Coping with Stressful Medical Examinations

Each year American citizens endure literally millions of painful and stressful invasive medical procedures. Invasive medical procedures require the “invasion” of the body, either through surgery or through the insertion of medical instruments into the body cavities.

Invasive medical procedures may produce both fear and anxiety among patients. For the purposes of this chapter, fear will be defined as an emotional reaction to a specific procedure. Anxiety refers to a more general unpleasant emotional state that is characterized by both physiological arousal and cognitive factors, such as apprehension or a sense of impending disaster. Stress is a feeling or reaction that occurs when a person is confronted with a situation that requires a response (Sarason & Sarason, 1980). Invasive procedures are also stressful for medical staffs, who frequently complain that situations that are more noxious for the patients are also more stressful for those who must subject the patients to them.

Most readers have experienced some stressful medical procedures in the past. As an example, consider the electromyograph (EMG), which is a common neurological procedure used to diagnose neuro muscular problems. If you were to experience this procedure, you would first receive a series of electric shocks of increasing magnitude. Small electrodes would be
attached to your wrist and elbow, and the physician would deliver shocks to your wrist and record the time required for the electrical impulse to reach the second electrode. Over the course of about 45 min, the voltage of the shock would gradually increase to about 250 millivolts! In many medical centers you may also receive a second examination to study voluntary muscle activity. This portion would require the insertion of long needles in several body sites. Although this procedure is often necessary to make a neurological diagnosis, the great majority of patients report that it is a very unpleasant experience. This chapter considers psychological interventions that may be useful for easing the burden caused by the EMG and other stressful medical exams.

Although many medical examinations are known to be stressful events, they also provide some unique opportunities for intervention. Unlike many other stressful events, medical examinations occur under well-controlled conditions. The stressor is clearly identifiable, and the patient is available prior to the aversive event. Under controlled conditions, patients can be given specific preparations, and the effects of these interventions can be observed.

There have been few studies on preparing patients for painful medical exams. However, this appears to be a promising field for the emerging specialty of health psychology. Considerable laboratory research has documented that brief psychological interventions significantly increase tolerance to experimentally induced pain. Since the painful stimulation used in laboratory studies is not dissimilar to the discomfort associated with common medical and dental procedures, it seems reasonable that effective laboratory interventions will also be effective in clinical settings.

In this chapter I will review research relevant to the preparation of patients for stressful medical examinations. The first portion of the chapter will review laboratory studies that identify potential interventions. After considering the laboratory studies, I will review demonstrations of the effectiveness of psychological interventions for helping patients cope with specific medical procedures. The data summarized in this latter portion of the chapter were obtained in actual medical settings.

LABORATORY STUDIES ON COPING WITH NOXIOUS STIMULATION

The perception of pain is a very complex phenomenon. Until recently, most of the emphasis was placed upon sensory discrimination. However, cognitive and emotional factors play a crucial role in the experience of pain (Melzack, 1974; Sternbach, 1968). Pain experiences are moderated by sociocultural background (Sternbach & Tursky, 1965; Wolff & Langley, 1968) and personality characteristics (Davidson & Bobey, 1970; Kendall,
Williams, Pechecck, Graham, Shisslak, & Herzoff, 1979; Petrie, 1967; Shipley, Butt, & Horwitz, 1979; Spear, 1967).

Pain is also moderated by cognitive factors, such as the meaning of the situation to the patient (Beecher, 1959; Lambert, Libman, & Poser, 1960), anxiety about the source of the pain (Beecher, 1959; Hill, Kornetsky, Flanary, & Wilder, 1952), attentional focus (Beecher, 1959; Blitz & Dinnerstein, 1971; Kanfer & Goldfoot, 1966), and the anticipation of pain (Hill et al., 1952; Wolff & Horland, 1967). This extensive evidence on the cognitive mediation of pain suggests a variety of psychological interventions for helping people cope with unpleasant medical experiences.

Placebo, Suggestion, and Expectancy Effects

Much of the initial interest in psychological methods of pain control was stimulated by documented placebo effects in the medical literature. A placebo is a medication containing no known medically effective substances. After reviewing 28 clinical studies, Evans (1974) concluded that 35% of patients suffering severe pain obtained relief from placebo medications. Placebo effects in laboratory studies were observed less often, with only 16% of the patients obtaining pain relief. A number of differences between the laboratory and the clinical settings may account for these differences. For example, clinical patients may experience more anxiety and anticipate more pain or define pain differently (Turk, 1975). The role of anxiety in the placebo effect has been demonstrated by Beecher (1972), who reported that anxious patients gain greater relief from placebos than do clinical patients who are less anxious.

The placebo response may be augmented by a positive doctor-patient relationship (DiMatteo, 1979). For example, placebo effects depend upon the individual's prior experience with physicians, his or her belief and confidence that something is being done to ameliorate the pain, and an expectancy that relief will be obtained (Weisenberg, 1977). Improvement of the doctor-patient relationship (DiMatteo, 1979; 1982), or nonverbal communication between patient and doctor (Friedman, 1979a; 1982), has potential for maximizing the benefits of suggestion.

Hypnosis

Hypnotic suggestion may be a useful method for helping patients cope with stressful medical exams. Greene and Reyher (1972) compared the effectiveness of two types of suggestion for increasing tolerance to electrical stimulation. The subjects were tested for pain tolerance, hypnotized, and given one of two suggestions: (a) to imagine their arms as numb and insen-
Among many measures of reactions to stressful stimulation a recent review (Sternbach, 1968) suggests that people experience less pain when hypnotizable (Knox & Shum, 1977). Relaxation training may be effective when anxiety is involved.

Chaves and Barber (1974) found that simply suggesting that pain would be reduced led to lowered ratings of discomfort. They instructed subjects to 
(a) imagine a pleasant event; 
(b) imagine their fingers insensitive to the discomfort; or 
(c) expect a reduction in pain (without instructions to engage in any cognitive strategy). The two cognitive strategies involving imagery each significantly reduced self-reports of pain, in comparison with the positive-expectation control. However, a greater reduction was observed for a group led to expect this change than for a no-treatment control group. In a similar experiment, Spanos, Barber, and Lang (1974) found that the most effective among several methods for reducing subjective reports of pain was imagining the effects of anesthesia. Patients were told to “think of the hand as numb and insensitive, as if it were a piece of rubber.”

Not all people are equally affected by hypnotic and other suggestions. Scales have been developed to measure how susceptible individuals are to hypnotic suggestions (Weitzenhoffer & Hilgard, 1967), and these measures have been quite useful in identifying those who will receive analgesic benefits from hypnotic suggestion (Hilgard, Hilgard, MacDonald, Morgan, & Johnson, 1978). Other studies have also demonstrated that methods such as acupuncture, which gain effectiveness through suggestions, are most effective for those who are hypnotizable (Knox & Shum, 1977).

Relaxation Training

Both experimental studies (Grimm & Kanfer, 1976) and clinical observations (Sternbach, 1968) suggest that people experience more pain when they are anxious. Several studies suggest that the discomfort associated with most types of laboratory-induced pain results more from anxiety than from physical stimulation. For example, Shor (1962) found that subjects show very little physiological response to painful stimulation when they are not anxious. Thus, it is often difficult to determine whether observed reactions are attributable to stress or to pain.

One study attempted to separate reactions to painful stimulation from reactions to stressful stimulation. Subjects were either exposed to painful pressure on the skin or asked to view unpleasant slides of homicide victims. Among many measures, there were very few significant differences be-
tween these two groups. Only frontal muscle tension and respiration rate separated pain reactions from stress reactions (Davidson & Neufeld, 1974).

A variety of other experiments demonstrate that muscle relaxation training can help subjects cope with many different types of unpleasant stimulation (Lehrer, 1972; Paul, 1969). However, the effectiveness of relaxation training tends to be most apparent for measures involving physiological arousal. Typically, relaxation is shown to control effectively heart rate (Paul, 1969), skin conductance (McAmmond, Davidson, & Kovitz, 1971), or habituation (Lehrer, 1972).

If reactions to unpleasant stimulation are partly the result of anxiety, methods that control anxiety might decrease this aversive nature of the experience. Clinical psychologists have shown that relaxation training can help control anxiety (Goldfried & Davison, 1976). Relaxation training is a simple behavioral method for training the relaxation of muscle groups through a series of exercises. After a few sessions most individuals can learn to identify muscle tension and to relax. Bobey and Davidson (1970) compared the relative effectiveness of relaxation, cognitive rehearsal of the upcoming procedure, and increased anxiety (produced by listening to a tape recording of women in labor). After experiencing one of these treatments, subjects were exposed to either radiant-heat or intense-pressure stimulation. The relaxation group was best able to tolerate radiant heat, and all three treatment conditions were better able to tolerate the heat than was the control group. Among the three treatment groups, however, only the relaxation group was significantly better able to tolerate pressure than was the control group.

Avoidant Thinking and Attention Diversion

A variety of studies have attempted to determine the effects of different mental strategies upon coping with laboratory pain. Some of these studies test the folklore notion that it is better just to avoid thinking about threatening situations. When giving immunizations, for example, some pediatricians routinely advise children to imagine they are somewhere else. Some studies consider the effects of diverting attention prior to the painful experience (analogous to sitting in the waiting room before a stressful medical procedure), whereas others evaluate the effects of mental strategies during a painful procedure.

More than 30 years ago John Dollard and Neal Miller suggested that avoidant thinking was a useful method for coping with stress. People can avoid stress, they suggested, by turning their attention away from the stress-causing situations and by thinking about other things (Dollard & Miller, 1950). More recently, several studies have supported the use of avoidant
thinking. In one such demonstration subjects were told that they would receive electric shocks. They were not told, however, when they would receive the shocks or how often they would get them. The subjects' self-reports about coping strategies indicated that the use of avoidant thinking was associated with less psychophysiological activity and distress than was paying attention to the threatening situation (Monat, Averill, & Lazarus, 1972). In other words, the people benefited from turning their attention toward something else.

Not all experiments support the use of avoidant thinking. In one study subjects were informed that they would receive a shock at some time within a 6-min period, but they were not told when within the period they would receive it. As expected, the uncertainty was stress producing. The subjects were then given an opportunity either to engage in an avoidant-thinking activity (listening to music) or to attend to the threat (listening for a tone that was emitted 5 sec before each shock was presented). The results indicated that those who chose to avoid thinking about the shock showed the greatest amount of psychophysiological activity and distress (Averill & Rosenn, 1972).

Since the findings of these experiments had been contradictory, Houston and Holmes (1974) decided to devote more study to the issue. They were aware that the earlier studies had been correlational in nature, with the question of causation remaining largely unanswered. That is, it was not quite clear whether avoidant thinking caused psychophysiological distress or if psychophysiological distress caused avoidant thinking.

In order to clarify the causal relationship, Houston and Holmes began with the hypothesis that avoidant thinking is an effective coping mechanism. Subjects were told that they would either receive or not receive electric shocks at some time during the experiment. For half of the subjects, distraction was created by having them read an interesting story while they were waiting for the experiment to get under way. Reading the stories, it was presumed, would cause avoidant thinking. The other half of the subjects did not read the distracting material. Among the subjects who thought they were to receive the shocks, psychophysiological reactions were highest for those who had read the distracting story. These findings were just the opposite of what was expected. After further analysis Houston and Holmes discovered that those who were not given the distracting reading material used the time to reappraise the seriousness of the threat. Upon reappraisal, their stress level went down. Subjects who had engaged in avoidant thinking did not have the opportunity for reappraisal, and, therefore, their stress level remained high. In any event, it became clear that avoidant thinking seemed to increase, rather than decrease, stress reactions.

Most of the early studies on avoidant thinking evaluated the effects of attention diversion while a subject waits for an unpredictable painful stimulus. Another set of studies considers the effects of diverting a subject’s
attention while the pain stimulus is being presented. These studies may have a quite different impact on the feeling of personal control over the stressor. Unpredictable painful experiences can minimize feelings of personal control, and attention diversion may do little to restore control. On the other hand, attention diversion as an active coping method while the stressor is present may increase perceived personal control. Thus, it is not surprising that attention diversion has been found to be more useful for coping with ongoing painful experiences as opposed to threats of painful stimulation. For example, Kanfer and Goldfoot (1966) found that distracting subjects by showing slides while they held their hands in cold water significantly increased the time they were able to tolerate the water. In comparison to strategies such as expecting severe pain, verbalizing the sensory experiences, or setting goals for cold tolerance, the distraction strategy was the most effective.

Barber and Cooper (1972) compared the effectiveness of three attention-diversion strategies: (a) listening to a taped story; (b) adding aloud; and (c) counting aloud. Each of these strategies was effective for only a short period of time, and it was concluded that with continued stimulation, distraction becomes ineffective. Thus distraction may be useful for helping patients cope with medical exams but may not be effective for managing long-term pain.

Not all attention-diversion approaches are equally effective. Spanos, Horton, and Chaves (1975) asked subjects either to reevaluate the sensory stimulation experienced (immersing a hand in ice-cold water) or to imagine an irrelevant scene. Reevaluation was more effective for increasing tolerance of the cold water. Further, a high involvement in images was found to be associated with greater pain tolerance. In a similar experiment Blitz and Dinnerstein (1971) found that subjects instructed to dissociate the experience of cold and pain and focus on the sensation of cold or to focus on the cold sensation and then interpret it as pleasant were significantly better able to tolerate the cold pressor than were comparable subjects who were not asked to divert their attention.

**Accurate Sensory Information**

As we have seen, directing attention away from a stressor can be of benefit in coping with an aversive experience. If these methods are effective, it is worth considering the opposite approach. Rather than avoiding information about the stress-producing situation, how about focusing on it and gathering more information? Medical and dental examinations are cases in point. Many times patients report being frightened about upcoming medical examinations. Their fears are not entirely groundless. It is quite possible that in many cases they will be subjected to painful ex-
experiences, such as being jabbed by a needle, cut by an instrument, or inspected via a scope. How, then, might patients react if they were told in advance the details of the forthcoming experience? "I don’t even want to hear about it" is a common response.

Jean Johnson (1973) probed deeply into mechanisms for coping with pain and distressing experiences. Her belief is that fear comes about as the result of inaccurate expectations about the sensations we experience. In one experiment she exposed two groups of subjects to blood pressure tests. She told one group that the cuff used in the blood pressure tests would cause pressure, tingling of the hand, aching, and blueness—which, in fact, it does. These people were given accurate information. The other group was told how the cuff would be placed on and inflated but was not told exactly what sensations to expect. Those who knew what sensations to expect gave significantly lower ratings when asked to indicate how distressful the situation had been. In a similar experiment it was shown that subjects were less distressed by an electric shock if they had accurate expectations of what the shock would feel like (Staub & Kellett, 1972). These (perhaps counterintuitive) findings suggest that accurate information about the sensations about a physical examination will produce may help patients cope with the unpleasant experience.

Cognitive-Behavior Modification

Cognitive-behavior modification programs teach patients to relax and to develop positive ways to talk to themselves. It is the internal dialogue, or talking to oneself, that determines expectations, evaluations, and the focus of attention. Meichenbaum (1977) believes that coping abilities can be increased by altering what people say to themselves in stressful situations. For example, people who have difficulty coping with medical exams may say to themselves, "This is awful, I can't put up with this." Meichenbaum recommends training them to say positive things to themselves, such as "Take it easy. Good—you’re doing fine! Just take a deep breath and relax; it will be over soon." This procedure has been labeled stress-inoculation training. Meichenbaum's procedure applies the technology of behavior therapy to the modification of thoughts or cognitions. The other component is behavioral, which involves training people to relax in specific situations. The Meichenbaum procedure has been shown to be remarkably effective for reducing stress in a wide variety of situations (Meichenbaum, 1977).

Turk (1975) successfully applied cognitive-behavior modification as a preparation for experimentally induced pain. After carefully considering many of the studies cited earlier in this chapter, Turk selected an assortment of cognitive strategies with some documented effectiveness. Trainers
described a variety of coping strategies from which subjects could choose to deal with the sensory-discriminative, motivation-affective, and cognitive-evaluative components of pain. Subjects were taught to relax their muscles, divert their attention, or to imagine being in some other situation. In addition, they received instructions for generating positive self-statements to enhance coping with each phase of the pain experience. Measures obtained before and after the procedure included time that the ischemic pain (which is created by tightening a blood pressure cuff) was tolerated as well as verbal report of pain intensity. Results suggested a 15-min increase in tolerance for subjects in the training condition in comparison to a 1-min increase for an attention-placebo control group. This 15-min improvement in tolerance is particularly impressive since Smith, Chaing, and Regina (1974) found that subjects' tolerance for ischemic pain was prolonged by only 5–10 min following the administration of 10 mg of morphine. Since noxious medical exams are of brief duration, cognitive-behavioral interventions may suggest alternatives to the use of drugs with toxic side effects.

Not all individuals respond equally well to cognitive-behavioral interventions, and these differences may be related to the use of self-control strategies in daily life. Rosenbaum (1980) reported that individuals differ in the use of self-control behaviors that are quite similar to those taught in the cognitive-behavioral package. Those who tend to use many self-control strategies in their daily lives are better able to cope with brief-duration pain than are people who use fewer of these strategies. Thus, the cognitive-behavioral package may simply be teaching strategies that individuals who are able to cope well have acquired through other experiences.

**Comment on Coping with Brief Aversive Stimulation**

Results from research on coping with brief-duration noxious stimulation have been mixed and sometimes contradictory. However, a general pattern of results seems to emerge from the accumulation of data. Thus far, I have avoided providing a definition of pain because, as Melzack (1974, 1980) so convincingly argues, pain is a complex multidimensional set of experiences for which no single definition has proven satisfactory. Melzack has shown that approaches to pain that consider only sensory experience have been inadequate because they ignore the motivational and affective properties.

It is now widely acknowledged that anxiety, fear, and other emotional experiences play an important role in reactions to painful stimulation (Bonica, 1980). Psychologists may be able to do little about the application of various medical instruments that cause undesirable sensations. However, psychological interventions may be very useful for the management of the affective and cognitive components of the pain experience. Thus, it is
not surprising that interventions that have been successful for helping patients cope with pain resemble other methods that help people cope with stress.

One of the most consistent findings to emerge from the research on painful stimulation is that patients are better able to cope when they have some feelings of personal control over the situation (Averill, 1973; Orne, 1980; Staub, Tursky, & Schwartz, 1971.) Similarly, belief in control is effective for relief from a variety of other stressful experiences (Rodin & Janis, 1982; Taylor, 1982).

In evaluating why belief in control is helpful, it is necessary to consider the various components of many control manipulations. Giving individuals personal control over a situation may also make the aversive stimulation more predictable. Thus, most experiments confound predictability and control.

Experiments by Johnson (Johnson, 1973, 1977; Johnson, Kirchhoff, & Endress, 1975; Johnson & Leventhal, 1974), which consistently demonstrate that providing accurate sensory information is helpful to patients undergoing stressful stimulation, may be successful because accurate sensory information makes the experience more predictable. Reactions that would ordinarily signal danger are placed in context by accurate sensory information. Instead of panicking when he or she experiences a certain sensation, a patient might realize that the uncomfortable sensations are normal and to be expected. Having information about a forthcoming undesirable event is consistently preferred by subjects over the opportunity to avoid this information (Lanzetta & Driscoll, 1966).

The concept of predictability also helps clarify some of the inconsistent results concerning the effects of avoidant thinking. Studies on avoidant thinking seem to fall into two categories. Some encourage subjects to avoid thinking about an impending shock that may be delivered at some unpredictable time. These studies tend to show that avoidant thinking is not a successful coping strategy.

This strategy allows the subject neither to predict nor to control the sensations. On the other hand, experiments that encourage subjects to divert their attention while they are enduring painful stimulation give them some feelings of personal control over the situation. As would be expected by this theory, manipulations that direct attention away from the presentation of the stressful event successfully enhance coping abilities. They gain effectiveness by providing the feeling of control over the aversive stimulation.

Although control and predictability are often confounded in experimental studies, it appears that the two have independent effects. Schulz (1976) carefully designed studies that separated personal control from predictability. He found that both control and predictability had desirable effects upon the well-being of a group of elderly persons. Even though control and predictability have different or independent effects, some evidence suggests
that perceived control and predictability of aversive stimulation are functionally equivalent (Burger & Arkin, 1980). Further, physical symptoms that have been found to be associated with the presentation of unpredictable aversive stimulation can be diminished when people exercise more personal control over the situation by attempting to focus their attention on the unpredictable event (Matthews, Scheier, Brunson, & Carducci, 1980).

Manipulations that make the nature of the aversive stimulation more predictable or those that give the patient personal control over the situation should be most useful for helping patients cope with stressful medical experiences.

COPING WITH SPECIFIC MEDICAL PROCEDURES

As I have noted, a growing number of papers have demonstrated that cognitive and behavioral interventions can increase pain tolerance and the perception of laboratory-induced pain (see also Weisenberg, 1977). These experiments typically induce pain by having subjects immerse one hand in cold water (cold pressor task) or by restricting the blood flow in an arm (ischemic pain). Although the results of these studies are frequently generalized to clinical pain, only a few experiments have attempted to assess the interventions in a clinical setting. As Ledwidge (1978) emphasized, research on the effectiveness of cognitive and behavioral interventions will be more convincing if the data are collected in a clinical setting with the same patient population to whom the results are to be generalized. In a clinical setting patients may experience more uncertainty and anxiety than they do in the laboratory. For example, clinically induced pain may be compounded by anxiety. In comparison to the laboratory analogue, clinical patients are less likely to be reassured about potential damage, cause of pathology, or the nature of the procedure (Sternbach, 1968).

Fortunately, evidence is now available that suggests that cognitive and behavioral interventions can be helpful to patients who must undergo a variety of specific medical procedures. These specific procedures include: endoscopy, sigmoidoscopy, electromyography, cardiac catheterization, and dental surgery.

Endoscopy

Endoscopy is a common examination used to diagnose diseases of the gastrointestinal tract. Throughout the 15–20 min examination the patient must endure a series of threatening and uncomfortable steps. During the course of the exam, a small flexible fiber optic tube is inserted in the patient’s mouth and passed through in order to inspect visually and
photograph the gastrointestinal tract. Prior to the examination, the patient's throat is swabbed with a novocaine-like medicine, and many patients are sedated with a narcotic and/or a tranquilizer (usually Valium). Although the patients are sedated, they cannot have general anesthesia because it is essential for them to be able to follow instructions. If the patient is not able to breathe through the mouth when the throat is swabbed and make swallowing motions when the tube is passed, the exam can be considerably more dangerous and time-consuming. Patients who can control their behavior during the exam will gag less and get through the procedure sooner.

In a study on reactions to endoscopic examinations, Johnson and Leventhal (1974) prepared 48 hospitalized patients for the procedure by giving them either one of two types of preparatory instructions, both types of instructions, or no instructions at all. One type of instruction described the specific set of sensations that would be experienced: what would be seen, heard, felt, and tasted. The other instructions were for "danger control" and told the subjects what they would have to do during the examination: that the chin should be kept down, and that swallowing motions should be made.

The results of the experiment showed that the instructions giving a description of the expected sensations reduced scores on selected measures of emotional stress. The danger-control instructions were only of benefit when they were used in combination with the sensory description instructions. These findings show how simple and accurate information can increase coping with potentially stressful situations.

Another benefit of information has been described by Vernon and Bigelow (1974). These investigators tested the effect of giving accurate information about a hernia-repair operation to 80 men who were about to enter such surgery. They found that those given the information: (a) were more able to concentrate on the specific problems involved in the operation; (b) had greater confidence in the physician; and (c) were less likely to have fits of anger after the operation. However, the instructions did not immunize the men against fear and worry.

Other experiments tend to confirm the importance of accurate expectations for patients undergoing the endoscopic examination. For example, Shipley et al., (1979) prepared a videotape of a patient undergoing the endoscopic examination and showed it to patients either zero, one, or three times. As evaluated by a variety of measures, patients who had viewed the tape three times experienced less distress while they went through the examination than did patients who had seen the film only once or not at all. However, not all patients who had seen the film three times actually experienced less distress.

Shipley and his colleagues divided their patients into two groups according to a well-known psychological dimension known as repression-sensit-
Sensitizers display a coping style that is characterized by seeking information about a stressor as a means of getting ready for the experience. Patients who scored high on sensitization became less distressed as a function of repeated exposure to the film. However, the other group of patients were categorized as repressors—a group usually characterized as avoiders. Repression is a defense mechanism that involves avoiding thoughts about distressing events. For this group, the most arousal occurred upon a single viewing of the tape.

In a later study Shipley and his colleagues replicated this experiment using 36 patients who had previously undergone the endoscopic exam. Since the patients had already gained firsthand experience with the examination, they would be expected to be aware of the sensations it would produce. Averaging all of the subjects, they found that repeated exposure to a videotape of an endoscopic exam had little benefit. However, a finer-grained analysis demonstrated that anxiety and heart rate was much better controlled for sensitizers who had seen the tape three times. The opposite pattern emerged for repressors. For these patients, repeated exposure to the tape actually decreased coping during the exam. These findings suggest that personality variables must be taken into consideration in preparing patients for stressful endoscopic examinations. Patients who are sensitizers or who use information as a method of preparation might become desensitized by repeated exposures to films showing the examination. However, repeated exposures may actually stimulate anxiety among repressors, who prefer to avoid thinking about stressful events (Shipley et al., 1979).

Cardiac Catheterization

Cardiac catheterization is a relatively common medical procedure that is used to diagnose problems of the heart and the major arteries that supply blood to it. During the procedure, a small tubular, flexible surgical instrument is inserted through the vein of either an arm, a leg, or the neck. This instrument, known as a catheter, is passed through the vein and into the heart. It can be used to secure blood samples, determine pressure within the heart, and to inspect for abnormalities of heart muscle and tissue. During the procedure a dye is injected into the heart to provide a contrast medium for X-ray studies. In addition to the anxiety and discomfort the procedure may cause, the injection of the dye can cause some patients to experience a "hot flash."

In one study, cognitive-behavioral and patient-education interventions were shown to be effective for helping patients cope with cardiac catheterization. The cognitive-behavioral intervention taught patients to identify their own fears and how to use specific methods to cope with their anxiety during the catheterization. The patient-education intervention
provided information about the procedure but did not focus on individual responses to the procedure. The patients were 44 adult males from the Veterans Administration hospital in Palo Alto, California. The cognitive-behavioral and the patient-education intervention were compared with an attention-placebo group in which a therapist actively listened to the patients. An additional no-treatment control group was also included. In this group patients were treated according to the usual hospital policy.

Ratings of the patients by doctors and technicians who were blind to the experimental conditions and patient self-ratings demonstrated that those who had experienced the interventions adjusted to the catheterization significantly better than those who had been randomly assigned to a control group. Further, those exposed to the cognitive-behavioral intervention fared better than those assigned to the patient-education group. These results provide further evidence that a relatively brief (45 min) and inexpensive intervention may aid patients in facing a frightening and painful experience (Kendall et al. 1979).

Electromyograph

Electromyography (EMG) is a common neurological procedure that is performed to diagnose neuromuscular disorders and to gain information about the site and nature of the pathology. There are two parts to the examination: (a) the electrical stimulation of nerves and muscles by means of applied electrical currents; and (b) the recording of action potentials during spontaneous or voluntary activity. During the first portion of the exam a series of electric shocks with durations of 0.1 to 1 msec and output from 50 MV to 250 MV is applied by means of surface electrodes. The second portion involves the insertion of needle electrodes into the muscles. Most patients experience some discomfort during the procedure, and the anticipation of forthcoming shocks and needle insertions tends to arouse anxiety and tension. Electromyography has been studied as a medical procedure amenable to behavioral preparations because it tends to arouse anxiety and produce considerable discomfort without requiring the administration of any tranquillizers or anesthetics.

One experiment illustrated how cognitive and behavioral interventions can be used to help patients cope with this most unpleasant examination. In this experiment, the cognitive and behavioral components of a cognitive-behavior-modification treatment package were systematically varied. In preparation for the EMG, half of the 40 male patients at the La Jolla Veterans Administration hospital were trained to say positive, coping things to themselves during the examinations. An example of a positive self-statement might be, "Just relax, you're in control; take it easy—it will soon be over."
The other half of the subjects were not given the training. The other manipulation was for relaxation training. Half of the subjects were given breathing exercises and muscle-relaxation training, whereas the other half were not. The resultant treatments were (a) cognitive only; (b) relaxation only; (c) cognitive plus relaxation; and (d) neither cognitive nor relaxation (control). The results demonstrated that the cognitive treatment was most successful when assessed by physician rating of distress, whereas the relaxation treatment was most useful for lowering heart rate (Kaplan & Metzger, 1980).

Overall, the results provided the greatest support for the use of the cognitive-behavior modification package. Although the relaxation training did reduce physiological arousal (heart rate), the cognitive-behavioral combination controlled heart rate nearly as well. Further, the relaxation treatment had little effect upon self-report or behavioral ratings. The cognitive intervention lowered self-rated reports of distress and physician distress ratings but had little effect upon physiological or behavioral measures. The combination cognitive-behavioral intervention had the most impact when considering cognitive, behavioral, and arousal measures. Thus, it appears the combination cognitive-behavioral method may be the most useful for helping patients cope with this particularly distressing examination. It is worth noting, however, that there were strong differences between the three treated groups and the control group, but weaker differences among the three experimental interventions.

**Sigmoidoscopy**

This year 110,000 new cases of cancer of the colon and rectum will be detected in the United States (American Cancer Society Statistics, 1979). This makes rectal and colon malignancies the most common internal cancer among American adults. The key to survival for patients with these maladies is early detection, since only early treatment is associated with lower fatality rates (Gilbertson, 1974; Hertz, Deddish, & Day, 1960; Winawer, Sherlock, Schottenfeld, & Miller, 1976). All men and women over the age of 40 are considered at risk for colon cancer (Copeland, Miller, & Jones, 1968), and annual screening of adults over 40 is now strongly advocated (Winawer et al., 1976). Baseline studies show the detection rates among asymptomatic patients to be 3–6 per 1000 examinations (Strum, Landres, & Berry, 1976).

Sigmoidoscopy is a common medical examination that is performed to examine the mucose of the bowel and to determine whether there are any unusual growths in the last 10 in. of the colon. New evidence supports the increased use of the procedure because it significantly enhances detection of malignancies during routine physical examinations (Winawer et al., 1976).
Although the examination is not believed to be particularly painful or dangerous, it causes mental anguish for significant numbers of patients. Some of this results from the medical procedure itself because the scope causes the bowel to be stretched. Other aspects of the discomfort result from the uncomfortable situation the patient finds himself or herself in. Since the exam requires that a scope be inserted in the anal cavity, the patient, who is nude below the waist, is placed face down in an unfamiliar environment with little personal control over the situation. Because of the unpleasantness of the exam, many patients avoid the situation altogether by refusing the exam or by failing to show up for an appointment. The effectiveness of brief interventions for coping with the exam was investigated by Kaplan, Atkins, and Lenhard (in press).

This study considered two separate factors. One factor was for self-instructional training: Patients were given brief training to focus their attention on either their own control over the situation (internal) or the doctor’s control over the situation (external). A third (control) group received attention but did not experience self-instructional training. Half of each of these three groups also received relaxation training, whereas the other half did not. Patients experiencing the internal intervention rated themselves as least anxious during the procedure, followed by the external and attention control groups, respectively. The internal and external groups moved and verbalized less, allowing the doctor to complete the exam in less time than for the control group. Patients experiencing relaxation training tended to overestimate the duration of the exam but had fewer spasms and emitted less verbalizations. Overall, the results encourage the use of a brief psychological intervention prior to this most unpleasant medical experience.

**Dental Surgery**

Going to the dentist is one of the most common and one of the most disliked health behaviors. Concern over emotional reactions among dental patients has been expressed in the dental literature for more than 45 years (Richardson, 1936). As a result of emotional reactions to the dental experience, many patients avoid regular dental checkups or become behaviorally unmanageable once they see a practitioner (Train, 1969). Because of these problems, helping patients cope with a dental situation may be of benefit to both the patients and the practitioner.

Throughout the last decade dentists have been told by psychologists that a variety of methods are successful for helping their patients cope with the dental experience. These interventions include relaxation, distraction, and personal control. One experiment compared the effectiveness of these three interventions in a dental clinic. Patients scheduled for minor dental surgery...
were randomly divided into four groups. One group received relaxation training via an audiotape. A second group experienced attention diversion. This was accomplished by having the patients play a video Ping-Pong game before and during the procedure. A third group was given the feeling of personal control over the situation by being better able to communicate with the dentist. The patient was given a button that turned on a light signaling the dentist to stop. The fourth group was a control that received the dental treatment but did not experience a psychological intervention.

Patients who had experienced either relaxation training or distraction were better able to tolerate the procedure as assessed by ratings from both the patients and their dentists. The personal-control intervention group did not differ significantly from the control group. Thus, it appears that either distraction or relaxation may be beneficial for preparing patients for dental surgery. It is worth noting that patients appear to prefer the distraction method over the relaxation technique (Corah, Gale, & Illig, 1979).

Visits to the dentist may be of particular concern to young children. One issue in childhood dentistry is just how much information should be given about the procedure. In an Australian study, 422 children were given one of three types of preparatory information before a dental examination and then again before a restoration. The preparations differed in the amount of information given. Some children simply learned about dental health in the clinic, a second group heard a lecture and was familiarized with the operating room, whereas the third group was given a more detailed explanation of the procedures. There was a tendency for children who had been given a moderate amount of information (familiarization with the operating room) to be the least anxious during the procedure. Too many details may increase rather than decrease anxiety among youngsters (Herbertt & Innes, 1979).

The cognitive-behavioral intervention, which has been effective for adults with several types of medical exams, also has been shown to be useful for children in dental situations. In one study, a brief cognitive-behavior modification intervention was compared with an attention-control and a no-treatment control group as a preparation for a visit to the dentist by 7-12-year-old children. Ratings by an observer revealed that those who had undergone the cognitive-behavioral treatment remained most calm during the dental procedure in comparison to the other two groups. This finding was consistent for children of different ages within the 7-12-year-old range (Nocella & Kaplan, in press). However, younger children in all conditions had more difficulty than the older children. Some studies have shown that the anxiety common to very young children can be eased by the presence of the mother during the procedure. However, for older children, mother presence may actually increase anxiety (Venham, 1979).

Research also suggests that personality characteristics of the patients must also be taken into consideration when designing interventions for use
in dental offices. In one study on preparation for tooth extraction, patients were given either general information about the clinic or specific information about the extraction procedure. The responsiveness of patients to these instructions was contingent on their perceived locus of control (Phares, 1976; Rotter, 1966). Patients who were categorized as internal (i.e., believed that rewards and punishments are a function of their own behavior) adjusted better during the surgery if they had been given the specific information. However, the opposite pattern emerged for patients who were classified as external (i.e., believed that rewards and punishments are independent of their behavior). These external patients adapted better during surgery if they had been given general information (Auerbach, Kendall, Cuttler, & Levitt, 1979).

It is worth noting that an enormous number of articles discuss their results as relevant to the dental situation. Nevertheless, relatively few studies have actually been conducted in dental clinics.

**CONCLUSIONS**

With the increase in medical technology and the access to medical care, we are witnessing a rapid expansion in the use of diagnostic procedures. Many of these procedures are found to be noxious by the millions of patients who experience them each year. Evidence is accumulating of how simple cognitive and behavioral interventions can be used to increase tolerance to noxious laboratory stimulation. Further, a small but growing literature expands upon the laboratory work to demonstrate that similar procedures help patients cope with actual medical examinations. To date, the application of psychological methods to help patients cope with medical examinations has been limited to a small sample of stressful procedures. However, there is reason to believe that the interventions will be effective in other medical situations. Similar methods have also been shown to be effective for preparing patients for other stressful medical experiences such as surgery (Kendall & Watson, 1981).

Studying methods for helping patients cope with stressful examinations provides unique opportunities for both basic and applied research. In the future, the most productive line of research will be experimental trials in which patients are randomly assigned to treatment groups. At least one of the groups should be an “attention-control” group in which the patients receive attention and support but do not experience the treatment that is theoretically linked to benefit. This group is necessary in order to demonstrate that the effectiveness results from the specific intervention and not just attention. The experiments should also include a variety of outcome measures. Some of these measures should be ratings by observers who are unaware of the condition to which the patient had been assigned. Ex-
perimenteration on preparation for examinations is relevant to not only a personal concern of many patients but also several theoretical positions such as attribution theory, reactance theory, and social learning theory, which can be evaluated using the data.

Because research on coping with stressful medical exams is only now beginning, clinical application of these methods has not been common. However, many physicians are concerned about the unpleasant experiences they subject patients to and are eager to learn about new approaches. Johnson's work (noted earlier) on endoscopy, for example, is now well disseminated, and I am aware of several physicians who apply her suggestions. Thus, research in this area has the potential to be rapidly disseminated and absorbed into practice as well as to be practical and theoretically challenging.

It is worth noting that the effects observed in most studies on interventions for stressful medical exams are not particularly strong. Longer and repeated interventions might be more effective in producing distinctive experimental effects. However, psychological preparations for brief examinations would not be useful in practice if they were time-consuming or required repeated visits. The brief interventions applied in most of the studies could be utilized within the period that patients typically spend in a waiting room and would not require serious constraints on scheduling. The modest experimental effects suggest that the interventions could be useful within the clinical practice of medicine. With a minimal increase in time and effort for medical staff to deliver the preparatory information, patients may be given more control over their own reactions to procedures they find stressful and painful. Patients are likely to be more relaxed and cooperative, to cope more successfully, and to experience minimal discomfort during the medical procedure. Further, the methods may circumvent the need for administering pharmaceuticals.

In our enthusiasm to become more active in health care delivery, health psychologists must be aware of the limitations of their offerings. To date, few psychological procedures have been demonstrated to be effective in clinical settings, and we must continue experimental testing until we are certain that the benefits of these methods offset the added costs and inconvenience they may produce. For example, several authors have suggested that personality test results be evaluated in order to tailor specific interventions for helping patients cope with brief medical exams. However, assessing personality characteristics may not be practical in many applied settings. Indeed, personality assessment may be more time-consuming than the treatments themselves. Further, personality testing requires additional consent, and time must be taken to give patients feedback on their test results. Thus, practical considerations must be exercised in the use of personality assessment as an adjunct to behavioral and cognitive interventions.
In the development of new intervention strategies it will also be important to stick closely to the data. Laboratory studies have provided guidance for those interested in stressful medical exams because the stimuli used in the laboratory are not dissimilar to those used in clinical settings. However, the clinical use of these methods must depend upon their demonstrated effectiveness in clinical settings. It is important to realize that other pain problems, such as chronic back pain, are qualitatively different from either laboratory pain or stressful medical exams. Data summarized in this chapter may not be relevant to more severe and enduring sources of pain. Research in clinical settings, with researcher and clinician working side by side, will eventually produce answers to many important theoretical and practical issues.