of light measured. The duller sensor apparently recorded a greater total volume of light than did the sensitive one. To the experts, this suggested that a meteoroid may have passed the satellite in a trajectory that took it closer to one of the sensors.

Outside the government, this explanation is met with skepticism. The authors of the Press report realize that the scenario described is in the rare event category, but they have nothing better to offer. The evidence supporting the Vela's message is still too flimsy, they think, to prove that someone tested a bomb.

The President's science staff will continue to study the Arecibo sighting and the characteristics of Vela's zoo animals. They hope these will provide a definite answer to the problem sometime.

—ELIOT MARSHALL

# Psychotherapy Works, But for Whom?

## *People improve with therapy, but the clinical studies are too uneven to explain how or why*

Less than 20 percent of the money spent on mental health care in the United States pays for psychotherapy, according to the American Psychological Association. Yet this form of treatment (involving structured talk rather than drug therapy) seems to draw the heaviest critical fire. This may be because psychotherapy, of all forms of mental health care, resembles the practice of physical medicine the least. It usually does not require the use of hospitals, drugs, or machinery, although it is often used in connection with them. The most important distinction may be that psychotherapy is governed by very few common standards. Thus it is difficult to make any generalizations about its effectiveness.

The field's most insistent critic at the moment is Congress, which has begun to demand hard clinical proof of psychotherapy's accomplishments before agreeing to finance it under Medicare (*Science*, 4 January). This demand and other demands from within the field for standardization of research have put new stress on attempts to demonstrate that psychotherapy really works. Many projects are afoot to increase the credibility of the field's scientific claims, the latest being a proposed $1 million clinical trial of the treatment of depression, to be managed by the National Institute for Mental Health (NIMH).

Here a note of definition is needed. The dictionary says that psychotherapy is simply the treatment of a mental or emotional disorder "by psychological means, especially involving verbal communication." The practitioners themselves use slightly more specific terms, stressing the importance of the therapist's credentials. One classic definition says psychotherapy is:

> the informed and planful application of techniques derived from established psychological principles, by persons qualified through training and experience to understand these principles and to apply these techniques with the intention of assisting individuals to modify such personal characteristics as feelings, values, attitudes, and behaviors which are judged by the therapist to be maladaptive or maladjustive.*

As the definition suggests, the trick is in knowing how to apply the established psychological principles. There is no consensus on this point; responsible reviewers have guessed that there may be 100 to 140 schools of psychotherapy—all of them in the mainstream.

Psychologists are annoyed when asked, "Does psychotherapy work?" Gary VandenBos, a policy official at the American Psychological Association, says "It is a stupid question. It's like asking, 'Does surgery work?' " He thinks the question is too broad to be answered meaningfully. "Does surgery work in treating the common cold?" he asks. VandenBos is annoyed also because he thinks it is unfair to demand that psychotherapy pass a hard scientific test of efficacy before it wins reimbursement in public health programs. He claims that techniques used in physical medicine are not required to pass such rigorous screening before winning reimbursement. And finally, he finds it ironic that what he considers to be the most progressive form of treatment—psychotherapy—is taking the greatest heat. He says that the more common practices of tranquilizing and hospitalizing mental patients would prove less effective than psychotherapy, or even harmful, if they were subjected to the same critical review.

> Responsible reviewers have guessed that there may be 100 to 140 schools of psychotherapy—all in the mainstream.

Jerome Frank, professor emeritus of psychiatry at the Johns Hopkins School of Medicine and a noted expert on the evaluation of therapies, argues that there is little point in conducting clinical trials. In a speech given last year before the American Orthopsychiatric Association, Frank said that success depends more on the abilities of the therapist than on the methods used. It is futile, he thinks, to codify rules of treatment: "To try to determine by scientific analysis how much better or worse, let us say, gestalt therapy is than transactional analysis is in many ways equivalent to attempting to determine by the same means the relative merits of Cole Porter and Richard Rogers. To ask the question is to reveal its absurdity." Frank thinks that a good therapist, like a good artist, is unique.

Despite their discomfort at doing so, practitioners do offer up general answers to the question of efficacy. One recent study cited as proof that psychotherapy works was conducted in 1977 by Mary Smith and Gene Glass at the University of Colorado in Boulder. Their ambitions

*J. Meltzoff and M. Kornreich, *Research in Psychotherapy* (Atherton, New York, 1970).


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were great: They attempted to collect and analyze every published report on the controlled study of psychotherapy and counseling. Glass said they may have missed 200 old studies through one oversight or another, and another 200 new ones published since 1977. Yet in their review of 500 reports they found that psychotherapy, regardless of the brand, always had some positive effect. Using statistical analyses, they concluded that the average client receiving therapy was better off in some way than 75 percent of those receiving no treatment, and also better off specifically with respect to alleviation of fear and anxiety than 83 percent of the untreated controls.

There are problems with their approach, however. They made no attempt to screen studies for scientific rigor; nearly everything they found was included. The terms used in the studies were not comparable. The therapies were diverse, as were the illnesses treated and the objectives of treatment. Measures of the effect of therapy were often subjective. The size of the population studies was typically no larger than 30. Nevertheless, Glass says his findings are statistically valid, particularly because the size of the aggregate population covered by the studies (25,000) was so large. Is it correct to say that hundreds of small, often poorly controlled studies add up to one large, valid study? Glass has no qualms about the strength of the statistics; psychotherapy works, he says.

It is difficult to generalize beyond that, Glass agrees, and it is particularly hard to compare the results of one study with another because there are so few common standards. Research on psychotherapy, according to Glass, is an "enormously widespread, unorganized cottage industry. Every university runs its own type in its own way. They don't listen to anybody else. They don't read anybody else's literature. It's quite an odd mishmash of things."

Another global review of the literature was conducted recently by Morris Parloff, chief of the division at NIMH that monitors research on psychotherapy. Like others, he thinks psychotherapy has unquestionably proved its worth. The difficult questions, he says, are what kinds of therapy work best with which kinds of illness? He has found evidence that some practices may be "psychonoxious"—doing more harm than good for the client—and he says it is important to identify and stop these practices.

Although Parloff finds the evidence too sketchy to permit strong conclusions, he recently offered a general summary of the state of the art. Pure psychotherapy (with minimal use of drugs) may be best suited for treating mild disorders.

Psychotherapy does not alone appear to be an effective treatment for the symptoms of schizophrenia, manic-depressive psychosis, autism, alcoholism, or drug abuse. Further, psychotherapy has not yet been shown to be particularly effective in the treatment of severe obsessive-compulsive behaviors in adults or in the treatment of children with hyperactivity, anxiety, depressive problems or learning disabilities. The disorders with which psychotherapy may be particularly useful are anxiety states—fears and phobias for example—and some nonpsychotic forms of depression.

Parloff is far less specific about noxious therapies, but he says that bad results turn up when the therapist fails to adapt to the personality of the client, for example, demanding too much or too little emotional involvement.

Parloff strongly feels the need for standardization of research and training methods. More than once he has complained about the "dogma eat dogma" existence which his colleagues lead. He has appealed to the profession to break down the walls of specialization and forge common terms, goals, and measures of achievement. Because there has been so little cooperation in the past, expert knowledge about psychotherapy is spread very far and very thin. While it is possible to assure nonresearchers that "psychotherapy has shown some evidence of potency," Parloff wrote recently, "our research has not yet been designed or conducted in a manner that can provide truly responsive answers to their questions."

Thus, one of the nation's best informed followers of psychotherapy research concluded with a shrug: "The best I can say after years of sniffing about in the morass of outcome literature is that in my optimistic moods I am confident that there's a pony in there somewhere."

A more narrowly focused review published recently by Yale psychologist Myrna Weissman suggests that it ought to be possible to conduct research in a way that permits generalizations covering several types of therapy. Weissman looked at the results of 17 clinical trials in which depressed patients were treated on a short-term basis with psychotherapy, antidepressant drugs, and a combination of drugs and therapy. Five types of psychotherapy were studied: interpersonal, group, marital, behavioral, and cognitive therapy. Weissman says the scientific quality of the studies was high, even though the therapists did not use standardized terms for diagnosing the illness or measuring changes in the patients. Procedural manuals were used by only the cognitive, interpersonal, and behavioral therapists.

Nevertheless, Weissman concludes, there were enough controls to make the tests credible and comparable. In all cases the patients receiving psychotherapy alone fared better than those receiving no treatment, and in the case of cognitive

## The Business of Science

The human gene for interferon, the body's natural antiviral compound, has apparently been isolated and cloned by scientists working for Biogen, a predominantly European company specializing in the commercial application of gene splicing.

The work was publicized at a 16 January press conference held in Boston by Charles Weissman of the University of Zurich and Walter Gilbert of Harvard, both members of Biogen's scientific advisory board.

A large share of Biogen is owned by the International Nickel Company (Inco) of Toronto. A significant but smaller share is held by the pharmaceutical company Schering-Plough.

What was the consequence, intended or otherwise, of the interferon press conference?

According to the Washington *Post* of 17 January, "In the words yesterday of Dr. Walter Gilbert of Harvard University, one of the world's leading molecular biologists, the new substance might 'knock out' some important virus diseases, as well as attacking cancer."

The stock market report of the same newspaper took the story a step further in its issue the following day: "Schering-Plough, the volume leader on turnover of better than 128 million shares, climbed $3^5/_8$ to $37^1/_2$, and Inco picked up $1^1/_2$ to $28^7/_8$. "The companies hold interests in Biogen S.A. . . ."

—NICHOLAS WADE


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therapy, patients did better with therapy alone than with drugs alone. The last finding, she says, needs confirmation. In general, the most effective approaches were those in which both drugs and therapy were used. Like Parloff, Weissman thinks it would be a boon to have more standardized manuals of practice. Few schools of therapy do.

The most ambitious attempt to conduct a clinical trial of psychotherapy is just getting under way now at NIMH. It exists at present only as a proposal which must clear two peer review panels before it wins funding. Designed by the NIMH staff, it would cost about $1 million and provide for research, at half a dozen centers, on two types of psychotherapy in treating depression on an outpatient basis. One type, interpersonal therapy, is the creation of Weissman and Gerald Klerman, head of the Alcohol, Drug Abuse, and Mental Health Administration. The other, cognitive therapy, was created by Aaron Beck at the University of Pennsylvania.

**The evidence is strong that people suffering from nonpsychotic depression may be helped.**

Although the designer of the test at NIMH was reluctant to discuss details, the project is clearly intended to be the largest and most carefully controlled trial of psychotherapy ever undertaken. The pilot phase alone will take 3 years. Its chief purpose will be to discover whether it is possible to conduct a standardized test of human behavior on such a scale.

Many psychologists are uneasy about the NIMH project, partly because they fear it will siphon off research money from other worthy experiments, and partly because the results of the test will have rather narrow use. It remains to be seen whether the peer groups will go along with the plan.

The record suggests that some forms of therapy can lay an undisputed claim to efficacy in treating mental illness. The evidence is strong, for example, that people suffering from nonpsychotic depression or moderate anxieties may be helped. But beyond generalizations of that kind, little has been demonstrated in a way that satisfies the demand for hard scientific proof of effectiveness.

—ELIOT MARSHALL

## China Gets a Satellite Station

During Defense Secretary Harold Brown's recent visit to China, the Chinese Army Deputy Chief of Staff and the American entourage are reported to have joined at a banquet in some hearty toasts of "Down to earth, bottoms up." The reference was to a statement made earlier by the Chinese Vice-Premier that "China and the United States should do something in a down-to-earth way so as to defend world peace against Soviet hegemonism," such as its recent invasion of Afghanistan.

During the visit, the Defense Department announced that one of the first down-to-earth activities will be the sale to the Chinese of an American resources satellite receiving station, a facility that probably would not be sold to the Russians. Though it is being sold with safeguards against the diversion to military use of its computer and tape recording equipment, the station—as a piece of advanced technology with military potential—still represents a risk of sorts for the Americans. As such, the Defense Department's approval of the sale marks a significant liberalization of its policies toward technology trade with China (in direct contrast to the Administration's recent embargo on such trade with the Soviets).

Christopher Phillips, president of the National Council for U.S.-China trade, has indicated that although similar sales will not receive blanket approval in the future, "there will be increasing approvals on a selective basis of dual-purpose [military and civilian] technology." Already, he told *Science*, the Administration has supported sales to the Chinese of several items of potential military use, including seismic equipment for petroleum exploration that might be diverted to antisubmarine warfare; navigational equipment for a Boeing 707 that is superior to anything the Chinese had previously; and an infrared scanning system for land survey aircraft that could also prove valuable in military planes. Phillips is not a critic of these decisions (indeed, his job is to promote trade with the Chinese), and simply offers them as examples of a more liberal Administration attitude toward the Soviet's southern neighbor.

The satellite receiving station, which will cost the Chinese about $10 million, is equipped to receive direct transmissions from the LANDSAT 3 survey satellite now circling the globe, and from the LANDSAT D satellite to be launched within 2 years. Although the images taken by these satellites have a potential reconnaissance value (the LANDSAT D photographs objects as small as 75 feet in diameter), the program is run strictly for civilian use by the National Aeronautics and Space Administration. NASA will permit the station to receive transmission only when the satellite is directly over Chinese territory. And photographs from the satellites, whether of Chinese or other lands, must be made available to any country that requests them.

At present, the Chinese can purchase these photos from a data center in South Dakota, but the turnaround time is occasionally as long as 6 months; the chief advantage of owning a station is to get instant analysis. The photos are useful for estimating crop production and exploring for oil, gas, and minerals.

A Defense official notes that even though the station's computer might be useful in high-speed defense calculations, some safeguards—such as visitation rights—will be extracted in a detailed agreement to be negotiated by NASA later this month. The Chinese are said to be tough negotiators on such assurances, which is one reason the Defense Department has been less generous with approval in the past.

## Nader Assails ETS

The Educational Testing Service (ETS) of Princeton, New Jersey, has come under renewed fire from consumer advocate Ralph Nader for making unsubstantiated claims that its standardized college-level exams measure aptitude and predict success. On 14 January, Nader released a 550-page report on ETS, which contains some of the same accusations made before by his group and others (*Science*, 14 September 1979). Flanking him at a press conference were representatives of the Parent-Teachers Association, the National


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