceptional recoveries from cancer.

We also tested the following ancillary hypotheses: (4) The occurrence of highly stressful life-events, such as rejection by a loved one, are a more common precursor of a diagnosis of cancer than of other equally life-threatening diseases, such as heart disease. (5) The incidence of such stressful events is greater among those with exceptional recoveries from cancer than among those with unexceptional recoveries.

Comparison Groups

An important challenge for research based on retrospective recall is to control for reporting bias. To control for a positive reporting bias produced by the recovery status of the exceptional cancer-recovered participants, we used two comparison groups. One was a group of non-exceptional cancer-recovered participants, and the other was a group of non-exceptional heart-disease recovered participants (i.e., people who responded favorably to treatment and were in a stable, improved condition). Although the use of these groups can control for the patients' recovery or stable state, it can not control for awareness by the exceptional cancer group of how remarkable their recoveries are. Unfortunately, it is impossible to completely control for such awareness, even in large, randomized, long-term prospective studies, so long as they include post-recovery self-reports. A mitigating factor in the present study is that, as will be shown, the pattern of results does not readily lend itself to an explanation in terms of biased reporting.

The non-exceptional cancer-recovered group was included to provide a meaningful comparison with the exceptional cancer-recovered group as both groups had the same disease
and both were fully recovered. There were two reasons for including the heart-disease group. One was to determine whether amelioration of a cancer-prone personality is specific to recovery from cancer. The other was to determine whether performance on the CPPI could distinguish the two cancer groups from the HD group. If so, it would provide support for the construct validity of the CPPI as a measure of a cancer-prone personality. It would also provide support for a constellation of the various attributes measured by the CPPI items.

Method

Participants

The following groups of participants were examined: 7 exceptional cancer-recovered participants (4 females and 3 males), 27 non-exceptional cancer-recovered participants (17 females and 10 males), and 31 HD-recovered participants (10 females and 21 males). The exceptional cancer-recovered participants had greatly "beaten the odds," having fully recovered from stage IV cancer in diseases from which this was extremely rare. Their diagnoses included kidney cancer with metastasis to both lungs; breast cancer with metastases to lungs, lymph nodes, and bones; diffuse hystiocystic lymphoma with metastases to the ribs; oat cell brain cancer with metastases to the spine and inner ear; undifferentiated lung cancer with metastases to the lymph nodes, meningeal carcinamatosis, and lung cancer with metastases to the chest. The average cancer-free period at the time of testing for the exceptional cancer-recovered group was 7.18 years (see Table 1 for information on individuals). As a prototypical example of the participants in this group, Alice Epstein had a complete recovery from a stage IV hypernephroma that had metastasized to both lungs. At the time of testing, she had been without any detectable...
signs of cancer for over 4 years and at the time of this report for many more years. The actuarial likelihood of remission, let alone recovery, from this condition at the time of her diagnosis was less than 4 in a 1000 (DeVita, Hellman, & Rosenberg, 1985). In a study by Middleton (1967) of 141 patients with metastasized kidney cancer, not one survived beyond two years. It takes no sophisticated judgment to decide that Alice Epstein’s recovery was extremely unusual. The same is no less true of the other participants in the exceptional cancer-recovered group.

The non-exceptional cancer-recovered participants had also been diagnosed as disease free at the time of testing, but their disease-free status was not unusual according to actuarial data for their type and stage of cancer. None had metastasis. Included in their diagnoses were stages I, II, and III of breast cancer; stage III of Hodgkin's disease, and stage III of ovarian cancer. All 27 participants in this group were diagnosed as disease free at the time of testing. The average cancer-free period for this group was 4.52 years.

Exceptional and non-exceptional cancer-recovered participants had been treated with surgery, chemotherapy, radiation, and medication. Cancer-recovered participants were obtained from a variety of sources, including a convention of the National Coalition for Cancer Survivors (NCCS), autobiographical books (e.g., A. Epstein, 1989), books summarizing case-histories of exceptional recoveries from cancer (Roud, 1990; Williams, 1990), and referrals by physicians.

The individuals in the heart-disease group had been diagnosed with angina, arterial stenosis, valve stenosis, and myocardial infarction. All had undergone bypass or valve-replacement surgery. Heart-disease participants had been treated with medications and dietary restrictions. All heart-disease participants were described as "stable" or "disease free" at the time
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of testing. Heart-disease participants were recruited from meetings of the Mended Hearts Association, a national organization of survivors of heart surgery, and from physicians.

Demographic Information

The two cancer groups did not differ significantly from each other in age, education, and family history of their disease. However, the heart-disease group was significantly older than the cancer groups (Heart-Disease $M = 65.39$, $SD = 9.26$; Non-Exceptional Cancer $M = 50.15$, $SD = 14.04$; Exceptional Cancer $M = 55.14$, $SD = 7.78$), and was significantly less educated than the other groups (Heart-Disease: 26% graduated college; Non-Exceptional Cancer: 70% graduated college; Exceptional Cancer: 57% graduated college).

Measures

Stressful Life Events. Participants rated the degree of stress they experienced from twenty events during the period from two years before their diagnosis to the time of their diagnosis. They made their ratings on a five-point scale that ranged from (1) not at all to (5) very much. Events that were not experienced were left blank and given a weight of zero. Examples of items are: rejection by a loved one, death or serious illness of a loved one, financial problems, change in living arrangement, and legal problems. An overall life-events stress score was obtained by summing the intensity ratings. The events were also examined individually.

The Emotions and Attitudes Inventory (EAI). This 41-item inventory included items referring to emotions, attitudes, and personality characteristics reported in various studies to be associated with attributes of cancer patients who either fared exceptionally well or exceptionally poorly. (e.g., Derogatis, Abeloff, & Melisaratos, 1979; Dunkel-Schetter, 1984; Gil, 1989; Jansen...
& Muenz, 1984; Kneier & Temoshok, 1984; Temoshok & Heller, 1984). It also included items referring to the Type A personality, assumed to be related to heart-disease (e.g., Evans, 1990; Friedman & Rosenman, 1974; Price, 1982; Ragland & Brand, 1988; Steptoe, 1981). Participants endorsed the items on a five-point scale ranging from (1) not at all to (5) very much. Items in the EAI were presented in two forms: 3-item clusters of related emotions, such as "sad, blue, or depressed," and phrases or sentences describing personality attributes, such as "You are the kind of person who keeps your emotions to yourself and avoids burdening others with your troubles."

Participants filled out the EAI for two time periods, the three to six months period preceding their diagnosis and the current period, i.e., the time of testing. To facilitate recall for the period preceding diagnosis, participants responded to open-ended questions concerning their experiences during that period. Examples of such questions are: “What were you doing for work at the time? What was your living situation like? What was going on in your family? What other events affected you emotionally at this time?” These questions were repeated for the current period. All forms other than the EAI were filled out only for the current period.

We have already indicated why we constructed our own cancer-prone personality scale rather than use an available instrument with established reliability and validity, such as the MAC. To recapitulate, the main reason for constructing the Cancer-prone Personality Inventory (CPPI) was that we required a measure of a relatively enduring behavioral pattern that preceded the diagnosis of cancer. At the time we conducted our study we could not find such an instrument. This same situation did not exist for the heart-disease prone personality measure, as a widely used scale, the Jenkins Activity Survey (JAS) was available. The JAS is a reliable scale for
measuring a personality pattern presumed to predispose people to cardio-vascular disease. We nevertheless constructed our own scale rather than use the JAS for the following reasons. The results with the JAS and other scales for measuring the Type-A personality have been less than satisfactory (e.g., see reviews in Friedman & Booth-Kewley, 1987 and in Wright, 1988). Moreover, we wished to construct a heart-disease-prone personality scale in an identical manner as the construction of our cancer-prone personality scale. By doing so, the results with the two scales would be more comparable than if the scales had been constructed by different procedures. A further consideration was that it was more efficient to present the items for both scales in the same format rather than having to administer two separate tests with different instructions.

Although we intended to construct two scales, we succeeded only with the cancer-prone scale, as indicated by its ability to discriminate between the cancer- and heart-disease groups. An ad-hoc examination of the items in the HDPPI revealed that a possible reason for the failure was an insufficient number of items referring to the maladaptive aspects of a Type-A personality. Accordingly, we will make only occasional references to the HDPPI for special purposes.

Seven psychology graduate students sorted the EAI items into 3 categories, Type X, Type Y, or “neither”. The description of Type X, which corresponds to the cancer-prone personality, is a composite derived from the literature previously reviewed. The raters were provided with the following description of Type X people: "People with this personality type are cooperative, unassertive of their own needs, and patient. They inhibit expression of negative emotions (particularly anger), and accept/comply with external authorities. They try to please
others and often sacrifice their own needs. They feel like they are blocked from living a life that they truly want. Thus, they have an underlying sense of hopelessness, helplessness, and deep despair, although on the surface they may appear amiable and pleasant."

The description of Type Y, the heart-disease-prone personality, was as follows: "People with this personality type have sustained aggression, ambition, competitiveness, a chronic sense of time urgency, and an intense commitment to occupational goals. People with this personality also have strong feelings of hostility and anger. They tend to be keyed-up, impatient, tense, anxious, and highly aroused."

The CPPI scale was created by computing an alpha reliability coefficient for the items that at least five of the seven judges placed in the Type-X category and then eliminating the items that reduced reliability. The final CPPI scale consists of 27 items and has an alpha reliability coefficient of .95 for the period before-diagnosis and of .90 for the current period (i.e., the time of testing). Examples of items are "You are (were) the kind of person who tries to please others even if it means (meant) sacrificing your own desires," "You are (were) the kind of person who has strong emotions but keeps them bottled up," "You do (did) more for others than they do (did) for you," and "You are (were) the kind of person who accepts things as they are and tries not to rock the boat." (See Appendix 2 for the entire CPPI scale.)

The Constructive Thinking Inventory (CTI). We administered the CTI (Epstein, 2001) because we wished to obtain information on people’s reports of their automatic (i.e., spontaneous, unreflective) ways of viewing themselves and the world. Not only might the CTI distinguish between the cancer groups and the heart-disease group in this respect, but it could
also provide useful information on biased reporting in two ways. One way was by a comparison of scores on scales readily influenced by impression management with the score on scales resistant to such influence. The other was by an elevated score on a defensiveness scale designed to detect favorable reporting bias.

The CTI is a 108-item self-report, commercially available inventory that has been standardized on a representative national sample. It meets acceptable standards of reliability and has strong support for its construct validity (for a review of the extensive research that has been conducted with the CTI, see Epstein, 2001). CTI scores have been shown to be related to job performance, social relations, emotional well-being, and physical health, including psychosomatic disorders (Epstein, 1992, 2001; Epstein & Katz, 1992; Epstein & Meier, 1989; Katz & Epstein, 1991). The inventory includes a Global scale of Constructive Thinking, a Defensiveness scale, and the following six subscales: Emotional Coping, Behavioral Coping, Categorical Thinking, Personal Superstitious Thinking, Esoteric Thinking, and Naive Optimism. The Global scale and its six subscales have alpha internal-consistency reliabilities between .79 and .91. The items are rated on a five-point scale from (1) definitely false to (5) definitely true.

**Social-Desirability scale.** A Social Desirability scale, also referred to as a defensiveness scale, was adapted from a validity measure in a commercially available self-esteem inventory (O'Brien and Epstein, 1980). The scale provides a measure of the degree to which people attribute unlikely virtues to themselves and deny likely weaknesses and transgressions. The items are responded to on a 5-point scale ranging from (1) not at all true to (5) very much true. Examples of items are, "There have been times when I took advantage of someone" and "I gladly
accept criticism whenever it is deserved." The scale provided a second measure of biased reporting.

**Course of Illness Questionnaire for Subjects (CIQ-S).** The CIQ-S was used to obtain information from the cancer groups about the diagnosis and progression of their disease. Participants responded to the items on the questionnaire by selecting one of the following options with reference to their current condition: (a) free of all detectable signs of cancer, (b) cancer in only one location and getting smaller, (c) cancer in more than one location and getting smaller in number or in size, (d) cancer in only one location and has not changed, (e) cancer in more than one location and has not changed, (f) cancer in one location and getting larger or spreading to other locations, and (g) cancer in more than one location and getting larger or spreading to other locations.

The heart-disease recovered participants described their condition by reporting one of the following options: (a) free of all detectable signs of heart disease, (b) improving, (c) stable, and (d) worsening.

**Course of Illness Questionnaire for Physicians (CIQ-Ph).** Physicians responded to the CIQ-Ph, a modification of the CIQ for patients, by indicating their patient's type and stage of illness, its course, and the treatments received by the patients.

**Procedure**

Participants were given a packet that included an informed-consent form, authorization to contact their physician, and the following set of questionnaires: 1) demographic questions, 2) the CTI ; 3) the Social Desirability Scale; 4) the CIQ-S; 5) the Stressful Life Events scale, which
was to be completed for the period from 2 years preceding diagnosis to the time of diagnosis; 5) the EAI for the period shortly before (3-6 months) diagnosis and again for the current time; They also received a postage-paid return envelope. The CIQ-Ph was sent to the participants' physicians after the return of the participants' signed consent forms.

We had a physician sort the cancer participants into three groups: those with extremely unusual recoveries from cancer (less than a 1% likelihood of recovery), those with unremarkable recoveries (more than a 50% likelihood of recovery), and a middle group that fell between the other two categories. We analyzed the data in two ways, once with the middle cancer group included and again without the middle group. The results for the middle group invariably fell between the other two cancer groups. We decided to report only the results without this group for the following reasons: (1) the middle group added nothing of substantive interest. (2) Having three cancer groups rather than two required many more statistical comparisons between the three cancer groups with each and with the heart disease group, which lengthened an already long article and made it burdensome and distracting to read, (3) Most important, by eliminating the middle group, as will be seen shortly, we were able to bypass any problems associated with the subjective judgment of the physician who assigned the cases to groups.

The physician who did the sorting was given all the available data on the cancer participants, including the diagnostic information they and their physicians had reported. He was instructed to divide the participants into three groups, extremely exceptional cases who had recovered despite less than a 1% probability of recovery, non-exceptional cases who had recovered from a condition in which more than half of similar cases were expected to recover,
and a middle group that comprised the remaining cases. He was requested in making his decisions to refer to actuarial tables on the mortality of the different types and stages of cancer (Sondik et al., 1986) and in addition to consider age, medical treatment, and whatever other information he considered useful. As previously noted, all the decisions about sorting people into the two extreme cancer groups could have been done by anyone on a completely objective basis, as the physician placed all participants who had recovered from stage-4 cancer and had sustained their recovery for at least a year in the exceptional-recovered category. He also placed all participants who had recovered from non-metastasized cancer and, according to actuarial tables, had a greater than 50% likelihood of surviving more than 5 years in the non-exceptional group.

As a verification of the unusualness of the recoveries of the exceptional cancer-recovered participants, personnel at the Tumor Registry in the VA Long Beach Healthcare System in Long Beach, California compiled a list of all cases within the last ten years with the same diagnoses as those of the exceptional cancer-recovered participants in the present study. One hundred and sixty six cases were found, representing six of the seven diagnoses. No case was found for meningeal carcinomatosis. Of the 166 cases in this comparison group, 164 were deceased. There was not a single case of even temporary recovery. The two people in this group who were still alive had been alive 10 and 11 months since their diagnosis, and both had active cancers at the time of evaluation and a very unfavorable prognosis. The mean length of survival since diagnosis was 6.35 months, with a range of 0-32 months. In comparison, the seven exceptional recovered participants with similar diagnosis to the comparison group were not only alive 8.78 years on average after having been diagnosed with cancer (see Table 1), but were all free of
any detectable signs of cancer. Thus, there is no overlap between the groups, with the shortest survival time (and still counting) among the exceptional cancer-recovered participants in our study far exceeding the longest survival time of any of the cancer patients in the comparison group. All the exceptional cancer participants at the time of our study had been cancer free for over a year (mean = 7.18 years, range = 1.5 – 12.3 years, whereas 99% of the patients in the comparison group with similar cancers were deceased and the remaining 1% have active cancer.

Questionnaire Return Rates

Of the 246 questionnaires distributed, 94 were returned, corresponding to a return rate of 38%. The return rate of completed inventories was similar for the cancer and heart-disease groups. It was 37% for the cancer-recovered and 41% for the HD-recovered participants. A breakdown of the cancer participants is not possible because there is no way of knowing how many of those who picked up the forms but did not return them were exceptional or non-exceptional cancer-recovered people. These return rates are somewhat higher than the usual rate of about 30% for inventories returned by mail, which is notable considering the amount of information that was required and the absence of a material reward for providing it. That the return rate was not higher can also be attributed to the manner in which most of the forms were distributed. They were made available on tables located at a conference of the National Cancer Survivor’s Coalition and at meetings of the Mended Hearts Society. Moreover, people who helped themselves to the forms could have done so for various reasons other than a serious intention to fill them out and return them, such as curiosity and being polite. Eleven of the questionnaires had to be discarded for reasons such as participants reporting a congenital disease,
Forty-two participants provided sufficient information for contacting their physicians. The other twenty-three participants either neglected to provide this information or they made errors in their physician’s addresses and telephone numbers, possibly because the physicians had moved. Of the 42 physicians who were contacted, 31 returned the forms sent to them, for a return rate of 74%. All but one of the physicians who returned the forms verified the reports of the participants. In the one case in which there was a discrepancy, the reason for it was a change in the patient's status during the period between the patient's and the physician's reports. Four exceptional cancer-recovered participants for whom physician reports were not available had diagnoses that were reported to have been verified in books published some time before the study (A. Epstein, 1989; Roud, 1990; Williams, 1990). Given the almost complete verification by the physicians who returned forms of the participants' reports, it can reasonably be assumed that most of the reports of the other participants were probably accurate. Besides, it seems highly unlikely that people with a disease that threatened their lives would not know their kind and stage of cancer.

Analysis of the Data

The data were analyzed as follows for all dependent variables. First, an ANOVA was conducted that included all three groups and the two time periods (i.e., before diagnosis and after recovery). Next, planned comparisons with t-tests were conducted comparing the two cancer groups with each other and with the HD group for each period. We used one-tailed rather than two-tailed tests of significance for several reasons. One reason was that, as the study was an
exploratory study we were more concerned about type-2 errors (i.e., accepting the null hypothesis when it false) than about type-1 errors (rejecting the null hypothesis when it is true). Other reasons were that results in the opposite direction of our hypotheses would make no theoretical sense, and most important, that the sample size of the exceptional recoveries was so small that very large effect sizes were required for significance. As has recently been emphasized by statisticians in response to the increasing reports of meta-analyses, there is an excessive concern about avoiding type-one errors in single studies at the cost of a loss of important information from an unreasonable readiness to accept very high rates of type-2 errors (e.g., Cohen, 1994; Hunter & Schmidt, 1996). This problem, of course, is greatly exacerbated in single studies that included groups with very small Ns. Given the small number of exceptional cancer-recovered participants and the consequent lack of statistical power, our research is conservative in the sense that relatively large differences between groups and highly consistent responses within groups are necessary to obtain statistically significant results. Another way in which our procedure is conservative is in the use of a comparison group of non-exceptional cancer participants whose recoveries, although not exceptional, were also not routine, as many people with the same cancers succumb. For all these reasons, we believe the use of a 1-tailed test of statistical significance is appropriate for the present study.

Results

Response Bias

Before examining the substantive findings, it is important to determine whether the groups differed in favorable-reporting-bias. An analysis of variance (ANOVA) of scores on the
Social-desirability Scale of the Multidimensional Self-esteem Inventory (O'Brien-Epstein, 1980) revealed no significant differences among the groups. The respective means for the exceptional cancer group, the non-exceptional cancer group, and the HD group were 49.00, 44.41, and 50.13. The Defensiveness Scale of the CTI also revealed no significant differences. The respective means on this scale for the exceptional cancer group, the non-exceptional cancer group, and the HD group were 21.29, 18.76, and 20.10. It may be concluded that there is no evidence of differences in a favorability-reporting bias among the three groups.

Other evidence that suggests that the results in this study do not simply reflect biased reporting is that the groups differed significantly only in the period preceding diagnosis. If they differed in favorability reporting bias, it would be expected that they would also differ in their description of their current state.

As a further check on reporting bias, we used three additional procedures. First, we examined the results for the heart-disease prone personality scale, which, as previously noted, we did not use in the study proper because it turned out to be mainly a measure of good adjustment. The three groups performed almost identically at both periods on this measure. If the exceptional cancer group wished to present a picture of being poorly adjusted at the pre-diagnosis period, as they reported on the CPPI, they would be expected to obtain a lower score than the other groups on this scale, which they did not. Second, we examined responses to each of the items in the CPPI for clues about false reporting. Although on almost all items, the exceptional cancer participants reported being considerably more poorly adjusted in the pre-diagnosis period than the other groups, there were the following interesting exceptions. They reported being less
conflicted, more determined, and less feeling sorry for themselves than the other groups. Thus, they did not follow a uniform pattern of describing themselves as poorly adjusted in the pre-diagnosis period, but responded more discriminatively. Finally, as will be shown later, the pattern of responses on the various CTI scale provides further support for the participants responding in a differentiated manner.

**Group Differences in Cancer-Prone Personality**

An ANOVA was conducted comparing the three groups on their scores on the CPPI for the two time periods. There was a highly significant main effect for Period (i.e., before diagnosis vs. post-recovery, also referred to as the “current period, F(1,62) = 43.62, p <.0001. For the combined groups, the CPPI scores in the pre-diagnosis period were higher than in the post-recovery period. The main effect for Groups across periods was not significant, F(2,62) = 2.13, p =.13. The significant effect for Period was qualified by a highly significant interaction of Group x Period, F(2,62) = 10.74, p <.001. It can be seen in Figure 1 that the period effect is greatest, by far, for the exceptional cancer group, is next greatest for the non-exceptional cancer group, and is almost non-existent for the HD group. Moreover, the differences among the groups are far greater in the pre-diagnosis period than in the post-recovery period.

Planned-comparisons supported the first hypothesis that a cancer-prone personality score preceding diagnosis is a more common precursor of cancer than of heart-disease. Both cancer groups had significantly higher CPPI scores for the period before diagnosis than the heart-disease group (Exceptional CA vs. HD, t(36) = 2.57, p<.01; Non-exceptional CA vs. HD, t (56) = 2.15, p<.02). The corresponding group differences for the current period did not approach
significance. In addition to supporting the first hypothesis, this finding provides support for the validity of the CPPI.

According to the second hypothesis, a cancer-prone personality is a more common precursor of cancer in those with exceptional recoveries than in those with more usual recoveries. This hypothesis was also supported, as the exceptional cancer group had a significantly higher CPPI score than the non-exceptional cancer group in the pre-diagnosis period, \( t(32) = 1.67, p < .05 \), (see Fig. 1).

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According to the third hypothesis, there is a positive relation between amelioration of a cancer-prone personality and exceptional recovery from cancer. In an ANOVA restricted to the two cancer groups, there was a strong main effect for Period, \( F(1,32) = 30.97, p < .000 \). Both groups exhibited a decrease in CPPI scores from before diagnosis to the current period. This effect was qualified by a highly significant Group x Period interaction, \( F(1,32) = 6.94, p < .01 \). In support of hypothesis, the exceptional cancer exhibited a much greater decrease in CPPI scores (\( Md = 38.53 \)) from the pre-diagnosis to the post-recovery period than the non-exceptional cancer group (\( Md = 13.77 \); see Fig. 1).

To determine whether the reduction in CPPI scores was specific to the cancer groups, the decreases in CPPI scores were separately evaluated for each of the three groups. The exceptional cancer group (\( Md = 38.53, t(6) = 3.37, p < .01 \)) and the non-exceptional group (\( Md = 13.03, t \)
(26) = 3.61, \( p < .001 \) both exhibited highly significant decreases in CPPI scores, whereas the decrease for the HD group did not approach significance (Md = 3.51, \( t (30) = 1.49, \text{ns} \)). The finding of decreases in CPPI scores following recovery only for the cancer groups provides support for the validity of the CPPI.

**Stressful Life Events Preceding Diagnosis**

In an ANOVA of the stressful life-events scores, there were significant differences among the groups in the intensity of stressful events they reported experiencing in the two-years preceding their diagnosis, \( F(2,62) = 6.75, \ p < .01 \) (Exceptional CA, \( M = 19.86, \ SD = 15.44 \), Non-exceptional CA, \( M = 12.96, \ SD = 11.53 \), HD, \( M = 6.16, \ SD = 6.72 \)). As hypothesized, both cancer groups reported significantly more stressful life-events in the period before diagnosis than the heart-disease group reported (Exceptional CA vs. HD, \( t (36) = 3.72, \ p < .001 \), Non-exceptional CA vs. HD, \( t (56) = 2.79, \ p < .01 \)). Although the difference between the two cancer groups was in the expected direction and even larger than the significant difference between the non-exceptional cancer group and the HD group, it was only marginally significant, \( t (32) = 1.32, \ p < .10 \). The non-significance of this large effect size can be attributed to the small N of the exceptional cancer group.

To determine whether stress associated with loss of a significant relationship (see introduction), produced different results from impersonal sources of stress, two judges sorted the items into two categories, one involving loss or threat of loss of a relationship and one involving impersonal stress, such as legal, financial, and job-related problems. Only items that both judges agreed on were retained. Scores consisted of the sum of the ratings on the items in a category. A
repeated-measures ANOVA revealed a significant effect for Groups, $F(2, 62) = 4.71, p < .01$, which was qualified by a highly significant interaction of groups x categories, $F(2, 62) = 8.00, p < .001$. The difference between the two kinds of stress averaged across groups did not approach significance, $F(1, 62) = 0.12$. However, the non-exceptional cancer group, $M = 4.29, t(56) = 3.14, p < .01$ and the exceptional cancer group, $M = 15.14, t(36) = 2.5, p < .05$, both reported significantly greater stress from life-experiences in the period preceding diagnosis that involved actual or threatened loss of a relationship than the HD group reported, $M = 4.29$. There were no significant differences between the groups on the measure of impersonal stress.

To examine the sources of stress in greater detail, responses to individual items were compared among groups. As single items are less reliable than scales based on multiple items, it would not be surprising if no single item differentiated the groups despite the significant findings for the multiple-item comparisons. Chi squares were conducted on individual items contrasting ratings of 0-1 (non-occurrence or no effect) with ratings of 2-5 (some effect or greater). Yates correction was used when a 2 x 2 table included an expected frequency of less than 5. Two items significantly differentiated the groups. In response to the item “rejection by a loved one or by someone you admire,” 6 out of 27 (22%) of the non-exceptional cancer group (Chi square = 5.48, $p < .01$) and 3 out of 7 (43%) of the exceptional cancer group (Chi square = 9.18, $p < .001$) reported more stress than did the HD group (0/31 = 0%). The cancer groups did not differ significantly from each other on this item (Chi square = 0.39).

For the item “marital problems or unhappy relationship with a lover,” 11 out of 27 (41%) of the non-exceptional cancer group (Chi square = 9.38, $p < .001$) and 3 out of 7 (43%) of the
exceptional cancer group (Chi square = 3.82, p < .05) reported significantly more stress for the period before diagnosis than the HD group reported (2/31 = 6%). The cancer groups again did not differ significantly from each other (Chi square = 0.04).

It may be concluded that the overall picture is consistent with the hypothesis that highly stressful experiences, particularly those associated with loss or threat of loss of a relationship, before cancer are more often reported by the cancer groups than by the HD group. There was, however, only marginal support for the hypothesis that exceptional cancer participants experienced more stressful life-events in the period preceding their diagnosis than the non-exceptional cancer participants. Although the results on general stress, and even more so on stress associated with loss of a relationship, revealed strong mean differences in the expected direction, again the differences were not sufficiently large to reach statistical significance. Very likely this can be attributed to the small N of the exceptional cancer participants. Of course, it remains to be verified in future research.

Current Constructive Thinking as Measured by the CTI

To assess differences among the three groups in their self-reported current coping performance, ANOVA’s of scores on the CTI global scale and its six main scales were conducted. Significant differences among the three groups were found only on the Categorical Thinking Scale, $F(2, 57) = 3.56$, $p < .02$, (Exceptional CA, $M = 33.14$, $SD = 8.45$, Non-exceptional CA, $M = 35.00$, $SD = 8.70$, HD, $M = 40.89$, $SD = 9.84$). Higher scores on this scale indicate more polarized thinking, less open-mindedness, and less tolerance of others who are different. Both cancer groups obtained significantly lower scores on the Categorical Thinking
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Scale than the heart-disease group (Non-exceptional CA, t(51) = 2.31, p<.02, Exceptional CA, t(32) = 2.09, p<.05, but did not differ significantly from each other, t(31) = .51, p = .31. The results suggest that the cancer groups are more open-minded and flexible in their thinking than the HD group. The findings on this scale, which is resistant to reporting bias, support the view that the groups responded in a differentiated and accurate manner.

Discussion

Cancer-prone Personality

All three main hypotheses concerning the cancer-prone personality were supported. According to the first hypothesis, a cancer-prone personality is a more common precursor of cancer than of other life-threatening diseases, such as heart disease. Our findings regarding the first hypothesis support the view that there is a cancer-prone constellation of attributes that is a significant part of some people’s personality. It follows that the overall personality structure that includes this constellation makes people who possess it more vulnerable than others to cancer. This hypothesis was supported by the finding that both cancer groups obtained significantly higher cancer-prone personality scores for the period preceding their diagnosis than the HD group. Support of this hypothesis is consistent with the positions of Cunningham and Watson (2004), Greer and Watson (1985), LeShan (1977), and Temoshok and Dreher (1992).

According to the second hypothesis, a cancer-prone personality is a more common precursor of a diagnosis of cancer in those with exceptional recoveries than in those with non-exceptional recoveries. In support of this hypothesis, the CPPI scores for the pre-diagnosis period of the exceptional cancer participants were significantly higher than the CPPI scores of
the non-exceptional cancer participants.

According to the third hypothesis, there is a direct relation between a decrease in a cancer-prone personality and an exceptional recovery from cancer. In support of this hypothesis, the exceptional cancer participants reported a significantly greater decrease in CPPI scores from before diagnosis to the post-recovery period than the non-exceptional cancer participants reported.

At the time we formulated our hypotheses we were unaware that Cunningham and Watson (2004) recently proposed a somewhat similar hypothesis. Cunningham and Watson stated their hypothesis as follows: “to the extent that the progression of cancer, or other chronic disease, is favored by a distorted psychological adaptation such as type C, healing may be assisted by a reversal of that adaptation …” (p. 214). It is noteworthy that the same hypothesis was arrived at from different pathways, inductively in their case and deductively in ours. Based on an exploratory study in which they compared exceptional survivors of cancer with those with the same diagnoses who did not survive, Cunningham and Watson (2004) proposed their hypothesis to account for their findings. In contrast, we first formulated our hypotheses and then subjected them to empirical testing. Of further interest, some of the more interesting substantive findings in the two studies also converge. For example, Cunningham and Watson described the major change they observed in their participants with exceptional recoveries was an increase in authenticity, which they defined as “being aware of one’s own experience, needs and values … while discarding other activities for which an unwelcome obligation was perhaps previously felt” (pp. 220-221). Several items in the CPPI, such as, “You were the kind of person who tries to
please others even if it means sacrificing your own desires,” correspond to this description of authenticity (see appendix for other CPPI items). Thus, in both studies a greater increase in authenticity was found in participants with exceptional recoveries from cancer than in others.

Cunningham and Watson also describe their exceptional cancer survivors as being more flexible in their thinking than non-survivors, an observation also emphasized by Temoshok and Dreher (1992). Consistent with this observation, the cancer-recovered participants in the present study obtained significantly lower scores on the CTI Categorical Thinking scale (a measure of rigid, inflexible thinking) than the heart-disease recovered participants.

It should be noted that Cunningham and Watson’s hypothesis is more relevant to our first than to our second hypothesis. Our second hypothesis extends the first hypothesis by proposing that psychological factors are more likely to be involved in very unusual recoveries from cancer than in more usual recoveries.

**Reporting Bias**

As noted in the introduction, an alternative interpretation of any support obtained in the present study for the hypotheses on the relation of a cancer-prone personality to recoveries from cancer is that the results can be attributed to biased reporting. There are several reasons for rejecting this as an explanation of the group differences we found on CPPI scores and on reports of stressful life-events. The first reason is that the groups did not differ on measures of social desirability and of defensiveness designed to measure favorable-reporting bias. A second reason is that the groups did not differ on the CTI Global Scale, a reliable and valid self-report measure of current constructive thinking (Epstein, 1980). Had the exceptional cancer participants
presented themselves in a more favorable way than others on this scale it could not be
determined if they really were better adjusted or if they were simply more favorably biased. 3) A
third reason is that the exceptionally cancer group did not provide a more favorable description
of themselves than either of the two comparison groups on five of the six CTI subscales. The
only scale on which they did differed from the other groups was the only scale that has been
demonstrated not to be susceptible to faking (Epstein, 2001). The reason it is fake-resistant is
that those with high scores are as proud of thinking categorically as those with low scores are of
thinking in a more nuanced manner. Thus, the exceptional cancer participants did not report that
they were currently better emotional copers, better behavioral copers, less superstitious, less
naively optimistic, or less believing in esoteric phenomena than the other groups reported. The
only difference was that they and the non-exceptional cancer participants obtained scores on the
CTI Categorical Thinking Scale that indicated they were more flexible thinkers than the heart-
disease participants.

A fourth reason is that the cancer groups differed from the HD group on cancer-prone
personality scores only in the period before diagnosis. If they had a general favorable-reporting
bias, it should have influenced their scores on the CPPI for the post-diagnosis period even more
than for the pre-diagnosis period. Moreover, as will be shown later, their negative reporting
about themselves in the pre-diagnosis period rather than being general was highly nuanced and
did not conform to any common stereotype.

A fifth reason is that the results from our study are similar to those from Cunningham and
Watson’s (2004) study which arrived at very similar conclusions using different procedures, such
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as relying predominantly on intensive interviews, whereas our study relied primarily on psychometric instruments. Finally, it should be considered that we employed some controls that have rarely, if at all, been used before. The participants in our comparison groups were, like our exceptional cancer group, all considered recovered at the time of testing. Admittedly, such a procedure can not control for the biased reporting that could result from the knowledge by the exceptional participants of how remarkable their recovery was. The only way to do so would be to conduct a long-term prospective study in which thousands of cancer patients would be tested before any of them had remarkable recoveries. The records of those who later exhibited remarkable recoveries could then be compared with those who had more usual recoveries and those who did not recover. We shall discuss this issue further in the section on “Future Directions.” For the moment, we wish to emphasize that, as a preliminary study, the major value of our study is in the tentative verification of the hypotheses we proposed, and, relatedly, in justifying the investment in time, effort, and expense that would be required to conduct a more definitive test the hypotheses.

Stressful Life Events as Precursors of Cancer

We hypothesized that stressful life events, particularly those associated with loss of a close relationship, are more often precursors of cancer than of other equally serious diseases, such as heart disease. This hypothesis was supported by the finding that both of our cancer-recovered groups reported greater stress from life-events associated with loss of a relationship or threat of its loss in the two-year period preceding their diagnosis than the HD group reported. These findings are consistent with LeShan's (1977) and Temoshok’s (1987) views that stress due
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to the loss of a close relationship by those with a cancer-prone personality who were previously sensitized to such loss increases vulnerability to cancer. The results are also consistent with Cooper, Cooper, and Faragher's (1989) prospective study in which they found that one of the most common stressful experiences in a sample of women with breast cancer was bereavement within two years preceding their diagnosis.

The hypothesis that greater stress from life-events preceding a diagnosis of cancer is more likely to be reported by those with exceptional recoveries than by those with more usual recoveries received only marginal support. However, it is noteworthy that the non-significant mean difference between the two cancer groups (Md = 7.96) was actually greater than the significant mean difference (Md = 6.04) between the Non-exceptional Cancer Group and the HD Group. What made one comparison significant and the other not was the difference in the sample sizes. Thus, the hypothesis concerning the relation of stressful events to exceptional recoveries from cancer remains promising, as the failure to achieve statistical significance may well have been due to the very small sample of exceptional cancer participants.

The CPPI as a Promising Measure of the Cancer-Prone Personality

The results on the CPPI indicate that it is a promising measure of the cancer-prone personality. The scale had satisfactory internal-consistency reliability and discriminated both cancer groups from the HD group, thereby providing support for its construct validity. As a measure of a personality attribute that under normal circumstances is relatively stable, the CPPI provides a different kind of information from the widely used Mental Adjustment to Cancer (MAC) Scale (Watson, Greer, & Bliss, 1989), which is a measure of patients’ coping reactions
following a diagnosis of cancer. Thus, the CPPI fills an important void and should be useful in studies of the relation of pre-cancer personality attributes to vulnerability to cancer as well as in studies of changes in presumed cancer-prone personality attributes to favorable progression and outcome of cancer.

Apart from the promise of the CPPI as a valid, reliable measure of cancer-prone personality attributes, the fact that a coherent, internally-consistent scale that included various kinds of behavior that share only one thing in common, correspondence to a variety of attributes that have been proposed as making a person vulnerable to cancer is itself informative (see appendix for the CPPI items). It remains to be seen, of course, whether the promise of the CPPI will be upheld in future research.

Limitations of the Study

The most obvious limitation in the present study is that a major part of it is based on retrospective recall, which is susceptible to influence by demand characteristics and other sources of distortion. However, as already noted, the pattern of findings and the controls we used suggest that our results can not readily be attributed to a general positive reporting bias, which has been a widespread limitation in other self-report studies that examined the relation of personality variables to health outcomes (Costa & McCrae, 1985; Watson & Pennebaker, 1989).

Because retrospective recall is not entirely accurate does not mean it is entirely inaccurate. In a review of the research literature comparing results from prospective and retrospective studies, Temoshok and Heller (1984) found that the results from the two kinds of data were similar.
Another obvious limitation is the small size of the exceptional cancer sample. Given a sample of only seven people, very large effect sizes are required to obtain statistically significant differences between the exceptional cancer-recovered group and the other groups. Fortunately, the effect sizes in many comparisons were large enough to be statistically significant despite the small sample size. However, other group differences, despite being of considerable magnitude, were only marginally significant, and therefore in particular need of verification. They can best be regarded as hypotheses for future investigation.

Another problem with the small sample of the exceptional cancer participants concerns how representative they are of an identifiable broader population. In the absence of random selection from a designated population, it can not be determined to what extent the exceptional and non-exceptional cancer-recovered participants in this study are representative of populations of similar cancer-recovered people. Thus, there is no way of knowing how general the findings are. However, as noted in the introduction, our intention was to determine whether there exists a subset of exceptional cancer-recovered people who behave in a manner consistent with our hypotheses. Having obtained support for this hypothesis, it remains for future research to verify our results and establish their generality.

As noted earlier, the attempt to control for people’s state of recovery by selecting participants in all three groups who were recovered at the time of testing only provides a partial control for participants’ state. The problem remains that the exceptional cancer-recovered participants know that their recoveries are remarkable.

Future Directions
An important further step would be to conduct a study that controls for the two major limitations in the present investigation, namely the problems associated with retrospective recall and the problems associated with awareness by the exceptional cancer participants of their remarkable recoveries. These limitations can be overcome by conducting a prospective study in which people’s cancer-prone personalities are determined before their remarkable recoveries. Such a study would be very costly in time, effort, and expense, but given the promising results from our preliminary study, we believe it warrants serious consideration. The study would require determining the cancer-prone personality of a very large sample of newly diagnosed cancer patients. If exceptional recoveries were defined, as in the present study, as those that occurred less than 1 in 100 times according to actuarial data for the same type and stage of cancer, it would require testing the degree to which people had cancer-prone personalities of over 2,000 newly diagnosed cancer patients to obtain a sample of 20 patients who would later have exceptional recoveries. The cancer-prone personality scores of these patients at their initial time of testing could then be compared with the initial cancer-prone scores of others, including those with more usual recoveries. It would also be of interest to obtain measures of the cancer prone personality at the post-recovery period for measuring changes in cancer prone personality and also measures of retrospective recall for the pre-recovery period, which would provide a way of assessing the distortions produced in such recall. However, as previously noted, any post-recovery measures could be biased by people’s awareness of their recovery status.

It would also be of interest to test participants at the pre-recovery period with both a measure of coping with cancer, such as the MAC, and a measure of the cancer-prone personality,
such as the CPPI, to determine what their unique as well as combined contributions are in predicting outcomes.

A much less-demanding study worth pursuing would be to compare the influence of psychotherapy in newly diagnosed cancer patients who differed in their scores on the CPPI. Groups that are high and low on CPPI scores could be formed and they could be divided into subgroups according the psychotherapy they received. One subgroup would receive a form of therapy focused on the attributes of a cancer prone personality. The other subgroup would receive a more general kind of therapy that did not have the same focus. The following hypotheses would be tested:

1. Cancer patients with high CPPI scores benefit more from both forms of therapy than cancer patients with low CPPI scores.
2. Cancer patients who exhibited the greatest decreases in CPPI scores from before to after psychotherapy would benefit the most with respect to the course of their cancer.
3. Among cancer patients with high initial CPPI scores, those who received the targeted form of therapy would exhibit a more favorable course of their cancer than those who received the more general form of therapy.

It would be instructive to administer the MAC scale of coping with cancer as well as the CPPI shortly after diagnosis. This would allow for determination of their independent as well as their combined contributions to predictions about the course of cancer and the effectiveness of psychotherapy.

Conclusions
Although there are obvious significant limitations in the present exploratory investigation, most are inherent in studying a highly unusual sample of cancer patients who are aware of their exceptional recoveries. However, the specific pattern of results can not be explained away by a general reporting bias, nor is it likely that the results could have been anticipated on the basis of any reasonable assumptions concerning more specific reporting biases. At the very least, the hypotheses we proposed, which could have been falsified, remain tenable and promising with respect to further investigation.
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Acknowledgments

We wish to acknowledge the contribution of Dr. Bruce Weinraub for his classification of the participants and his consultation throughout the project. We thank Donna Fuhrman and Matthew Duffy for their work on data entry and computer analysis. We thank Richard Charter for his helpful comments on drafts of the article. Finally, we wish to acknowledge Alice Epstein, whose book describing her exceptional recovery from cancer inspired this project.
## Table 1

Description of the Exceptional Cancer Survivors: diagnosis, age at testing, medical treatment, survival time since diagnosis, and time disease-free.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Age at Testing</th>
<th>Medical Treatment</th>
<th>Years Since Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney IV (in lung)</td>
<td>63</td>
<td>Surgery</td>
<td>5.83</td>
</tr>
<tr>
<td>Breast Cancer IV (in lung, lymph nodes, &amp; bone)</td>
<td>57</td>
<td>Radiation, Chemotherapy</td>
<td>10.00</td>
</tr>
<tr>
<td>Diffuse Histiocytic Lymphoma IV (in Ribs)</td>
<td>44</td>
<td>Radiation, Chemotherapy, Bone Marrow Transplant</td>
<td>5.75</td>
</tr>
<tr>
<td>Oat Cell-Brain in spine and inner ear</td>
<td>54</td>
<td>Radiation (inoperable)</td>
<td>6.50</td>
</tr>
<tr>
<td>Undifferentiated Lung (in lymph nodes)</td>
<td>45</td>
<td>Radiation then refused treatment (inoperable)</td>
<td>10.75</td>
</tr>
<tr>
<td>Meningeal Carcinomatosis</td>
<td>60</td>
<td>Radiation, Acupuncture</td>
<td>9.67</td>
</tr>
<tr>
<td>Lung (in Chest)</td>
<td>62</td>
<td>Radiation (inoperable)</td>
<td>13.00</td>
</tr>
</tbody>
</table>
Figure Captions

Figure 1. Mean scores on the Cancer-prone Personality Inventory for the three groups pre-diagnosis and after recovery (current testing period).

(Note to editor: A better version of Fig. 1 is available on the hard copies sent by regular mail.)
Fig. 1

![Graph showing CPPI Score over time for exceptional cancer, non-exceptional cancer, and heart disease categories.](image)
Appendix 1

Significant Events During the Two Years Preceding Diagnosis

Instructions: Did any of the following events occur during the period from 2 years before your illness to the time of your diagnosis? If so, indicate, by your ratings, how much distress you experienced, that is, how intensely it affected you. Use a 1-5 point scale where 1 = not at all and 5 = very much. If more than one event occurred among the alternatives listed for some items, rate the one that affected you most strongly.

1. Death or serious illness of loved one(s)
2. Death or serious illness of a pet to whom you were deeply attached
3. Divorce or separation from a spouse, or break up with a lover
4. Marital problems or unhappy relationship with a lover
5. Family conflict or disappointment not covered in items 3 or 4
6. Conflict or disappointment with a friend, neighbor, or co-worker
7. Distressing changes in your employment (e.g., not being able to find employment, being laid off or demoted, relocated, unhappy retirement, etc.)
8. Financial problems
9. An accident, injury, or illness that required a significant change in life-style
10. Loss of independence, or inability to be as independent as you would like
11. Change in living arrangement (moving, change in number of people living with you, etc.)
12. Rejection by a loved one or by someone you admire, or being left out of others’ social plans
13. Failure or not being able to do as well as you wished in an important examination, or in some other activity that was important to you

14. Legal problems, such as a lawsuit or being accused of a crime or of improper tax returns

15. Problems associated with pregnancy for you or your partner (e.g., having an unwanted pregnancy or an abortion, being unable to conceive)

16. Pressured by a demanding schedule

17. Family responsibilities that interfered with your life

18. Victim of an assault, rape, or robbery

19. Victim of a natural or human-made disaster (e.g., a hurricane, or a fire)

20. Loss of an important activity or responsibility that had made you feel needed and important

21. Other (write in and rate its affect on you)______________________________
Appendix 2

The 27 Items of the Cancer-Prone Personality Inventory (CPPI)

(Note.- The 27 CPPI items were included in the Emotions and Attitudes Inventory, which was responded to for two time periods, the present (post-recovery) period and a pre-recovery period shortly before diagnosis. Separate forms were used for each period. The corresponding items for the two periods differed only in tense, which is indicated below by providing the past-tense wording in.

Instructions for responding to questions to facilitate accurate recall of what life is (was) likeduring the period being rated: “Please jot down a few comments to the questions below to remind yourself about what is (was) going on in your life.”

What are (were) you doing for work?
What is (was) your living situation like?
What is (was) going on with your family?
What are (were) your friendships like?
What other events affect (affected) you emotionally?
How well are (were) you achieving your inner goals at this time?

Use the 1-5 scale to rate, overall, how good a period this is (was) for you ___
Use the same scale to rate, overall, how distressing a period this is (was) for you ___

The items and instructions for the CPPI

Using a 1-5 point scale where 1= not at all and 5=very much, please rate the following items for how you generally are (were) at the PRESENT TIME (SHORTLY BEFORE THE DIAGNOSIS
OF YOUR ILLNESS).

1. Sad, blue, or depressed
2. Angry, annoyed, or irritated
3. Feeling sorry for yourself
4. Helpless, or hopeless
5. (R) Strong, powerful, or in control of your life
6. Withdrawn, resigned, or defeated
7. Frustrated, blocked, or trapped
8. (R) Pleased with yourself, self-accepting, liking yourself
9. Anxious, worried, or insecure
10. (R) Challenged, determined, or having a fighting spirit
11. Tense, jittery, or on edge
12. (R) Serene, calm, or content
13. Emotionally numb, unreactive, no feeling
14. Controlled, dominated, or feeling you have to please others
15. Confused, conflicted, or torn in different directions
16. Guilty, regretful, or ashamed
17. Feeling inadequate, unworthy, or like a failure
18. Feeling like you are (were) putting on a "false front"
19. (R) Feeling you have (had) all the emotional support you want
20. Feeling lonely, unwanted, or unneeded
21. (R) Feeling at peace with yourself and in harmony with the world

22. (R) *Meaningful life*. You view (viewed) your life as meaningful. You feel (felt) you have (had) a purpose in living.

23. *Despairing life*. You feel (felt) that life is (was) passing you by, that you are (were) not getting out of it what you want (wanted) and you would never be able to feel fulfilled and genuinely happy in your life.

24. *Self-sacrificing for the good of others*. You are (were) the kind of person who tries to please others even if it means (meant) sacrificing your own desires. You do (did) more for others than they do (did) for you.

25. *Emotionally intense and unexpressive*. You are (were) the kind of person who has strong emotions but keeps them bottled-up.

26. *An accepter*. You are (were) the kind of person who accepts things as they are and tries not to rock the boat.

27. (R) *A fighter*. You are (were) the kind of person who approaches problems as challenges to be overcome and who does not accept defeat or resign yourself.

- All items preceded with "(R)" are reverse-scored. The CPPI score is the sum of the ratings for all items.