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IMAGE-SP

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Introduction

The Image-SP is a "pain drawing" technique, initially used to help document symptoms in patients admitted to the Problem Back Treatment Center at Rancho Los Amigos Hospital in Downey, California. Over time it became apparent that such drawings had the potential to forecast information about patients' psychological status.

In treating recalcitrant pain problems, it is useful to have an instrument that has the predictive power to differentiate good from poor treatment responders. In preliminary work, Ransford, Cairns, and Mooney (1976) attempted to predict patients scoring high (scale score > 70) versus low (scale score < 70) on the Hypochondriasis and Hysteria scales based on an affective pain score derived from a pain drawing. Out of 109 patients studied, Ransford et al. were able to predict in 97 cases which patients scored high and which scored low on the two MMPI scales. Over the course of 7 years, Mooney and colleagues Lawlis, McCoy, and Selby utilized the pain drawing in their work with pain patients, and as a result the drawing has been revised and a scoring system devised.

The Image-SP manual does not describe the standardization samples adequately in terms of social status, geographical area, age, or sex; in addition demographics are not provided. In one study cited in Achterberg and Lawlis (1984), subjects are described solely as low-back-pain patients who were classified according to their MMPI profiles (normals, whose scale elevations fell within the normative range, vs. abnormals, those who fell outside the normative range). In the other studies cited in Achterberg and Lawlis (1984), patients are described simply in terms of the procedures they had undergone (e.g., chemonucleolysis, laminectomy, spinal fusion, facet injections, and pain rehabilitation).

The Image-SP package includes a cassette tape (titled "Relaxation" on side A and "Guided Imagery: 'The Weaver's Loom'" on side B), the Image-SP pain draw-

ing, the scoring grid, the response sheet, and the pain drawing summary. The Image-SP pain drawing consists of a single sheet of paper with outlines of two symmetrical human figures, one viewed from the anterior and the other from the posterior. A space is provided to record percentage of pain in the back as well as percentage of pain in the legs. The patient chooses from among several symbols signifying various pain sensations when completing the pain drawing (ache, burning, numbness, pins and needles, stabbing, and other). Also included is a 5" linear visual analogue scale, the ends of which are anchored "no pain" and "intolerable pain."

The Image-SP scoring grid consists of a grid of $\frac{1}{2}$ " squares superimposed over the two symmetrical human figures. This allows for the quantification of the amount of space the patient has invested in pain. The manual describes the grid as a transparency; however, no such transparency is included in the packet. Consequently, the patient is required to complete not only the Image-SP pain drawing, but the pain drawing grid as well. A more practical solution is to make a transparent grid overlay with $\frac{1}{2}$ " squares.

The Image-SP response sheet includes space to record the date as well as the patient's name, age, occupation, and other pertinent demographics. The response sheet lists items to be checked as they apply to the mechanism of pain onset, the duration of the pain, when the pain occurs, and what relieves the pain. Also included is a listing of seven psychosocial dimensions, evaluated by checking a column indicating the dimension is presently problematic or one indicating that the dimension is believed to be critical for recovery. These seven dimensions are 1) pending litigation; 2) family role; 3) time in chronic pain greater than 6 months; 4) work history, including job satisfaction, job demands, workers compensation, relationship with company, and tenure in job; 5) complicating factors (social); 6) complicating factors (medical); and 7) previous treatment similar to present. Questions comprising the Image-SP response sheet provide a structure for the interview.

The Image-SP pain drawing summary provides space to make neurological notations, record diagnostic impressions, and recommend treatment. The summary sheet also lists descriptors intended to help assess the affective components of pain; that is, pain that does not follow any known neurological pathway or that is not associated with spinal pain of any specified etiology. "Unreal" pain cited by the patient counts 2 points each. Examples of such pain include total leg pain, lateral whole leg pain, circumferential thigh pain, bilateral tibial pain, circumferential foot pain, and bilateral foot pain. Drawings showing "expansion" or magnification of pain also count 2 points each. Examples include back pain radiating to ilium crest, groin, or anterior perineum, anterior knee pain, and anterior ankle pain. Finally, 1 point is given for pain that is overly dramatized (e.g., via additional explanatory note on the pain drawing, pain drawn outside the body outline, painful areas circles, etc.)

The pain summary sheet has a space to record the affective pain score, the number of grids covered, and the pain intensity score. Additional space is provided to make notes.

The Image-SP requires few materials and minimal space. Materials required for administration and scoring include a tape recorder and the cassette tape (both of

which are optional), the Image-SP pain drawing, the scoring grid, the response sheet, the summary, and pencils or pens. Any quiet setting with an electrical outlet, comfortable chair or place to recline, adequate illumination, and a flat surface would be considered adequate. During the drawing phase the examiner's participation is minimal, but becomes more active when asking subjects to respond to questions on the response sheet.

Information regarding methods and procedures for administering the Image-SP are presented in the manual. The interview (Image-SP response sheet) is to be conducted prior to administering the Image-SP pain drawing. The manual states that relaxation techniques can be introduced at the time the instructions are recited to the patient. If the Image-SP is to be used as a baseline measure of a patient's perception of his or her pain, then introducing a relaxation tape may influence the way the patient fills in the pain drawing. For example, if the relaxation tape alters the patient's physiological state, he or she may fill in the pain drawing differently than had he or she not been relaxed first. The tape may have potential therapeutic value, but perhaps would be introduced more appropriately after the initial assessment.

The format for administration involves two phases. In the first, the patient is asked to respond to questions on the Image-SP response sheet. The cassette tape may or may not be introduced (optional). In the second phase, the manual provides a script of instructions to recite to the patient. The patient is directed to indicate on the pain drawing where and what kind of pain (using symbols) he or she is experiencing. The patient also is instructed to indicate the percentage of pain in the back versus the legs and to estimate the pain intensity on the visual analogue scale. The manual does not specify whether it is possible to administer the Image-SP in group format nor does it specify the qualifications or training required of the examiner.

Practical Applications/Uses

As with the Image-CA and Image-DB (reviewed elsewhere in this volume), practical applications of the Image-SP are largely open to question. Only a handful of studies (Achterberg & Lawlis, 1980; Lawlis & McCoy, 1983; Mooney, 1984; Mooney, Cairns, & Robertson, 1976; Ransford et al., 1976) have addressed its use as a tool to predict which patients will respond favorably to medical treatment or to a rehabilitation program. The instrument cannot be used to make psychological diagnoses nor can it detect individuals who malingers.

The Image-SP can be administered in any number of settings, the most likely being rehabilitation centers, pain clinics, and neurosurgeons' as well as orthopedic surgeons' offices. Administration, scoring, and interpretation require considerable familiarity with the instrument as well as knowledge of anatomy and medical terminology, limiting its use to those individuals having expertise in the area of chronic pain.

The time required to administer the Image-SP is contingent on the pace at which the patient works as well as the breadth and detail of the drawings. The manual does not specify how long it takes to interview the patient and to have him or her complete the pain drawing; on average, however, it should take no more than an

hour. Use of a relaxation procedure or tape prior to administering the instrument may add approximately 20 minutes to task. Scoring is relatively simple and can be accomplished within 15 minutes.

Two quantitative scoring systems for the Image-SP are outlined in the manual. The first allows the test user to derive an affective pain score. Two points are assigned for the presence of any of nine different kinds of pain that does not follow a known neurological pathway or is not associated with spinal pain having a specified etiology. In order to assign scores, the test user must possess considerable medical knowledge, primarily limiting this scoring system to medical personnel. One point is assigned for overly dramatized pain (items 10 through 14) and for pain lacking in specificity; 1 point is assigned for small areas and 2 points for large areas (i.e., covering more than 20% of the body).

A second method of scoring involves quantifying the amount of space used. The examiner counts the number of $\frac{1}{2}$ " squares on the grid sheet that contain any mark representing pain. Included are lines, words, other notations, the pain drawing, and the number of squares encompassing the patient's notation on the visual analogue scale. The scoring instructions in the manual are somewhat unclear. The manual does not specify how the visual analogue scale is scored nor how the score is to be used. Nor does the manual clearly state how a number is derived for the pain estimate. It appears as though the patient is to pick a number between 0 and 10 as an estimate of his or her pain intensity.

The interpretation of the Image-SP is based on the two quantitative scoring systems, the affective scoring system and the grid counting system. An affective pain score of 0 indicates that no affective or psychological component is incorporated into the pain symptom, whereas a score of 3 or more indicates evidence of significant psychological influence. Although not specified in the manual, the designated cutoff scores apparently were derived from a study conducted by Ransford et al. (1976). These researchers found that 93% of patients with MMPI Hypochondriasis and Hysteria scale scores greater than 70 had scores of 3 or more on the pain drawing. Seventy-nine percent of those not exhibiting elevations on the MMPI obtained scores of 2 or less on the drawing. Overall, Achterberg and Lawlis (1980) found 66% of patients with elevated MMPI profiles to have scores of 2 or more on the pain drawing. Seventy-three percent of those with MMPI scale scores below 70 obtained scores of 2 or less.

The critical cutoff score for the grid count is set at 15, though the manual does not specify how this cutoff is derived. Omitting this information violates the *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1985). Scores greater than 15 indicate multiple causes for pain and a poorer prognosis. More specifically, the more grids that are filled in, the more abnormality (scale scores > 70) the patient will show on the MMPI. In its current stage of development the Image-SP is unable to identify malingering nor can it be used to make specific psychological diagnoses.

The manual does not address the educational level required to complete the task satisfactorily. The concept of percentage may be one that some patients may not comprehend, making it difficult for them to indicate the "percentage" of pain in their back as opposed to their legs. Some of the vocabulary on the response sheet,

such as *manipulation* and *traction*, also may be difficult for some patients to understand.

Technical Aspects

The Image-SP falls short in meeting acceptable standards of reliability, validity, and normative breadth (AERA, APA, & NCME, 1985). The procedures used to obtain samples for the purpose of estimating reliabilities and standard errors of measurement are not provided, nor are the normative samples adequately described. Based on two independent scores, interrater reliability is 0.85 ($N = 125$) for the affective scoring system and 0.97 for the grid counting system ($N = 318$). Kline (1986), however, believes that reliability studies of tests should be carried out on samples of no less than 200 subjects. He states that "as . . . 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). According to Nunnally (1978), for predictor tests used in basic research an interrater reliability coefficient of 0.70 or higher will suffice; for applied settings, 0.90 is the minimum. In this light, interrater reliability for the affective scoring system meets acceptable standards for basic research and the grid counting system is acceptable for applied settings (Nunnally, 1978). Unfortunately, the significance levels are not specified in the manual. Credentials of the raters are not provided and demographic information is lacking, as is a selection strategy and criteria for inclusion.

Given that a test's validity is established by demonstrating criterion-related, content, concurrent, and/or construct validity (AERA, APA, & NCME, 1985), little evidence has been presented that bears on the validity of either the affective or grid scoring systems. Unfortunately, in each of the studies cited in the manual, criterion measures seem to have been selected arbitrarily. No rationale for selecting them is provided, and neither are the methods for scaling the criteria. This is in violation of the *Standards for Educational and Psychological Testing*: "All criterion measures should be described accurately, and a rationale for choosing them should be made explicit" (AERA, APA, & NCME, 1985, p. 16).

In one study cited in the manual, it was reportedly possible to correctly classify normal versus abnormal MMPI profiles (abnormal = one or more scale elevations above 70) 82% of the time ($p < .005$) based on the grid counting system. No rationale is provided for the selection of the MMPI as a criterion measure nor for the selection of 11 grids as the cut score.

In a second study attempting to demonstrate criterion-related validity, physicians' ratings of surgical outcomes and outcome of rehabilitation procedures on 318 patients were correlated with number of squares marked on the grid. A global outcome rating based on a composite of pain behaviors, functional status (range of motion), and whether the patient had returned to work were cited as criteria. Patients received ratings ranging from 1 to 3, with the latter indicating excellent outcome. Those having fewer squares filled in on the pain drawing accounted for 88% of those on the best outcome category. Of those with poor outcome, 44% had marked 15 or more squares. Correlations for these are not provided in the manual. With the sparsity of information provided it is difficult to determine whether

criterion-related validity was actually demonstrated. One must accept the findings at face value.

In a third study attempting to establish predictive validity, Mooney (cited in Achterberg & Lawlis, 1984) administered the pain drawing prior to interventions such as spinal fusion, facet injections, and spinal pain rehabilitation. Outcome ratings were poor, fair, and excellent improvement. Two correlations failed to reach significance while the remaining correlations ranged from 0.33 to 0.53 at the 0.05 and 0.01 levels. Correlations reported in the manual (Table 20) having achieved statistical significance accounted for 11%, 28%, 24%, and 16%, respectively, of the outcome by means of the number of grids filled in. The relatively low magnitudes of the correlations and the absence of information pertaining to standard error of estimate makes it questionable as to how well the criterion measures have been predicted from the test scores.

Although scoring may be relatively consistent between raters, it is not clear what the Image-SP is actually measuring. Research has not demonstrated content, construct, or concurrent validity for either the grid count or affective scoring systems. There are no validation studies for the affective scoring system outlined in the manual. Information pertaining to the determination of cut scores for the affective scoring system can be found in Achterberg and Lawlis (1980) and Ransford et al. (1976).

Critique

Historically it has been clinically difficult, if not impossible, to make the organic/psychogenic pain distinction. This is especially so in cases of chronic low back pain. Rarely will psychogenic or organic factors act independently (Murray, 1982). The overlap is considerable and the condition too complex to expect a single cause. The advantages of conceiving an instrument with predictive power to differentiate potential treatment successes from treatment failures are obvious. The Image-SP is innovative and in line with this goal. The instrument attempts to separate those cases with simple clear-cut symptoms from those with a complex pain response that may result from either emotional or multiple physical causes.

Unfortunately, unlike the Image-CA and the Image-DB, the Image-SP is not designed to be used as a projective technique. In their book, *Bridges of the Body-mind: Behavioral Approaches to Health Care*, Achterberg and Lawlis (1980) have patients make drawings of their pain. It is very unfortunate that this component was not retained in the Image-SP; rich material could be derived from the imagery of as well as perceptions about the sources of pain and the body's capacity to combat it.

In terms of selecting a pain assessment instrument with emphasis on the affective and evaluative properties of pain, the Image-SP would be far preferable to the Pain Apperception Test, for which no evidence of validity has been established (see Levit, Killian, & Katell, 1988), but less preferable to an instrument like the McGill Pain Questionnaire, whose reliability and validity are well documented (see review elsewhere in this volume). One might wonder whether an instrument like the MMPI or the low back pain (Lb) scale (Graham, 1977), where reliability and validity are better established, would be a sounder choice to differentiate

those who benefit from treatment from those who do not. In its current stage of development, it would be unwise to use the Image-SP in any way other than for basic research.

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