

IMAGERY IN COGNITIVE-BEHAVIOR THERAPY: RESEARCH AND APPLICATION

*Paul Crits-Christoph
and
Jerome L. Singer*

Yale University

ABSTRACT. *This paper explores the uses of imagery within behavioral and cognitive-behavioral clinical interventions. The nature of imagery as a central human phenomenon is first examined and then recent theoretical models of the role of imagery in therapy are reviewed and evaluated critically. A trend towards broader conceptualizations of the role of imagery in treatment is highlighted. The notion of self-efficacy and its role in imagery methods is discussed. The specific kinds of imagery techniques that have been practiced, including systematic desensitization, positive imagery, covert conditioning, implosive imagery and others, are briefly described and research results bearing on their effectiveness are presented. The assessment of imagery for clinical purposes is outlined and the possibilities for enhancing imagery capabilities are explored. The paper concludes on a note of cautious optimism about the potential of imagery therapies, acknowledging the limitations of imagery. Finally, it is proposed that clinicians should adopt a "research perspective" to collect information on the effectiveness of their procedures and provide data which could be used to correct the course of therapy as needed.*

The human capacity for generating mental imagery is rapidly becoming a central part of many forms of psychotherapy and self-improvement strategies (Singer, 1974; Singer & Pope, 1978a). Some of these uses range from relaxation and pain relief to the treatment of neurosis, depression, and even cancer and hypertension. This recent proliferation of imagery techniques has spurred increased interest in the phenomenon of imagery not only for clinical use but within psychological theory and research in general. This paper will explore the role of imagery in current psychotherapy methods. The conceptual issues involved in the use of imagery and fantasy will be discussed in addition to descriptions of the clinical procedures. Empirical studies bearing on the effectiveness of the methods will also be presented.

Requests for reprints should be sent to Paul Crits-Christoph, Department of Psychology, Yale University, Box 11a Yale Station, New Haven, Connecticut 06520.

The more direct forms of intervention which have typically been called either behavioral or cognitive-behavioral treatments will be the focus of this paper. It will become obvious that the distinction between behavioral treatment versus cognitive-behavioral treatment blurs when one is concentrating on the role of imagery in these therapies, especially if one sheds the specific rationales that are placed on each technique. Therefore, a relatively wide variety of clinical uses of imagery will be considered here. Furthermore, an emphasis will be placed on theoretical positions which cut across these many uses of imagery.

THE NATURE OF IMAGERY

Before discussing the role of imagery in treatment, it is important to take a closer look at what we mean by imagery. The private experiences of imagery, fantasies, and the stream of human thought have been elusive phenomena for psychologists to measure and describe. Because of this difficulty in measurement these internal events were almost entirely ignored during the behaviorist movement which dominated American psychology from 1910 to 1960. Singer and Pope (1978a) have provided a detailed account of this bias against imagery. Ironically, it was the development of the imagery-based *behavior* therapies in the 1960s and to some extent the cognitive psychology movement in the 1970s which increased interest in the nature of imagery.

Perhaps the central theoretical question that has emerged is whether imagery is best viewed as an elaborate description consisting of private *verbal* affirmations about the world, or, on the other hand, as a unique phenomenon which allows us to reduplicate certain perceptual and sensory experiences in a manner similar to the way the stimuli were first processed. Neobehaviorists Pylyshyn (1973) and Lang (1977) have argued the former position which has been called the propositional theory of imagery. The latter position is represented by the research of cognitive psychologists Shepard and Kosslyn, among others. Shepard's research (1978) has shown the similarity between mentally rotating geometric figures under carefully controlled conditions and reporting on their characteristics when they are actually presented perceptually. Studies by Kosslyn (1980) have shown that when subjects imagine the shape and size of a rabbit's ears at different distances their reports parallel the real objects presented visually in many ways.

Although this controversy is far from resolved, it seems likely that visual images have some distinctive properties which bear more resemblance to visual percepts than they do to verbal statements. While it is certain that imagery is not an identical duplication of a perceptual or sensory experience, the similarities are strong enough for the consideration of imagery as a special type of mental process in its own right.

The tie between the imagery system and emotion is also important to recognize. This link is described in detail by Singer (1974, 1979) and has its foundations in the cognitive-affective theory of Tomkins (1962, 1963). Tomkins proposed that human beings steer themselves through their physical and social milieu by generating images or "scripts" of possible sequences of events and of the patterns of relationships between people one can expect. As one encounters each specific new situation one matches it against such prior expectancies or scripts. If an easy match is made then one feels reasonably content or experiences the emotion of joy. If there is sufficient novelty in a situation one's emotions of interest or surprise are aroused. If there is extreme novelty one reacts with fear or terror. If the strangeness persists over time and one cannot assimilate the new events (a bereavement or

desertion by a loved one) into one's previous expectancies the affects of anger or sadness may be elicited. In effect, then, the imagery system is closely tied to the information-processing and affect patterns of the individual.

IMAGERY IN THERAPY: RECENT THEORETICAL MODELS

How can using imagery in therapy contribute to behavior change? The number of theories on this issue is probably equal to the number of different methods that have been tried. Each method claims success and a specific explanation is offered. These explanations include processes such as conditioning, catharsis, modeling, unconscious unfolding, self-reinforcement, cognitive restructuring, and others. The need for more unifying theories regarding imagery has been stressed by Wilkins (1971) and Meichenbaum (1978). Some recent unifying theories coming out of more neobehavioral or cognitive-behavioral perspectives will be examined here.

One comprehensive model has been proposed recently by Meichenbaum (1978). Drawing upon his cognitive theory of behavior change, Meichenbaum (1978) uses three main psychological processes to explain why imagery-based therapies contribute to change. The first process is the sense of control that a client develops out of the monitoring and rehearsing of various images. This sense of control over images and inner thought in turn helps the client have a greater sense of control over his emotions and overt interpersonal behavior. The second process involves changing for the client the meaning of his maladaptive behavior.

Each of the many imagery therapies involves conveying a new perspective to the client which will lead to a new conceptualization of the problem. This changed meaning will be reflected in altered internal dialogue that is evident before, during, and after instances of the problem behavior. The third process in imagery treatments is the mental rehearsal of behavioral alternatives that contribute to the development of coping skills. This process has been described by other authors as "the work of worrying" (Janis, 1958), "mental practice" (Richardson, 1967), and "covert modeling" (Kazdin, 1973). Meichenbaum claims that by engaging in this mental problem-solving the occurrence of the client's own symptoms will become a reminder to use the coping skills he has learned rather than engaging in further maladaptive behaviors.

These three processes are present to different degrees in all imagery-based treatments. Singer (1974, 1979) has related the control and flexibility of imagery to the emotional control and anticipatory processes implied in Tomkins' Theory (1962) and in the elaboration of a differential emotions theory by Izard (1977).

Although Meichenbaum's (1978) theory is admittedly tentative, it appears promising as a framework for understanding the role of imagery in therapy. Certain specific predictions can be made from the model. For example, extended rehearsal of coping behaviors in imagery should be an effective technique. In fact, research by Meichenbaum (1971), Sarason (1975), and Kazdin (1973) on the distinction between coping models and mastery models in imagery treatments tends to support this aspect of Meichenbaum's theory. The emphasis of the theory, however, is on the more general processes of changing the client's belief systems and increasing the client's sense of control that are present in almost all treatments. This has the advantage of explaining why diverse treatments can all produce successful outcomes. On the other hand, an obvious criticism of Meichenbaum's position is that it seems an oversimplification of the processes involved in imagery treatments.

Perhaps, though, this type of simplification is necessary to place the burden on therapists to show why the subtleties of their own theories are essential to explain the effects of treatment.

Another recent model concerning the role of imagery in therapy has been proposed by Lang (1977) and has been applied to the treatment of fear behavior. This formulation is based on the propositional theory of imagery discussed earlier. Lang claims that images can be analyzed in terms of their stimulus propositions and their response propositions. Stimulus propositions are essentially descriptive of a scene, e.g., a black snake moving on the ground. Response propositions involve assertions about the individual's behavior in response to the stimulus. These can involve verbal responses ("I scream"), behavioral responses ("I run away"), and/or visceral responses ("my heart is pounding"). Lang states that it is the imagined response propositions which play a central role in the fear process. Treatment should accordingly involve modification of the client's imagined response propositions, i.e., the client should imagine himself behaving competently and calmly rather than in the maladaptive way he usually responds. Lang suggests that this analysis could be applied to other emotional states and problems in addition to fear.

Only a few studies have addressed the predictions made by Lang's theory. As already mentioned, the research by Shepard and Kosslyn can be taken as evidence questioning the notion that images are only propositional units. The clinical implications of the theory have been investigated in studies by Grayson and Borkovec (1978) and Crits-Christoph and Singer (Note 1). The study by Grayson and Borkovec (1978) was a one session imagery treatment of speech phobic college students. The results indicated that subjects who, after an initial stimulus scene, imagined themselves behaving in a relaxed and competent manner, had lower subjective ratings of fear to the phobic images than subjects who either imagined being anxious and incompetent or imagined themselves avoiding the phobic situations. While supportive of Lang's theory, these results have limited generality because of the brevity of treatment and the nature of the sample used. The study by Crits-Christoph and Singer was less supportive of Lang's model. In that study, phobic patients were treated by either a positive imagery method or by a mastery imagery method over twelve sessions. The positive imagery method consisted of the pairing of relaxing, positive scenes with fearful phobic scenes, and the mastery imagery method consisted of changing subjects' imagined response propositions along the lines suggested by Lang (1977). Results indicated that both treatments were equally successful compared to a no-treatment group in reducing the severity of the specific focal fear but the positive imagery treatment was more effective in reducing general levels of distress and other unwanted thoughts and behaviors. In sum, no strong evidence exists to show that the method proposed by Lang (1977) is the crucial way to produce behavior change through imagery. It seems likely, however, that the systematic analysis of imagery into its components as provided by Lang (1977) may prove to be a useful tool for asking meaningful questions about imagery as a psychotherapeutic device.

One final conceptual issue, the notion of self-efficacy, is worth considering as it relates to imagery treatments. Bandura (1977) has recently proposed from a social learning perspective that various psychotherapeutic methods produce a change by altering an individual's expectations for self-efficacy. Singer (1979) and Singer and Pope (1978b) have specifically related this concept to the imagery-based treatments. In brief, it is argued that our projections into the future involve expectations about the outcomes of certain actions we might perform. Our images

and self-verbalizations of whether we expect to successfully produce certain outcomes are especially important in determining if we will initiate certain behaviors and how long we will persist in certain efforts (Singer & Pope, 1978b). These expectations are based on our own experiences and our observations of how well others (e.g., our parents or siblings) have done in similar situations. The work by Bandura and Adams (1977) and Bandura, Adams, and Beyer (1977) documents that changes in self-efficacy are related to improvement in the treatment of fear behavior.

Imagery treatments in particular can serve to improve expectations of self-efficacy. For example, sometimes a person's lack of belief in his coping skills for dealing with certain situations may lead to strong negative affect just in imagining such situations. Some imagery methods (e.g., systematic desensitization, covert modeling) often help reduce the negative affect associated with the imagined situations and provide the person with an additional sense that they do have the coping skills if they confront such situations. It also seems likely that the repeated practice of success-oriented fantasies in an imagery based treatment would be a particularly direct way of strengthening self-efficacy expectations. In fact, a study by Kazdin (1979) has recently found that covert modeling treatments do improve the self-efficacy expectations of unassertive clients. Changes in the levels of self-efficacy were also significantly correlated with improvement on behavioral and self-report measures of assertiveness. Thus, the concept of self-efficacy cuts across many types of therapeutic interventions and may be especially relevant in explaining the effects of imagery treatments. It is to these different behavioral and cognitive-behavioral imagery procedures that we now turn.

IMAGERY IN THERAPY: EVALUATION OF SPECIFIC TECHNIQUES

Systematic Desensitization

Wolpe's (1958) technique of systematic desensitization was the first of the imagery based behavioral therapies. The popularity of this approach is probably due to its simplicity. The main components of the procedure involve only the imagination of a graded sequence of anxiety-arousing scenes while deeply relaxed. The widespread and repeated success of the method is evident not only from anecdotal reports but from many controlled outcome studies. In fact, a review of controlled outcome studies by Smith and Glass (1977) concluded that desensitization type behavior therapies produced larger average therapeutic effects than any other type of psychotherapy. The usefulness of systematic desensitization for the treatment of phobic behavior is especially well documented.

In spite of this extensive evidence supporting the effectiveness of the procedure, questions still remain as to the important ingredient in systematic desensitization. The use of an ordered anxiety hierarchy and progressive muscle relaxation have been found not to be essential for success. Kazdin and Wilcoxon (1976) have argued that nonspecific factors such as expectancy for improvement should not be ruled out as the reasons for the changes shown with the use of desensitization. Wilkins (1971), on the other hand, has found that the research literature seems to indicate that the significant ingredient of systematic desensitization and similar treatments is the use of imagery by the client. At the least, the evidence seems to indicate that the underlying theory of reciprocal inhibition proposed by Wolpe and the rela-

tionship of this approach to learning theory is highly questionable (Breger & McGaugh, 1965). Much more likely, treatment seems to work by changing the private anticipations, self-communications, and images that the client holds with respect to the critical situations for which treatment has been sought (Singer & Pope, 1978b).

Positive Imagery

An imagery approach that appears to have a wide variety of uses is positive imagery (Singer, 1974). This procedure, also called emotive imagery, involves the use of highly pleasurable, relaxing images to counteract anxiety. These positive scenes (typically nature scenes) can be used to reduce anxiety in real life confrontations or through the pairing of the scenes with anxiety-arousing images. The latter approach has been reported by Singer (1974) and Lazarus and Abramovitz (1962) with the systematic desensitization treatment of phobias. The recently completed study by Crits-Christoph and Singer (Note 1) discussed earlier, documents the usefulness of this type of imagery not only in reducing the amount of phobic anxiety but also in reducing general levels of distress and unwanted thoughts. Other uses of positive imagery include reducing childbirth anxiety (Horan, 1973), relieving the symptoms of peptic ulcer patients (Chappell & Stevenson, 1936), reducing laboratory-produced pain (Greene & Reyher, 1972), and helping to alleviate feelings of depression in severely depressed patients (Schultz, 1978).

The psychophysiological effects of imaging positive scenes have been documented by Schwartz, Fair, Mandel, and Klerman (1976) who found that a unique pattern of facial muscle responses is produced by positive images in comparison to sad or angry images, and by Crits-Christoph and Singer (Note 1) who found that sharp drops in forehead muscle tension occur when clients shift from fearful to positive scenes. These results indicate that the clinical use of positive scenes involves more than simply teaching clients how to keep their mind off the problem of concern, but rather the physiological concomitants of the affect aroused by the images play an important role. The special quality of the relaxation that can be achieved by such images may have a carry-over effect on the anxiety-arousing images or situations. Crits-Christoph and Singer (Note 1) found that, indeed, physiological response to phobic images was reduced after the repeated pairing of these images with positive scenes. Such an interpretation of the role of positive imagery is consistent with the relationship of imagery and affect discussed by Singer (1974, 1979) and postulated by Tomkins (1962, 1963).

Covert Conditioning

Several different procedures fall under the label of covert conditioning, most of them developed by Cautela (1967). These techniques were derived from extensions of operant learning principles and include covert sensitization (Cautela, 1967), covert reinforcement (Cautela, 1970a), covert negative reinforcement (Cautela, 1970b), covert extinction (Cautela, 1971b), covert response cost (Cautela, 1976), and covert modeling (Cautela, Note 2).

Covert sensitization involves the pairing of extremely unpleasant images with scenes in which one engages in undesirable behavior. For example, a problem drinker might imagine he is about to take a drink of alcohol and then imagine that he vomits as he puts the drink to his mouth. This procedure has been applied

relatively successfully to the treatment of sexual deviations (Barlow, Leitenberg, & Agras, 1969), alcoholism (Ashem & Donner, 1968), compulsive behavior (Cautela, 1966), and smoking (Cautela, 1970c).

Covert reinforcement procedures involve the use of positive, pleasant images as a reinforcement to increase certain behaviors. A client who has deficits in social skills, for example, might imagine himself going to a party and engaging in various social behaviors. Each time the client exhibits a desirable behavior in the imagery, the therapist instructs the client to imagine the pleasant scene to reinforce the behavior. Escape from an aversive situation can also be used as the reinforcer, in which case the technique of covert negative reinforcement is being used.

The method of covert extinction relies upon imagining that the reinforcing stimulus which maintains the maladaptive behavior does not occur. With drug abusers this would involve imagining that the drug high does not come after injection. In using covert response cost, the client is instructed to imagine the response to be reduced followed by the imaginary loss of a reinforcer, e.g., "imagine you are about to take a drink, now imagine that your brand new car has just been demolished." Most of the research on the above techniques consist of case reports and consequently their relative usefulness compared to other techniques remains untested.

The final method of covert conditioning, covert modeling, has generated the greatest amount of interest. This procedure is derived from the modeling or vicarious learning literature, especially the work of Bandura (1970). However, rather than actually observing a model, a client imagines a model performing the behavior that the client wishes to develop. A series of progressively more demanding situations might be used in treatment.

Several case reports and analogue fear treatment studies have indicated the potential of this technique for some purposes. More convincing evidence of the clinical usefulness of covert modeling comes from a series of studies by Kazdin (1974, 1975, 1976, 1979). These studies have shown that covert modeling can be effective for the treatment of unassertive behavior in a clinical population. Covert modeling was found to be superior to imagining scenes without the modeling component and to no treatment control groups. Various parameters of the covert modeling imagery scenes have also been manipulated. Treatment appears to be enhanced by increasing the similarity between the imagined model and the client (Kazdin, 1974), by the use of several different models across sessions instead of the same model (Kazdin, 1976), by imagining positive consequences following the model's behavior (Kazdin, 1975), and by allowing clients to elaborate on their modeling images rather than limiting the context of the images (Kazdin, 1979).

Although these covert conditioning techniques appear promising, two important questions can be raised concerning their clinical use. First, the efficacy of most of these procedures has not been rigorously tested in a clinical setting. As mentioned, most studies involve single cases or analogue samples. The work of Kazdin moves in this direction. However, no controlled comparisons have been made between covert modeling and other viable clinical treatments. Secondly, the theoretical relationship of covert conditioning to learning theory is questionable. Studies on covert reinforcement have indicated that results are similar whether subjects imagine the reinforcement before or after the target response, or whether the reinforcer is omitted entirely (Blanchard & Draper, 1973; Hurley, 1976; Ladouceur, 1974; Marshall, Boutilier, & Minnes, 1974). Research on covert sensitization has similarly found that the aversive scenes can be imagined before the behavior to be suppressed

and still be effective (Ashem & Donner, 1966), and that positive or aversive scenes are equally effective in suppressing behavior (Foreyt & Hagan, 1973). These and other studies are not consistent with the learning theory explanations. Kazdin (1977) has stated that alternative conceptual models for covert conditioning techniques need to be posed and tested.

Implosive Imagery

The technique of implosive imagery, or flooding, was introduced by Stampfl and Levis (1967). This procedure consists of rapid, prolonged approach to a phobic situation in imagery. The patient is supposed to experience stress and anxiety without the relief usually provided by avoiding or escaping the situation. The assumption of the method is that anxiety will gradually diminish, much as in an extinction procedure. Thus, this approach also has its foundations in learning theory. An analogous procedure is *in vivo* flooding, where the exposure is a real confrontation to the public stimulus.

Some clinical success has been reported with implosive imagery. Whether this type of imagery has anything unique to offer is uncertain, however. Reviews of the experimental literature by Baum (1970) and Morganstern (1973) have questioned the therapeutic promise of the method. One study found that a considerable reduction in specific phobic behavior can be obtained by the use of phobia irrelevant fear images in implosive therapy (Watson & Marks, 1971). There is also evidence that the amount of arousal during implosive imagery does not affect outcome as would be predicted by Stampfl (see Mathews, Johnston, Shaw, & Gelder, 1974). Wolpe (1969) has pointed to the potential harmful effects of emotional flooding. It is clear that further research is needed to show the value and the limitations of implosive imagery.

Other Methods

A variety of other imagery procedures have been used in therapy. Most of these have not been widely researched or used clinically and, consequently, will only be briefly described here.

Imagery is one component of Meichenbaum's (1974) "stress inoculation" technique. This procedure uses self-instruction and imagination of alternative successful coping behavior to help a person get through stressful situations and develop an effective coping strategy. Turk's (Note 3) research on the use of images and other cognitive techniques as mechanisms for tolerating laboratory-produced pain has contributed to our knowledge of how imagery may be effective in combating stress. The emphasis is placed upon the individual's ability to use imagery to distract oneself and to generate very strong experiences that might be capable of psychophysiological counteraction.

Perhaps the most innovative and provocative use of imagery is the work of Simonton, Simonton, and Creighton (1978) in the treatment of cancer. The Simontons instruct cancer patients to imagine white blood cells or other adaptive psychological forces fighting the cancer cells. This is one part of a comprehensive program that also includes relaxation, physical exercise, counseling, and medical treatment. Achterberg and Lawlis (1977) have reported that the Simontons' imagery program leads to a better outcome and better predictability of disease course with cancer patients than does a treatment consisting of only chemotherapy and verbal

counseling. These research results have far-reaching implications. We must, however, regard them with extreme caution as they have not yet been subjected to thorough scrutiny by critical reviewers nor have the results been replicated by independent investigators.

Of course, the more behavioral and cognitive-behavioral methods discussed in this paper are only some of the ways imagery has been used in therapy. More traditional forms of psychotherapy such as psychodynamically-oriented therapy are making increased use of imagery. The work of Reyher (1963) on his method of "emergent uncovering therapy" is an example. Europeans have also been at the forefront of imagery therapy as indicated by the methods of Desoille (1965) (*le reve eveille dirige*) and Leuner (1978) (guided affective imagery). Ahsen's (1965) procedure of eidetic psychotherapy represents even another imagery based approach to treatment. The reader is referred to the volume by Singer and Pope (1978) for an extended discussion of these techniques.

DEVELOPING IMAGERY FOR USE IN THERAPY

Assessment of Imagery and Fantasy Capacities

If one chooses to employ an imagery based technique in therapy, the problem of measuring clients' imagery becomes crucial. Unfortunately, the assessment of imagery for clinical purposes is, except in the indirect form of projective techniques, rather undeveloped. Tower and Singer (1980), in a review of the literature on the measurement of imagery for clinical purposes, found very few measures that could identify and predict imagery capabilities. In spite of the inherent problems in this area, therapists and clinical researchers should realize the importance of imagery assessment for obtaining maximal results in imagery based treatment.

Tower and Singer (1980) have described how the measurement of imagery has several diagnostic uses. First, imagery can be used to help discover the nature of a client's problem, as with the traditional uses of projective tests. Second, assessment can provide information on the imaginal resources a client has available for doing the work of the treatment. Almost all of the procedures discussed in this paper rely heavily on the client's imagery skills: his or her capacity for generating vivid images and controlling the images produced. Indeed, a study by Dyckman and Cowan (1978) documents that imagery vividness scores obtained during treatment highly correlate with the outcome of systematic desensitization therapy with snake phobics. Third, it may be of interest to the therapist to assess a person's general style of processing information or responding. Some people, for example, are primarily verbalizers while others tend to be more visualizers in their cognitive styles (Richardson, 1977).

What types of instruments are currently available for measuring imagery capabilities? A variety of self-report measures attempt to assess imagery under the assumption that a person's subjective judgements concerning his or her own experience are of primary interest. These include the Betts Questionnaire Upon Mental Imagery (Betts, 1909), Gordon's Test of Visual Imagery Control (Gordon, 1949), the Vividness of Visual Imagery Questionnaire (Marks, 1973), the Imagery Survey Schedule (Tondo & Cautela, 1974), the Imagery Research Questionnaire (Lane, 1977), the Personal Imagery Questionnaire (McSweeney & Baer, Note 4), the Survey of Mental Imagery (Switras, Note 5), the Individual Differences Question-

naire (Paivio, 1971), the Verbalizer-Visualizer Questionnaire (Richardson, 1977), the Creative Imagination Scale (Wilson & Barber, Note 6), and the Imaginal Process Inventory (Singer & Antrobus, 1972). For a detailed discussion of these tests, see White, Sheehan, and Ashton (1977) and Tower and Singer (1980).

Several more direct behavioral measures can also be used for assessment. Various problem solving tasks such as solving spatial tasks, visual memory tasks, and word recognition tasks are frequently used in this regard. The correlations between these methods and the self-report measures mentioned above are typically low, however. Consequently, one's choice of behavioral versus self-report measures depends primarily on the clinical purpose of the assessment.

Two other methods, those of projective techniques and physiological recordings, can also be used as measures of imagery. Projective techniques are mostly used to obtain information about the meaning of images to a particular person. The Shorr Imagery Test (Shorr, 1974) in particular stresses imagery, but the Thematic Apperception Test (Murray, 1943), and the Rorschach "M" response (Rorschach, 1942) are the most widely used for these purposes. Physiological measures which have been used include breathing regularity (Golla & Antonovich, 1929), facial muscle patterns (Schwartz, Fair, Mandel, & Klerman, 1976), laterality of eye movements (Bakan, 1969; Rodin & Singer, 1977; Rosenberg, 1980), and brain waves (Schwartz, 1975; Short, 1953; Slatter, 1960; and many others). The work of Schwartz and his colleagues has extended beyond simple indices of physiological responses towards examining patterns of physiological processes associated with imagery and emotions.

For many clinicians these assessment procedures may seem too time consuming or costly for use with their clients. Physiological measurement, however, need not be restricted to laboratory experiments with sophisticated equipment. Many processes, such as lateral eye movements and facial muscle tension, can be observed by eye. Heart rate can be monitored by taking a person's pulse. Other types of measures, such as simple ratings of vividness and affective responses to images, can also be obtained easily in a clinical situation. It is our view that therapists should recognize their responsibility for obtaining such information regarding the imagery process. This data can then be used to adjust the treatment as necessary for each client to obtain maximum results.

Enhancing Imagery

The imagery measurement techniques just described typically yield a wide range of individual differences in imagery abilities. There are many people who report little or no capacity for generating vivid images. What should be done with such people in therapy? In the extreme case, clients who show very poor imagery skills can be treated with alternative methods. Attempts can also be made to enhance the imagery of some clients. Relaxation techniques are one way to potentially make images more vivid. Mathews (1971) has concluded that this is in fact the probable function of relaxation training in systematic desensitization. By screening out external information and limiting task demands, one can, through relaxation, enhance the occurrence of imagery and increase the likelihood that a more intense affective response is generated (Singer, 1974).

Lang (1979) describes a training program he has developed within the context of his propositional analysis of imagery. Therapists read prepared scripts to subjects who are then asked to image the scene suggested by the script and report the details

of what they actually imagined. The therapist reinforces all statements by the subject which indicate that the subject imagined what the therapist wanted. Data presented by Lang (1979) indicate that training in imagining response propositions in particular tends to produce larger psychophysiology effects to fear imagery. Such training results in more concordance between self report and physiological indices of fear during phobic imagery.

Instructing clients to practice imagery at home and to attend to their spontaneous fantasies and daydreams can also enhance their imagery skills. Crits-Christoph and Singer (Note 1) found that during imagery treatments for phobias, ratings of vividness of imagery increased with repeated practice of each new hierarchy scene. Therapists should be aware of these practice effects and also realize that clients often need considerable time to bring into focus a vivid image.

Imagery training workshops are beginning to spring up for the purpose of helping persons who report that they lack imagery capabilities. The possibility of systematically training people in imagery may have much broader implications than the clinical applications described here. At present the excessive claims of some of these workshops must be regarded with skepticism. Controlled studies of imagery training effectiveness remain to be carried out.

SUMMARY AND CONCLUSIONS

There is a growing body of evidence indicating the clinical usefulness of imagery techniques in therapy. It is somewhat ironic that many of these methods have developed out of the behavioral perspective traditionally confined to the study of overt behavior. The systematic and detailed analysis of the behaviorists, however, has led to an extensive research literature on imagery. What has become increasingly clear is that the original conceptualizations of imagery-based treatments are probably inadequate. Broader theories are beginning to emerge that challenge some long held beliefs of clinicians who use these methods. The relationship of imagery to other cognitive variables and the affect system in particular is highlighted in these newer theories and models.

Careful empirical investigation is needed to document the effectiveness and mechanisms of imagery treatments. Research should also be directed at developing new methods for assessing imagery, identifying those individuals who are more or less capable of different degrees of imagery, and developing procedures for enhancing imagery skills. We suggest that clinicians should adopt a similar "research perspective" in their own work. By doing so they could not only collect information on the effectiveness of their procedures, but additionally provide themselves with data on the process of treatment from beginning to end which could be used to correct the course of therapy as needed.

In closing, we view the potential of imagery therapies optimistically, yet one must also acknowledge the limitations of imagery. Several studies have shown that in vivo desensitization and modeling treatments are superior to imagery therapies for some types of problems. From a practical standpoint it is often difficult for the therapist to accompany a client to the many social settings in which fears or impulsive behaviors emerge. One must work therefore with the patient's own images of such settings and with the system of plans and private scripts which make up the human stream of consciousness (Pope & Singer, 1978). Imagery and fantasy play a crucial role in many of the dilemmas of life. The new approaches to imagery assessment, training, and therapy are beginning to confront in a more systematic

fashion the structural properties and components of this complex system and may therefore open important new methods for exploring and modifying this central but elusive facet of human experience and self-expression.

REFERENCES NOTES

1. Crits-Christoph P., & Singer, J. L. *Positive Imagery versus coping imagery in the treatment of phobic behavior*. Unpublished pre-dissertation research. Yale University, 1980.
2. Cautela, J. R. *Covert modeling*. Paper presented to the Association for Advancement of Behavior Therapy, Washington, D.C. 1971.
3. Turk, D. *A multimodal skills training approach to the control of experimentally produced pain*. Unpublished Doctoral Dissertation. University of Waterloo, 1977.
4. McSweeney, A. J. & Baer, P. *The Personal Imagery Questionnaire*. Unpublished manuscript, 1976.
5. Switras, J. E. *Survey of mental imagery*. Unpublished manuscript, 1975.
6. Wilson, S. C., & Barber, T. Y. *The Creative Imagination Scale: Applications to clinical and experimental hypnosis*. Medfield, Mass: Medfield Foundation, 1976.

REFERENCES

- Achterberg, J., & Lawlis, G. F. Psychological factors and blood chemistries as disease outcome predictors for cancer patients. *Multivariate Experimental Clinical Research*, 1977, **3**, 107–122.
- Ahsen, A. *Eidetic psychotherapy: A short introduction*. Lahore: Nai Matboat, 1965.
- Ashem, B., & Donner, L. Covert sensitization with alcoholics: A controlled replication. *Behavior Research and Therapy*, 1968, **6**, 7–12.
- Bakan, P. Hypnotizability, laterality of eye movements and functional brain asymmetry. *Perceptual and Motor Skills*, 1969, **28**, 927–932.
- Bandura, A. Modeling theory. In W.S. Sakhasian (Ed.), *Psychology of learning: Systems, models, and theories*. Chicago: Markham, 1970.
- Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 1977, **84**, 191–215.
- Bandura, A., & Adams, N. E. Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research*, 1977, **1**, 287–310.
- Bandura, A., Adams, N. E., & Beyer, J. Cognitive processes mediating behavioral change. *Journal of Personality and Social Psychology*, 1977, **35**, 125–139.
- Barlow, D. H., Leitenberg, H., & Agras, W. S. Experimental control of sexual deviation through manipulation of the noxious scene in covert sensitization. *Journal of Abnormal Psychology*, 1969, **74**, 569–601.
- Baum, M. Extinction of avoidance responding through response prevention (flooding). *Psychological Bulletin*, 1970, **74**, 276–284.
- Betts, G. H. The distribution and functions of mental imagery. *Teacher's College Columbia University Contributions to Education*, 1909, No. 26, 1–99. (Monograph)
- Blanchard, E. B., & Draper, D. O. Treatment of a rodent phobia by covert reinforcement: A single subject experiment. *Behavior Therapy*, 1973, **4**, 559–564.
- Breger, L., & McGaugh, J. L. Critique and reformulation of "learning-theory" approaches to psychotherapy and neurosis. *Psychological Bulletin*, 1965, **63**, 338–358.
- Cautela, J. R. Treatment of compulsive behavior by covert sensitization. *Psychological Record*, 1966, **16**, 33–41.
- Cautela, J. R. Covert sensitization. *Psychological Reports*, 1967, **20**, 459–468.
- Cautela, J. R. Covert reinforcement. *Behavior Therapy*, **1**, 33–50, 1970. (a)
- Cautela, J. R. Covert negative reinforcement. *Behavior Therapy and Experimental Psychiatry*, 1970, **1**, 272–278. (b)
- Cautela, J. R. Treatment of smoking by covert sensitization. *Psychological Reports*, 1970, **26**, 415–420. (c)
- Cautela, J. R. Covert conditioning. In A. Jacobs & L. B. Sachs (Eds.), *The psychology of private events: Perspectives on covert response systems*. New York: Academic Press, 1971. (a)
- Cautela, J. R. Covert extinction. *Behavior Therapy*, 1971, **2**, 192–200. (b)

- Cautela, J. R. Covert response cost. *Psychotherapy: Theory, Research, and Practice*, 1976, **13**, 397–404.
- Chappell, M. N., & Stevenson, T. I. Group psychological training in some organic conditions. *Mental Hygiene*, 1936, **20**, 588–597.
- Desoille, R. *The directed daydream*. New York: Psychosynthesis Research Fund, 1965.
- Dyckman, J. M., & Cowan, P. A. Imaging vividness and the outcome of in vivo and imagined scene desensitization. *Journal of Consulting and Clinical Psychology*, 1978, **46**, 1155–1156.
- Foreyt, J. P., & Hagan, R. L. Covert sensitization: Conditioning or suggestion? *Journal of Abnormal Psychology*, 1973, **82**, 17–23.
- Golla, F. L., & Antonovich S. The respiratory rhythm in its relation to the mechanism of thought. *Brain*, 1929, **52**, 491.
- Gordon, R. An investigation into some of the factors that favour the formation of stereotyped images. *British Journal of Psychology*, 1949, **39**, 156–167.
- Grayson, J. B., & Borkovec, T. D. The effects of expectancy and imagined responses to phobic stimuli on fear reduction. *Cognitive Therapy and Research*, 1978, **2**, 13–27.
- Greene, R. J., & Reyher, J. Pain tolerance in hypnotic analgesic and imagination states. *Journal of Abnormal Psychology*, 1972, **79**, 29–38.
- Horan, J. J. "In vivo" emotive imagery: A technique for reducing childbirth anxiety and discomfort. *Psychological Reports*, 1973, **32**, 1328.
- Hurley, A. D. Covert reinforcement: The contribution of the reinforcing stimulus to treatment outcome. *Behavior Therapy*, 1976, **7**, 347–378.
- Izard, C. E. *Human emotions*. New York: Plenum Press, 1977.
- Janis, I. *Psychological stress*. New York: John Wiley & Sons, 1958.
- Kazdin, A. E. Covert modeling and the reduction of avoidance behavior. *Journal of Abnormal Psychology*, 1973, **81**, 87–95.
- Kazdin, A. E. The effects of model identity and fear-relevant similarity on covert modeling. *Behavior Therapy*, 1974, **5**, 624–635.
- Kazdin, A. E. Covert modeling, imagery assessment, and assertive behavior. *Journal of Consulting and Clinical Psychology*, 1975, **43**, 716–724.
- Kazdin, A. E. Effects of covert modeling, multiple models, and model reinforcement on assertive behavior. *Behavior Therapy*, 1976, **7**, 211–222.
- Kazdin, A. E. Research issues on covert conditioning. *Cognitive Therapy and Research*, 1977, **1**, 45–48.
- Kazdin, A. E. Imagery elaboration and self-efficacy in the covert modeling treatment of unassertive behavior. *Journal of Consulting and Clinical Psychology*, 1979, **47**, 725–733.
- Kazdin, A., & Wilcoxon, L. Systematic desensitization and nonspecific treatment effects: A methodological evaluation. *Psychological Bulletin*, 1976, **83**, 729–758.
- Kosslyn, S. *Image and mind*. Hillsdale, N.J.: Erlbaum, 1980.
- Landouceur, R. An experimental test of the learning paradigm of covert positive reinforcement in deconditioning anxiety. *Journal of Behavior Therapy and Experimental Psychiatry*, 1974, **5**, 3–6.
- Lane, J. B. Problems of assessment of vividness and control of imagery. *Perceptual and Motor Skills*, 1977, **45**, 363–368.
- Lang, P. Imagery in Therapy: An information processing analysis of fear. *Behavior Therapy*, 1977, **8**, 862–886.
- Lang, P. A bio-informational theory of emotional imagery. *Psychophysiology*, 1979, **6**, 495–512.
- Lazarus, A. A., & Abramovitz, A. The use of "emotive imagery" in the treatment of children's phobias. *Journal of Mental Science*, 1962, **108**, 191–195.
- Leuner, H. Basic principles and therapeutic efficacy of Guided Affective Imagery. In J. L. Singer & K. S. Pope (Eds.), *The power of human imagination*. New York: Plenum Press, 1978.
- Marks, D. F. Visual imagery differences in the recall of pictures. *British Journal of Psychology*, 1973, **64**, 17–24.
- Marshall, W. L., Boutilier, J., & Minnes, P. The modification of phobic behavior by covert reinforcement. *Behavior Therapy*, 1974, **5**, 469–480.
- Mathews, A. M. Psychophysiological approaches to the investigation of desensitization and allied procedures. *Psychological Bulletin*, 1971, **76**, 73–91.
- Mathews, A. M., Johnston, D. W., Shaw, P. M., & Gelder, M. G. Process variables and the prediction of outcome in behaviour therapy. *British Journal of Psychiatry*, 1974, **125**, 256–264.
- Meichenbaum, D. Examination of model characteristics in reducing avoidance behavior. *Journal of Personality and Social Psychology*, 1971, **17**, 298–307.
- Meichenbaum, D. *Cognitive behavior modification*. Morristown, New Jersey: General Learning Press, 1974.
- Meichenbaum, D. Why does using imagery in psychotherapy lead to change? In Singer J. L. & Pope, K. S. (Eds.) *The power of human imagination*. New York: Plenum Press, 1978.

- Morganstern, K. P. Implosive therapy and flooding procedures. *Psychological Bulletin*, 1973, **79**, 318–334.
- Murray, H. A. *Thematic Apperception Test Manual*. Cambridge, Mass: Harvard University Press, 1943.
- Paivio, A. *Imagery and verbal processes*. New York: Holt, 1971.
- Pope, K. S., & Singer, J. L. *The stream of consciousness: scientific investigations into the flow of human experience*. New York: Plenum Press, 1978.
- Pylyshyn, Z. W. What the mind's eye tells the mind's brain: A critique of mental imagery. *Psychological Bulletin*, 1973, **80**, 1–24.
- Reyher, J. Free imagery: An uncovering procedure. *Journal of Clinical Psychology*, 1963, **19**, 454, 459.
- Richardson, A. Mental Practice: A review and discussion. Part I. *Research Quarterly*, 1967, **38**, 95–107.
- Richardson, A. Verbalizer-visualizer: A cognitive style dimension. *Journal of Mental Imagery*, 1977, **1**, 109–126.
- Rodin, J., & Singer, J. L. Laterality of eye shifts, reflective thought and obesity. *Journal of Personality*, 1977, **44**, 594–610.
- Rorschach, H. *Psychodiagnostics*. Switzerland: Huber, 1942.
- Rosenberg, B. Mental task instructions and optokinetic nystagmus to the left and right. *Journal of Experimental Psychology: Human Perception and Performance*, 1980, **6**, 459–472.
- Sarason, I. Text anxiety and the self-disclosing coping model. *Journal of Consulting and Clinical Psychology*, 1975, **43**, 148–153.
- Schultz, K. D. Imagery and the control of depression. In J. L. Singer & K. S. Pope (Eds.), *The power of human imagination*. New York: Plenum Press, 1978.
- Schwartz, G. E. Biofeedback, self-regulation and the patterning of physiological processes. *American Scientist*, 1975, **63**, 314–342.
- Schwartz, G. E., Fair, P. L., Mandel, M. R., & Klerman, G. L. Facial muscle patterning to affective imagery in depressed and non-depressed subjects. *Science*, 1976, **192**, 489–491.
- Shepard, R. N. The mental image. *American Psychologist*, 1978, **33**, 125–137.
- Shorr, J. E. *Shorr Imagery Test*. Los Angeles: Institute for Psycho-Imagination Therapy, 1974.
- Short, P. L. An objective study of mental imagery. *British Journal of Psychology*, 1953, **44**, 38–51.
- Simonton, O. C., Simonton, S., & Creighton, J. *Getting well again*. Los Angeles: J. P. Tarcher, 1978.
- Singer, J. L. *Imagery and daydream methods in psychotherapy and behavior modification*. New York: Academic Press, 1974.
- Singer, J. L. Imagery and affect in psychotherapy: Elaborating private scripts and generating contexts. In A. A. Sheikh & J. T. Shaffer (Eds.) *The potential of fantasy and imagination*, New York: Brandon House, 1979.
- Singer, J. L. & Antrobus, J. S. Daydreams, imaginal processes, and personality: A normative study. In P. W. Sheehan (Ed.), *The function and nature of imagery*, New York: Academic Press, 1972.
- Singer, J. L. and Pope, K. S. The Use of Imagery and Fantasy Techniques in Psychotherapy. In Singer, J. L. & Pope, K. S. (Eds.) *The power of human imagination*. New York: Plenum, 1978. (a)
- Singer, J. L. & Pope, K. S. (Eds.), *The power of human imagination*. New York: Plenum Press, 1978. (b)
- Slatter, K. H. Alpha rhythm and mental imagery. *EEG Clinical Neurophysiology*, 1960, **12**, 851–859.
- Smith, M. L., & Glass, G. V. Meta-analysis of psychotherapy outcome studies. *American Psychologist*, 1977, **32**, 752–760.
- Stampfl, T. G., & Levis, D. J. Essentials of implosion therapy: A learning-theory-based psychodynamic behavioral therapy. *Journal of Abnormal Psychology*, 1967, **72**, 496–503.
- Tomkins, S. *Affect, imagery, and consciousness*. (Vol. 1). New York: Springer, 1962.
- Tomkins, S. *Affect imagery and consciousness*, (Vol. 2). New York: Springer, 1963.
- Tondo, T. R., & Cautela, J. R. Assessment of imagery in covert reinforcement. *Psychological Reports*, 1974, **34**, 1271–1280.
- Tower, R. B., & Singer, J. L. The measurement of imagery: How can it be clinically useful? In P. C. Kendall & S. Hollon (Eds.), *Cognitive-behavioral interventions: Assessment methods*. New York: Academic Press, 1980.
- Watson, J. P., & Marks, I. M. Relevant and irrelevant fear in flooding—A crossover study of phobic patients. *Behavior Therapy*, 1971, **2**, 275–293.
- White, K. D., Sheehan, P. W., & Ashton, R. Imagery assessment: A survey of self-report measures. *Journal of Mental Imagery*, 1977, **1**, 145, 170.
- Wilkins, W. Desensitization: Social and cognitive factors underlying the effectiveness of Wolpe's procedure. *Psychological Bulletin*, 1971, **76**, 311–317.
- Wolpe, J. *Psychotherapy by reciprocal inhibition*. Stanford: Stanford University Press, 1958.
- Wolpe, J. *The practice of behavior therapy*. New York: Pergamon Press, 1969.