
ISSUES OF CONTROL AND HEALTH: THE ACTION IS IN THE INTERACTION

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Butler (1976) delineates three "symptoms" of middle age. The first is counting the number of years left before death rather than counting the years since birth. The second involves looking at what one has done and evaluating accomplishments in relation to goals. The third is an awareness of the body and a monitoring of the body systems and states. As one ages and one's health status declines this third symptom plays an increasingly important role.

The middle-aged years are a time of "settling down" (Levinson, 1977). Middle-aged adults experience greater control over their lives and have stronger feelings of security and stability than at other developmental periods. During these years, individuals struggle with resolving the "crisis" between generativity versus stagnation (Erikson, 1968). Generativity is the ability to care for others and to help them accomplish their goals as well as to manage one's own life and to care for oneself. Stagnation is hanging on to the same goals established early in life regardless of the likelihood of achieving those goals, or using unhealthy or self-destructive methods for coping with disillusionment or failure.

Middle-aged is an ambiguous term. Various definitions exist as far as when someone should be considered middle-aged. Some theorists have marked the decades between 30 and 70 as the middle years (Kerckhoff, 1976). The US census more narrowly delimits the range to between 45 and 64 years of age. Chronological age is not the only determinant of when middle-age begins and ends. The perspectives of similarly-aged people vary as to whether they consider themselves middle-aged or not. The tasks one is attempting to accomplish and the characteristics of one's life also mark the middle years.

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Generally, the developmental tasks of middle-age involve the establishment of oneself in one's career, the raising of children, caring for elderly parents, and, in a real sense, managing the world. This is usually the most productive period of one's life. Typically one is more in control over one's own life, as well as other people's lives, when one is middle-aged than at any other time. In addition to managing one's own life, the middle-aged individual is also a member of the primary group that is responsible for the major decisions and activities of society as a whole.

Of course, not all individuals in this period of life experience equivalent levels of control. Women in traditional domestic roles may begin to struggle with their own dependency on their husbands (Sheehy, 1976). Their crisis is less one of learning to care for other people and more of learning to care for oneself. People in lower socioeconomic status groups also do not feel as much in control over their destinies as those with more financial resources. At the same time when one is at the peak of productivity, one is also beginning to notice and deal with the decline of youth and vigorous health, both of which have implications for one's feelings of control over one's health status.

The effects of aging on health are relatively gradual and may not be noticed until much later. The first effects of aging may become evident during the early 40s - wrinkles, gray hairs, vision and hearing loss, weight gain. Certain effects of aging (e.g. weight gain; wrinkles) can also be delayed or diminished through regular exercise, a good diet, and avoiding tobacco. Health issues during this period are variable from individual to individual. Some may begin to experience the effects of cardiovascular disease or other chronic illnesses such as arthritis or diabetes. Even those who do not suffer from serious illness usually observe more of their contemporaries having health problems. The impact of declining health has differential effects on individuals depending upon a variety of factors, most of which interact with one another to produce varying outcomes.

In addition to health issues, there are many other stressors that go along with this highly significant period in life. The management of multiple roles, the responsibilities and obligations that accompany power, all produce stress as well as rewards. Middle age is the most complex period in the life-cycle. Personality characteristics, beliefs, values, attitudes, societal expectations, environmental factors, and role demands are only a few of the numerous factors that influence the behavior and psychological states of middle-aged adults. This chapter focuses on one of these factors: the extent to which an individual believes he or she is "in control" of some aspect of his/her health.

Elsewhere we have defined perceived control as "the belief that one can determine one's own internal states and behaviour, influence one's environment, and/or bring about desired outcomes" (Wallston, Wallston, Smith and Dobbins, 1987, p. 5). Perceived control is related to, but different from, desire for control - a motivational construct which also plays a role in determining behavior (R. Smith, Wallston, Wallston, Forsberg and King, 1984). Also, perceived control of health encompasses more than "health locus of control" (Wallston, 1992). Control beliefs, however, are only one of the possible factors that may predict behavior. Because behavior is multiply determined, it is unlikely that control beliefs alone would have a singular impact on a middle-aged adult's behavior. It is also the case that one's own behavior may be only a minor determinant of one's health status (Kaplan, 1984). Control beliefs are far more likely to interact with a myriad of other factors in predicting behavior and

outcomes for this group than would be evident if only one looked for "main effects" of such beliefs.

For example, consider a middle aged male who has spent a lifetime experiencing many positive outcomes as a result of his behavior and who, therefore, has developed an "internal locus of control orientation" (i.e. the generalized belief that one's outcomes are the result of one's actions; Rotter, 1966). Suppose that one day he experiences chest pains and is hospitalized for "tests and observation" in an institution where all decisions are made for him by the staff. The experience of not having control in that setting may result in more negative outcomes for the person who expects control than for another person who has experienced little control up to that point. This latter patient might just as soon relinquish all control to the doctors and nurses. In other words, the patient's control beliefs (locus or desire) may interact with situational factors in predicting how the patient will adjust to the situation.

In applying Rotter's (1954) social learning theory to the prediction of health-related phenomena, Wallston and his colleagues have consistently stated that one's expectations about the outcomes of one's health behavior (typically assessed by a measure of health locus of control beliefs: Wallston, Wallston and DeVellis, 1978; Wallston, Wallston, Kaplan and Maides, 1976) are moderated by the value one places on being healthy and, perhaps, by other factors as well (see Wallston, 1991, or Wallston and Wallston, 1984, for explications of this theoretical proposition).

Theoretically, one's health behavior is only predictable by one's health locus of control beliefs if one values being healthy. Testing this theoretical proposition calls for, at minimum, examining the interaction between a measure of expectancies and a measure of values. For example, Kaplan and Cowles (1978) found that individuals who simultaneously held internally-oriented health locus of control beliefs (Wallston *et al.*, 1976) and who valued their health highly were the only subjects able to maintain reduced smoking levels post-treatment. Internally-oriented subjects who were lower in health value were able to reduce their smoking levels during the treatment phase, but relapsed during maintenance. (See Smith and Wallston, 1992, for a discussion of how to assess health values).

The remainder of this chapter consists of a potpourri of studies in which some measure of health-related control beliefs was examined in interaction with some other variable in order to explain some health-related phenomenon. Only some of these studies were conducted by Wallston and his students/colleagues, and only some employed one or other of the health locus of control scales developed by Wallston and his colleagues. All of these illustrations, however, involve people with either chronic illnesses or people who are receiving medical or surgical attention. In addition, the vast majority of subjects in these studies were middle-aged. Finally, they all have in common the fact that the most interesting findings were interactions rather than main effects. In effect, the action was in the interaction.

MEASURES OF CONTROL AND COPD PATIENTS

Chronic Obstructive Pulmonary Disease (COPD) is a set of conditions (such as chronic bronchitis, emphysema, and asthma) that are characterized by a persistent slowing of airflow while attempting to exhale air rapidly (Brashear, 1980). From both

an economic and personal health standpoint, COPD is a serious, debilitating condition and a significant public health problem. The condition, however, is amenable to behavioral intervention, especially attempts at getting the patient to engage in appropriate physical conditioning exercises. If COPD patients can be motivated to carry out these exercises, they can improve their oxygen consumption and utilization, lower their heart rate, improve ventilation, and increase their tolerance for additional physical activity. The problem, however, is getting COPD patients to comply with a physical exercise regimen. Initially, in sedentary patients, physical activity may lead to serious shortness of breath. Experiencing shortness of breath is often frightening, causing the patient to avoid not only exercise but, also, many "essential" activities of daily living.

In the early 1980s, Bob Kaplan and Cathie Atkins, colleagues of the first author's out in San Diego, California, developed a number of cognitive-behavioral interventions to help COPD patients maintain a daily exercise program involving mostly walking. These interventions were based on Bandura's social learning theory (Bandura, 1977a), especially that aspect of his theory involving situationally-specific self-efficacy beliefs as mediators of behavior change (Bandura, 1977b; 1982). In order to test whether COPD patients' beliefs in their abilities to do the exercises did, in fact, contribute to their exercise compliance, Kaplan, Atkins, and their students (Kaplan, Atkins and Reinsch, 1984) administered a set of six self-efficacy scales. Within each scale, the patient was presented with a series of progressively more difficult performance requirements within a specified domain of activity. For example, the scale for walking included: walk one block (in approximately five minutes); walk two blocks (in 10 minutes); . . . walk three miles (in 90 minutes). Altogether, the walking efficacy scale consisted of nine items representing increasing gradients (in nonequal intervals) of difficulty. These self-efficacy scales (which we consider to be measures of perceived control of behavior; Wallston *et al.*, 1987) were administered at baseline - after the patient had been given a walking prescription - and at follow-up, three months later.

Kaplan *et al.* also administered the unidimensional HLC Scale to their subjects on the same occasions they had them fill out the behaviorally specific self-efficacy scales. Their reason for doing so was to show that measures based on Bandura's social learning theory were superior to one based on Rotter's social learning theory when it came to predicting health behaviors and outcomes. In their initial analyses, Kaplan and Atkins confirmed their (West Coast biased) expectations: for example, walking compliance over the three-month study period correlated .63 with self-efficacy for walking, but was essentially uncorrelated ($r = -.08$) with HLC scores. However, after a suggestion by the first author of this chapter, Kaplan and Atkins carried out additional analyses examining the hypothesis that HLC beliefs moderated the relationship between specific self-efficacy beliefs and health outcomes. Using a median split, they divided their sample into two groups: "HLC internals" and "HLC externals." Lo and behold, the correlations between self-efficacy for physical activity and the criterion variables were mostly positive and significant for the "HLC internals" and insignificant for the "HLC externals." In other words, only for those COPD patients who believed that their health was dependent on their actions did expectations of one's ability to carry out those actions predict health status. These findings, which are consistent with both Rotter's and Bandura's social learning theories, can be found in the article about these analyses published by Kaplan, Atkins and Reinsch (1984).

We turn next to a series of studies done by Glenn Affleck, Howard Tennen, and their colleagues at the University of Connecticut, with patients with rheumatoid arthritis. Rather than illustrating interactions among different measures of control beliefs, their work demonstrates how control beliefs interact with disease severity to predict psychological well-being.

ADAPTATION TO RHEUMATOID ARTHRITIS

Rheumatoid arthritis (RA) is a debilitating chronic illness characterized by severe pain, fatigue, disfiguration, and joint damage. It may occur at any age, but its onset is most prevalent during the late 30s through the early 50s. Although RA is incurable, it is not life-threatening; its prognosis is variable and most patients experience intermittent periods of disease flare and remission. In fact, living with the uncertainty of the disease, especially not knowing from day-to-day how one will feel, is a major stressor associated with this condition (Wiener, 1975). In illnesses such as RA, perceptions of control over the illness and its symptomatology are likely to play a significant role in patients' psychological well-being (Wallston, 1993).

Many investigators interested in psychological adaptation to RA have used the health locus of control scales as their sole means of assessing the control perceptions of RA patients. With few exceptions, these investigators contented themselves with simply correlating HLC or MHLC scores with outcome measures such as anxiety or depression. The group headed up by Glenn Affleck and Howard Tennen at the University of Connecticut, however, has not only approached measurement of control in a novel manner, they have also examined interactions of control perceptions and symptom severity as predictors of RA patients' mood disturbance.

Affleck, Tennen, Pfeiffer and Fifield (1987) interviewed a sample of 92 patients with RA (mean age = 50.4 years). In the context of that interview, they asked patients to rate the degree of personal control they felt they had over (1) day-to-day symptoms, (2) the future course of the disease, and (3) their medical care and treatment. Patients made these control appraisals on scales ranging from 0 to 10 (0 = "absolutely no control;" 10 = "extreme amount of control"). Their measure of disease severity was a composite index of physician-rated joint involvement, joint deformity, joint erosions, and global disease severity. As dependent variables, Affleck *et al.* (1987) assessed patients' mood (using the Profile of Mood States-B; Lorr and McNair, 1982) and global adjustment to their illness (by having rheumatologists and nurse practitioners treating these patients make ratings using the scale developed by Derogatis, 1975).

In two hierarchical multiple regression analyses in which background and illness-status variables were controlled, Affleck *et al.* (1987) found that RA patients' rating of the degree to which they had control over their treatment process was predictive of both positive mood and global adjustment. More importantly, with both dependent measures, there was a significant interaction between appraisals of personal control over the disease and disease severity. Perceiving personal control over the course of the disease was marginally associated with positive mood in patients with mild disease but was significantly associated with negative mood in patients with severe RA. Similarly, perceiving control over the course of the disease was only weakly associated with global adjustment in patients with mild and moderate disease severity, but was

significantly related to less positive adjustment in those with relatively severe disease (Affleck *et al.*, 1987).

Recently, Tennen, Affleck, Urrows, Higgins and Mendola (1992) have reported on another set of interactions involving control beliefs and illness factors in RA patients. This more recent investigation followed 54 RA patients (mean age = 53 years) for 75 days, obtaining daily reports of pain intensity, mood, and activity limitations due to pain. Controlling for disease activity and dispositional optimism (Scheier and Carver, 1985), those who believed at the onset of the study that they had more control over their pain experienced less daily pain. However, with increased levels of pain, greater control was associated with less positive mood. On the other hand, perceived benefits of having chronic pain—a construct Tennen *et al.* (1992) equate with “secondary control” (cf Rothbaum, Weisz and Snyder, 1982)—interacted in a different manner with pain severity to predict activity limitations. Those RA patients who perceived greater benefits and then experienced severe pain reported fewer days on which their activities were limited by their pain. These extremely complex, but clinically important, findings would not have been discovered had not Tennen *et al.* examined their data for interaction effects.

DEPRESSION IN END-STAGE RENAL DISEASE

Another example of how control beliefs interact with situational variables to predict psychological state comes from a study conducted by Christensen, Turner, Smith, Holman and Gregory (1991). In their study of patients with end-stage renal disease, health locus of control beliefs (Wallston *et al.*, 1978) were examined in interaction with the experience of a failed renal transplant to predict depression.

Their study was based on Folkman's (1984) assertion that the benefits of a particular set of control beliefs are dependent on the situational context. Christensen *et al.* predicted that the negative effects of a transplant failure would be greater for those who had strong beliefs in the controllability of their illness, whether through their own efforts or those of their health care providers. It was also predicted that among those patients who had not experienced a transplant failure, those with stronger beliefs in control would have better psychological outcomes. Christensen *et al.* also predicted that disease severity would moderate the interaction described above, such that the more severe the disease the stronger the interaction.

The subjects for this study were 96 dialysis patients—66 of whom had never had a transplant and consequently had never experienced a failure, and 30 who had had unsuccessful transplants. The measures given were the PHLC and IHLC subscales of the MHLC, the Sickness Impact Profile (SIP, Bergner, Bobbit, Carter and Gilson, 1981), and the Beck Depression Inventory (BDI, Beck, Ward, Mendelson, Mock and Erbaugh, 1961). (The BDI was administered without the somatic items due to the possible confound with symptoms of end-stage renal disease.) All measures were administered at one time point. Subjects were classified as high or low on internal and powerful other control beliefs based on a median split on each of the scales. Subjects were also classified as high or low in disease severity based on a median split on the SIP.

A separate 2 (Treatment Condition) × 2 (Control Beliefs) × (Disease Severity) ANCOVA was conducted for each dimension of control beliefs. The covariates were

age and time since diagnosis, two variables that were significantly different between the treatment groups. For both analyses, the predicted three-way interactions were found to be significant: for IHLC \times Disease Severity \times Condition ($F(1,86) = 6.53$, $p < .05$); and for PHLC \times Disease Severity \times Condition ($F(1,86) = 4.71$, $p < .05$). The pattern of results were similar for both types of control beliefs. Within the low disease severity group, the two-way interactions between control beliefs and treatment conditions were not significant. However, the predicted interaction was found among the high disease severity group. In the failed transplant group, the high IHLC patients and high PHLC patients were significantly more depressed than the low IHLC and low PHLC patients, respectively. Among the patients who never had transplants, the opposite effects were found.

The implication of these results is that contextual variables are very important to consider in interaction with control beliefs when predicting the effects of an illness on psychological states. Beliefs in the controllability of health are more critical when those beliefs are challenged. When challenged, strong beliefs in control can actually be detrimental rather than beneficial. The experience of illness in and of itself challenges a belief in control over one's health.

Next we turn to the prediction of the "ultimate" dependent variable of interest to health psychologists: survival.

PREDICTING CANCER PATIENTS' LENGTH OF SURVIVAL

The study of the relationship between individual differences among cancer patients and how long they survive with the disease has generated an increasing amount of attention from health researchers. Investigations in this area are based on the clinical evidence that, despite similarity in histology and stage of cancer at diagnosis, cancers do not advance at the same rate across patients (Levy, 1983). Some patients die within a few weeks or months after diagnosis while others live long, nearly normal lives. The controversy over whether and to what extent we can use knowledge of individual differences to predict how long a patient will live after being diagnosed with cancer has led to much interdisciplinary attention and debate (e.g. Angell, 1985).

At the time the analysis to be described below was conducted, literature considering the effect of psychological variables on the course of cancer was replete with diverse and inconsistent findings. With the exception of a few studies (e.g. Bloom, 1982; Cassileth *et al.*, 1985; Funch and Marshall, 1983; Weisman and Worden, 1975), the majority of cancer survival investigations typically employed univariate analyses examining isolated main effects of the individual difference variables (e.g. Bieliauskas *et al.*, 1979; Derogatis, Abeloff and Melisaratos, 1979; Greer, Morris and Pettingale, 1979; Jamison, Burish and Wallston, 1987). We were aware of no studies that had examined interactions among psychological constructs.

While univariate analyses offer advantages of design simplicity and ease of interpretation, one major disadvantage is that examining one isolated factor at a time does not allow for the conjoint influences among the factors. It is, perhaps, too simplistic to believe that any one individual difference factor (or even a linear combination of these variables - such as was examined by Cassileth *et al.*, 1985) would predict an outcome as multidetermined as cancer survival. Thus, the analytical

strategies employed in most past studies may have resulted in either losing or obscuring important information and may very well have contributed to the "discrepancies" in the literature.

This study, which was carried out by Maribeth Smith (no relation to the second author of this chapter), had as its primary goal the investigation of a multicomponent model of length of cancer patient survival time. The model consists of selected psychological variables (health locus of control beliefs and coping style) along with selected nonpsychological factors (i.e. age, sex, severity of type of cancer, and length of time since diagnosis). Smith was stimulated to look for interactions by Dinardo's (1972) finding (cited in Strickland, 1978) that the best adjustment for patients with spinal cord injuries were for those with both an internal locus of control orientation and a high degree of emotional repression. Those patients with an external locus who tended to be open about their negative emotional feelings had the poorest adjustment (Dinardo, 1972). It was hypothesized that interactions between health locus of control beliefs and coping style would be more predictive of survival from cancer than either construct alone, and that these interactions in combination with other individual differences would constitute a significant set of predictors.

The sample consisted of 56 terminal cancer patients, all of whom had received chemotherapy. Of the 56 subjects, 41 (73%) were female. The mean age of the sample at the time of testing was 51.3 years (s.d. = 11 years), and the average time from diagnosis to testing was 15.8 months (s.d. = 20 months). The following cancer types were represented in the sample: breast (39%), ovarian (21%), lung (21%), testicular (5%), melanoma, lymphoma, Hodgkins, colon, and leukemia. By the time of the analysis, all 56 patients had died of cancer.

All subjects had filled out a battery of psychological instruments as part of an earlier study of conditioned nausea and vomiting (conducted at Vanderbilt by Tom Burish and his associates, Burish *et al.*, 1984) in which they had participated. Inclusion criteria for Smith's sample were the availability of descriptive data (i.e. verification of date and cause of death; age; sex; cancer type; and date of diagnosis) and completion of the two psychological measures used in this analysis. Psychological testing occurred at various intervals from each patient's date of initial diagnosis. To control for these differences, the analysis included a measure of the number of months between diagnosis and time of testing (hereafter called "lead time").

Each patient completed the Multidimensional Health Locus of Control (MHLC) Scale (Wallston *et al.*, 1978) and the Situation-Response Inventory of General Trait Anxiousness (S-RI; Endler and Okada, 1974). The S-RI is a multidimensional measure of anxiety which assesses three response modes across five situations. For purposes of this study, the response mode of distress/avoidance in a new or strange situation was used as the indicator of coping style. Thus, the more a subject indicated he/she typically felt uneasy, tense or anxious when in a new or strange situation, the higher his/her distress and the greater the sensitizing coping style. Conversely, low scores on those items were indicative of avoidance or a repressive coping style.

For use in the analysis, the subscales of the MHLC (i.e. IHLC, PHLC, CHLC) and distress/avoidance scores were converted to standardized T-scores before multiplying each of the MHLC subscales by distress/avoidance to create six interaction terms. This procedure gave equal weighting to health locus of control and coping style in the resultant interactions. It also allowed separate interaction terms (e.g. IHLC \times distress

and IHLC \times avoidance) to be included to examine the exact shape of the interaction among the constructs.

Because of the wide range of cancer types included in the sample, it was felt necessary to control for the influence of cancer severity on survival time. This was done using normative five-year survival rates (American Cancer Society, 1984). The five-year probability of surviving, based on the patient's cancer type, was subtracted from 1.00 to produce a relative severity rating. These severity ratings ranged from .18 (melanoma) to .88 (lung) with a mean of .49 (s.d. = .26).

Survival time, the dependent variable in this analysis, was operationalized as the number of months between psychological testing and death. Using a stepwise multiple regression analysis, survival time was regressed upon age, sex, cancer severity, lead time, the four psychological measures (IHLC, PHLC, CHLC, and distress/avoidance), and the six interaction terms (IHLC \times distress, IHLC \times avoidance, PHLC \times distress, PHLC \times avoidance, CHLC \times distress, and CHLC \times avoidance).

The regression analysis indicated that six predictors accounted for 28% of the variance (adjusted $R^2 = .176$) in cancer survival. This six predictor regression equation – consisting of CHLC \times distress, sex, PHLC \times distress, cancer severity, lead time, and IHLC \times avoidance – was significantly different from 0.00, $\{F_{(6,49)} = 2.96; p < .02\}$, although, in the final model, no one predictor was significant by itself. CHLC \times distress was the only predictor that ever contributed significantly to the equation, but it did so only on the first and second steps $\{F_{(1,54)} = 8.94 p < .01; F_{(1,53)} = 5.15, p < .01\}$. None of the psychological measures taken by themselves (i.e. considered as main effects as opposed to interactions) entered the regression equation.

Maribeth Smith's (1985) results did not exactly fit the pattern Dinardo (1982) reported with spinal cord injured patients. Instead of the combination of internality and repression leading to the best outcome ("adjustment" in Dinardo's study, survival in Smith's), it appears that those with the *lowest* scores on IHLC \times avoidance survived longer than those with the highest scores. On the other hand, the PHLC \times distress interaction term appears to replicate Dinardo's finding that externals with a sensitizing coping style had the poorest outcome. It should be noted, however, that "adjustment" and length of survival time are quite different outcomes. In fact, the results of Derogatis *et al.* (1979) could indicate that those cancer patients who indicated the best "adjustment" (i.e. low levels of anxiety and depression) were those who died most quickly.

Given the complexity of an event such as dying from cancer and the controversy which has arisen over trying to predict the time of occurrence of that event from individual differences or psychological constructs, it is indeed remarkable that Smith was able to account for an adjusted 18% of the variance in cancer survival time. If she had done so merely through the use of predictors such as degree of disease severity and/or length of time since diagnosis, her findings would not be of much interest or importance to health psychologists. However, that was not the case in this study. In and of themselves, those nonpsychological individual difference factors were not significant predictors of survival. It was only when they were combined with measures of psychological constructs that the model became statistically significant and psychologically intriguing.

Taylor (1983) described a multicomponent adaptation process necessary for adequate coping with cancer. Her model consisted of a number of components, each of

which was necessary, but none alone were sufficient. The fact that the only psychological terms that entered Smith's prediction equation were interactions rather than main effects may explain why other investigators (e.g. Cassileth *et al.*, 1985; Jamison, Burish and Wallston, 1987) failed to predict cancer survivorship from psychological measures. Up until Smith's (1985) study, few people reported looking for effects of interactions in predicting survival.

In the next section we review a series of three field experiments carried out by our research team at Vanderbilt under the auspices of a grant from the National Center for Health Services Research. In each of these three studies, we attempted to manipulate patient's perceived control over some aspect of their health-care situation. We also assessed how much control the patients said they wanted in those settings, so that we might examine the interactions between our control manipulations and the patients' control preferences. As will be seen, the action *was* in the interaction, but not in the form we originally thought it would be.

ENHANCING CONTROL IN HEALTH-CARE SETTINGS AS A FUNCTION OF INDIVIDUAL DIFFERENCES IN DESIRE FOR CONTROL

The major objective of this line of research was to enhance patients' sense of control by giving certain patients predictability information about and/or choice over selected aspects of their health-care regimen. We based this work on the findings of social psychologists who had demonstrated the positive health benefits of small-scale control-enhancing interventions such as (a) letting blood donors choose from which arm the blood should be drawn (Mills and Krantz, 1979); (b) giving nursing home residents a plant to take care of and letting them choose which night to attend a movie (Rodin and Langer, 1977); or (c) allowing nursing home residents to select the frequency and timing of a visit from a college student volunteer (Schulz, 1976).

In each of the three experiments we conducted, we measured, at the outset, how much control each patient wanted in the particular health care setting (see R. Smith, Wallston, Wallston, Forsberg and King, 1984). Our theoretical prediction was that the outcome variables (e.g. psychological well-being; compliance; etc.) would be determined by an interaction between this individual difference variable, desire for control (DFC), and the experimental conditions (in which we felt we would be differentially manipulating perceived control). When we first began these studies, we hypothesized that patients high in DFC would respond very favorably to our choice condition and negatively to being assigned to the condition where they were neither given choice nor enhanced predictability information. Conversely, we felt that those low in DFC would do all right if left alone, but might even become somewhat stressed if "forced" to make choices (i.e. exercise decisional control) or if presented with sensory and procedural information (i.e. heightened informational control). We soon learned how naive we were in making those predictions. We were correct in looking for an interaction, but the form of the interaction surprised us.

In the first experiment in this series (B. Wallston, Wallston, Smith *et al.*, 1987) the stressor was having to prepare for a barium enema on an outpatient basis. Having a barium enema is, in and of itself, a highly stressful experience for any patient. The

unpleasantness of the situation, however, is compounded by having to follow a strict bowel cleansing regimen at home or at work for 24 to 48 hours prior to the radiological examination. (The standard regimen at that time involved a combination of a liquid diet, ingesting an evil tasting, castor-oil like preparation, and taking laxatives in order to insure that one's bowels and intestines would be empty before being given the barium enema.) Our proposed means of "improving" the situation was to develop two other alternative regimens, each of which had equal efficacy. One-third of our patient-subjects were allowed to choose from among the three regimens after we carefully described what each experience would involve. We hypothesized that patients randomly assigned to this "choice" condition would perceive the greatest amount of control and, subsequently, would have the most favorable outcomes (e.g. be less distressed and most likely to follow the regimen).

To complete the design of this randomized clinical trial, another third of the patients were given one of the regimens along with the complete description of what it would involve—including the sensations they would experience. These patients constituted the "predictability" condition. We were not sure how much perceived control to hypothesize for these subjects, since Schulz (1976) had found that his "predictability alone" subjects fared as well as those given choice. The remaining patients were given neither choice nor enhanced sensory information about the regimen assigned them. We hypothesized that these latter subjects would have the least perceived control.

In the second study (K. Wallston, Smith, King *et al.*, 1991), the stressor was receiving chemotherapy for cancer and its attendant side effects, especially nausea and vomiting. We used a two-group experimental design. Half of the patients were randomly assigned to the "choice" condition where they were given information about three distinctly different antiemetic treatments, each purportedly equivalent in reducing the noxious side effects of the chemotherapy treatments. The other group of cancer patients were assigned an antiemetic treatment, rather than being given a choice, but were provided the same sensory and procedure information as those in the "choice" condition. (For ethical reasons, we did not feel comfortable in utilizing a no information "control" group in this study.) The patients, all of whom were just beginning chemotherapy or resuming chemotherapy after at least a year's time, were studied for four consecutive sessions.

In the final study in this series (R. Smith, Wallston, King and Zylstra, 1991), the health care stressor was the post-operative period in the hospital following major surgery. Patients were studied for five days post-surgery (or after being released from the surgical intensive care unit). Typically, patients feel dreadful for a day or two post surgery, then they begin to recover. By five to seven days post surgery, if complications have not occurred, they are usually well enough to be discharged. In the immediate post-operative period, when one is not feeling well, being "in control" is probably not highly salient for most patients. However, as they begin to recover, many patients become distressed at being in a situation characterized by some (e.g. Taylor, 1979) as lacking in opportunities for patients to have any control. We reasoned that this would especially be the case for those aspects of the patients' lives that they would normally control if they were at home instead of being in the hospital (such as if and when to take a bath or to receive visitors).

In the hypothesized high perceived control condition, one of our research nurses visited the patient-subject on four consecutive post-op days to offer a menu of choices

in a number of areas: sleeping aids; bathing; diet; visitors; telephone calls. The patient was free to make as many, or few, choices off the "menu" as desired, and could change the selections on a daily basis. In contrast, those randomly assigned to the "predictability only" condition were not given choices but were, instead, given enhanced predictability information (e.g. told they would/would not receive a back rub that evening, or half bath in the morning). Finally, those assigned to the "standard operating procedure" SOP) condition received only the routine nursing care available to all patients on those post-surgical units.

In analyzing the data for Study One, while attempting to test the hypothesized interaction between DFC and the experimental conditions, we soon realized that we had many more "significant" findings if we did a three-way rather than a two-way split on DFC. This decision to trichotomize rather than dichotomize our individual difference variable proved fortuitous. By doing so, we established a pattern of findings which we replicated over the next two studies. If we had stuck by our initial decision to simply separate patients into high and low DFC (or if we had adopted a linear regression rather than an ANOVA approach to the analysis), we likely would have missed the most important findings. Briefly, what we found in all three of these studies, was that the only patients who profited by our "enhanced control" manipulation were those who were moderate in DFC. Contrary to prediction, those high in DFC who were given choices did poorly (e.g. became upset, were non-compliant), while those low in DFC who were given choices did fine, but not as well as those moderate in DFC.

What did we learn from these three studies? We learned that, for these particular settings, we could not give a sufficient amount of control to the high DFC patients to meet their needs. For patients with a high desire (or need) for control, the kinds of choices we were able to give were not enough to satisfy them. We may, in fact, have raised their expectations by dangling choices in front of them, and then dashed their hopes when the choices did not lead to the control they desired. Perhaps, certain patients can only feel in control by seizing it. Control which is "given" to them does not meet their needs. Additionally, the whole experience of being ill is characterized by uncontrollability. Individuals with a high need for control are placed in a particularly stressful situation; simply giving them limited choices over a treatment regimen may be irrelevant when they were unable to choose whether or not to be ill in the first place.

We also learned that health care providers won't do any harm by offering enhanced choices and/or information to patients who do not want control. Across all three studies, our low DFC patients did fine no matter which condition they were in. Because "being in control" was not a salient issue for them, they were not affected by whether or not they had choices or predictability information. In examining the demographic correlates of DFC, two variables - age and educational level - consistently showed negative relationships with DFC scores. When controlling for educational level, we still found significant age effects for DFC. Persons aged sixty or older professed less of a desire to control their health care setting than younger adults (R. Smith, Woodward, Wallston *et al.*, 1988). Given our finding that elderly patients are more apt to be lower in desire for control than younger patients, it is reassuring that those low in DFC were not adversely affected by our interventions.

Most importantly, we learned that providing opportunities for taking control had a positive benefit for at least some patients - those with moderate DFC. Although their perceived control scores were no different than any other subjects, the moderate DFC

patients who were given choices did significantly better on many of the other dependent variables than other patients given choices or moderate DFC patients in other conditions.

SUMMARY IMPLICATIONS

We have just described seven different studies involving predominantly middle-aged subjects all of whom were experiencing health problems. In each of these studies, the investigators assessed some aspect of belief about control over some aspect of their health and analyzed the data for interactions among these health beliefs and some other aspect of the situation. In each of these analyses, it was the interaction effect which produced the most interesting findings, not the main effects. In other words, the action was in the interaction.

As we stated in the introduction to this chapter, the middle-aged years involve a number of complexities; any person who attempts to understand and/or predict the behavior or experiences of persons who are middle-aged must be open to an interactionist perspective. Control beliefs do play an important role in helping to explain/predict the behavior and/or experiences of individuals, but they do not do so alone. One of the most consistent findings across several of the studies we described was that strong beliefs in control over one's health do not necessarily lead to positive outcomes. This is particularly the case in situations which challenge one's beliefs in control, such as when one has a severe chronic illness. The more severe the disease, the more strongly one's control beliefs are confronted. As control beliefs are disconfirmed by disease progression, one's view of the world changes, and one becomes psychologically disturbed. For many persons in this situation, it might be psychologically "healthier" to desire and/or expect a lesser degree of control (cf. Burish, Carey, Wallston *et al.*, 1984).

For researchers, it is important not only to examine interactions, but also to recognize that the interactions among the variables might not always be linear. Also, in choosing which variables to examine in interaction with control beliefs, it is better to be guided by theory (or at least some well thought out conceptual framework) than to capitalize on chance by exploring all possible combinations of variables. As several of the studies we reviewed suggest, when looking at chronically ill populations it is a good idea to block on disease severity. Other situational characteristics, such as whether the patient has experiences that confirm or disconfirm controllability beliefs, may also be important moderators. A similar case could be made for other individual differences interacting with control beliefs, such as one's feelings of susceptibility (cf. Smith, 1988). Finally, it is quite possible that the interaction effects described in this chapter are limited to middle-age persons who are experiencing health difficulties; the presence, nature, and direction of interaction effects might be very different in healthy, younger populations.

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