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IMAGE-CA

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Introduction

The Image-CA is a projective technique much like Buck's (1948) House-Tree-Person test (see Killian, 1985) and Machover's (1949) Draw-a-Person test. According to Anastasi (1982), "the hypothesis underlying projective techniques is that the way in which the individual perceives and interprets the test material, or 'structures' the situation, will reflect fundamental aspects of his or her psychological functioning" (p. 564). Test materials serve as a screen onto which respondents project their inner thought processes, emotions, needs, motivations, and the like. With the Image-CA, the respondent is instructed to draw his or her cancer, cancer treatment, and immunological defense (the white blood cells). In the process of doing so, the patient presumably reveals attitudes regarding the course of his or her disease, effectiveness of the treatment, and attitudes regarding his or her immune capabilities. The Image-CA utilizes an objective scoring system.

Impetus for the Image-CA came from several hundred hours of listening to patient sessions and questioning patients on the manner in which they perceived their disease, immunity, and treatment. In preliminary work (Achterberg, Lawlis, Simonton, & Matthews-Simonton, 1977), batteries of psychodiagnostics in combination with blood chemistry assessment were administered to 126 patients who were incurable and had a 5% chance of 5-year survival. Psychological factors were found to be the best predictors of 2-month follow-up disease status. Imagery appeared to be the most powerful predictor. Consequently, focus was turned toward image variables and attempts were made to standardize the procedure for data collection, scoring, and interpretation (see Achterberg & Lawlis, 1978).

The sample size used in developing norms for the quantitative scoring system was scanty: (N = 58) in normative sample I and (N = 21) in normative sample II. According to Kline (1986), large samples, in the vicinity of 500 or more subjects, are recommended for creating norms, and use of stratified samples are preferable.

He goes on to state that sample size must be considered in relation to the population from which the sample is derived. "A small but representative normative sample is far superior to a large but biased sample" (p. 160). Clearly, sample sizes for normative groups I and II fall short of Kline's recommendation. Normative groups I and II are not representative of the cancer population at large, and furthermore, no attempt was made to select a random or stratified sample of subjects.

Criteria for inclusion in the study were nebulous. Normative sample I consisted of 58 adult subjects who had been diagnosed as having metastasized cancer and a 5% chance of 5-year survival. Patients were seen at the Cancer Counseling and Research Center in Fort Worth, Texas. Each patient was highly verbal and intimately familiar with relaxation, meditation, and imagery techniques. Patients had exposure to a tape for a minimum of three times daily for 2 weeks. Demographic data for normative group I are presented clearly in table format in the manual, although the demographics provided are sparse. Twenty-two males and 36 females comprised the sample; no attempt was made to select an equal number of males and females. The sample ranged in age from 20 to 61 years, and the distribution was skewed from the general population in educational attainment with a mean of 17 years. Furthermore, two separate collection methods were used during the standardization study: Some patients completed the drawings and structured interview at the time of their outpatient visit, while others completed some of the material at home.

Normative sample II consisted of 21 adult subjects treated in a medical school–affiliated county hospital. Subjects were primarily postsurgery mastectomy patients whose disease ranged from none to widespread metastasis. All were residents of Dallas County and had an annual income of less than $3,000.00. The sample was racially mixed. As with normative sample I, demographic data are presented clearly in table format in the manual; what is provided, however, is scanty. Sixty percent of the sample had a six- to ninth-grade education, 25% had a fourth- to sixth-grade education, and 15% had less than a fourth-grade education. Patients had no exposure to relaxation, meditation, or imagery. When the group was introduced to a relaxation/imagery tape, the tape used was different than the one used at the Cancer Counseling and Research Center.

The two sample groups used in developing norms for the quantitative scoring system are highly dissimilar. Cultural differences between the two groups are alluded to but not elaborated upon in the manual. Predictive criteria also differed for the two groups. In the first, the criterion was degree of tumor involvement; in the second, it was degree of functionality. With the second group, there was no long-term follow-up, the variable most predictable in the first study.

Trestman (1981) attempted to replicate and extend the data base in a doctoral dissertation. However, it is not a replication in the true sense because the normative sample is demographically different from the original data base used in the development of the Image-CA. Trestman used 48 adult cancer patients representing a more moderate group than the normative samples in the original study in terms of socioeconomic status and seriousness of disease. Nineteen patients had stage IV cancer and none were involved in formal groups utilizing relaxation and imagery procedures.

In the original study, the weighted and summed total scores, according to Ach-

terberg and Lawlis (1984), reflect what they call a "quality of disease-related imagery." This is the attitude or expectancy the patient holds regarding the disease process. The score has been shown to predict state of health 2 months post-administration. In comparison, the weighted and summed total scores of the Image-CA obtained by Trestman were not found to be predictive of concurrent or follow-up disease status. Trestman analyzed the factor structure of the Image-CA from a factor analysis after varimax rotation. Four factors were identified: 1) a vividness dimension, 2) a symbolism dimension, 3) a white blood cell factor, and 4) a cancer factor. Given the interpretable factor structure, Trestman suggested that the Image-CA is not unidimensional and that a pattern of subscores might be more meaningful than a single weighted sum as suggested in the original version.

In the original version, the three dimensions pertaining to cancer cell imagery (vividness, activity, and strength) are weaker predictors of medical history variables and blood chemistry measures than the five dimensions pertaining to white blood cell imagery (vividness, activity, number of white blood cells relative to cancer cells, size of white blood cells relative to cancer cells, and strength). Trestman (1981) identified four alternative dimensions that increase the predictive power of the cancer cell imagery with regard to medical history variables and blood chemistry measures: 1) color, 2) dangerousness, 3) strength, and 4) activity. These were based on metaphorical content gleaned from the verbal descriptions of the cancer cells. Four color categories were derived from the inclusion of a color dimension: black/red, light colors (pink, grey, white, or yellow), dark colors (dark grey), and no color or clear. Thirteen of 14 people whose disease status was categorized as good described their cancer as red or black, whereas 8 or 11 with poor health status described their cancer in lighter colors. The additional dimensions are not included in the Image-CA packet as sold.

Minning (1982) and Schneider, Smith, and Whitcher (1983) used modifications of the Image-CA to correlate blood variables with imagery to test the notion that imagery can direct functioning of the immune system. More recently, Crawford (1985) used an adaptation of the Image-CA to explore the effects of hypnosis and imagery on total T-lymphocytes, T-helpers, T-suppressors, natural killer lymphocytes, and level of salivary IgA. While these studies may provide support for the potential of imagery as a regulator of immune function, it does not appear as though they contribute to the development or refinement of the Image-CA.

Although the Image-CA has not been used with children to date, Graves (1983) devised a very similar technique and scoring system to be used with children. With her technique, respondents were asked to draw the "battle" between their cancer and their system of defense against cancer. The six dimensions, each scored on a 5-point scale, include 1) size of objects drawn for cancer and defense, 2) relative number of objects drawn for cancer and defense, 3) powerfulness of images used for cancer and defense, 4) area on the paper used for objects representing cancer and defense, 5) aggressiveness of objects drawn for cancer and defense, and 6) effectiveness of cancer and defense in battle. A score of 1, for example, indicates that the child perceives the cancer as having won the battle, while a score of 5 indicates that the child perceives his or her system of defense as overpowering the cancer. Graves's technique provides a measure of a child's understanding of the seriousness of his or her illness and a record of his or her ability

to cope. Given the similarity of this technique to the Image-CA, the latter probably could be used with children provided that the objective scoring system was standardized and validated on a representative sample of children with a diagnosis of cancer.

The Image-CA package includes a cassette tape entitled "Guided Imagery and Relaxation Exercise," a test manual, an interview record, scoring forms, and a data summary sheet. The manual provides a description of the test; its development and uses; normative data; reliability and validity information; instructions for administering, scoring, and interpreting; a transcription of the cassette tape; case histories; and illustrations of patient drawings. The Image-CA biographical/treatment data sheet covers demographics such as age, sex, marital status, type of treatment, diagnosis, current disease status, and a place to insert the Image-CA total (STEN) score for quick and convenient reference and for comparative purposes. The imagery scoring sheet is divided into four sections: cancer cells, white blood cells, treatment, and general or miscellaneous responses. The drawings and interview are scored using 5-point Likert-type scales on 14 dimensions: 1) vividness, 2) strength, and 3) activity of the cancer cells; 4) vividness, 5) activity, 6) numerosity, 7) size, and 8) strength of the white blood cells; 9) vividness and 10) effectiveness of the treatment; and 11) symbolism, 12) overall strength of imagery, 13) estimated regularity, and 14) clinical opinion as to prognosis for disease.

The 14 scale scores are weighted and summed, yielding an overall imagery score. The Image-CA interview record also is subdivided into four main sections (paralleling the imagery scoring sheet) and it includes 14 questions forming a skeletal basis for the interview procedure. Although the manual includes two example dialogues, one directed and highly structured and the second expansive, it points out that the major determinant of the amount of clinical information obtained is the skill of the administrator. The Image-CA summary data sheet is where scores for the 14 dimensions are recorded, weighted scores are computed, and two STEN conversion tables (one for use with only 13 dimensions and one for all 14) are provided.

The Image-CA requires few materials and minimal space. Material required for administration and scoring include a tape recorder, the cassette tape, training materials (8½" × 11" sheets of white paper and reproduction pencils), and the Image-CA interview record, scoring sheet, and data summary sheet. Any quiet setting with an electrical outlet, a comfortable chair or place to recline, adequate illumination, and a flat drawing surface would be adequate. During the drawing phase the examiner's participation is minimal, but it becomes more active when asking subjects to respond to the 14 skeletal questions on the structured interview sheet as well as to any additional questions that seem clinically pertinent.

Specific age limitations are not given in the manual, although it is specified that individuals with less than fourth-grade reading ability would have difficulty with the task, making the validity of the results questionable.

Detailed information with regard to precise methods and procedures for administering the test are lacking. Achterberg and Lawlis (1984) state, for example, "the manner in which this information is collected is highly contingent upon the patient involved" (p. 24). It is stated further that the manner of administration

differs depending on whether the respondent is an inpatient or outpatient, medicated or alert, ambulatory or bedridden, but the authors do not specify instructions or modifications of instructions for administering the technique under "special circumstances." The instructions are as follows:

> After the patient has listened to the guided imagery and relaxation exercise, instruct him or her to draw on separate 8½" by 11" sheets of white paper, (1) the white blood cells, (2) any treatment being received, and (3) the cancer cells, all acting inside the body. When the drawings are completed, begin the interview. (Achterberg & Lawlis, 1984, p. 25)

The manual does not specify whether it is possible to administer the Image-CA to groups. Although it might be possible to administer the drawings in this fashion, it is unlikely that the interview could be conducted in a group format because it requires variation by the clinician in order to assess most accurately the underlying meanings of the drawings. Further, the manual gives no indication as to whether it is possible to administer a shortened or abbreviated form of the test. Although it is possible to administer, score, and interpret 13 as opposed to 14 dimensions, doing so reduces the predictive power of the instrument.

A trained psychologist is not necessary to administer the separate phases of the test. The manual states that graduate training is not required, but basic interviewing skills and human sensitivity are requisites. It is not specified who can administer the Image-CA; however, a minimum of 50 hours of imagery analysis, including administration, scoring, and clinical practice, is strongly recommended.

As is true for other projective techniques like the House-Tree-Person, the time required to complete the Image-CA drawings is contingent on the patient's work pace and may vary considerably depending on his or her work style. Someone with obsessive-compulsive traits may take considerably longer to complete the task. Although not specified in the manual, the post-drawing interview conceivably could be completed in 30 to 60 minutes.

The format of administration for the Image-CA involves three phases. During the first, the patient listens to a tape recording, though it is not specified how much exposure he or she should have prior to making the drawings (listening once is probably sufficient). The tape contains specific suggestions on breathing techniques and muscular relaxation lasting approximately 30 minutes. The recording has been tested against patient reading level and appears to be valid on adults with reading capabilities as low as the fourth grade, but not lower. Where the cancer has metastasized to the brain, the patient may have difficulty processing the recorded information, making the validity of his or her responses questionable.

The guided imagery and relaxation tape includes an educational component. The patient is instructed to imagine the cancer cells, the immune system (represented by the white blood cells), and any medical treatment. It appears to be the authors' intention to utilize the tape and the educational component as a primer for the drawing task, given that the objective is to ascertain the patient's capacity to image and utilize imaging as a means of altering the course of the disease. However, if the Image-CA is to be used as a baseline measure of a patient's capacity to imagine his or her disease process and immune status, then introducing a relaxa-

tion tape with an educational component as a primer may bias an initial assessment of the patient's attitudes and expectancies. According to Achterberg and Lawlis (1984), "the new information is given to the patient which may be helpful in evoking an attitude change, such as the notion of a surveillance system, a built-in system of defense, and the natural process of healing. Finally, suggestions are provided for cooperation with medical treatment . . ." (p. 33). The tape may have potential therapeutic value, but perhaps it would be introduced more appropriately after the initial assessment, as a therapeutic intervention.

Phase II of the Image-CA instructs the patient to draw the cancer or disease, the immune system, and any treatment for the malignancy. The manual does not specify a time frame but states that, as a rule of thumb, nothing is gained by rushing the patient through the task. There appears to be no standard administration procedure.

The final phase of the Image-CA entails conducting the structured interview. The patient and examiner need access to the drawings at the time the interview is initiated, much like in the House-Tree-Person. With one group of patients with whom the Image-CA was used, respondents were given 7 minutes to talk about their imagery and the examiner made notes on the dialogue. Although the manual recommends this procedure, apparently it is not standard practice. Responses to questions are to be recorded carefully on the interview record. Using a tape recorder or transcribing the interview session is highly recommended, particularly when the interview is conducted by a novice.

Practical Applications/Uses

At the present time, practical applications of the Image-CA are largely open to question. Only one subsequent study (Trestman, 1981) has addressed its use as a diagnostic or therapeutic tool. Pelletier (cited in Trestman, 1981) states

> the significance of this research is two-fold. Evaluation of the positive and negative aspects of the patient's imagery is certainly a useful psychosocial assessment of the experience of the patient. But beyond that, there is the possible value of early intervention since the imagery seems reflective of developing disturbances. (p. 37)

In other words, Pelletier seems to be saying that evaluating positive and negative patient attitudes and expectancies is useful in understanding the patient. If it is discovered that the patient is negativistic and has a defeatist attitude, for example, early clinical intervention such as supportive psychotherapy may be possible.

Trestman (1981) suggests that one drawback of the Image-CA is the ineffective scoring procedures for cancer imagery. In the original version, white blood cell imagery is a far better predictor of physiological health status than is cancer imagery. Trestman evaluated words and sentences used by patients to describe the drawings of their cancer and white blood cells, then, as previously mentioned, he identified four new dimensions and devised an alternative scoring system for the cancer cell imagery to enhance the value of the Image-CA as a diagnostic tool.

The Image-CA was developed with the intent of creating a medium through which the cancer patient and physician can communicate more intimately about

attitudes toward the patient's medical condition, his or her immunological defense, and treatment. The patient is encouraged to become a more active participant in the rehabilitation process, and the physician is afforded an opportunity to assess emotional and cognitive components impacting the course of the disease. The Image-CA can be used to obtain baseline measures of imaginal capabilities, to assess emotional and cognitive reactions to a cancer diagnosis, and to provide a vehicle of change in therapy. The measure can be used in any number of settings—hospital, outpatient clinic, private practice, and so on.

The manual includes a section entitled "Evaluating the Imagery" that specifies what each dimension measures. Excerpts of interviews and illustrations of patient drawings are provided as examples of imagery scored high versus low on a particular dimension. No examples are given for middle-range values (e.g., 2, 3, or 4), leaving considerable leeway for subjective opinion. For some of the dimensions, the manual specifies particular qualities of the drawings or aspects of the interview that would help determine further whether a particular dimension receives a high or low score. For example, when rating dimension 5, activity of white blood cells, it is suggested that a higher rating be assigned if the activity is self-generated rather than coming from an external source (e.g., the image of a polar bear vs. that of a vacuum cleaner, which must be plugged into an external power source). These kinds of hints are scattered throughout the text but are not organized or clearly delineated in tabular form, which makes the evaluation process quite cumbersome. The manual provides case studies illustrating the relationship between types of imagery and disease outcome, but though very interesting, they are not overly useful in helping to objectify the evaluation of the imagery.

The quantitative scoring system involves several simple steps and is clearly described in the manual. Computer or machine scoring is not available nor would it be worth the expense, considering that it takes very little time to sum the weighted scale scores for the 14 dimensions. Scores for the 14 dimensions of the Image-CA are derived from the drawings and the records of dialogue from the structured interview. The imagery is evaluated across three dimensions: the disease, the body's defenses or immunity, and the treatment. A fourth set of dimensions pertains to miscellaneous items. Each dimension is rated on a 5-point scale, with 1 generally connoting weak or ineffective and 5 meaning strong or most desirable.

In order to determine an overall score, raw ratings for each of the 14 dimensions first are transformed into weighted scores, then the weighted scores are summed, and finally they are transformed into an overall standard score (STEN) for convenient comparison from one record to another. Weights are used to maximize the relative predictive power of each dimension. The manual includes tables for converting summed weighted scores to STEN scores as well as the actual computational formulas. STEN conversion tables for use with only 13 dimensions as well as with all 14 are provided. For examiners who have limited experience working with the protocols, it is recommended that the 14th dimension, "clinical judgment," be omitted, as it requires integration of the imagery, knowledge of psychodynamics, and an understanding of the emotional aspects of cancer. Achterberg and Lawlis (1984) state that "scoring the Image-CA involves a degree of subjective impression, some familiarity with the disease, and sensitivity to the

> Since, as with any other statistic, the standard error of the correlation coefficient is related to the size of the sample from which it is derived, it is essential that large samples be used to minimize this kind of sampling error. (p. 122)

Kline has looked at the standard errors of correlations with given *N*'s and feels that with 200 subjects this source of error is negligible. Although unquestionably there is sufficient evidence bearing on the reliability of the Image-CA, the sample sizes on which interrater reliability is based fall short of Kline's recommendation.

According to Nunnally (1978), for predictor tests used in basic research an interrater reliability coefficient of 0.70 or higher will suffice; in applied settings, 0.90 is the minimum that should be tolerated. In this light, the Image-CA appears to meet more closely the acceptable standards for basic research.

For normative group I, attempts were made to demonstrate concurrent and criterion-related validity by systematically relating test scores with outcome criteria, using the dimensions of the Image-CA to predict concurrent physiological health status and 2-month follow-up health status. Using an unspecified form of multiple regression, coefficients for concurrent and criterion-related validity were 0.76 and 0.78, respectively, with the clinical judgment dimension included. Unfortunately, the significance of these values were not reported.

Hayes (cited in Trestman, 1981) reports that a null hypothesis of the true *R* being equal to zero may be tested. Accordingly, Trestman made the appropriate calculations and states:

> With a sample of 58 and with 13 variables in their first regression equation, the number of degrees of freedom are 45 and 12 and the critical value of F required for these degrees of freedom at the 0.05 level is 1.97. The value of the calculated statistic for their coefficient of 0.53 is 1.47, which is not grounds for assuming a significant multi-variate relationship. The second R is 0.78 and with a sample size of 58 and with 14 variables yielding 44 and 13 degrees of freedom produced an F value of 5.25 which is significant at the 0.01 level ($F > 1.95$; $P < 0.05$). (p. 136)

By way of comparison, Trestman (1981) evaluated the utility of the Image-CA in estimating current and future disease status on a sample of 45 cancer patients. None of the 14 dimensions correlated significantly with concurrent disease status. Using 19 patients with stage IV cancer, only one correlation proved significant with regard to patient health status at 2-month follow-up. Relative size of white blood cells correlated with 2-month follow-up status, indicating that patients who saw their white blood cells as larger than their cancer cells did better at the time of follow-up.

A few additional shortcomings should be noted. Scaling of the criteria (e.g., death, evidence of new tumor growth and degenerative disease, stabilized condition, evidence of reduction in existing tumors and positive process, and evidence of complete absence of tumors or disease) used in the multiple regressions are not delineated clearly in the manual. This violates a primary standard set forth in *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1985), which specifies that "all criterion measures should be described accurately and the rationale for choosing them as relevant criteria should be made explicit" (p. 16). No rationale to support the selection of a 2-month time frame for follow-up is provided in the manual, but can be found in Achterberg et al. (1977).

As outlined previously, scores of 140 or above (using Table 9 in the manual) and 198 or above (using Table 10) are prognostic of excellent diminishment of disease. In fact, for the latter it was stated that 93% prediction was obtained for favorable prognosis. Achterberg and Lawlis (1984) appear somewhat misleading here. Without knowledge of how many of the 58 patients actually scored 198 or above, for example, it is not possible to assess how impressive the percentages reported actually are. Also, by perusing Tables 9 and 10, one might be led to assume that the percentages were somehow derived from the multiple regression analyses, when in actuality it appears they were not. In fact, there does not appear to be any evidence bearing on the validity of inferences made from Tables 9 and 10.

In the second normative study, an attempt was made to demonstrate concurrent validity. Achterberg and Lawlis report correlations of 0.37 ($p < .03$) and 0.45 ($p < .025$) with and without dimension 14 included for concurrent disease status. An adaptation of Izsak's Patient Status Form (Izsak & Medalie, 1971) was used as a criterion. The manual does not specify how this test was adapted other than by saying, "it more clearly scaled items involving medical and functional rehabilitation areas" (p. 127). Furthermore, the manual is somewhat unclear in its description of how the Patient Status Form is used and scored.

Dissimilar patient samples were used in validation studies I and II. It is unfortunate that Achterberg and Lawlis did not take advantage of having two different samples for purposes of replication and cross-validation. Use of dissimilar criteria in validation studies I and II made this prohibitive. Achterberg and Lawlis overstate the situation somewhat when saying, "the second validation study did substantiate the first in major respects" (1984, p. 130).

Correlations between the Image-CA and a number of psychological tests (the MMPI, Levinson's modification of the Locus of Control, the FIRO-B, and the Profile of Mood States) were computed. All of the dimensions of the Image-CA correlated with the various scales of the psychological tests. Imagery of cancer cells related primarily to trait scales, while imagery of white blood cells related to mood states. Apparently the authors were attempting to define or describe the dimensions by correlating them with other psychological tests. No rationale is provided for selecting the tests, nor does this appear to be a demonstration of concurrent or construct validity.

Critique

The Image-CA is certainly a pioneer in its field. Few instruments as innovative and specifically tailored have been devised since its conception nearly 10 years ago. The Image-CA serves as an excellent vehicle to promote communication between patient and physician, which is so often lacking, and to uncover unspoken attitudes and beliefs that may not be unearthed through a standard interview.

As a projective instrument, the Image-CA has many innovative applications because patients will respond differently, making use of the stimuli in their own creative way. Qualitative analysis of the Image-CA entails deciphering underlying dynamics of patient drawings and interview content; however, evidence of validity for use of the Image-CA in this fashion has not been established. The relative

ease with which the Image-CA can be administered and the few required materials makes it a desirable instrument. However, the recommended 50 administrations of the instrument in order to acquire sufficient familiarity and skill to use it may be a greater investment in time than the average clinician is willing to expend.

The psychometric properties of the Image-CA generally fall short of today's standards. However, just as potentially life-saving pharmaceutical agents often are shelved because of a lack of interest, prematurely terminated study, or lack of financial incentive, it would be similarly unfortunate if the Image-CA were relegated to a similar "shelf." If further researched, revised, and refined in terms of its psychometric properties, conceivably there could be a place for it on every clinician's desk.

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