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Adjustment to Threatening Events

A Theory of Cognitive Adaptation

Shelley E. Taylor *University of California, Los Angeles*

ABSTRACT: *A theory of cognitive adaptation to threatening events is proposed. It is argued that the adjustment process centers around three themes: A search for meaning in the experience, an attempt to regain mastery over the event in particular and over one's life more generally, and an effort to restore self-esteem through self-enhancing evaluations. These themes are discussed with reference to cancer patients' coping efforts. It is maintained that successful adjustment depends, in a large part, on the ability to sustain and modify illusions that buffer not only against present threats but also against possible future setbacks.*

One of the most impressive qualities of the human psyche is its ability to withstand severe personal tragedy successfully. Despite serious setbacks such as personal illness or the death of a family member, the majority of people facing such blows achieve a quality of life or level of happiness equivalent to or even exceeding their prior level of satisfaction.¹ Not everyone readjusts, of course (Silver & Wortman, 1980), but most do, and furthermore they do so substantially on their own. That is, typically people do not seek professional help in dealing with personal problems. They use their social networks and individual resources, and their apparent cure rate, if self-reports of satisfaction are to be trusted, is impressive even by professional standards (Gurin, Veroff, & Feld, 1960; Wills, 1982).

These self-curing abilities are a formidable resource, and our recent work with cancer patients, cardiac patients, rape victims, and other individuals facing life-threatening events has explored them. The consequence of these investigations is a theory of cognitive adaptation. I will argue that when an individual has experienced a personally threatening event, the readjustment process focuses around three themes: a search for meaning in the experience, an attempt

to regain mastery over the event in particular and over one's life more generally, and an effort to enhance one's self-esteem—to feel good about oneself again despite the personal setback.

Specifically, meaning is an effort to understand the event: why it happened and what impact it has had. The search for meaning attempts to answer the question, What is the significance of the event? Meaning is exemplified by, but not exclusively determined by, the results of an attributional search that answers the question, What caused the event to happen? Meaning is also reflected in the answer to the question, What does my life mean now? The theme of mastery centers around gaining control over the event and one's life. It is exemplified by, but not exclusively served by, beliefs about personal control. Efforts at mastery center on the questions, How can I keep this or a similar event from happening again? and What can I do to manage it now? The third theme is self-enhancement. Victimized events often reduce self-esteem (e.g., Briar, 1966; Pearlin & Schooler, 1978; Ryan, 1971) even when the individual had no responsibility for bringing the event about. Many intrapsychic efforts at recovery accordingly involve finding ways to feel good about oneself again. The theme of self-enhancement is not addressed by one particular cognition (it is served by many), but in our own work, social comparisons have been a chief vehicle by which self-enhancement occurred.

Before turning to an analysis of these three themes, an important quality that they share merits mention. I will maintain that the individual's efforts to successfully resolve these three themes rest fundamentally upon the ability to form and maintain a set of illusions. By illusions, I do not mean that the beliefs are necessarily opposite to known facts. Rather, their maintenance requires looking at the known facts in a particular light, because a different slant would yield a less positive picture, or the beliefs have yet to yield any factual basis of support. The viewpoint that successful recovery from tragedy rests on illusion may seem overly cynical, but I hope to convince the reader that it is not.

The following analysis draws heavily on the responses of 78 women with breast cancer and many of their family members whom Rosemary Lichtman,

¹ See Turk (1979); Visotsky, Hamburg, Goss, and Lebovitz (1961); Tavormina, Kastner, Slater, and Watt (1976); Andreasen and Norris (1972); Weisman (1979); Follick and Turk (Note 1); Katz (1963); Myers, Friedman, and Weiner (1970); see also Silver and Wortman (1980); Leon, Butcher, Kleinman, Goldberg, and Almagor (1981).

Joanne Wood, and I have intensively interviewed during the past two years (Taylor, Lichtman, & Wood, Note 2). Some of these women have good prognoses, others do not. Some have achieved a high quality of life following their illness (although it may have taken them several years to do so), others have not. But virtually all of them have shown some attempt to resolve the three issues of meaning, mastery, and self-enhancement.

In the remainder of the article I will first describe the processes that contribute to cognitive adaptation, namely those that center around these three themes. Next, I will address the issue of illusion and maintain that, far from impeding adjustment, illusion may be critical to mental health. Then, I will focus on the very important question: What happens if the illusions upon which one's satisfaction is based are disconfirmed? I will suggest that disconfirmation of one's beliefs, such as a belief in personal control, may not be as psychologically problematic as currently popular models of the disconfirmation process would lead us to believe. Using principles of cognitive adaptation, I will offer an alternative model of the disconfirmation process.

The Search for Meaning

The search for meaning involves the need to understand why a crisis occurred and what its impact has been. One of the ways in which meaning is addressed is through causal attributions. Attribution theory (Heider, 1958; Kelley, 1967) maintains that following a threatening or dramatic event, people will make attributions so as to understand, predict, and control their environment (Wong & Weiner, 1981). By understanding the cause of an event, one may also begin to understand the significance of the event and what it symbolizes about one's life. In the case of cancer, of course, no one knows the true cause or causes. There are a number of known causes, such as heredity, diet, or specific carcinogens, but a search for the cause of cancer on the part of a patient would seem to be a fruitless endeavor.

Nonetheless, cancer patients do try to understand why they developed cancer. Ninety-five percent of our respondents offered some explanation for why their cancer occurred. In an effort to have some comparison group against which to judge this rate, we also asked the spouses of these patients whether they had any theory about the cause of their partner's cancer. One would also expect spouses' rates of making attributions to be inflated, relative to an uninvolved person, since they, like the patients, have been strongly affected by the cancer experience. Nonetheless, their rate of making causal attributions was significantly less (63%), suggesting that the need for an explanation was more insistent among the patients themselves.

Does any particular form of the attributional

explanation meet the search for meaning better than others? This question can be partially addressed by looking at the specific content of the cancer patients' explanations and then relating those explanations to overall psychological adjustment.² The largest number (41%) attributed their cancer either to general stress or to a particular type of stress. When a particular stressor was mentioned, it was often either an ongoing problematic marriage or a recent divorce. Thirty-two percent of the sample attributed their cancer to some particular carcinogen, including ingested substances such as birth control pills, DES, or primarin (which is an estrogen replenisher prescribed for menopausal women) or to environmental carcinogens such as having lived near a chemical dump, a nuclear testing site, or a copper mine. Twenty-six percent of the women attributed their cancer to hereditary factors. Another 17% attributed it to diet (usually to a diet high in protein and fat and low in vegetables), and 10% blamed some blow to the breast such as an automobile accident, a fall, or in one case, being hit in the breast by a frisbee. (The numbers exceed 100% because a number of people had multiple theories.) It is noteworthy that with the exception of heredity, all of these causes are either past, rather than ongoing events, or they are events over which one currently has some control, such as stress or diet. This fact anticipates a point to be made shortly—that meaning and mastery may often be intertwined.

When one relates these specific attributions to overall psychological adjustment to the cancer, no single attribution stands out as more functional than any other. All are uncorrelated with adjustment. It would be premature to conclude from this information that these attributional explanations are functionally interchangeable. However, the high frequency of making attributions, coupled with the fact that no specific attribution produces better adjustment, sug-

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Requests for reprints should be sent to Shelley E. Taylor, Department of Psychology, University of California, Los Angeles, California 90024.

² Psychological adjustment is operationalized in this study as a factor score. The high-loading items are: The physician's rating of the patient on a standardized measure of adjustment termed the Global Adjustment to Illness Scale (GAIS; Derogatis, 1975); the interviewer's independent rating on that same scale; the patient's self-rated adjustment on a 5-point scale; patient self-reports of various psychological symptoms, such as anxiety and depression; the patient's score on the Profile of Mood States (McNair & Lorr, 1964); and the Campbell, Converse, and Rodgers (1976) Index of Well-Being.

gests that causal meaning itself is the goal of the attributional search rather than the specific form through which it is realized.

The search for meaning involves not only understanding why the event occurred, but what its implications for one's life are now. Slightly over half of our respondents reported that the cancer experience had caused them to reappraise their lives. Here is one example from a 61-year-old woman:

You can take a picture of what someone has done, but when you frame it, it becomes significant. I feel as if I were for the first time really conscious. My life is framed in a certain amount of time. I always knew it. But I can see it, and it's made better by the knowledge.

For many, the meaning derived from the cancer experience brought a new attitude toward life:

I have much more enjoyment of each day, each moment. I am not so worried about what is or isn't or what I wish I had. All those things you get entangled with don't seem to be part of my life right now.

For others, the meaning gained from the experience was self-knowledge or self-change:

The ability to understand myself more fully is one of the greatest changes I have experienced. I have faced what I went through. It's a bit like holding up a mirror to one's face when one can't turn around. I think that is a very essential thing.

I was very happy to find out I am a very strong person. I have no time for game-playing any more. I want to get on with life. And I have become more introspective and also let others fend for their own responsibilities. And now almost five years later, I have become a very different person.

Typically, individuals have reordered their priorities, giving low priority to such mundane concerns as housework, petty quarrels, and involvement in other people's problems and high priority to relationships with spouse, children, and friends, personal projects, or just plain enjoyment of life (Lichtman, Note 3):

You take a long look at your life and realize that many things that you thought were important before are totally insignificant. That's probably been the major change in my life. What you do is put things into perspective. You find out that things like relationships are really the most important things you have—the people you know and your family—everything else is just way down the line. It's very strange that it takes something so serious to make you realize that.

Not everyone can construe positive meaning from the experience:

I thought I was a well-cared-for, middle-class woman who chose her doctors carefully and who was doing everything right. I was rather pleased with myself. I had thought I could handle pretty much what came my way. And I was completely shattered. My confidence in myself was completely undermined.

However, when positive meaning can be construed from the cancer experience, it produces significantly better psychological adjustment. The cancer threat, then, is perceived by many to have been the catalytic agent for restructuring their lives along more meaningful lines with an overall beneficial effect.

To summarize, the attempt to find meaning in the cancer experience takes at least two forms: a causal analysis that provides an answer to the question of why it happened and a rethinking of one's attitudes and priorities to restructure one's life along more satisfying lines, changes that are prompted by and attributed to the cancer.

Gaining a Sense of Mastery

A sudden threatening event like cancer can easily undermine one's sense of control over one's body and one's life generally (e.g., Leventhal, 1975). Accordingly, a second theme of the adjustment process is gaining a feeling of control over the threatening event so as to manage it or keep it from occurring again. This theme of mastery is exemplified by beliefs about personal control.

Many cancer patients seem to solve the issue of mastery by believing that they personally can keep the cancer from coming back. Two thirds of the patients we interviewed believed they had at least some control over the course of or recurrence of their cancer, and 37% believed they had a lot of control. Some of the remaining one third believed that although they personally had no control over the cancer, it could be controlled by the doctor or by continued treatments. Hence, belief in direct control of the cancer is quite strong. Again, using the significant others as a comparison population, belief in both the patient's ability to control the cancer and the physician's ability to control the cancer are less strong, suggesting that mastery needs are greater among patients. Significantly, both the belief that one can control one's own cancer and the belief that the physician or treatments can control it are strongly associated with overall positive adjustment, and both together are even better.

Many of the patients' efforts at control were mental. One of the most common manifestations was a belief that a positive attitude would keep the cancer from coming back:

I believe that if you're a positive person, your attitude has a lot to do with it. I definitely feel I will never get it again.

My mental attitude, I think, is the biggest control over it I have. I want to feel there is something I can do, that there is some way I can control it.

I think that if you feel you are in control of it, you can control it up to a point. I absolutely refuse to have any more cancer.

A substantial number attempted to control their cancer by using specific techniques of psychological

control. These techniques included meditation, imaging, self-hypnosis, positive thinking, or a combination of factors. Many had read the Simonton and Simonton (1975) work suggesting that people can control their own cancers using these kinds of methods, and they saw no harm in trying them on their own; a number had great faith in them.

Causal attributions can also contribute to a sense of mastery if the perceived initial cause is believed to be no longer in effect. Apropos of this point, for many patients the perception of a discontinuity between the time before their cancer and their present life is very important. They need to be able to say that "things are different now." For some, this perceived temporal discontinuity was tied to a relationship. One woman, for example, characterized her first husband as a "boorish rapist" and believed that this destructive relationship had produced the cancer; her new involvement with her "wonderful" second husband, she felt, would keep her cancer-free. Another woman, who attributed her cancer to a poor immune system, believed that the cancer had structurally altered her body—she called it "realigning the cells." As a consequence, she felt she would no longer be vulnerable to cancer. This expression of a discontinuity between precancer and postcancer time—the sense that things are different now—is echoed many times and seems to be important to producing a sense of mastery by maintaining, in part, that the initial cause is no longer in effect.

Although many patients have regained a sense of mastery by thinking about their cancer differently, others adopt direct behavioral efforts to keep the cancer from coming back. In a number of cases, patients made changes in their lives that both enabled them to reduce the likelihood of recurrence (they believed) and gave them something to control now. For some, these were dietary changes; a full 49% of our sample had changed their diet since the cancer bout, usually in the direction of adding fresh fruit and vegetables and cutting down on red meats and fats. For others, eliminating the medications they had taken like birth control pills or estrogen replenishers fulfilled the same function. The relationship of these changes to the need for mastery was verbalized by some patients:

[Where the cancer came from] was an important question to me at first. The doctor's answer was that it was a multifaceted illness. I looked over the known causes of cancer, like viruses, radiation, genetic mutation, environmental carcinogens, and the one I focused on very strongly was diet. I know now why I focused on it. It was the only one that was simple enough for me to understand and change. You eat something that's bad for you, you get sick.

A sense of mastery can be fulfilled by other than direct efforts to control the cancer. Assuming control over aspects of one's cancer care can meet the same need. One such effort at control is acquiring infor-

mation about cancer, so one can participate in or be knowledgeable about one's care. As one woman put it:

I felt that I had lost control of my body somehow, and the way for me to get back some control was to find out as much as I could. It really became almost an obsession.

One spouse described his wife:

She got books, she got pamphlets, she studied, she talked to cancer patients, she found out everything that was happening to her, and she fought it. She went to war with it. She calls it taking in her covered wagons and surrounding it.

Attempting to control the side effects of one's treatments represents another effort at mastery. For example, 92% of the patients who received chemotherapy did something to control its side effects. For slightly under half, this involved simply medications or sleep, but the remaining half used a combination of mental efforts at control. These included imaging, self-hypnosis, distraction, and meditation. Similar efforts were made to control the less debilitating but still unpleasant side effects of radiation therapy. For example, one woman who was undergoing radiation therapy would imagine that there was a protective shield keeping her body from being burned by the radiation. Another woman imaged her chemotherapy as powerful cannons which blasted away pieces of the dragon, cancer. One 61-year-old woman simply focused her attention on healing with the instruction to her body, "Body, cut this shit out."

A sense of mastery, then, can be achieved by believing that one can control the cancer by taking active steps that are perceived as directly controlling the cancer or by assuming control over related aspects of one's cancer, such as treatment. This belief in mastery and its relationship to adjustment ties in with a large body of literature indicating that manipulated feelings of control enhance coping with short-term aversive events (Averill, 1973; see Thompson, 1981, for a recent review). The cancer patients' experiences suggest that self-generated feelings of control over a chronic condition can achieve the same beneficial effects.

The Process of Self-Enhancement

The third theme identified in our patients' adjustment process was an effort to enhance the self and restore self-esteem. Researchers exploring a range of threatening events from the death of one's child (Chodoff, Friedman, & Hamburg, 1964) to going on welfare (Briar, 1966) have documented the toll such events can take on self-regard. Even when the events can be legitimately attributed to external forces beyond the individual's control, there is often a precipitous drop in self-esteem. After experiencing such a drop, how-

ever, many individuals then initiate cognitive efforts to pull themselves back out of their low self-regard.

In some cases, esteem-enhancing cognitions are quite direct. During our interviews, we asked our respondents to describe any changes that had occurred in their lives since the cancer incident. To digress momentarily, I think people are always curious about how others change their lives when they have had a life-threatening experience. Popular images would have patients changing jobs, changing spouses, moving, or squandering all their money on a series of self-indulgent adventures. In fact, these major changes are fairly rare, and when they do occur, they are associated with unsuccessful overall adjustment. Frequently, a couple will have one "binge" such as taking a cruise or buying a Cadillac, but otherwise there are typically few overt dramatic changes. After people reported the changes they had experienced in their lives since cancer, we asked them to indicate whether those changes were positive or negative. Only 17% reported *any* negative changes in their lives. Fifty-three percent reported only positive changes; the remainder reported no changes. We also asked our patients to rate their emotional adjustment before any signs of cancer, at various points during the cancer bout, and at the time of the interview. Not only did patients see themselves as generally well adjusted at the time of the interview and as better adjusted than they were during the cancer bout, they also saw themselves as better adjusted than before they had any signs of cancer! When you consider that these women usually had had disfiguring surgery, had often had painful follow-up care, and had been seriously frightened and lived under the shadow of possible recurrence, this is a remarkable ability to construe personal benefit from potential tragedy.

Some of the most intriguing illusions that contribute to self-enhancement are generated by social comparisons (Festinger, 1954; Latané, 1966; Suls & Miller, 1977). Drawing on some provocative suggestions by Wortman and Dunkel-Schetter (1979) concerning cancer patients' needs for social comparison, we hypothesized that if we could identify the women's objects of comparison we could predict who would perceive themselves as coping well or badly. The media highlight people who are models of good adjustment to crises. With respect to breast cancer, women such as Betty Ford, Shirley Temple Black, or Marvella Bayh come to mind. We reasoned that such models might demoralize normal women by making them feel they were not doing well by comparison (Taylor & Levin, 1976). In contrast, comparisons with average women who might be experiencing a number of more negative reactions to cancer should yield more favorable self-evaluations. An alternative prediction derived from Festinger's (1954) social comparison theory (Wheeler, 1966) is that people will compare themselves with

someone doing slightly better than they are—in other words, make upward comparisons in order to learn how to cope more effectively.

What we found conformed neither to our analysis nor to the upward comparison prediction (Wood, Taylor, & Lichtman, Note 4). Instead, virtually all the women we interviewed thought they were doing as well as or somewhat better than other women coping with the same crisis. Only two said they were doing somewhat worse. If we had an unusually well-adjusted sample, of course, these perceptions could be veridical, but we know from other information that this was not true.³ These results suggest that these women are making downward comparisons, comparing themselves with women who were as fortunate or less fortunate than they. These results tie in with a more general body of literature recently brought together by Wills (1981) indicating that when faced with threat, individuals will usually make self-enhancing comparisons in an apparent effort to bolster self-esteem. Downward comparisons, then, would seem to be a fairly robust method of self-protection against threat.

In some cases, these downward comparisons were drawn explicitly. For example, one woman took great glee from the fact that her Reach to Recovery volunteer (the woman sent in by the American Cancer Society to serve as a model of good adjustment) seemed to be more poorly adjusted than she was. Despite some direct comparisons, however, many of the social comparisons seem to be made against hypothetical women:

Some of these women just seemed to be devastated. And with really less problems than I encountered, you know, smaller tumors.

You read about a few who handle it well, but it still seems like the majority really feel sorry for themselves. And I really don't think they cope with it that well. I don't understand it, because it doesn't bother me at all.

I think I did extremely well under the circumstances. I know that there are just some women who aren't strong enough, who fall apart and become psychologically disturbed and what have you. It's a big adjustment for them.

It seems, then, that the need to come out of the comparison process appearing better off drives the process itself; the process does not determine the outcome. If a comparison person who makes one appear well adjusted is not available from personal experience, such a person may be manufactured.

Choice of comparison target is not the only way that social comparison processes can operate to en-

³ Comparison of participants in the study with nonparticipants from the same practice on a large number of disease-related and adjustment-related variables revealed no significant differences between the two (Taylor, Lichtman, & Wood, Note 2).

hance self-esteem. One must also consider the dimensions selected for evaluation. Conceivably, one could select a dimension that would make one appear more advantaged than others or one could select a dimension for evaluation that would put one at a disadvantage. To illustrate what our patients did, let me offer a few of their statements. The following is a comparison made by a woman whose cancer was treated with a lumpectomy (removal of the lump itself) rather than a mastectomy (which involves the removal of the entire breast):

I had a comparatively small amount of surgery. How awful it must be for women who have had a mastectomy. I just can't imagine, it would seem it would be so difficult.

These are the remarks of a woman who had a mastectomy:

It was not tragic. It's worked out okay. Now if the thing had spread all over, I would have had a whole different story for you.

An older woman:

The people I really feel sorry for are these young gals. To lose a breast when you're so young must be awful. I'm 73; what do I need a breast for?

A young woman:

If I hadn't been married, I think this thing would have really gotten to me. I can't imagine dating or whatever knowing you have this thing and not knowing how to tell the man about it.

The point, of course, is that everyone is better off than someone as long as one picks the right dimension. In our study, several women with lumpectomies compared themselves favorably to women with mastectomies; no woman with a mastectomy ever evaluated herself against a woman with a lumpectomy. Older women considered themselves better off than younger women; no younger woman expressed the wish that she had been older. Married women pitied the single woman; no single woman pointed out that it would have been easier if she'd been married. The women who were the worst off consoled themselves with the fact that they were not dying or were not in pain. The amount of self-enhancement in these dimensional comparisons is striking. Not only choice of comparison target, then, but also choice of comparison dimension is important for restoring self-enhancement in the face of threat. The issue of dimension selection in social comparisons is one that has been almost entirely ignored in the social comparison literature. This would seem to be an important oversight, particularly for research that examines social comparisons made under threat (Taylor, Wood, & Lichtman, *in press*).

The fact that social comparison processes can be used to enhance oneself is important, because it

meshes social psychological processes with clinically significant outcomes. However, these social comparisons appear to serve important functions other than just self-enhancement. Several researchers (e.g., Fazio, 1979; Singer, 1966) have made a distinction between social comparisons that are made to validate one's self-impression versus social comparisons that are drawn to construct self-impressions. The results just described can be construed as efforts to validate a favorable self-image. However, one can also see evidence of constructive social comparisons among the respondents. Specifically, some of the comparisons involved instances in which women selected as comparison objects other women who were worse off physically (such as women with nodal involvement, women with metastatic cancer, or women with double mastectomies) but who were coping very well. Such comparisons are self-enhancing, but they are also instructive and motivating. That is, the fact that women worse off are coping well seems to inspire the person drawing the comparison to try to do as well and to pattern her own behavior after the comparison person. These comparisons are particularly important because self-enhancement, and indeed cognitive illusion generally, is often written off as defensive and dysfunctional. Instead, these illusions may have multiple functions. In addition to self-enhancement, they can instill motivation and provide information, as these downward comparisons apparently did for some of our respondents (see Brickman & Bulman, 1977). I will discuss this point more fully in a later portion of the article.

What, then, can be learned from the analysis of cancer patients' comparative processes? These women made downward comparisons instead of upward ones, and appear to have selected their comparison persons to enhance their self-esteem rather than letting their self-esteem be determined by who was available for comparison. If other appropriate persons were not readily available for comparison, they manufactured a norm that other women were worse off than they were. The dimensions singled out for comparison were ones on which they appeared better, rather than worse, off. Physically disadvantaged but successful copers also were selected as models. One, then, has the best of both worlds: The comparisons enable one to feel better about oneself, but one does not lose the advantage of having a successful model on which to pattern one's efforts at adjustment.

Implications of Cognitive Adaptation for Cognitive Processing

Given these themes that constitute the tasks of cognitive adaptation to threatening events, it is now useful to examine the form of these cognitive adaptations more generally and discuss their implications for cognitive processing. The themes of meaning, mastery,

and self-enhancement could be observed in nearly every patient as a consequence of the threat she was experiencing, and yet the form through which the theme was expressed differed from patient to patient. For example, although the specific attributions made by our cancer patients were varied, virtually every patient had a theory about her cancer. Likewise, although cognitions about what one could control varied from patient to patient, an effort at control was present for most. Although the specific form of social comparisons varied, their self-enhancing quality was highly robust. These findings imply that the specific form of the cognitions patients hold about their illness may matter less than the functions those cognitions serve.

Indeed, cognitions are both the easiest and the hardest thing to study empirically. They are easy because there are so many of them, and they are hard because it is so difficult to know which ones are important and when. The meaning of specific cognitions can vary substantially from situation to situation. To take an empirical example, consider the specific cognition of self-blame for a negative outcome. Self-blame may serve some needs under some circumstances and other needs under others. In Bulman and Wortman's (1977) research on quadriplegics and paraplegics, self-blame was associated with good coping outcomes, perhaps because it signified a restored sense of mastery. In our cancer work (Taylor, Lichtman, & Wood, Note 2), self-blame was uncorrelated with adjustment; for some, self-blame may have produced guilt and self-recrimination (cf. Abrams & Finesinger, 1953), whereas for others it was associated with mastery. In recent research Buf Meyer and I conducted on rape victims (Meyer & Taylor, Note 5), self-blame was associated with poor coping, because it may well have led people to question their sense of mastery. Note, then, the robustness of the mastery need, but the different ways that the specific cognition of self-blame related to it. Thus, a particular cognition may mean one thing under one set of circumstances and something completely different under others.

Moreover, specific cognitions (such as attributions, beliefs about control, or social comparisons) are in some cases functionally equivalent or at least functionally overlapping. The need for self-enhancement can conceivably be served by believing one has control or by making downward comparisons. Likewise, the need to find meaning in the experience can be served by finding an explanation for the event or by laying out a plan for controlling things in the future. Not only do specific cognitions functionally overlap, but individual cognitions may serve several needs simultaneously. For example, a causal explanation can simultaneously provide meaning for an experience and increase one's sense of mastery. Rothbaum, Weisz, and Snyder (1982) have argued that attempts

to find meaning in an aversive experience actually represent an effort at interpretive control, a secondary form of control that involves flowing with the experience rather than trying to change it.

Perhaps the best example of meeting dual needs through a single cognition is the downward social comparisons our cancer patients made. By selecting someone worse off physically but who was coping very well, these women both came off looking advantaged and also provided themselves with a model of how to cope, thus contributing to their mastery needs. To summarize, specific cognitions may mean different things under different circumstances, they may be functionally overlapping rather than functionally distinct, and they may satisfy several functions simultaneously.

This portrait of cognitions is very different from that typically provided by psychological research on social cognitions. These usually laboratory-based efforts often portray specific cognitions as if they were highly robust rather than fluid and ephemeral (cf. Wortman & Dintzer, 1978). Cognitions are often discussed as if they had a fixed meaning across situations rather than multiple and changing meanings. The functions specific cognitions serve, such as those identified in the present study, are almost entirely ignored in laboratory investigations. The present results argue, at the very least, for expanding the study of cognitions to include field situations of high involvement; such situations may more properly capture the function-cognition interface that is necessary for interpreting the specific form through which a cognitive theme is expressed. There are other implications as well. As will be seen shortly, the preceding points regarding the form of specific cognitions assume increasing importance in the context of the disconfirmation of cognitions. Before that issue is discussed, however, an important attribute of cognitive adaptations to threatening events merits extended comment, and that is their illusion-based nature.

Illusion As Essential to Normal Cognitive Functioning

The cognitions upon which meaning, mastery, and self-enhancement depend are in a large part founded on illusions. Causes for cancer are manufactured despite the fact that the true causes of cancer remain substantially unknown. Belief in control over one's cancer persists despite little evidence that such faith is well placed. Self-enhancing social comparisons are drawn, and when no disadvantaged person exists against whom one can compare oneself, she is made up. I have argued that these illusions are beneficial in bringing about psychological adaptation. However, in the past, mental health researchers and clinicians have assumed that positive mental functioning depends upon being in touch with reality (e.g., Erikson,

1950; Haan, 1977; Jahoda, 1958; Maslow, 1954; Menninger, 1963; Vaillant, 1977; see Lazarus, 1983, for a discussion of this point). Indeed, one goal of therapy has been considered to be the stripping away of illusions so that a more accurate view of the world and one's problems can emerge. As Lazarus (1983) put it: "to be sophisticated [meant] accepting accurate reality testing as the hallmark of mental health. . . . Everyone knew that self-deception was tantamount to mental disorder" (p. 1).

However, the idea that normal mental functioning depends upon illusion is gaining increasing support. In his new look at denial, Lazarus (1983) points out that denial is no longer denounced as the primitive, ultimately unsuccessful defense it once was; rather, clinicians and health psychologists are now recognizing its value in protecting people against crises, both in the initial stages of threat and intermittently when people must come to terms with information that is difficult to accept, such as the diagnosis of a terminal illness.

Greenwald's (1980) recent analysis of the totalitarian ego points out how the maintenance of the self-concept depends upon the revision of one's personal history. One remembers oneself as more successful and more often correct than one really is. Attribution research reveals that good outcomes are attributed to oneself much more than are bad outcomes (e.g., Bradley, 1978; Miller & Ross, 1975; Snyder, Stephan, & Rosenfield, 1978). Optimism pervades our thinking (Tiger, 1979). People believe that the present is better than the past and that the future will be even better (Brickman, Coates, & Janoff-Bulman, 1978; Free & Cantril, 1968; Weinstein, 1980). People expect to succeed and improve in the future. All these views of oneself and the world become even more extreme under ego-involving conditions (see Greenwald, 1980).

Perhaps the clearest evidence for the benefits of illusions comes from the study of depressive cognitions. Independent work by several investigators has shown that relative to depressives, normals show several characteristics. Normals inflate others' views of them (Lewinsohn, Mischel, Chaplin, & Barton, 1980). They are more prone to an illusion of control—that is, the perception that they can control objectively uncontrollable outcomes (Alloy & Abramson, in press; Alloy, Abramson, & Viscusi, 1981; Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1979). Nondepressives underestimate the amount of negative feedback they have received (DeMonbreun & Craighead, 1977; Nelson & Craighead, 1977). Nondepressives overestimate the predictability of and control they have over positive outcomes and underestimate the predictability of undesired outcomes (Alloy & Abramson, 1979, 1980; Alloy et al., 1981). They reward themselves more than their objective

performance warrants (Rozenky, Rehm, Pry, & Roth, 1977), and they tend to attribute their successes to internal stable causes and their failures to external, unstable, specific ones (Abramson & Alloy, 1981). Finally, on an issue quite similar to the cancer experience, Silver and Wortman (1980) found that often unrealistic beliefs among quadriplegics and paraplegics about the relationship between their own efforts and likelihood of improving led to better emotional functioning and better coping.

Illusion clearly pervades normal cognitive functioning, and the researchers who have investigated this area have suggested several reasons why. Such illusions may have evolutionary significance: As Greenwald (1980) notes, they contribute to maintaining the self as a highly organized information processing system, and they produce behavioral persistence. Behavioral persistence may also be the adaptive significance of the illusion of control and other exaggerated perceptions of contingency (Lewinsohn et al., 1980) in that high expectations of control should enhance efforts at control. Self-enhancement biases likewise are functional: Positive self-perceptions can make one behave more favorably toward both the self and others, such as by increasing helping behavior (Isen, Shalke, Clark, & Karp, 1978; Rosenhan, Underwood, & Boore, 1974). Self-reinforcement, which normals appear to do to excess, increases rate of responding at a task (see Rozenky et al., 1977). The so-called "warm glow" produced by these illusion-based perceptions, then, may have implications for a wide variety of adaptive self-regulatory mechanisms (Lewinsohn et al., 1980). In our own work, it is clear that the sense of meaning, mastery, and self-enhancement, and the specific cognitions through which they are achieved, enable people to make sense of the cancer, to take controlling efforts to attempt to forestall a recurrence, to assert control in aspects of their lives where control is possible, and to change perceptions of themselves and their lives in ways that are self-enhancing and psychologically beneficial. The effective individual in the face of threat, then, seems to be one who permits the development of illusions, nurtures those illusions, and is ultimately restored by those illusions.

The Disconfirmation of the Cognitive Management of Threat

There is one potential problem in arguing for the adaptive significance of illusion, which is that beliefs that rest on illusion are vulnerable to disconfirmation. The belief that one can control one's cancer can, for example, be abruptly disconfirmed by a recurrence. The belief that one's cancer came from a particular cause, such as an auto accident, can be quickly disconfirmed by a physician or a knowledgeable acquaintance. If people's adjustment to threat depends

on the maintenance of illusions, what happens when these illusions are challenged or destroyed?

This has been an extremely important issue in social cognition, especially in work on psychological control (e.g., Wortman & Brehm, 1975). Whereas considerable research highlights the benefits of control (Thompson, 1981), there is growing suspicion that when efforts at control are exerted in an environment where no control exists, controlling efforts will lead to poorer rather than more successful adjustment (e.g., Seligman, 1975; Wortman & Brehm, 1975). A sense of mastery may be fine so long as nothing happens to undermine it. This suspicion about the potential adverse effects of control is sustained by two models of the disconfirmation process furnished by psychological theory. The first is reactance (Brehm, 1966; Brehm & Brehm, 1981), which maintains that threats to freedom or loss of it produce arousal, hostility, and direct or indirect efforts to restore those freedoms. The second, more widely researched, model is learned helplessness (Abramson, Seligman, & Teasdale, 1978; Seligman, 1975), which maintains that after repeated, unsuccessful efforts at control, the individual will give up responding. Motivational, cognitive, and emotional deficits may then arise that will interfere with learning in a new environment. Central to these models is the belief that when lack of control exists in reality, those who attempted to exercise it will be worse off behaviorally, emotionally, cognitively, and motivationally than those who do not.

Both reactance theory and learned helplessness theory, however, suffer from the problems of laboratory-based investigations of social cognition described earlier. Both greatly simplify the environments within which loss of control is introduced, creating several difficulties in interpreting both the meaning of loss of control and the cognitive and behavioral responses to loss of control. For example, potential controlling efforts are often limited to a restricted set of responses, such as a bar press or a verbalized choice. In the world in which loss of control is usually experienced, however, a range of response options is often available to an individual. Accordingly, the potential responses to loss of control are far greater than the range made available in typical studies of learned helplessness or reactance. It is therefore hard to know how to interpret persistence or giving up when those are the only possible responses available. A greater conceptual problem of both theories is that they focus attention on the controlling response itself and the fact that it has been blocked, rather than on the goal or function that the response was designed to serve. In life, however, controlling responses are not made in a vacuum; they are made in response to some goal that achieves some value or function. From the standpoint of cognitive adaptation theory, the specific response (and its blocking) has no fixed meaning in-

dependent of the goals or functions it serves. The specific form matters little or not at all. Knowing the value or function of the goal can enable one to look for its expression elsewhere, if expression through some specific form is blocked.

Accordingly, let me propose a third model of the disconfirmation process that more fully captures the fluidity of cognitive adaptations. This model owes its genesis, in part, to some observations on mundane plans. Barbara and Frederick Hayes-Roth, two cognitive psychologists, have studied mundane plans extensively (Hayes-Roth, 1981; Hayes-Roth & Hayes-Roth, 1979), and they report one highly robust and quite curious finding. It is that people grossly overestimate how much they can accomplish in a given period of time and continue to do so in the face of repeated negative feedback. Anyone who makes a daily "to-do" list must be aware of the following phenomenon. Each morning, one makes an extensive list of what one plans to do for the day. One then does perhaps 40% of the items, starts another 40%, and leaves 20% completely untouched. One then shifts the uncompleted items over to the next day or, if the day was particularly unproductive, crosses out the name of the day at the top of the list—for example, Monday—and changes it to the next day! What is interesting is that this process goes on day after day with no disruption to one's functioning, little if any emotional upset, and more to the point, no modification in behavior. Disconfirmation of our expectations of getting things done is a fact of life about which we are apparently unperturbed.

I believe this model of cheerful ineptitude, which associates have variously dubbed "learned helplessness" or "proactance," similarly characterizes the disconfirmation of illusions in the adjustment to threat. The model is appropriately derived from behavior in complex environments. It conceives of specific cognitions, like control or attributions, not as individual responses to be observed in isolation, but rather outlines general themes that are themselves made up of a number of potential specific cognitive responses. It conceptualizes disconfirmation not as the violation of a single expectation, but as a temporary frustration. According to the model, disconfirmation of a single effort at control or a single attribution would be little more frustrating than would finding a particular store closed when one was running one's errands.

An additional important feature of the planning literature that makes it an appropriate source for a model of the disconfirmation process is its emphasis on the plan-goal relationship. Specific plans (which here function as analogues to specific cognitions) have no meaning independent of the goals or values they serve. Accordingly, when a particular plan is thwarted, some alternative plan is substituted that accomplishes

the same goal or achieves the same value. It is only when the goal or value itself is blocked, as by the blockage of *all* possible tactics or plans, that one may see goal frustration rather than response substitution as the consequence of loss of control. Even then, goal substitution or value substitution may occur (see Schank & Abelson, 1977; Wilensky, 1981).⁴

Applying the model to the cancer experience leads to specific predictions. If one's belief about the cause of one's cancer is disconfirmed, one finds another potential cause to satisfy one's search for meaning. If one felt that one could control one's cancer, and a recurrence occurred, then one would shift to control something else that *was* controllable, such as one's responses to chemotherapy. Before I create an incorrect impression, let me hasten to add that I do not mean that people face setbacks with aplomb. One does not, for example, react calmly to a recurrence of cancer. What I mean is that people who believed they understood the cause of their cancer, believed they could control it, or believed they were handling it well, and who then discover their beliefs are untrue, are not worse off for having thought so. In fact, they may be better off.

This possibility first suggested itself in our examination of causal attributions among the seriously ill. Having been wedded to laboratory models of the attribution process, we believed that the specific attribution an individual made for his or her cancer would predict adjustment. It was therefore somewhat unnerving that when we asked people what they thought caused their cancer, a large number of them listed several possibilities. More to the point, they encompassed the entire range of dimensions thought to be theoretically important in understanding the consequences of causal attributions. Furthermore, some of the theories people had originally advanced for their cancer had been disconfirmed by a physician or other knowledgeable individual with no apparent emotional costs. For example, one woman who had been in an auto accident just prior to the detection of her tumor wanted to file suit against the other driver for causing her cancer. Her doctor and lawyer, of course, quickly disabused her of this notion. She promptly came up with another explanation. She is one illustration of the general point: People often hold multiple or serial theories about their cancer that would seem to have vastly different psychological consequences, but which apparently do not. Moreover, having one or more theories disconfirmed does not seem to be particularly bothersome.

The issue of disconfirmation is most important in the area of psychological control, and at present, our own investigations do not provide a large data

⁴ The author apologizes to these planning investigators for vastly oversimplifying their models.

base on the effects of failure of control. One example, however, is particularly illustrative of the point I want to make. One of the women I interviewed told me that after detection of her breast tumor, she had believed she could prevent future recurrences by controlling her diet. She had, among other things, consumed huge quantities of Vitamin A through the singularly unappetizing medium of mashed asparagus. A year and a half later, she developed a second malignancy. This, of course, is precisely the situation all control researchers are interested in: a dramatic disconfirmation of efforts to control. I asked her how she felt when that happened. She shrugged and said she guessed she'd been wrong. She then decided to quit her dull job and use her remaining time to write short stories—something she had always wanted to do. Having lost control in one area of her life, she turned to another area, her work life, that *was* controllable.

This example is raised not as proof, but as an instance of what was observed several times. Disconfirmation of efforts at control did not produce the emotional upset or inactivity that one might predict from reactance or learned helplessness theory. Rather, there are many things that can potentially be controlled, and if one's need to control a situation is great, one will control what one can and give up attempting to control what one cannot (cf. Rothbaum et al., 1982).

Cognitive adaptation theory, then, is proposed as an alternative model of the disconfirmation process, not because it has been proven to be better—it has not yet—but because it offers a very different view of the human organism than do currently available models. It views people as adaptable, self-protective, and functional in the face of setbacks.

Conclusion

I have offered a theory of cognitive adaptation to threatening events. The theory maintains that when individuals experience personal tragedies or setbacks, they respond with cognitively adaptive efforts that may enable them to return to or exceed their previous level of psychological functioning. The themes around which such adaptations occur include a search for meaning, an effort to gain mastery, and an attempt to enhance the self. Meaning is addressed by such cognitive processes as finding a causal explanation for the experience and restructuring the meaning of one's life around the setback. Mastery involves efforts to gain control over the threatening event in particular and over one's life more generally by believing that one has control and by exerting behavioral control over threat-related events. Self-enhancement occurs by construing personal benefit from the experience, by comparing oneself with others who are less for-

tunate, and by focusing on aspects of one's own situation that make one appear to be well off.

I have maintained that these cognitive restructurings are in large part based on illusions, that is, beliefs that have no factual basis or that require looking at known facts in a particular way. Illusion has, in the past, been treated with mild contempt. In the psychological community, illusion is often equated with defensiveness, relegated to being primarily of clinical interest, and is seen as ignorant, static, and as ineffective for learning and action. Even in literature in which the need for illusion is a common theme, the self-deluded characters are often portrayed as naive or pathetic (see Lazarus, 1983). Consider as examples *Don Quixote* (Cervantes, 1605, 1615/1956), *The Iceman Cometh* (O'Neill, 1946), or *Who's Afraid of Virginia Woolf?* (Albee, 1964). In contrast, I maintain that illusions can have a dynamic force. They can simultaneously protect and prompt constructive thought and action. As the literature on depression and on the self makes clear, normal cognitive processing and behavior may depend on a substantial degree of illusion; whereas the ability to see things clearly can be associated with depression and inactivity. Thus, far from impeding adjustment, illusion may be essential for adequate coping.

Perhaps the most important implication of cognitive adaptation theory is its metatheoretical stance regarding the nature of cognitions themselves. Specific cognitions are viewed not as robust elements that maintain a cross-situational meaning, but as strategic changing elements that serve general value-laden themes. Specific cognitions may change their meanings from situation to situation, they may be functionally overlapping rather than functionally distinct, and they may serve several functions simultaneously. Viewed from this perspective, the disconfirmation of a specific cognition, such as a belief in personal control over a recurrence of cancer, may not be as psychologically problematic as previous models of the disconfirmation process (reactance, learned helplessness) have suggested. Rather, given the flexibility of the relationship between cognitions and themes, the individual may find an alternative response that serves the same function and thus continue to adapt as well as or better than the individual who makes no adaptive effort at all.

As a theoretical and empirical venture, cognitive adaptation theory is still in its infancy. It suggests a general strategy for studying adaptation to threatening events by focusing on multiple cognitively adaptive efforts simultaneously, rather than upon the adaptive value of particular cognitions in isolation. It also takes a stand against laboratory-based examinations of reactions to threat that fail to acknowledge the relation of particular cognitions to overriding goals or values. More specifically, the theory points to some directions

for beginning research. Systematically documenting the themes of meaning, mastery, and self-enhancement in adjustment to threatening events other than cancer is an important empirical step. In this context, it is encouraging to note that evidence for each of the three themes—meaning (Chodoff et al., 1964; Frankl, 1963; Mechanic, 1977; Visotsky et al., 1961; Weisman & Worden, 1975), mastery (Bulman & Wortman, 1977; Janoff-Bulman, 1979; Rothbaum et al., 1982), and self-enhancement (Pearlin & Schooler, 1978; Wills, 1981)—has already been reported by investigators exploring misfortunes as varied as economic difficulty, marital problems, rape, and physical illness other than cancer. A second beginning line of research stems from the different predictions that cognitive adaptation theory generates for reactions to disconfirmation of cognitions, as compared with reactance or learned helplessness theory. The theory suggests, for example, that in field settings where people have multiple response options at their disposal, they will turn their frustrated efforts at control, understanding, or self-enhancement to tasks on which they are more likely to be successful. Our current empirical work focuses on this very question: What happens when people's efforts to exert control in a threatening environment are unsuccessful?

My biologist acquaintances frequently note that the more they know about the human body, the more, not less, miraculous it seems. The recuperative powers of the mind merit similar awe. The process of cognitive adaptation to threat, though often time-consuming and not always successful, nonetheless restores many people to their prior level of functioning and inspires others to find new meaning in their lives. For this reason, cognitive adaptation occupies a special place in the roster of human capabilities.

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