American Handbook of Psychiatry

Behavioral Medicine and Biofeedback

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BEHAVIORAL MEDICINE AND BIOFEEDBACK[1]

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Why is so little attention paid to behavioral research in the treatment and cure of disease? While infectious diseases used to be the most burdensome illnesses, we now see cardiovascular disease, cancer, lung disease, accidents, homicide, and violence as the major threats to life and health. These afflictions have strong behavioral components.

Introduction

In a recent address at the National Institutes of Health (NIH), Senator Edward Kennedy made a pointed reference to a growing trend in American medicine, namely, the emergence of a field of research and clinical endeavor that is now widely identified by the term "behavioral medicine." This trend is a historical fact, as documented by several recent events, including the founding of an Academy of Behavioral

Medicine Research and a Society of Behavioral Medicine; the establishment of an experimental Behavioral Medicine Review Group within the Division of Research Grants of the NIH; the establishment of a Behavioral Medicine Branch within the Division of Heart and Vascular Diseases of the National Heart, Lung and Blood Institute; and a recent flurry of program announcements from the NIH in such areas as chronic pain and psychological aspects of cancer.

It is timely, therefore, to undertake a review of the emerging field of behavioral medicine. This chapter shall first consider the historical and conceptual contexts within which these recent developments have occurred, with particular emphasis on differential conceptual orientations between behavioral medicine and psychosomatic medicine, which is also concerned with emotions and disease. Then will follow a review of the substantive research contributions from studies carried out with a behavioral-medicine conceptual orientation. This review will consider those aspects of behavioral medicine research relevant to etiology and pathogenesis of disease, to modification of lifestyles associated with increased risk of disease, and to direct treatment of disease. A concluding section on future directions will address the need for the integration of more psychodynamically oriented approaches (derived from psychosomatic medicine and consultation-liaison psychiatry) with the more behaviorally oriented approaches of behavioral medicine.

Historical and Conceptual Context

To understand the forces behind the historical development of behavioral medicine, it is necessary to focus our attention on several recent trends. First is the realization that most patients with physical disease have not been shown to benefit from the application of "talking therapies," which focus upon verbal productions and free associations with the goal of achieving

insight into neurotic conflicts. Perhaps this realization has been responsible for what both George Engel and David Graham have perceived to be psychosomatic medicine's lack of any substantial impact upon medicine in general in the past three decades. A second and probably more important impetus for the recent emergence of behavioral medicine as a distinct field has been the discovery in large-scale epidemiological studies that certain behaviors or lifestyles are "risk factors" for such major medical disorders as cancer and coronary heart disease. The failure of public education approaches to achieve the hoped-for dramatic changes in such risk-factor behaviors as cigarette smoking and nonadherence to antihypertensive regimens has convinced some leaders in clinical medicine that behavior modification approaches that have proved effective in changing behaviors associated with mental disorders might also prove useful in attempts to modify behaviors that increase risk of major physical disorders. In addition to this realization that techniques of behavior modification might help to reduce risk-factor behaviors that presumably lead to disease, there has been the demonstration in a growing body of clinical research that behavioral treatment approaches aimed at changing physiology directly (for example, biofeedback and autogenic training) are effective in the actual treatment of such physical disorders as headache, chronic pain, and Raynaud's disease— all disorders that heretofore had proven unusually resistant to the traditional biomedical approaches. The apparent ease with which these behavioral treatment

approaches have found acceptance in the medical community may be because they share the traditional rationale for the use of pharmacologic agents in clinical medicine—direct modification of pathophysiological processes.

To the extent that Engel and Graham are correct in their observations that psychosomatic medicine has not had the desired impact upon medicine in general, it must be considered whether there is anything new or different about behavioral medicine. A brief historical digression might help to put the differences between behavioral medicine and psychosomatic medicine in perspective, In the first issue of *Psychosomatic Medicine,* which appeared in 1939, the editors defined psychosomatic medicine as the study of the "interrelation of the psychological and physiological aspects of all normal and abnormal bodily functions and thus [to achieve the integration of] somatic therapy and psychotherapy." Nine years later, however, Carl Binger found it necessary to comment in an editorial: "the content of psychosomatic medicine should be greatly widened . . . beyond the ulcer, hypertension, asthma round. We should try to get away from too exclusive an emphasis on etiology and so-called psychogenesis." Again, in 1958, Binger was moved to comment in another editorial that "We are not primarily interested in etiology. . . ." More recently, in commenting on the definitions of psychosomatic medicine, Weiner has observed that "its aim has always been to contribute to a comprehensive account of the etiology and pathogenesis of disease."

It becomes clear from these observations that psychosomatic medicine has from the beginning been concerned primarily with the role of psychological factors in the etiology and pathogenesis of disease. While initially the focus was upon seven disorders that were considered to be "psychosomatic" (duodenal ulcer, asthma, Graves' disease, essential hypertension, ulcerative colitis, neurodermatitis, and rheumatoid arthritis), the emphasis in recent years has shifted to the role of psychosocial factors in all diseases and to the underlying physiological mechanisms whereby these roles are mediated. Another feature through the years has been a primary focus upon specific personality traits that, it is felt, lead to neurotic conflicts that are in some way responsible for pathophysiologic alterations which, in turn, lead to the emergence of the disease in question. This focus upon intrapsychic conflicts determined that therapeutic interventions should focus upon the spontaneous verbal productions of the patient, with the goal of achieving insights that would result in the resolution of the neurotic conflict and, hopefully, of the disease process as well. Unfortunately, as Graham noted in his recent Presidential Address before the American Psychosomatic Society, this hope has not been widely fulfilled.

Following an earlier exploratory meeting at Yale University in January 1977, a group of some thirty-five behavioral and biomedical scientists was convened at the Institute of Medicine of the National Academy of Sciences in April 1978 for the purpose of forming an Academy of Behavioral Medicine

Research. A direct outgrowth of that conference was the reformulation of an earlier proposed "official" definition of behavioral medicine:

> Behavioral medicine is the *interdisciplinary* field concerned with the development and *integration* of behavioral *and* biomedical science and techniques relevant to health and illness and the application of this knowledge and these techniques to prevention, diagnosis, treatment and rehabilitation.

While only future events will disclose whether thirty years hence the president of the Academy of Behavioral Medicine Research will note in his or her presidential address the lack of any impact of behavioral medicine upon the practice of medicine, there are certain conceptual differences that do appear to exist between psychosomatic medicine and behavioral medicine.

In contrast to the primary focus in psychosomatic medicine upon personality factors and intrapsychic conflicts and their role in the etiology and pathogenesis of disease, behavioral medicine focuses primarily upon the overt behavior of the patient and upon modifying behavior as a means of preventing or treating the disease in question. Based upon the conditioning and learning experiments of I. P. Pavlov and B. F. Skinner and their extension by Joseph Wolpe and A. A. Lazarus into the clinical area, behavioral medicine at present does not focus upon the patient's verbal reports and free associations but rather upon the direct observation and quantification of the patient's overt behavior in real-life situations, followed by the application of

the principles of learning theory and behavior modification, with the goal of changing the behaviors or pathophysiology that appear important in the initiation and maintenance of the disease process.

Even though psychosomatic medicine has focused primarily on etiological concerns, there has also been a continuing interest in issues related to treatment and intervention. Similarly, while the recent emergence of behavioral medicine stems largely from an increased awareness of, and interest in, the potential application of behavior modification techniques to prevention and treatment of physical disorders, there has also been evident a strong interest in the role of overt behaviors in the etiology and pathogenesis of physical disease. Consequently, it becomes necessary to address that area of behavioral medicine research that deals with the role of overt behavior in the etiology and pathogenesis of physical disease—with the main focus being on the relationship between the Type A behavior pattern and coronary heart disease. Bearing this in mind, it seems appropriate to review, in somewhat broader detail, the body of behavioral medicine research that deals with the use of behavior modification techniques to (1) change lifestyles and behavioral patterns that increase risk of developing physical disease and (2) modify directly pathophysiological mechanisms to treat physical disease.

Review of Major Areas of Behavioral Medicine Research

Etiology and Pathogenesis

The most successful study of the role of psychosocial factors in the etiology of physical disease conducted within the psychosomatic medicine tradition was done by Herbert Weiner and his colleagues, showing that among men physiologically predisposed by virtue of high serum pepsinogen levels subjected to the stress of army basic training, those who displayed a specific personality profile (high needs to be taken care of by others, frequent experience of frustration of these needs, and fear of expressing the resultant anger) were far more likely to develop active peptic ulcer disease than those not displaying the specific personality characteristics.

In contrast to this study of the role of personality in the etiology and pathogenesis of peptic ulcer disease, the research relating the Type A behavior pattern to coronary heart disease (CHD) has focused not upon the personality of research subjects but rather upon their overt behavior. As Ray Rosenman has noted: "Type A behavior pattern is ... a style of *overt behavior* by which such individuals confront, interpret and respond to their life situations." [Emphasis added.]

Rosenman also notes that the appearance of such behavior depends upon the underlying personality of Type A individuals, the environmental demands with which they are confronted, and their interpretation of such demands. However, the assessment of the global Type A behavior pattern is

based not upon inferences regarding such underlying personality characteristics but rather upon the “voice stylistics and psychomotor mannerisms” of the subject during the structured interview developed by Rosenman and Friedman. Among the overt behaviors used to characterize subjects as Type A are rapidity of speech, explosive voice modulation, and expressions of anger or hostility.

Just as the validity of the hypothesis that the personality characteristics originally described by Franz Alexander are involved in the etiology of peptic ulcer disease was confirmed in a prospective study, the best evidence for the role of Type A behavior pattern in the etiology of CHD is to be found in a large-scale prospective study of over 3,000 middle-aged men by the Western Collaborative Group Study (WCGS). The WCGS found that the approximately 1,500 men (free of signs of CHD at intake) who were Type A exhibited 2.37 times the rate of new CHD over an eight-and-one-half-year follow-up period as compared to their non-Type A, or Type B, counterparts. This increased CHD risk among Type A men remained highly significant even when the traditional risk factors (serum cholesterol level, cigarette smoking, and blood pressure) were statistically controlled. Subsequent research has extended these findings to show that Type A patients have significantly more severe coronary atherosclerosis on arteriography even with control for traditional CHD risk factors.' Another line of research has shown that normal subjects exhibiting Type A behavioral characteristics also show heightened physiological and

neuroendocrine responsivity when challenged behaviorally.

Those interested in learning more of the details of this body of research relating Type A behavior pattern to coronary heart disease are referred to a recent review volume edited by Theodore Dembroski and associates. This body of research was recently reviewed by a diverse group of distinguished biomedical and behavioral scientists who were convened by the National Heart, Lung and Blood Institute (NHLBI), and who had not been directly involved in any of the Type A-related research themselves. The utility of the focus in behavioral medicine research upon overt behavior as it relates to etiology and pathogenesis was highlighted by one of the conclusions of the Review Panel:

> The Review Panel accepts the available body of scientific evidence as demonstrating that Type A behavior ... is associated with an increased risk of clinically apparent coronary heart disease in employed, middle-aged U. S. citizens. This increased risk is over and above that imposed by age, systolic blood pressure, serum cholesterol and smoking and appears to be of the same order of magnitude as the relative risk associated with any of these other factors.

The distinction between the conceptualization underlying the research on Type A behavior pattern and the primary focus upon intrapsychic factors in traditional psychosomatic medicine approaches to the study of etiology and pathogenesis was highlighted at the Timberline Conference on Psychophysiologic Aspects of Cardiovascular Disease in 1964. Ray

Rosenman's presentation of the then available data pertaining to the relationship between Type A behavior and coronary disease was strongly criticized as inadequate because it did not attempt to define "important traits in a personality" that could be related to disease processes. Although it was to be a full decade before the first indications of the emergence of a distinct field of behavioral medicine, Rosenman's response to these criticisms was quite consistent with behavioral medicine's conceptual orientation as being primarily concerned with overt, observable behavior:

> We have not concerned ourselves with factors of motivation but only with determining the presence or absence of the *overt* pattern A, and I suspect that [those objecting to absence of concern with personality traits] are upset at this as well as our seeming oversimplification of inexact factors that are difficult to assess and even more difficult to quantitate. . . . [However] it is possible ... to study different aspects of men that are tall and men that are short . . . without determining why they are tall or short, [p. 502] [Emphasis added.]

Prevention and Treatment

The almost explosive recent growth of interest in behavioral medicine stems from the hope that application of behavior modification approaches can be helpful in modifying risk-factor behaviors and lifestyles, which have been shown to increase the likelihood of developing diseases that are major public health problems in the United States today. An additional impetus for the recent emergence of behavioral medicine was the demonstration in the mid-

1960s by Neal Miller and his coworkers that the application of instrumental conditioning techniques, or biofeedback, could be successful in directly modifying physiological functions that previously had been thought to be beyond voluntary control. While there continues to be much controversy regarding the precise nature of the mechanisms whereby such control is achieved by human subjects, Miller's initial demonstration has spawned a new clinical specialty whereby biofeedback and other behavior therapy techniques are employed on an ever-increasing scale in the direct treatment of a wide range of physical disorders that had previously proven to be quite resistant to traditional treatment approaches in clinical medicine. Representative research findings in these two areas of "applied" behavioral medicine will now be reviewed.

Behavioral Medicine and Prevention of Disease

There is probably no better case to be made for the need for better means of helping people to change risk-conferring behaviors than the fact that more than 50 million Americans continue to smoke despite the massive public education campaigns that fairly shout the well-known increased risk of both lung cancer and coronary heart disease among cigarette smokers. Even more disturbing is the observation that, although among adults the rate of smoking has decreased, there has been less of a decline in smoking rates among teenagers and even an increase among female teenagers. Moreover, the onset

of smoking is occurring at an earlier age and the number of cigarettes smoked is increasing among those who do smoke. This suggests that the introduction of low-tar and -nicotine brands has resulted in increased consumption among addicted smokers to compensate for the loss of nicotine.

As it became clear that educational efforts alone, even when incorporating techniques of fear arousal (for example, gory slides of emphysematous lungs) were ineffective, behavioral scientists began to devote more effort toward the study of smoking behavior. It is noteworthy that this attention focused not on personality characteristics that predisposed people to smoke but rather on the various consequences of smoking and the role of social forces influencing the adoption of smoking behavior. Thus, these efforts fall clearly within the definition of behavioral medicine. One observation has been that while the long-term outcomes of smoking (lung cancer, heart attack) are clearly bad, the short-term benefits can be quite positive (stress reduction, good taste after a meal, facilitating communication and togetherness with others, and so on). This leads to a greater "subjective expected utility" in continuing the addiction rather than quitting and going through the unpleasantness of breaking the habit. Numerous studies have also demonstrated the importance of social influence in terms of the modeling of smoking behavior by peers, parents, siblings, and significant others perceived by children as role models (for example, teachers and celebrities).

In evaluating various early attempts of the application of behavior modification approaches (for example, electrical aversion, counterconditioning, loss of a cash deposit) to the problem of smoking cessation, R. M. McFall and C. L. Hammen found that while any program could achieve abstinence in all subjects at the end of the treatment program, after six to twelve months only an average of 13 percent of participants were not smoking. More recently, the "rapid smoking" technique developed by E. Lichtenstein—having the subject smoke at a rate of one inhalation every six seconds in a darkened unpleasant room—has been reported to have much higher abstinence rates on long-term follow-up than the disappointing 13 percent found in earlier efforts. Although the rapid smoking technique has obvious limitations insofar as application to the most important target populations for smoking cessation is concerned (those with lung and heart disease), it continues to be one of the most seriously considered behavioral approaches for those already addicted to smoking.

In his extensive review of behavioral medicine research related to cigarette smoking, Richard Evans notes a number of problems in the extensive efforts that have been made to demonstrate the efficacy of behavior modification approaches to smoking cessation in the addicted smoker. First, the early high-success rates reported for the rapid smoking technique as well as for other innovative behavior modification approaches (including operant paradigms involving self-monitoring of smoking behavior, stimulus control,

and systems of self-reward and punishments) have not been confirmed in subsequent studies, particularly those where longer follow-ups have been included. Thus, the "true" rate of long-term abstinence with the best of these programs appears to be in the range of 25 to 30 percent, clearly better than the early results, but not as promising as was hoped initially. Other problems with the controlled outcome studies relate to the fact that all subjects in them are volunteers and, hence, not representative of those in the addicted smoking population who do not volunteer. Furthermore, the practice of including in the success rates only those subjects who complete the program inflates the success rates by ignoring the dropouts. Based upon his review of the results of the smoking cessation literature, Evans concludes that, "For the health professional who is asked to recommend or even judge a program there is very little basis for favoring one program over another. In fact, it would be difficult with any degree of confidence to recommend any program at all."

These disappointing results have led to a general conclusion that since the resources available for the solution of the cigarette smoking problem are limited, greater efforts could be more profitably directed toward "influencing pre-addictive smokers to curtail the incidence of smoking before they become addicted or nicotine-dependent, or to focus on preventing individuals from beginning to smoke in the first place." Research in this area clearly demonstrates the inadequacy of depending only on educational efforts and

fear arousal; teenagers and pre-teens must be taught social skills that will enable them to cope with the many pressures to smoke to which they are subjected by the media, peers, family, and role models. Whether this approach, based on principles of applied social psychology, will achieve the goal of reducing over the next decades the proportion of preteens and teenagers who smoke is something that only time will tell. Preliminary studies suggest that such a "social inoculation" approach can be utilized effectively to deter the onset of addictive smoking in junior high school students.

While not intended to be exhaustive, this review of behavioral medicine research related to smoking cessation does permit us to make several generalizations concerning the core characteristics of the behavioral medicine approach to a typical public health problem. The first key ingredient is a *behavioral assessment* that attempts to identify the environmental influences that play a role in the initiation, promotion, and maintenance of the behavior in question. Second is the *application of behavioral science knowledge and techniques* (in this case, derived from behavior therapy and social psychology) in attempts to prevent or reduce the behavior in question. Finally, and equally important, is a data-based *evaluation of the outcome* of the intervention employed, on both a short- and long-term basis. When this evaluation suggests that one approach (for example, behavior modification) is not having the desired effect, then further evaluation of the reasons for such failure is carried out in an attempt to identify other approaches that may offer a greater

chance of success (for example, inoculation strategies to cope with peer pressures). In each case it is overt, manifest behavior that is the focus of the assessment, the intervention, and the evaluation of that intervention—thus placing this type of endeavor squarely within the mainstream of behavioral medicine.

Similar reviews could be presented here concerning the behavioral medicine approach to a variety of other risk-inducing lifestyles and behaviors, but this would not add to the general conclusions or illustrative impact of what has already been presented. The interested reader is referred to several excellent recent reviews of the behavioral medicine approach to problems of eating behavior, compliance with therapeutic regimens, and coronary-prone (Type A) behavior.

Behavioral Medicine and Treatment of Disease

The initial demonstrations provided by basic psychophysiological research that so-called autonomic functions could be brought under voluntary control through the use of biofeedback techniques has led to the widespread use of biofeedback and other behavioral techniques in the direct treatment of a wide variety of medical disorders. As with the behavioral medicine approaches to lifestyle modification, an exhaustive review of the literature in this area of behavioral treatment approaches would far exceed the scope of

this chapter. Several recent comprehensive reviews have appeared describing the research in this area. For purposes of illustration, the present review will focus on behavioral medicine approaches to (1) neuromuscular reeducation, (2) treatment of muscle contraction headaches, (3) treatment of Raynaud's disease, and (4) treatment of idiopathic insomnia.

Before proceeding with this review, some general introduction is necessary to place the behavioral medicine approach to treatment in proper perspective. As previously noted, the main stimulus for attempting the direct treatment of various disorders was the exciting early work showing the effectiveness of biofeedback techniques in achieving changes in physiologic functions previously thought to be beyond the control of instrumental learning techniques. Much paper and ink (not to mention laboratory time) has been expended in the past decade describing studies comparing biofeedback with other, non-instrumented techniques in the treatment of various disorders. Almost without exception these studies have found that various relaxation approaches, including autogenic training, progressive muscle relaxation, and various forms of meditation, are as effective in reducing symptoms as biofeedback. This suggests that general relaxation, rather than some specific therapeutic mechanism, is a key ingredient in the therapeutic efficacy of these various techniques. It should be noted that in virtually all these studies of clinical efficacy, the behavioral treatments employed, whether biofeedback or some form of relaxation exercise, have been found

more effective in reducing symptoms than has a waiting-list control group or a group given some form of attention placebo control treatment. For purposes of this review of clinical applications of behavioral treatment of physical disorders, the issue of whether biofeedback or some form of relaxation training is better is not particularly relevant. The data reviewed to date indicate that where controlled-outcome studies have been conducted, both biofeedback and relaxation approaches are about equally effective and better than no treatment at all. These studies also suggest strongly that whatever means are employed to reduce muscle tension or autonomic activity, regular home practice is essential for the realization of maximum symptomatic improvement. Finally, there is some indication that where neurotic conflicts are present, they can interfere with attempts to modify physiological responses that are responsible for maintaining symptoms. There are, in fact, arguments for dealing with such underlying conflicts through the use of more dynamic interpretations in order to achieve symptom relief with the behavioral approaches. With these qualifications in mind, we may now turn to the more detailed review of the disorders where strong evidence exists for the efficacy of behavioral treatment approaches.

Neuromuscular Reeducation

In contrast to the other disorder types to be reviewed here, the area of neuromuscular reeducation appears to represent an example of

electromyograph (EMG) biofeedback as a *specific* treatment. Following the early case reports of Marinacci and Horande, a number of systematic studies have convincingly documented the therapeutic efficacy of EMG biofeedback training in the rehabilitation of patients with a wide variety of disorders of neuromuscular function, including upper extremity paralysis, lower extremity paralysis,- and spasmodic torticollis. This has led Blanchard to conclude that: "Overall, it seems well established that EMG biofeedback can be a very useful adjunct to standard rehabilitation therapy with many neuromuscular disorders.

Muscle Contraction Headache

There are now in the literature numerous reports of controlled outcome studies showing that EMG biofeedback, some form of relaxation training, or a combination of the two are effective in reducing the frequency and severity of muscle contraction headaches. This represents one of the most gratifying treatment areas for the behavioral medicine clinician, since even patients with a long history of debilitating headaches requiring daily narcotic treatment can be brought to a relatively headache-free state within two to three weeks of treatment using any of the techniques typically employed to achieve reduced muscle tension. Two studies' have reported long-term follow-up data on patients with muscle contraction headaches or with mixed migraine and muscle contraction headaches. Both studies suggest that even after periods

ranging in length from six months to five years, anywhere from 34 to 60 percent of patients treated behaviorally still show significant clinical improvement.

Raynaud's Disease

Compared to the other disorders covered in this brief overview, Raynaud's disease probably accounts for much less overall suffering and financial cost on the part of those who have it. Nevertheless it represents an excellent model for evaluating behavioral treatment approaches in that (1) patients do experience discomfort and, hence, should be motivated to comply to behavioral regimens; (2) the attacks are circumscribed with respect to stimulus situations (cold weather) that elicit them and determine their frequency and severity; and (3) a logical mechanism can be postulated (try to decrease sympathetic nervous activity) whereby behavioral approaches can be employed to decrease the activity of the disease process.

Based upon this reasoning, Richard Surwit and colleagues have conducted a well-designed controlled outcome study evaluating the response of disease activity (frequency and severity of vasospastic episodes) to a combination of autogenic training and finger-temperature biofeedback with frequent home practice of hand-warming strategies among patients with Raynaud's disease during a severe northern winter season. The design of this

study included several important features. First, the physiologic mechanisms underlying the disease and its response to the treatment were evaluated by exposing subjects to a controlled cold stress and determining the amount of decrease in finger temperature produced by this maneuver before and after treatment. Second, both an active treatment group and a wait-list control group were evaluated in terms of both disease activity and vasomotor response to the standard cold-room stress exposure. Compared to pretreatment levels, the active treatment group showed a significant decrease in frequency of attacks and a nearly significant decrease in severity of attacks following treatment. Documenting a physiologic mechanism for this symptomatic improvement, Surwit found that the active treatment group were able to maintain as high as 4°C warmer finger temperature during the posttreatment cold stress compared to the pretest levels. In contrast, repeat testing of the wait-list controls showed no difference in their finger-temperature response. After a course of active hand-warming training, however, the wait-list controls were able to maintain a significantly warmer finger temperature on cold exposure following training, comparable to that of the first active treatment group. Thus, the symptomatic improvement in Raynaud's disease activity was paralleled by observable improvement in the subjects' ability to maintain a warmer hand temperature on cold exposure. By showing a demonstrable modification in pathophysiologic responsivity in association with behavioral training, Surwit's group has taken an important

step forward in providing evidence for the scientific basis of the behavioral treatment approach in the clinical improvement of disease activity. In further studies employing this paradigm, Surwit has found preliminary evidence of neuroendocrine correlates of reduction in disease activity with behavioral treatment, as well as having evaluated the joint effect on disease activity of both the behavioral treatment and a pharmacologic intervention (intra-arterial reserpine).[2] The application of this approach to the evaluation of behavioral treatment for other disorders should help considerably to establish the scientific basis and credibility of behavioral medicine approaches to treatment of physical disorders.

Insomnia

Sleep-onset insomnia is a very common complaint in general medical practice and probably accounts for a substantial proportion of the very high level of prescriptions for minor tranquilizers and soporifics, not to mention the record sales of over-the-counter sleep aids. Paradoxically, the chronic use of sleep medications is probably the most common cause of chronic sleep-onset insomnia. Thus, the use of medications whose action is sleep induction probably has no place in the long-term management of the patient who experiences difficulty in falling asleep. (It is important to note that the following discussion is confined only to idiopathic sleep-onset insomnia.) Where there is some underlying biologic cause of the sleep disturbance, such

as depression, sleep apnea, or rhythmic leg twitches, the appropriate intervention must first address the underlying biologic problem. Where recent life events are responsible for distress, which interferes with falling asleep, counseling efforts should also be addressed to helping improve the patient's coping ability, as well as to the use of appropriate behavioral approaches.

When careful initial evaluation establishes the diagnosis of idiopathic sleep-onset insomnia (complaints of difficulty falling asleep, six or less hours of sleep per night, and daytime drowsiness in the absence of any of the previously mentioned biologic causes), the two behavioral approaches of relaxation training and stimulus-control procedures have both been shown to be remarkably effective treatment.

Thomas Borkovec favors the use of a modified version of Edmund Jacobsen's progressive muscle relaxation training as a means to provide the patient with skills at achieving a quiet state of low arousal, which is felt to be conducive to sleep onset. Borkovec reports that in six studies of over 250 sleep-disturbed subjects, who followed continued home practice and honing of relaxation skills, progressive relaxation training was found to be significantly superior to both no-treatment and several placebo control conditions in reducing sleep-onset time. Follow-up evaluation of these subjects at four months and one year showed an average reduction in sleep

onset time from forty-one minutes down to only nineteen minutes— bringing the treated group within the latency reports for the majority of the normal population.

Based upon learning theory considerations, Richard Bootzin made the assumption that persons with sleep-onset insomnia may well have learned to associate bed-related stimuli with sleep-incompatible responses, such as reading, watching television, worrying about the day's events, or planning the next day's activities—thus leading to the circumstance that exposure to bed-related cues increases the probability of sleep-incompatible behaviors, with a corresponding reduction in the probability of sleep. With this in mind, Bootzin has proposed the following "behavioral prescription" for the treatment of sleep-onset insomnia:

1. Lie down only when you feel sleepy.
2. Set your alarm clock for the same time and get up at that time every morning regardless of how much sleep you obtained the night before.

3. Avoid daytime naps.

4. Use the bed and bedroom only for sleeping. Do not engage in other activities (e.g., eating, studying, reading, watching TV) in your bed or bedroom.

5. If you do not fall asleep within ten minutes, leave the bedroom immediately, and return to bed only when you feel sleepy again.

6. Repeat step #5 as often as necessary during the night until rapid (i.e., within ten minutes) sleep onset occurs.

It is felt that with sufficient practice of these behaviors the association

between bed cues and sleep grows stronger, while a corresponding decrease in the strength of the relation between bed cues and sleep-incompatible behaviors makes the probability of sleep that much greater. Bootzin reported that the use of this approach resulted in an average decrease of seventy-four minutes in sleep-onset time among insomniacs requiring over ninety minutes to fall asleep prior to treatment; 61 percent of the patients averaged less than twenty minutes to sleep onset after treatment.

In view of the high prevalence of sleep-onset insomnia as indexed by the very high rates of use of pharmacologic agents to induce sleep, it is somewhat surprising that these highly effective behavioral treatment approaches are not employed more widely. Bootzin's stimulus-control procedure is particularly well-suited for use in a primary care setting, where the practitioner can simply write out the behavioral prescription (or have it on a printed form) and hand it to the patient with a brief explanation, just as if it were a prescription for a tranquilizer or sleeping pill.

As with the review of behavioral medicine approaches to modification of risk-factor behaviors, this review of behavioral medicine approaches to treatment of physical disorders is not intended to be exhaustive. It is meant to illustrate general principles underlying behavioral approaches to medical treatment, as well as those disorders for which particularly good evidence is available regarding the efficacy of behavioral treatment methods. For a more

comprehensive review of this area of treatment of physical disorders, the interested reader is encouraged to refer to any of several recent review volumes.'

Behavioral Medicine: Future Directions

Behavioral medicine has a great potential to contribute significantly to the understanding of the role of psychosocial factors and behavior in the etiology and pathogenesis of disease and to the prevention, treatment, and rehabilitation of a wide variety of physical disorders. As was noted, however, with regard to behavior modification approaches to cigarette-smoking cessation, the realization of this potential is not automatically assured. To promise too much, to lead the medical community to expect miracles that we cannot deliver, would be to sow the seeds of a future disillusionment that could lead to an unfortunate delay in achieving the realistic potential contributions of behavioral medicine. As with the behavioral medicine approaches to smoking cessation, it is essential that we continue to evaluate our efforts in a scientifically rigorous fashion, and we must be ready to acknowledge our failures and to modify our approaches based on the results of such evaluations. If the full potential contributions of behavioral medicine are to be realized, it is of prime importance that we follow Neal Miller's injunction to "be cautious in what we claim and bold in what we try."

Another issue to be regarded as critical for the future development of behavioral medicine is the avoidance of false dichotomies. It is often tempting for those who focus primarily on overt behaviors to view with at least a certain amount of contempt efforts to explain pathogenesis of disease in terms of such intrapsychic constructs as personality or neurotic conflicts, which can only be inferred rather than observed and quantified directly. By the same token, as was noted earlier with regard to early criticisms of the Type A behavior pattern concept, it is often hard for those who focus primarily on psychodynamically oriented issues to escape the impression that more behaviorally oriented efforts to explain pathogenesis are only scratching the surface and not getting at the real, "underlying" personality issues. Might it not be wiser, however, that workers with both orientations consider the notion that the two emphases are not in conflict with one another but rather are really complementary? Surely the needs, motivations, and other intrinsic predispositions of the individual play some role in determining the overt behavior that will be displayed in any given environmental situation. Conversely, those same intrapsychic factors will exert their influence upon disease processes through the overt behavior (not just conceptualized as psychomotor, but also as physiologic and neuroendocrine) of the individual in certain environmental situations. For example, it was found that the overt Type A behavior pattern was associated with increased levels of coronary atherosclerosis on arteriography. However,

it was also found that a psychometrically measured personality construct, hostility, is equally and independently predictive of coronary atherosclerosis. This suggests that a realization of the complementary relationship between intrapsychic and overt behavioral phenomena, and a willingness to incorporate both orientations in our attempts to understand the role of psychosocial factors in the etiology and pathogenesis of disease, will offer the greatest chances of success. To document further the need for and desirability of integration of psychodynamically and behaviorally oriented approaches, it is necessary to consider in some detail the relevance of behavioral medicine for consultation-liaison psychiatry.

Complementarity Between Behavioral Medicine and Consultation-Liaison Psychiatry

Consultation-liaison psychiatry has emerged over the years as that branch of psychosomatic medicine that is primarily concerned with issues of treatment within the clinical medicine setting. A. J. Krakowski defines consultation-liaison psychiatry as "the services which psychiatrists render outside of the psychiatric departments in the general hospitals." He goes on to note that these services are rendered to help nonpsychiatric physicians care for patients with primary psychiatric disorders or whose psychiatric problems "interfere with, complicate or stem from somatic illness." Z. J. Lipowski has reviewed the kinds of psychiatric problems that are commonly seen in the setting of physical illness. In addition to this consultative role, the

consultation-liaison psychiatrist also has a liaison function: to educate consulting physicians and other members of the health care team about referred patients so that they can better manage such problems themselves in the future. In fulfilling these roles, the consultation-liaison psychiatrist is generally seen as one who evaluates and treats psychiatric/psychosocial disorders and problems encountered in a medical (as compared to a psychiatric) setting. Traditional psychiatric approaches are employed, including psychotherapy, psychopharmacologic agents, and working with family and other key people in the patient's environment.

In contrast to consultation-liaison psychiatry's primary focus on the evaluation and treatment of psychopathology occurring in the setting of physical illness, biofeedback and other behavioral medicine treatment techniques have generally been directed primarily toward the relief or amelioration of the physical symptoms associated with physical illness per se. David Shapiro and Richard Surwit have pointed out that these behavioral medicine approaches differ from the consultation-liaison psychiatric approach in two ways. First, they focus mainly on the "specific physiological problem presented by the patient" rather than on a hypothesized psychodynamic conflict that may underlie it. Second, treatment is directed toward achieving a specific change in disturbed physiology through instrumental learning rather than by any approach to the underlying psychodynamic conflicts.

The obvious conclusion from these descriptions of consultation-liaison psychiatry and behavioral medicine approaches to patients with physical illness is not that they are in conflict with each other, or that to agree, with the tenets of one is to reject the principles of the other, but rather that the two approaches are, more than anything else, different. One aims at evaluating and reducing psychological distress, with the outcome often a reduction in physical distress (that is, pain); the other aims at evaluating and reducing physical distress, with the outcome often a reduction in psychological distress (that is, anxiety and depression). The word that best describes the relation between the consultation-liaison psychiatry and behavioral medicine approaches is "complementarity." Webster's defines "complementarity" as the quality of being complementary and goes on to define complementary as "serving to fill out or complete . . . mutually supplying each other's lack." Thus, not only are the approaches of behavioral medicine and consultation-liaison psychiatry different, but each has the capacity to supply something that is lacking in the other.

Even though many patients with physical symptoms related to physical illness or psychophysiologic disorder will be helped by an approach that focuses exclusively on instrumentally modifying the physiologic basis of symptoms, there is a significant proportion of patients in whom underlying neurotic conflicts are such that they will be either unable or unwilling to participate in their treatment to the extent that they fail to achieve control

over their physiologic function and/or symptoms. William Rickies has spoken cogently of the problem of resistance to biofeedback apparatus. Also, there are other detailed descriptions of the various ways in which underlying psychologic conflicts can prevent patients from responding to biofeedback therapy of somatic disorder, as well as of the "psychological complications" that can surface when somatic symptoms are reduced or removed in patients with severe underlying psychodynamic conflicts. Besides the advantages of addressing issues related to those psychodynamic conflicts that may prevent or complicate patients' benefiting from biofeedback therapy, it is felt that many patients with organic pain syndromes, such as low back pain, will achieve better pain control if treated with combination phenothiazine/tricyclic antidepressant therapy and EMG biofeedback-assisted-relaxation training than they will with biofeedback training alone. Again, such psychopharmacologic approaches are more often found within the province of the consultation-liaison psychiatrist than of the typical behavioral medicine practitioner. Indeed, since many working in behavioral medicine are Ph.D. psychologists, if patients are to receive the potential benefits of the above psychopharmacologic approach it is essential to have the input of the consultation-liaison psychiatrist, or some other doctor-clinician.

If these are some of the ways in which the consultation-liaison psychiatrist's approach can complement that of the behavioral medicine

practitioner, how can the latter's approach help the consultation-liaison psychiatrist? One way is by making easier the insight-oriented psychotherapist's task of overcoming resistances in patients with somatic disorders. As is well-known, such patients can be quite resistant to the notion that they have any psychological problems, and they may react to the presence of a psychiatrist with anger at the implicit threat that a (medical) doctor thinks the patient is a mental case and that the pain is all in the patient's head. Such patients will often accept (if it is presented properly) the proposition that their symptom is due to real "physical" causes. For example, patients suffering from tension headache can be told that their head and neck muscles are too tight and that in order to obtain relief they will have to learn how to reduce that excess muscle contraction with the aid of a "scientific" apparatus, the biofeedback machine. If the underlying psychological problem is sufficiently severe, it may be that the patient will have difficulty learning to reduce EMG levels, and in that context will become more receptive to interpretations of underlying emotional conflicts. In fact, the patient will often spontaneously report that whenever he thinks about a certain area (for example, what his mother said to him last week) he notices that the EMG feedback signal shows an increase. Thus, biofeedback approaches can often serve to prepare patients with psychological problems to enter psychotherapy who otherwise might have continued to focus only on some physical symptom and resist entering psychotherapy until the physical

symptom was gone.

Another area where behavioral medicine approaches can be of help to consultation-liaison psychiatry is in narrowing the gap that Donald Lipsett has noted still exists between psychiatry and the rest of medicine, despite the advances made by consultation-liaison psychiatry in recent years. First of all, by directly treating the physical disorder itself, behavioral medicine approaches not only complement the help provided by the consultation-liaison psychiatrist for psychiatric problems occurring in association with physical disorders but at the same time cannot help but impress the nonpsychiatric physician with the scientific legitimacy of a treatment modality that successfully alleviates physical symptoms which may have been resistant to his best efforts within a strictly biomedical model. By incorporating behavioral medicine approaches, consultation-liaison psychiatry can thus enhance its position vis-a-vis the rest of medicine in terms of being able to intervene directly to affect physical symptoms. As a result, it seems not unreasonable to assume that the nonpsychiatric physician will also exhibit an increased acceptance of the more traditional focus of the consultation-liaison psychiatrist upon psychopathology. Thus, consultation-liaison psychiatry, by adding behavioral medicine approaches to its usual treatment approaches, might find that not only is it able to successfully deal with a wider variety of problems "outside of the psychiatric departments of the general hospitals," but also that the personnel in those settings are more

receptive to, and appreciative of, those things the consultation-liaison psychiatrist has been doing well all along.

To illustrate how some of these mutual benefits might be achieved by behavioral medicine clinicians and consultation-liaison psychiatrists working in hospital settings, it will be helpful to briefly describe how a biofeedback treatment facility was set up at Duke University, paying attention to its evolution and to the experimenters' plans for future integration between Duke Behavioral Physiology Laboratory and the Consultation-Liaison Service. It was found that many of the patients referred for biofeedback treatment had underlying psychodynamic conflicts, which either prevented their being able to benefit from biofeedback therapy or complicated their treatment despite a positive response of physical symptoms. Naturally, an attempt was made to identify and deal with these psychodynamic issues. However, since the primary orientation was toward the use of behavioral techniques and not toward long-term psychotherapy, both clinicians and patients found it helpful if treatment concentrated on patients in whom psychodynamic conflicts were readily evident (or who were not learning to control physiological function using biofeedback). Such evaluation was done by psychiatrist colleagues. This often led to a joint effort—with the Behavioral Physiology Laboratory focusing on reduction of physical symptoms and the consultation-liaison psychiatrist focusing on psychodynamic issues; this effort benefited the patient. This joint approach was so successful—in terms of both patient

benefit and the clinicians' own sense of doing a better job —that the chief of the consultation-liaison service now attends Behavioral Physiology Laboratory's weekly clinical case conference. Not only do the behavioral therapists appreciate and benefit from his viewpoint in understanding patient problems, but he also gains an appreciation of behavioral approaches that he can then use to enhance his liaison activities.

There are plans to incorporate this joint approach with training activities as well as with the clinical service aspect of the programs. Psychology interns rotate through the Behavioral Physiology Laboratory and receive supervision in using biofeedback and other behavioral techniques in the evaluation and treatment of patients with physical disorders. Psychiatry residents rotate through the Consultation-Liaison Service and receive supervision in the evaluation and treatment of psychiatric problems arising in the nonpsychiatric wards of Duke University Medical Center. Additionally, there are plans to form teams, consisting of a psychology intern and a psychiatric resident, that will jointly evaluate and formulate a treatment plan for patients referred for biofeedback therapy of somatic symptoms. Through joint supervision of this clinical activity and through this joint participation in the Behavioral Physiology Laboratory clinical case conference, it is hoped that this training program will achieve a model for the integration of the behaviorally and psychodynamically oriented approaches to patients referred for treatment of physical symptoms.

It is possible that both behavioral and psychodynamic "purists" may take issue with what has been said herein, asserting that to the extent that each other's viewpoint has been incorporated, this review has been a waste of the author's and the patient's time. Of course, one must realize that most clinicians, whether behaviorally or psycho-dynamically oriented, do not take such extreme views. But to those who might—and to emphasize the point of what has been said— it bears repeating that an integrative approach, incorporating what is useful in both approaches, will not only serve to help us all care better for our patients, but it will also serve to achieve the goals of both behavioral medicine and consultation-liaison psychiatry more rapidly and to a greater extent than will ever be possible in the absence of such an integrative team approach.

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Notes

1 Supported by a Research Scientist Development Award (MH70482-06) from the NIMH and by grants (HL 18589-04) from the NHLBI.

2 Personal communication.