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Assessment and Cognitive-Behavioral Interventions[1]

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The use of methods for assessing cognitions is crucial for the development of cognitive-behavioral therapies. Seven approaches to assessing cognitions are described and discussed: in vivo thought sampling, and the assessment of imagery, cognitive style, beliefs, attributions, self-efficacy expectations, and self-statements. Emphasis is placed upon a description of the assessment methods, a consideration of their role in the validation of cognitive explanations of emotional disorders, and a call for the verification of the effects of cognitive treatments upon cognitions. Discussion also considers the overlap among the various approaches to cognitive assessment and the question of the accessibility of cognitive information.

It should not be surprising for a clinical psychologist to read that advances in therapeutic intervention are directly related to prior advances in the accuracy of assessment. Yet, perhaps because this statement sounds so much like the platitude "and further research is needed in this area," it is often overlooked or disregarded. What may be surprising, however, is that we, as cognitive-behavioral therapists, may be repeating this error of omission. The upshot is that while our efforts to develop cognitive-behavioral treatments are indeed worthwhile, similar efforts within assessment should not be bypassed.

The value of detailed assessment has been documented throughout the behavioral literature (e.g., Ciminero, Calhoun, & Adams, 1977). The utility of behavioral assessment procedures results, in part, from their direct involvement in treatment evaluation and in research. That is, most assessments that are conducted behaviorally rely heavily upon the observation and recording of data that pertain directly to treatment and treatment eval-

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uation. An in vivo procedure such as observational coding and an analogue method such as role playing produce data that can be readily identified as relevant to therapy outcome. A third behavioral assessment method entails the use of self-report inventories that include situational specificity. In this manner, behavioral assessment seeks to identify how the respondent would actually behave in a given situation. When both in vivo and role-playing assessments are not available, situation-specific paper-and-pencil inventories are useful in acquiring assessment data that are as close to the criterion as possible. The history of behavioral assessment is a valuable source of information for developing cognitive-behavioral assessment methods. Similarly, the psychometric principles of objective assessment should not be overlooked. Indeed, though it may be only one of the problems faced by cognitive-behavior therapists (Mahoney, 1977), the assessment of cognitions as a part of therapy and therapy research should be a current concern of workers in this area.

The approaches to cognitive assessment currently being employed can reasonably be organized into seven categories: in vivo thought sampling, assessment of imagery, assessment of cognitive style, assessment of beliefs, assessment of attributions, assessment of self-efficacy expectations, and assessment of self-statements. These approaches are not entirely independent (a self-statement can be an attribution) but nevertheless focus, in greater or lesser detail, on aspects of the clients' cognitive processes.

The importance of assessing cognitions is twofold. First, one must be able to assess both functional and dysfunctional cognitions in order to *investigate their role in the development of disorders or the process of coping.* For instance, a theoretical position that hypothesizes detrimental effects of irrational beliefs requires an assessment instrument that can be used to measure irrational beliefs and to study their relationship to specific disorders. Also, one would want to study the absence of such beliefs in adaptively coping individuals. Thus cognitive assessment instruments are valuable tools for the convergent and discriminant validation of the role of cognitive variables in clinical disorders.

Second, one must assess cognition in order to confirm the effects of treatment procedures upon cognitions. The *confirmation of treatment mechanisms* is necessary to corroborate that the therapy that had been designed to alter cognitions actually did change the targeted cognitions, as indicated in pretreatment-to-posttreatment comparisons. For example, a therapy researcher provides cognitive therapy for depression (e.g., Beck) and reports a significant reduction in depressive symptoms. In order to *confirm* the cognitive treatment mechanism, cognitive assessment instruments should be administered pre- and posttherapy and examined for desired treatment effects.

IN VIVO THOUGHT SAMPLING

In 1879 Francis Galton published a description of an experimental method for studying cognitions. In that study, Galton used one subject—himself. While walking along Pall Mall, he would notice some object and use it as a stimulus to which he would free-associate. Periodically he would focus his attention on the things he had been thinking about and record them. He was then able to describe characteristics of the associations (such as amount of repetition) and the types of cognitions that occurred (he identified "histrionic" or primarily verbal ones, imagery, and abstractions). In developing this method, Galton hoped to show "how the whole of these associated ideas, though they are for the most part exceedingly fleeting and obscure, and barely cross the threshold of our consciousness, may be seized, dragged into daylight, and recorded" (in Crovitz, 1970, p. 24).

As Crovitz (1970) has pointed out, there was one flaw in Sir Francis's method. His trials were neither random nor independent. Thus there was no way to be sure that he was recording a random assortment of associations rather than a biased sample of memories. It could be that he accidentally focused his attention on his cognitions in response to a small subset of discriminative covert stimuli. If thoughts about the weather, for example, were always (accidentally) discriminative cues for the thought "Observe what I'm ruminating about," he would be led to conclude from his data that he spent an inordinate amount of time ruminating about the weather. In fact, Galton's major conclusion was that thoughts tend to recur.

Sir Francis's error could perhaps have been corrected. If he had been signaled by something independent of his own cognitive system to notice and record his thoughts at a given moment, it would have been safer to conclude that he was indeed recording a truly random collection of cognitions.

One such approach has been taken by Klinger (1978). Klinger has made use of a portable "beeper," which is carried by (trained) subjects and which goes off at varied intervals. When it goes off, the subjects record their thoughts and/or rate their inner experience on a variety of variables using a Thought Sampling Questionnaire. The variables in this questionnaire include ratings of the duration of the latest and previous thought segments, vividness, controllability of the segment, and degree of trust in their memory of the segment. In lieu of or in addition to questionnaires, diaries, or other written records, it would also be possible to have subjects or clients carry tape recorders so that they might immediately dictate what they were thinking when the beeper sounded. As Klinger points out, however, the use of ratings aids in overcoming obstacles, such as problems in memory and the idiosyncratic quality of the data that individual subjects generate.

An advantage of this technique is that it guarantees that the client's thoughts are sampled "on the spot." It thus provides the therapist with a more valid way to assess the person's "current concerns." Klinger (1978) defines a current concern as "the state of an organism between the time it becomes committed to pursuing a goal and the time it either gains the goal or abandons the pursuit . . . a separate current concern corresponding to each such goal" (p. 249). Klinger, Barta, and Mahoney (1976) and Barta, Klinger, and Mahoney (Note 1) have used in vivo thought sampling to demonstrate that people spend more time attending to cues and thinking about things that are related to their current concerns.

There are some direct applications of these research procedures to psychopathology. Since this is an on-the-spot sampling procedure, it would be possible to use it to gather data that are less based on a person's *recollections* of his or her thoughts and current concerns. This quality is an advantage in that it makes it possible to compare the person's global impression of his/her thinking with systematically gathered, nonretrospective data about his/her thoughts. For example, an anxious patient's statements in the clinic about having "spent all weekend worrying about what to say at the wedding" could be compared with his/her data actually gathered on those days (which might, for example, indicate that the person actually spent only 3% of his/her time thinking about those things). This method would also make it possible to compare the cognitions of persons with different problems. For instance, how would the randomly collected cognitions of depressives differ from those of anxious clients? From those of normal clients? Though there is currently an absence of systematic research along these lines, such efforts would likely prove valuable.

It should also be noted that in vivo thought sampling can be used in conjunction with laboratory assessment procedures. Subjects exposed to different levels of independent variables could be required, in addition to other dependent measures, to report on thoughts occurring during the actual experimental procedures. Such sampling of cognitive data is strengthened by the greater control that would be possible over the situations likely to elicit certain thoughts.

Another promising use for in vivo thought sampling is as an outcome measure in psychotherapy research. The beeper might be carried by subjects before therapy begins in order to gather baseline data, and the effects of the therapeutic intervention upon these thoughts might then be assessed, both during treatment and posttreatment, to evaluate changes. This procedure would also permit a therapist to isolate particular activities or situations that are related to varying amounts of the maladaptive or troublesome cognitions, thus augmenting the presently available behavioral assessment methods. Also, when treatment strategies focus directly upon changing a

client's cognitive events, the in vivo thought-sampling technique can provide data to confirm the cognitive aspects of the treatment. There is presently an absence of this type of pretreatment-posttreatment cognitive data.

The in vivo thought-sampling technique appears promising for laboratory research, analogue studies, and clinical outcome evaluations. In order to avoid the difficulties of unstructured data, it is recommended that subjects be required to report their thoughts by responding to objective data sheets (questionnaires) designed to quantify their current thoughts.

ASSESSING IMAGERY[3]

One of the earliest measures of imagery was developed by Betts (1909). His "Questionnaire Upon Mental Imagery" consisted of 150 written descriptions that were designed to elicit imagery in seven modalities: visual, auditory, cutaneous, gustatory, kinesthetic, olfactory, and organic. Subjects attempted to image each stimulus and were then asked to rate on a 1-to-7 scale how vivid the image was. More recently, Sheehan (1967) developed a shorter form of Betts's questionnaire by selecting 35 items (5 from each modality) that met the criteria of loading highly on the main component for that modality, not showing a sex difference, and having similar means and standard deviations. The advantage of this measure over Betts's is its brevity. Sheehan reports that it takes only about 10 minutes to administer and that it reliably differentiates people based on their capacity to image.

Sheehan (1966) has also described a laboratory procedure by which one might assess the accuracy and vividness of imagery. Subjects are first shown a simple stimulus, for instance a yellow or red square projected onto a screen. The subjects' task is to try to reconstruct, based on their visual image of the original stimulus, an identical one on the screen. The dependent variables are the size, clarity, and luminance of the image contracted by the subjects. Sheehan correlated these accuracy measures with

[3]Also of importance, Singer (1975) describes a questionnaire method for the study of daydreams. The method involves presenting subjects with a list of a large number of daydreams (e.g., "I plan to increase my income in the next year" or "I picture an atomic bombing of the town I live in," etc.; p. 53) to which subjects indicate whether they have ever had such daydreams as well as when, how often, and under what circumstances. This method allows for collection of a large number of subjects under standardized conditions. In addition, the responses can be scored a number of ways, yielding information on the prevalence of various "themes" in the daydreams or identifying the determinants and/or consequences of daydreaming.

subjects' self-reports of the vividness of their mental imagery and found five out of six to be significantly positive.

In order to have any confidence in the role of imagery, it would first be important to demonstrate convergent and discriminant validity. Several studies have been conducted in an effort to determine the relationship among various measures of imagery. Rimm and Bottrell (1969) administered four measures of imagery vividness to subjects and determined the correlations among the measures. They used (a) self-ratings of the vividness of images; (b) a test of pair-associate learning, where subjects were instructed to use images as mnemonic aids (based on the findings that imagery leads to better performance on paired-associate learning tasks; see Paivio & Madigan, 1968); (c) changes in overt responses associated with imagining fearful and neutral scenes; and (d) a test of the ability to recall the location of objects in a picture (Picture Memory). Rimm and Bottrell found significant relationships between the self-rating and the response-change ratings associated with imaging a fearful scene, between the fearful-scene response and Picture Memory, and between Picture Memory and the paired-associate learning. But other correlations were not significant. A similar study was conducted by Danaher and Thoresen (1972), and their inconsistent findings led them to suggest that there was a need for further evaluation of the procedures used to assess imagery vividness.

Similar results were reported by Rehm (1973). In Rehm's study, two memory tasks (pair-associate and recognition memory, in which 12 photos must be identified from a group of 45 others) did not significantly correlate either with each other or with any self-ratings of the vividness of imagery. On the other hand, most of the correlations between the different self-ratings of imagery vividness were significant. In view of these findings, Rehm concluded that "a clearly behavioral rating with convergent relationship to self-ratings has not yet been identified" (p. 269).

More recently, Hiscock (1978) examined several self-report measures of imagery: (a) Betts's (Sheehan's version) Questionnaire Upon Mental Imagery, (b) Paivio's Individual Differences Questionnaire (Paivio, 1971), and (c) Gordon's Scale of Imagery Control (Gordon, 1949). In two studies, the Betts and Paivio questionnaires were moderately correlated (i.e., .45-.50), but correlations involving the Gordon scale were inconsistent.

In summary, the studies of the assessment of imagery indicate that while certain procedures result in theoretically reasonable results, the different measures are lacking in convergent and discriminant validation.

The therapeutic relevance of clients' imaginal behavior has been assessed in a series of studies by Kazdin (1974, 1975). This program of research focused on the evaluation of the therapeutic application of covert modeling. In these procedures, imagery has been assessed by having clients

respond to an imagined-scene information sheet or to narrate aloud the imagined scene. The data sheet and the narrative of the imagined scene are compared to the scene that was presented by the therapist. Methodologically, these procedures allow the researcher to check the client's adherence to the imagery instructions. Specifically, the client's self-reported cognitions are checked against the experimenter's imagery instructions to confirm the therapy procedures. Had the results indicated a significant improvement in assertive behavior, with the imagery data indicating that clients did not follow instructions, information about the unimportance of the imagery would have been unveiled. In general, without such a confirmation of the cognitive aspects of the therapy procedures, cognitive explanations of behavior change may be unfounded.

ASSESSING COGNITIVE STYLE

Cognitive style has been studied in several different fashions. In one, Witkin (1965) describes a field-dependent/field-independent dimension that is measured by a tilting-room/tilting-chair test, a rod-and-frame test, or an embedded-figures test. Though there is evidence for relatively meaningful individual differences, the field-dependent/field-independent aspect of cognitive style was not recommended as an outcome measure in psychotherapy research due to the limited understanding of the processes to which the measures relate (Scott, 1975).

Another aspect of cognitive style, cognitive tempo, has received a modicum of attention from psychotherapy researchers. The cognitive tempo dimension of impulsivity-reflectivity (Kagan, 1966) is assessed by a Matching Familiar Figures (MFF) test. The MFF is a 12-item, match-to-sample task in which the subject is shown a single picture of a familiar object and is instructed to select from an array of six variants the one picture that is identical to the stimulus picture. The examiner records latency to first response and number of response errors. Subjects who have a high error rate and short latencies are impulsive, while the longer-latency/fewer-errors subjects are considered reflective.

Studies of cognitive tempo, as assessed by the MFF, have focused almost without exception on the performance of children. Although several reviews of the data on the MFF (Messer, 1976; Finch & Kendall, 1979) have suggested that children's cognitive tempo is meaningfully related to behavior, the instrument has not been without criticism (Ault, Mitchell, & Hartman, 1976; Block, Block, & Harrington, 1974). Ault et al. (1976) point to some methodological dilemmas that occur in the developmental study of reflective and impulsive children as categorized by the MFF. While these

dilemmas do exist for certain types of research, the use of the MFF to identify impulsives (using norms) with random assignment to treatment groups and subsequent comparison of treatment effects is not problematic.

The data of Block et al. (1974) suggest that the latency measure is not as personalogically relevant as the error score and that use of both measures may be misleading. These conclusions are based upon responses from preschoolers and are not necessarily relevant to school-aged or older subjects.

Cognitive tempo has been assessed in a number of cognitive/cognitive-behavioral interventions (e.g., Meichenbaum & Goodman, 1971; Kendall & Finch, 1976, 1978). The impulsive subjects (children) are assigned to different treatments and pretreatment-posttreatment (follow-up) comparisons of MFF latency, and error scores are examined for the effects of treatment. Increased latencies and reduced errors are evidence of treatment efficacy.

The assessment of cognitive tempo via the MFF can be used as a valid indicant of cognitive change, but the MFF has not been used to *confirm* the effects of therapy procedures upon the contents of cognitions. Treatments designed to alter cognitive tempo have, for example, focused upon verbal self-instructional training (e.g., Kendall & Finch, in press; Meichenbaum, 1977). Changes in MFF, given an appropriate design, can be attributable to the treatment and can be evidence of treatment efficacy, but the MFF does not provide a direct assessment of the use of self-instructions. Rather, prior to acceptance of the self-instruction as the "active" component, this line of research would require a direct assessment devised to confirm the increased use of self-instructions in the treated children.

In an attempt to assess the changes in the verbal behavior of treated and untreated impulsive children, Kendall and Finch (Note 2) examined tape recordings of children's pretreatment, posttreatment, and follow-up performances on the MFF. Significant differences were found on several measures of coded verbal behaviors such as, for example, in the amount of off-task verbal behavior (treated subjects evidencing less off-task verbal behavior). However, the taping of spoken verbal behavior is an insufficient confirmation of the treatment. Children that did not speak during MFF performance could be exhibiting complete internalization of language or, equally plausibly, complete failure to utilize self-instructions. Though MFF performance and taped verbal behavior provide valuable information regarding treatment efficacy, neither confirms the treatment mechanism. Assessment of the degree to which self-instruction was used and the relationship of self-instructional use to degree of improvement would be necessary to confirm the efficacy of the self-instructional procedures.

The MFF can be a useful instrument in therapy-outcome research for the assessment of cognitive tempo. An adult form of the MFF exists, yet the use of the MFF has been restricted largely to children.

ASSESSING BELIEFS

Jones (1968) devised a 100-item Irrational Beliefs Test (IBT) that is based on Ellis's (1962) position that a major factor in people's experiencing of emotional problems is their holding of certain "irrational beliefs" (e.g., the belief that it is important that everyone love them). Subjects respond on a 5-point scale according to how strongly they agree or disagree with each of the statements, and they receive a score on each of 10 scales (e.g., Demand for Approval, High Self-Expectation) as well as a total score.

In studying the role of irrational beliefs in the emotional disorders, both Goldfried and Sobocinski (1975) and Nelson (1977) reported significant relationships between irrational beliefs and paper-and-pencil measures of anxiety and depression, respectively. Goldfried and Sobocinski, going one step further, found that subjects holding the irrational belief of an overriding need for social approval reported more anxiety when imagining themselves being rejected by others.

The notion of treating emotional disorders via a focus on modifying irrational beliefs is reasonably supported by the relationship of beliefs to scores on measures of emotionality. However, for the confirmation of treatment mechanisms, subjects receiving treatment would have to show initially high pretreatment and subsequently lowered posttreatment levels of irrational beliefs. Such changes were reported in a study by Trexler and Karst (1972).

Of precautionary interest, changes on the IBT due to psychotherapy may be spuriously deflated by a lack of client self-knowledge. That is, an initial IBT assessment is hampered by clients' lack of knowledge of the beliefs that they hold. Subjects may fail to endorse items that their behavior clearly betrays their belief in. Therapy-change scores therefore might not accurately reflect changes due to therapy.

ASSESSING ATTRIBUTIONS

Attribution has been defined as "a process whereby the individual 'explains' his world" (Valins & Nisbett, 1972, p. 137). Valins and Nisbett have described how such explanations can play a role in the development of psychological disorders. As a general rule, people attempt to validate their explanations of the world by seeking the consensus of others. Under certain conditions, however, they avoid doing so. For instance, if they feel that some aspect of their own behavior is "bad" or "shameful," they will actually avoid seeking the opinions of others (e.g., Sarnoff & Zimbardo, 1961; Schachter, 1959). As Valins and Nisbett point out, this failure to seek consensual validation can lead to debilitating feelings of inadequacy,

shame, and abnormality. Further, it can lead to a person's developing incorrect or even delusional explanations of reality.

There have been a variety of methods to assess attributions. Attributions have been assessed by asking subjects to respond to questionnaire items (e.g., Intellectual Achievement Responsibility (IAR) scale, Crandall, Katkowsky, & Crandall, 1965), by interviewing subjects (children) and having them place attribution cards (statements of effort, teacher bias, or luck) into boxes labeled "It makes a lot of difference" to "It doesn't make any difference" (e.g., Bugental, Whalen, & Henken, 1977), or by having subjects assign portions of the reasons for an outcome (parts of a given 100%) to such categories as luck, skill, effort, or the task (e.g., Frieze & Weiner, 1971).

Considering attributions in the broad sense, many studies can be cited to illustrate the role of attributional processes in certain psychopathological conditions. Studies of the tendencies of individuals to attribute event outcomes to luck, fate, chance, or powerful others (external locus of control) versus their own personal, internal locus of control (Lefcourt, 1966; Phares, 1976; Rotter, 1966) consistently report higher levels of anxiety in external subjects (e.g., Watson, 1967; Kendall, Finch, & Montgomery, 1978).

Depressed individuals have been found to attribute positive outcomes to external and negative outcomes to internal sources (Rizley, 1978). Helpless children took less responsibility for the outcomes of their behavior and tended to place less emphasis on the role of effort in determining success and failure (Dweck & Reppucci, 1973). Indeed, Abramson, Seligman, and Teasdale (1978) have reformulated the helplessness model of depression to incorporate subjects' attributional processes. Their analysis suggests that depressed adults tend to make attributions of negative outcomes that are more internal, stable over time, and global. In a sense, depressed individuals are negative trait theorists.

Therapeutic procedures have been found to produce different outcomes depending upon the attributional style of the subjects (Bugental et al., 1977). Furthermore, therapy studies that target client attributions may provide the client with accurate information about the courses and meanings of their own and others' behavior. Dweck (1975) reported that training "helpless" children to take responsibility for failure and to attribute it to lack of effort resulted in maintenance and improvement in performance. Specifically, this procedure taught different attributions to the misattributing subjects and *confirmed* the treatment mechanism by readministering the attribution measure and testing for pre-post changes. As confirmation, the subjects in the attribution-retraining condition showed a significant increase in their choice of effort attributions. The use of the reported measurement of cognitive factors allows for what might be labeled a manipulation check in other research areas.

Though there is a lack of consistency in the methods used to assess attributional styles, subjects' attributions are valuable cognitive data that should be systematically examined within clinical research. Self-statement inventories (discussed below) could be readily adopted to assess attributions and may prove to be considerably useful in this respect.

ASSESSING SELF-EFFICACY

Recently, Bandura (1977) proposed a unifying theory to account for changes in behavior by positing a common underlying cognitive process. According to Bandura, the many behavioral approaches to changing behavior are effective to the degree that they change a person's "self-efficacy" expectations, or expectations of personal effectiveness. As defined by Bandura, "an efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcomes" (p. 193). The expectations of self-efficacy are said to be effective because they "affect both initiation and persistence of coping behavior" (p. 193).

Self-efficacy expectations are measured by means of a brief questionnaire. In a study by Bandura and Adams (1977) involving snake phobias, the questionnaire had subjects state whether or not they had expected to be able to perform each of a list of behaviors involving snakes (e.g., "look at snake through a wire cover," "touch snake with bare hand"). They then had to rate, on a 10- to 100-point scale how confident they were that they could complete the task listed. The responses could be scored for level (how many tasks subjects felt they could perform) and strength (based on the average confidence score per task) of efficacy expectations.

The assessment of self-efficacy can be applied to a wide variety of research topics in addition to phobic behavior. Indeed, the methodology is applicable to any number of behaviors, though a specific self-efficacy instrument would need to be devised for each behavior under investigation. Although self-efficacy per se has not been studied in relation to distinct psychopathological conditions, efficacy expectations have been found to be powerful predictors of nonavoidant performance in the fear-producing situation (Bandura, 1977).

The assessment of efficacy expectations is valuable in the investigation of the role of cognitive processes in behavior change. Efficacy expectations, however, have not yet been the target of treatment and therefore have not been used to confirm therapy procedures. That is, treatment has yet to focus specifically upon the improvement of self-efficacy using subsequent analysis of pre-post changes in self-efficacy as evidence that improved behavior was the result of changes in self-efficacy. Nevertheless, efficacy

expectations should be used as dependent measures in therapy-outcome studies.

ASSESSING SELF-STATEMENTS

With the increase of interest in the things people say to themselves (Meichenbaum, 1975), self-statements are becoming an important focus for assessment. Cautela and Upper (1976) report on a Thought Stopping Survey Schedule (TSSS). It is part of a larger "Behavioral Inventory Battery," which is a standardized battery of self-report inventories that are applicable to a fairly wide variety of situations and persons. The TSSS contains 51 items involving thoughts, feelings, or images that the subject rates according to how frequently he/she has experienced them. The 51 statements were chosen because of their presumed causal role in depression, anxiety, and other kinds of maladaptive behavior. The person rates on a 5-point scale how frequently he/she has each thought, from "not at all" to "very much." The thoughts that are presented include "I feel lonely" and "I am going crazy." This inventory deals with a variety of cognitive events in a global fashion, and investigations of the specific role of cognitive activities in distinct psychopathologies would first require additional psychometric research (e.g., factor analysis). This instrument is, at present, only promising.

Schwartz and Gottman (1976) studied the specific role of self-statements in the ability of individuals to perform assertive behaviors. These researchers developed an Assertiveness Self-Statements Test (ASST), which they had subjects complete after taking part in an assertiveness situation. Half the items were considered "adaptive," in that saying them should make it easier for a person to refuse an unreasonable request. The other half were maladaptive, since rehearsing them should make it harder to refuse such a request. The inventory's direction of scoring and selection of items was based on consensual validation by a group of college students. Items that 90% or more of the students agreed would positively or negatively facilitate assertive behavior constituted the ASST.

Schwartz and Gottman (1976) found that subjects did not differ with respect to knowledge of assertive responses, but low-assertive subjects had significantly more negative and fewer positive self-statements than moderate- and high-assertive subjects. High-assertive subjects as a group reported very few negative self-statements and many positive self-statements. Low-assertive subjects, on the other hand, had moderate amounts of both negative and positive statements. There was a greater difference between the groups on the negative than on the positive self-statements. Schwartz and Gottman (1976) concluded that the "low-assertive subjects . . . can be char-

acterized by an 'internal dialogue of conflict' in which positive and negative self-statements compete against each other" (p. 919).

The therapeutic effects of self-instructional training (Meichenbaum, 1975) have been demonstrated in several studies (e.g., Meichenbaum, 1977). Specifically, treatments that utilize self-instructional procedures have been shown to be effective in the reduction of anxiety (Kendall, Williams, Pechacek, Graham, Shisslak, & Herzoff, 1979), control of pain (Meichenbaum & Turk, 1976), and management of anger (Novaco, 1975). Self-instructional training has also been effectively applied to impulsive children (Meichenbaum & Goodman, 1971; Kendall & Finch, 1976, 1978), aggressive children (Camp, Blom, Herbert, & Van Doormenck, 1977), and hyperactive children (Douglas, Parry, Marston, & Garson, 1976). Although studies have examined the therapeutic merits of self-instructional procedures, few have sought to confirm the treatment mechanisms. Again, confirmation would require that the self-statements (self-reported self-statements) be known to be involved in the client's problematic condition and that while they are present at pretreatment they are eliminated following successful therapy.

One approach to the question of confirmation will be illustrated by the Kendall et al. (1979) study. The Self-Statements Inventory (SSI) developed by Kendall et al. was used to assess the degree to which subjects engaged in thoughts that would be expected to help or hinder coping behavior among cardiac patients undergoing a catheterization procedure. In the Kendall et al. study, a 20-item Self-Statement Inventory (SSI) was employed. This inventory was developed by (a) gathering numerous examples of situationally appropriate self-statements of both a positive and a negative tone, (b) establishing consensual validation by having a sample of normal subjects indicate whether such a self-statement would help or hinder behavior in the situation, and (c) selecting a sample of consensually validated items to use in research. The final SSI consisted of 10 helpful self-statements (positive) and 10 hindering self-statements (negative). Subjects responded on a 1-to-5-scale the extent to which each thought characterized their thoughts during the catheterization. The SSI was scored for positive, negative, and positive minus negative items. The results of this study indicated that higher negative self-statement scores were related to poorer ratings of adjustment by physicians and technicians who were involved in the catheterization procedures. The positive scores were not related to ratings of adjustment during the procedure.

It should be noted that in both the Schwartz and Gottman (1976) and Kendall et al. studies, the positive and negative scales in the self-statement inventories apparently did not function in the same way. In both cases, the scores on the negative scales were more highly related to the criteria of assertiveness or adjustment than were those of the positive self-statements.

These findings suggest that negative or maladaptive cognitions, more than a paucity of positive, are important contributors to behavioral problems.[4]

An initial attempt at the confirmation of intervention procedures was reported by Kendall et al. (1979). The ability of a cognitive-behavioral and a patient-education intervention to reduce anxiety and increase ratings of adjustment was compared to attention-placebo and no-treatment controls. In the cognitive-behavioral treatment, subjects were trained in methods of coping that included a reframing of formerly anxiety-producing cues into cues for the use of coping self-statements. Although both interventions produced desirable effects (the cognitive-behavioral treatment was superior), the response of subjects to the SSI (serving as an assessment of the self-statements made by subjects during the catheterization) did not reflect a greater amount of positive self-statements for the subjects receiving the cognitive-behavioral treatment and therefore did not confirm the efficacy of the self-instructional component of the treatment procedures. The mean positive dominated SSI scores of the cognitive-behavioral subjects was the highest of the four experimental groups, but not significantly so.

Hollon and Kendall (Note 4) have developed an Automatic Thoughts Questionnaire (ATQ) to study the negative cognitions associated with depression. This 30-item self-statement inventory was developed by (a) having nearly 800 students generate "thoughts that pop into their heads" during periods of depression, (b) creating criterion groups of depressed and nondepressed subjects based upon their MMPI-Depression (D) scale and Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) scores, (c) selecting items that significantly differentiate the criterion groups, and (d) cross-validating the ATQ items on a second set of criterion groups. The resulting ATQ-30 was successfully cross-validated and appears promising as a self-statement inventory for the investigation of depressive cognitions. Future use of this instrument should focus on the depressive cognitions associated with experimental manipulations and/or therapeutic interventions.

It has been suggested in this paper that confirmation of the treatment requires changes in cognitive activity that are related to the psychopathologies. Pretreatment and posttreatment assessment is not always possible in

[4]Cacioppo, Glass, and Merluzzi (Note 3) reported that the anticipation of a discussion with an unfamiliar woman resulted in the spontaneous generation of more *negative* self-statements by high socially anxious men than low socially anxious men. These authors assessed self-statements by having subjects write their thoughts and then go back and label them positive, negative, or neutral. Judges were also employed to check the labeling of the "thoughts" that were listed. Comparisons of the validity of this open-ended approach with the more structured self-statement inventory approach are needed, yet are hampered by the absence of a validity criterion.

that some treatment situations are brief crises rather than prolonged conditions, as was the case in the catheterization "crisis" studied by Kendall et al. (1979). In such cases, subjects' self-statements may have to be related to other measures of coping or adjustment.

The importance of cognitive assessment is highlighted by the two studies employing self-statement inventories. Schwartz and Gottman provide data to indicate the specifics of the task deficiency in nonasserative behavior and correspondingly spotlight a treatment target. In the Kendall et al. paper, the results of cognitive assessment suggest that while the presence of positive cognition may not help the person to cope, an *absence* of negative statements appears related to positive adjustment. Thus, telling a person to "think positively" is not perhaps as helpful as finding out where he/she is thinking negatively and doing something about it.

Of course, considerably more research needs to be conducted before such speculations are supported. Nevertheless, self-statement inventories (devised by the procedures described above) have successfully discriminated groups of subjects in several studies. Moreover, self-statement inventories provide a psychometrically sound way to measure the relative importance of certain kinds of thinking for adaptive and maladaptive behavior, and they can be useful in the confirmation of treatment mechanisms.

CLOSING COMMENTS

The above discussion has dealt with the assessment of cognitive variables by placing them in seven semioverlapping categories. For instance, a subject may imagine an interpersonal situation, believe that he/she will behave inadequately (thus betraying a low self-efficacy expectation), attribute this expected inadequacy to a lack of interpersonal skills, and initiate an internal dialogue consisting of predominantly negative self-statements. Thought sampling could, given different formats to which the subject may respond, assess any of these cognitive events. Similarly, the self-statement inventory methodology could be designed to require the subject to report on the description of the image that was experienced, the perceived reason for a given cognition, or the frequency of certain experienced cognitions. The self-statements per se could be beliefs, attributions, or expectancies.

Although overlap may be said to exist, the observed areas of cognitive assessment do appear to form natural groupings. In vivo thought sampling and self-statement inventories can be considered *methods* for assessing cognitive phenomena. Imagery ability, cognitive tempo, and, to a lesser degree, attributional preference can be referred to as cognitive *styles* (individual differences), whereas beliefs, self-efficacy expectations, and actual self-state-

ments are more appropriately thought of as cognitive *content.* Such an organization, however, should not be considered inflexible. Indeed, Smith and Miller (1978) have pointed to the drawbacks of attempting to make distinctions between cognitive content and cognitive process, as Kiesler (1973) has also done in arguing against separating psychotherapy process from psychotherapy content. Our tentative organization does, nevertheless, highlight the types of cognitive variables that are being assessed and the methods that are being used.

Cognitive-Functional Analysis

The behavioral approach to assessment is based on the notion of a "functional analysis" of problem behaviors. The original strategy evolved from the idea that one ought to avoid the "puzzles and indoor games" (Shapiro & Ravenette, 1959, p. 296) of the traditional psychodiagnostician and focus instead on conducting miniexperiments in order to answer one's assessment questions (Shapiro, 1951; Shapiro & Ravenette, 1959). The important aspect of assessment was the discovery of the environmental antecedents and consequences of the problem behaviors. With cognitions now being considered important factors in behavioral problems and plausible targets for clinical intervention, they have also become important targets for assessment. The "cognitive-functional analysis," then, "emphasized both a task-analysis and an accompanying, psychological analysis of the cognitions (i.e., self-statements and images) that clients employ (or fail to employ) to do a task" (Meichenbaum, 1976, p. 162). Research efforts along these lines appear warranted.

Accessibility of Cognitive Processes

Theory and research presented by Nisbett and Wilson (1977) argue that people may not always have access to their cognitive processes. Nisbett and Wilson's (1977) position states that "introspective access . . . is not sufficient to produce generally correct or reliable reports" (p. 233). However, cognitive processing may not be as inaccessible as Nisbett and Wilson suggest (e.g., Smith & Miller, 1978).

The clinical relevance of the accessibility-of-cognition question concerns the likelihood of *differential accessibility.* This differential ability can exist as a function of the *type of cognitive assessment* that is being required and as the result of the presence of *distinct psychopathologies.* As stated above, beliefs may be difficult for subjects to endorse due to a lack of self-knowledge. A subject may fail to endorse a "belief" item that his/her be-

havior clearly betrays a belief in. Attributional endorsements are less difficult, but a subject with restricted verbal abilities will be hampered. In contrast, subjects are likely to have ready access (barring defensiveness) to reporting the thoughts currently on their minds (e.g., self-statements, thought sampling) or to endorse a degree of confidence in their performance abilities (efficacy-expectations). Consideration of the subject's accessibility of cognitive assessment data should guide the use of cognitive assessment instruments.

Regarding the presence of psychopathology, consider anxiety and depression. Anxiety, given the symptomatic presences of a lack of ability to concentrate and interference in short-term memory, may well handicap a subject's access to cognitive data. Depression may "distort" the material in a manner similar to the distortions of attributions (Abramson et al., 1978) and reinforcements (Nelson & Craighead, 1977) that have been reported. Also, excessively routinized/overlearned pathological behavior may be particularly inaccessible to the subject for the self-report of related cognitive processing. The *differential* accessibility of cognitive activity is an important area for clinical research.

Closing Caveat

The notion that cognitive-behavioral assessment will achieve acceptance is evident in the Bandura and Adams statement that "there exists little empirical justification for revering autonomic reactions or muscular contractions more highly than cognitive judgements . . ." (1977, p. 305). With regard to at least some measures of internal occurrences, however, reliability and validity may be difficult to assess. As Klinger (1978) points out, one cannot verify someone's report of a cognition or image, and it is even questionable whether one can record the event accurately. In the study of cognitions, then, the "validating process resides in ruling out artifacts, in replications, and, ultimately, in the usefulness of data or theory for making possible other forms of prediction and perhaps control" (Klinger, 1978, p. 227).

We doubt, however, that the process is all that simple, and certainly it will not be an error-free one. Essentially, the process is more complicated due to the covert, inaccessible nature of cognitions. The fact that they are covert means that we must rely upon some kind of transducer to produce our data, much in the same way that a plethysmograph or GSR translates unobservable and complex physiochemical occurrences into electrical signals and finally into squiggly marks on paper or an oscilloscope. In the case of cognitions, the transducer consists of anything that intervenes

between the raw cognition and the data on paper.[5] So an image, say, of short duration and sometimes minimal salience must be translated (inexactly) into language, edited (probably) for social acceptability or to fit demand characteristics, and finally spoken to the clinician or researcher. He or she must then try to understand this communication, translate it into something that has meaning for the clinician, and compare it on a variety of characteristics with similar data from other individuals. Thus the enterprise of assessing cognitions may be prone to a great deal of potential difficulty. We believe, however, that there is no way to avoid facing up to the problems involved if we are to be able to understand, develop, and confirm the efficacy of cognitive-behavioral treatments.

REFERENCE NOTES

1. Barta, S., Klinger, E., & Mahoney, T. *Personally relevant right-ear cues enhance right-handed people's cognitive processing.* Paper presented at the Psychonomic Society, Washington, D.C., November 1977.
2. Kendall, P. C., & Finch, A. J., Jr. *A cognitive-behavioral treatment for impulsivity: Analyses of verbal behavior and hyperactivity ratings.* Manuscript submitted for publication, 1978.
3. Cacioppo, J. T., Glass, C. R., & Merluzzi, T. V. *Self-statements and self-evaluations: A cognitive-response analysis of social anxiety.* Manuscript submitted for publication, 1978.
4. Hollon, S. D., & Kendall, P. C. *Cognitive self-statements in depression: Development of an automatic thoughts questionnaire.* Manuscript submitted for publication, 1978.

REFERENCES

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology,* 1978, *87,* 49-74.

Ault, R. L., Mitchell, C., & Hartman, D. P. Some methodological problems in reflection-impulsivity research. *Child Development,* 1976, *47,* 227-231.

Bandura, A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review,* 1977, *84,* 191-215.

Bandura, A., & Adams, N. Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research,* 1977, *1,* 287-310.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J. E., & Erbaugh, J. K. An inventory for measuring depression. *Archives of General Psychiatry,* 1961, *4,* 561-571.

Betts, G. H. The distribution and functions of mental imagery. *Columbia University Contributions to Education,* 1909, *26,* 1-99.

Block, J., Block, J. H., & Harrington, D. M. Some misgivings about the Matching Familiar Figures test as a measure of reflection-impulsivity. *Developmental Psychology,* 1974, *10,* 611-632.

[5]Cognitive assessment procedures have often required responses to paper-and-pencil tests. The psychometric principles associated with such objective self-report data should not be overlooked since instruments with poor psychometric properties may cloud the transducer.

Bugental, D. B., Whalen, C. K., & Henker, B. Causal attributions of hyperactive children and motivational assumptions of two behavior-change approaches: Evidence for an interactionist positon. *Child Development,* 1977, *48,* 874-884.

Camp, P., Blom, G., Herbert, A., & Van Doormenck, W. "Think aloud": A program for developing self-control in young aggressive boys. *Journal of Abnormal Child Psychology,* 1977, *5,* 157-169.

Cautela, J., & Upper, D. The Behavioral Inventory Battery: The use of self-report measures in behavioral analysis and therapy. In M. Hersen & A. Bellack (Eds.), *Behavioral assessment: A practical handbook.* New York: Pergamon, 1976.

Ciminero, A. R., Calhoun, K. S., & Adams, H. E. *Handbook of behavioral assessment.* New York: Wiley, 1977.

Crandall, V. C., Katkovsky, W., & Crandall, V. J. Children's beliefs in their own control of reinforcement in intellectual-academic achievement situations. *Child Development,* 1965, *36,* 91-109.

Crovitz, F. *Galton's walk.* New York: Harper & Row, 1970.

Danaher, B., & Thoresen, C. Imagery assessment by self-report and behavioral measures. *Behaviour Research and Therapy,* 1972, *10,* 131-138.

Douglas, V. I., Parry, P., Marston, P., & Garson, C. Assessment of a cognitive training program for hyperactive children. *Journal of Abnormal Child Psychology,* 1976, *4,* 389-410.

Dweck, C. S. The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality and Social Psychology,* 1975, *31,* 674-685.

Dweck, C. S., & Reppucci, N. D. Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology,* 1973, *25,* 109-116.

Ellis, A. *Reason and emotion in psychotherapy.* New York: Lyle Stuart, 1962.

Finch, A. J., Jr., & Kendall, P. C. Impulsivity: From research to treatment. In A. J. Finch & P. C. Kendall (Eds.), *Clinical treatment and research in child psychopathology.* New York: Spectrum Publications, 1979.

Frieze, I., & Weiner, B. Cue utilization and attributional judgments for success and failure. *Journal of Personality,* 1971, *39,* 591-605.

Goldfried, M. R., & Pomeranz, D. M. Role of assessment in behavior modification. *Psychological Reports,* 1968, *23,* 75-87.

Goldfried, M. R., & Sobocinski, D. Effect of irrational beliefs on emotional arousal. *Journal of Consulting and Clinical Psychology,* 1975, *43,* 504-510.

Gordon, R. An investigation into some of the factors that favour the formation of stereotyped images. *British Journal of Psychology,* 1949, *39,* 156-167.

Hiscock, M. Imagery assessment through self-report: What do imagery questionnaires measure? *Journal of Consulting and Clinical Psychology,* 1978, *46,* 223-230.

Jones, R. *A factored measure of Ellis' irrational belief system with personality and maladjustment correlates.* Unpublished doctoral dissertation, Texas Technological College, 1968.

Kagan, J. Reflection-impulsivity: The generality and dynamics of conceptual tempo. *Journal of Abnormal Psychology,* 1966, *71,* 17-24.

Kazdin, A. E. Covert modeling, model similarity, and reduction of avoidance behavior. *Behavior Therapy,* 1974, *5,* 325-340.

Kazdin, A. E. Covert modeling, imagery assessment, and assertive behavior. *Journal of Consulting and Clinical Psychology,* 1975, *43,* 716-724.

Kendall, P. C., & Finch, A. J., Jr. A cognitive-behavioral treatment for impulse control: A case study. *Journal of Consulting and Clinical Psychology,* 1976, *44,* 852-857.

Kendall, P. C., & Finch, A. J., Jr. A cognitive-behavioral treatment for impulsivity: A group comparison study. *Journal of Consulting and Clinical Psychology,* 1978, *46,* 110-118.

Kendall, P. C., & Finch, A. J. Developing nonimpulsive behavior in children: Cognitive-behavioral strategies for self-control. In P. C. Kendall & S. D. Hollon (Eds.), *Cognitive-behavioral interventions: Theory, research, and procedures.* New York: Academic Press, in press.

Kendall, P. C., Finch, A. J., & Montgomery, L. E. Vicarious anxiety: A systematic evaluation of a vicarious threat to self-esteem. *Journal of Consulting and Clinical Psychology,* 1978, *46,* 997-1008.

Kendall, P. C., Williams, L., Pechacek, T. F., Graham, L. G., Shisslak, C. S., & Herzoff, N. Cognitive-behavioral and patient education interventions in cardiac catheterization procedures: The Palo Alto medical psychology project. *Journal of Consulting and Clinical Psychology,* 1979, *47,* 49-58.

Kiesler, D. J. *The process of psychotherapy: Empirical foundations and systems of analysis.* Chicago: Aldine, 1973.

Klinger, E. Modes of normal conscious flow. In K. S. Pope & J. L. Singer (Eds.), *The stream of consciousness: Scientific investigations into the flow of human experience.* New York: Plenum, 1978.

Klinger, E., Barta, S., & Mahoney, T. Motivation, mood, and mental events: Patterns and implications for adaptive processes. In G. Serban (Ed.), *Psychopathology of human adaptation.* New York: Plenum, 1976.

Lefcourt, H. M. Internal versus external control of reinforcement: A review. *Psychological Bulletin,* 1966, *65,* 206-220.

Mahoney, M. J. Reflections on the cognitive-learning trend in psychotherapy. *American Psychologist,* 1977, *32,* 5-13.

Meichenbaum, D. Self-instructional methods. In F. Kanfer & A. Goldstein (Eds.), *Helping people change.* New York: Pergamon, 1975.

Meichenbaum, D. A cognitive-behavior modification approach to assessment. In M. Hersen & A. Bellack (Eds.), *Behavioral assessment: A practical handbook.* New York: Pergamon, 1976.

Meichenbaum, D. *Cognitive-behavior modification.* New York: Plenum, 1977.

Meichenbaum, D., & Goodman, J. Training impulsive children to talk to themselves: A means of developing self-control. *Journal of Abnormal Psychology,* 1971, *77,* 115-126.

Meichenbaum, D., & Turk, D. The cognitive-behavioral management of anxiety, anger and pain. In P. Davidson (Ed.), *Behavioral management of anxiety, depression and pain.* New York: Brunner/Mazel, 1976.

Messer, S. B. Reflection-impulsivity: A review. *Psychological Bulletin,* 1976, *83,* 1026-1052.

Nelson, R. E. Irrational beliefs and depression. *Journal of Consulting and Clinical Psychology,* 1977, *45,* 1190-1191.

Nelson, R. E., & Craighead, W. E. Selective recall of positive and negative feedback, self-control behavior, and depression. *Journal of Abnormal Psychology,* 1977, *86,* 379-388.

Nisbett, R. E., & Wilson, T. D. Telling more than we can know: Verbal reports on mental processes. *Psychological Review,* 1977, *84,* 231-259.

Novaco, R. W. *Anger control: The development and evaluation of an experimental treatment.* Lexington, Massachusetts: Lexington Books, 1975.

Paivio, A. *Imagery and verbal processes.* New York: Holt, 1971.

Paivio, A., & Madigan, S. Imagery and association value in paired-associate learning. *Journal of Experimental Psychology,* 1968, *76,* 35-39.

Phares, E. J. *Locus of control and personality.* Lawrencetown, New Jersey: General Learning Press, 1976.

Rehm, L. Relationship among measures of visual imagery. *Behaviour Research and Therapy,* 1973, *11,* 265-270.

Rimm, D., & Bottrell, J. Four measures of visual imagination. *Behaviour Research and Therapy,* 1969, *7,* 63-69.

Rizley, R. Depression and distortion in the attribution of causality. *Journal of Abnormal Psychology,* 1978, *87,* 32-48.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs,* 1966, *80* (1, Whole No. 609).

Sarnoff, I., & Zimbardo, P. Anxiety, fear, and social affiliation. *Journal of Abnormal and Social Psychology,* 1961, *62,* 356-363.

Schachter, S. *The psychology of affiliation.* Stanford University Press, 1959.

Schwartz, R., & Gottman, J. Toward a task analysis of assertive behavior. *Journal of Consulting and Clinical Psychology,* 1976, *44,* 910-920.

Scott, W. H. Measures of perceptual and cognitive tendencies in psychotherapy research. In I. E. Waskow & M. B. Parloff (Eds.), *Psychotherapy change measures.* Washington, D.C.: U. S. Government Printing Office, 1975.

Shapiro, M. An experimental approach to diagnostic psychological testing. *Journal of Mental Science,* 1951, *97,* 748-764.

Shapiro, M., & Ravenette, E. A preliminary experiment on paranoid delusions. *Journal of Mental Science,* 1959, *105,* 295-312.

Sheehan, P. Accuracy and vividness of visual images. *Perceptual and Motor Skills,* 1966, *23,* 391-398.

Sheehan, P. A shortened form of Betts' Questionnaire Upon Mental Imagery. *Journal of Clinical Psychology,* 1967, *23,* 386-389.

Singer, J. *The inner world of daydreaming.* New York: Harper & Row, 1975.

Smith, E. R., & Miller, F. O. Limits on perception of cognitive processes: A reply to Nisbett and Wilson. *Psychological Review,* 1978, *85,* 355-362.

Trexler, L. D., & Karst, T. O. Rational-emotive therapy, placebo, and no treatments effects on public-speaking anxiety. *Journal of Abnormal Psychology,* 1972, *79,* 60-67.

Valins, S., & Nisbett, R. Attribution processes in the development and treatment of emotional disorders. In E. Jones, D. Kanouse, H. Kelly, R. Nisbett, S. Valins, & B. Weiner (Eds.), *Attributions: Perceiving the causes of behavior.* Morristown, New Jersey: General Learning Press, 1972.

Watson, D. Relationship between locus of control and anxiety. *Journal of Personality and Social Psychology,* 1967, *6,* 91-92.

Witkin, H. A. Psychological differentiation and forms of pathology. *Journal of Abnormal Psychology,* 1965, *70,* 317-336.