ALTERATION OF SOME BODY IMAGE INDICES IN SCHIZOPHRENICS VIA INDUCED SOMATIC AWARENESS

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ABSTRACT

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By

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It has been theorized that schizophrenia involves a lack of cathexis of ego boundaries. At the most basic level this consists of a lack of bodily ego cathexis. Starting with this postulate, Des Lauriers developed a theory of psychotherapy in which the central premise is that the therapist must stimulate in the schizophrenic patient "reactions of interest in, and attention to his bodily self as the separating boundary from what is not himself, and as the primary instrument of his contacts with and actions on his environment."

The present study tested the proposition that inducing somatic awareness in schizophrenic patients can influence their body image boundaries. Seventy-five hospitalized schizophrenic males, 15 patients in each of five different groups, were given Form A of the Holtzman Inkblot Test (HIT), underwent the experimental or control conditions appropriate to the group to which they had been assigned,

and were then administered Form B of the HIT. Only the first 25 cards of the Holtzman forms were used.

The between-test conditions imposed on the different groups were as follows:

A Somatic group did a number of physical exercises which induced somatic awareness in the subjects under conditions which maximized their involvement in the process.

Subjects in an Imagination group were asked to imagine what it would feel like to do those same exercises in order to induce somatic awareness in them while at the same time keeping their involvement minimal.

A Separateness group underwent a number of sensory experiences calculated to induce somatic awareness and to maximize boundary definiteness.

A Fusion group also underwent a number of sensory experiences which induced somatic awareness but which, at the same time, attempted to minimize boundary definiteness.

Subjects in the Control group spent the time between tests viewing colored slides through an automatic desk-top viewer.

The boundary indices developed by Fisher and Cleveland, the Barrier and Penetration of Boundary scores, were used as measures of body boundary definiteness.

Inducing somatic awareness in these schizophrenic patients increased their boundary definiteness as indicated by the significant increases in Barrier score achieved by the Somatic, Separateness, and Fusion groups. This was interpreted as direct support for Des Lauriers' theory. The attempt to increase boundary definiteness under conditions of minimal involvement, i.e., through cognitive means, failed. This failure was interpreted as demonstrating not so much that a cognitive approach is not feasible but that stimulation which the patient can not avoid or ignore is necessary in dealing with schizophrenic patients.

The Penetration of Boundary score was only slightly affected by the experimental manipulations. It was suggested that this score is a measure of an affective component of perceived boundary definiteness and is indicative of anxiety about body integrity and one's ability to control what happens to it. As such, it would not be much affected by isolated experiences, but would only be subject to stabilized, longer term gains in perceived definiteness. In addition, any effects the experimental manipulation had, or might have had, on this measure were no doubt depressed by the heavy tranquilization on which these patients were maintained.

A highly significant correlation between the Barrier and Penetration scores was obtained for the pretest data. In addition, the pretest boundary scores as well as the boundary score changes from pretest to posttest were correlated with selected demographic characteristics of the sample. The Barrier score was found to be independent of these characteristics for the most part. The Penetration score, however, was found to be positively related to the patients' ages and their ages at first hospitalization.

Various ramifications of these results and their implications for the psychotherapeutic treatment of schizophrenic patients were discussed. In addition, areas of needed future research were delineated.

Approved: Albert J. Rabin

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ALTERATION OF SOME BODY IMAGE INDICES IN SCHIZOPHRENICS VIA INDUCED SOMATIC AWARENESS

By

Joel A. Albert Darby

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to carolyn

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INTRODUCTION

In recent years, more and more clinicians have come to believe that psychotherapy can be effective in the treatment of schizophrenia. The study of methods of producing changes in the behavior of schizophrenic patients is, today, a major preoccupation in the fields of psychology and psychiatry. The present study empirically tests the basic psychotherapeutic premise developed by Des Lauriers (1962) in his work with schizophrenic children.

Theory

The ego and schizophrenia. Loss of reality contact is one of the few aspects of schizophrenia on which there is overwhelming agreement. Cameron (1963) defined schizophrenia as a " . . . regressive attempt to escape tension and anxiety by abandoning realistic interpersonal object relations . . . " Maher (1966) stated that "in clinical usage, it is common to regard loss of reality contact as the key difference between pathological patterns described as psychotic and those classed as neurotic."

This area of agreement also exists within the predominantly structural approach the psychoanalysts have taken

in their explanations of the schizophrenic behavior disturbance. While the hypotheses raised by different individuals within the psychoanalytic school of thought are divergent in many respects, they all agree that there is a severe impairment in ego functioning and that this impairment leads to behavioral manifestations which are called schizophrenic (Bellak, 1966).

Federn (1952) made an important contribution to the understanding of schizophrenia when he theorized that schizophrenia was not a withdrawal of object cathexis but a hypercathexis of objects. It was not the loss of the love object but was rather the patient's ego which had lost the cathexis. He saw the ego of schizophrenics as impoverished, inadequately cathected, and unable to test reality. Federn introduced the concept of "ego boundaries" which were the center of perception of the "ego feeling." This feeling distinguished everything that was a part of the ego from everything that was not. In schizophrenia the poorly cathected ego boundary breaks down resulting in an inability to correctly perceive reality.

Thus, the schizophrenic patient is not someone who has withdrawn from the world and created a world of his own, but rather is essentially an individual who has lost the capacity to experience himself as real (Des Lauriers, 1962).

The concept of the body ego. The idea that one's body is important for the establishment of personal identity

is not a new one and has received considerable attention from workers in diverse areas of psychology.

Schilder (1950) dealt specifically with the appearance of the human body and its physiological, psychological, and sociological determinents and consequences. Others, for example Gesell (1948) and Piaget (1963), emphasize bodily schemata in psychological processes in their theories of child development. Witkin's theory of psychological differentiation includes the idea that "Formation of the body concept must accordingly be viewed in the context of the total stream of psychological growth, and its study may teach us a good deal about individual development and functioning" (Witkin, 1965). Wapner and Werner (1965) based the development of their theory of perception of objects on the assumption that " . . . there can be no perception of objects 'out there' without a bodily framework . . . " The experience of one's body has not been disregarded by the Existentialists either (e.g., Buytendjik, 1961; Strauss, 1952).

Psychoanalytic theory has, of course, placed particular emphasis on the importance of the body and the body ego. Freud believed that an individual's body played an important role in bringing about the formation of the ego and its differentiation from the id. He stated that "The ego is first and foremost a bodily ego . . . " (Freud, 1962).

Federn (1952), Fenichel (1954), and Ferenczi (1926), as well as Freud, all emphasized that the individual's discovery of his own body plays a very special role in his discovery of reality. The body, by its capacity to experience both inner tension and stimulation from outside, is the main organ enabling the individual to work out the distinction between ego and non-ego. Reality, as an object of psychological experience, comes into existence through a developmental process whereby the individual progressively delineates, differentiates and bounds himself by detaching himself from an 'outside' which he is then able to relate to as an object.

The here-and-now experience of this external reality results from the fact that stimuli from the outside world are passing through a bodily ego boundary charged with a particular quality of sensation and bodily ego feeling. The continuing ability of the individual to relate to the outer world is dependent upon the maintenance of these boundaries. The outer world will remain evident only as long as the individual's bodily ego boundaries remain intact (Federn, 1952).

Des Lauriers' theory of psychotherapy with schizophrenics. In the schizophrenic, the ego as a complex psychological organization which unifies, integrates, and directs the various ego functions ceases to exist. However, the fact that the schizophrenic individual has lost his capacity to relate to reality does not mean that he lacks the libidinal

and aggressive energies necessary to develop and maintain an ego. The instinctual energies and their strivings for real gratifications are still present in the schizophrenic, just as are all the various ego functions. It is the cathexis, the investment of these energies in his own bodily boundaries, which is lacking.

The schizophrenic is not struggling to solve those conflicts which may be postulated to have precipitated his psychosis; he is struggling with and against the experience of being schizophrenic. He is attempting to make sense out of innumerable unintegrated experiences which are conflicting and contradictory because his various ego functions operate no longer as ego functions, but rather as unrelated and somewhat independent mechanisms. His behavior, then, can be seen, not as an attempt to escape, or to withdraw, or to defend himself against intrapsychic conflict, but as a disorganized, panic-stricken, and ineffective attempt to reestablish himself as real.

Analysis of the schizophrenic's defense system would not lead to a conflict which, resolved, would make the schizophrenic behavior unnecessary. The defensive system broke down with the occurrence of the schizophrenic reaction. The individual's schizophrenic behavior is better viewed as coping behavior, attempts to cope with the schizophrenic experience itself. Thus, an analysis of this sort would lead

to a conflict which was a result of being schizophrenic, not the cause of the schizophrenia.

Instead, the schizophrenic must reestablish the ability to distinguish himself from what is not himself. This experience depended originally on the narcissistic cathexis of his own bodily boundaries; and the self is experienced as real only if such a cathectic investment is achieved and maintained. Because the primary model of reality, as a psychological experience, is the experience of the bodily self, as bounded, finite, limited in space, separated from what reaches it by transgressing such bodily boundaries, the focus of psychotherapy with a schizophrenic must be on helping him define his identity in terms of what has been called his body ego, i.e., as a physically and spatially separated entity.

The Rorschach and Body Image

Fisher and Cleveland (1958) felt that because the process of separating one's body from the world was fundamental in the development of personal identity, the character of an individual's body image boundary should provide important information about his adjustment strategies. Knowing that body experience could influence the perception and interpretation of unstructured stimuli, they believed that body image would be reflected in perception of Rorschach inkblots. Consequently, they developed a new content scoring

system for projective responses to the Rorschach to measure and describe body image boundary. This system is based on the properties attributed to peripheries of inkblot percepts.

Fisher and Cleveland's methods of Rorschach scoring. Fisher and Cleveland (1958) developed the Barrier score index to evaluate boundary definiteness of the body image. This index is an indication of the degree to which definite structure, substance, and surface qualities are assigned to inkblot images. Operationally, the barrier score equals the number of elicited responses that are characterized by an emphasis upon the protective, containing, decorative, or covering functions of the periphery, e.g., vase, kettle or pot, cave with rocky walls, person covered with a blanket, etc. The degree of boundary definiteness is directly related to the number of Barrier responses produced.

A Penetration of Boundary score was also developed. It was based on the number of all inkblot responses which emphasize the destruction, evasion, or bypassing of a boundary, e.g., sword piercing armor, x-ray of the body, volcano erupting, building burning, etc. Presumably, the higher the Penetration score is, the less definite is the body image boundary. This score often has a low and sometimes negative relation to the Barrier score. Fisher and Cleveland's rules for scoring both the Barrier and Penetration scores appear in more detail in Appendix B.

Fisher and Cleveland (1958) established the following norms based on a sample of 200 normal college students: median Barrier score = 4 with a range of 0 - 12; median Penetration score = 3 with a range of 0 - 8; mean Barrier score = 4.1 with a standard deviation of 2.1; mean Penetration score = 3.2 with a standard deviation of 1.6. Inter-scorer reliabilities for the two scores have been found to cluster in the high .80's to the high .90's (Fisher & Cleveland, 1958; Holtzman, et al., 1961). Adequate test-retest reliability has also been demonstrated (Daston & McConnell, 1962). Neither of the scores was found to be related to verbal productivity, verbal facility, or intellectual level (Fisher & Cleveland, 1958).

Some writers have criticized the Barrier and Penetration scores. Eigenbrode and Shipman (1960), for example, state that "the scoring rules, in detail, have not been published," question the stability of the scoring because of the small size of the modal Barrier score (4) and the wide range (0-12), and believe that many of the major scoring categories seem arbitrary in regard to which Rorschach response fits which category.

Cassell (1964) criticized the scores on the basis that both of them refer to the body boundary and advanced the notion that a more useful conceptualization of the body image might be "boundary" and "interior." Consequently, he

developed the body interior awareness scale which measures the degree to which a person's body interior is dominant in his body conception.

Mednick (1959), in his review of Fisher and Cleveland's Body Image and Personality (1958), criticized the lack of research into what relationships exist between boundary scoring and more traditional Rorschach scoring. He also questioned whether or not the newer scoring was needed at all.

Empirical findings with the boundary scores. A number of studies have investigated the relationship between the boundary indices and how an individual copes with stress. Fisher and Cleveland (1958) and Landau (1960) found that individuals who indicated definite body boundaries by their Rorschach percepts dealt relatively more efficiently with the stress of present or impending body disablement than did individuals who indicated indefinite boundaries. McConnel and Daston (1961) found that the favorableness with which females viewed their pregnancies was positively linked with their Barrier score, and that following delivery the Penetration score declined significantly. Brodie (1959) found Barrier scores to be negatively correlated with emotional expressivity under induced laboratory stress. Davis (1960) investigated the relationship between Rorschach Barrier scores and physiological reactivity to stress. He found that the high Barrier group responded primarily in the

exterior measures of stress while the low Barrier group responded in the interior measures of stress.

In small group behavior studies, the boundary indices have been found to be related to spontaneous expressiveness, independence, promotion of group goals, warmth and friendliness, and willingness to face hostility (Fisher and Cleveland, 1958), number of sociometric nominations (Cleveland and Norton, 1962), and to ease of communication, management of self, and self identity as evaluated by interviewers in a 50 minute interview (Fisher, 1964).

Fisher and Cleveland (1958), Cleveland and Fisher (1960), Williams and Krasnoff (1964), and Cassell (1965) have all found a consistent relationship between body attitudes as measured by the Rorschach and somatic symptom formation. Individuals with external somatic symptoms have tended to evidence higher Barrier and lower Penetration scores, while those with internal somatic symptoms have had higher Penetration and lower Barrier scores.

Two general themes seem to emerge from these varied studies. First of all, boundary definiteness appears to be related to "good adjustment" in the sense that those individuals with substantial boundary definiteness evidence greater competence in day-to-day type living skills and are better able to cope with stressful situations. Second, individuals with an external body awareness focus tend to exhibit

greater boundary definiteness than those people whose focus of somatic awareness is primarily internal.

Of particular interest for our present discussion are two different sets of studies, the first of which relates schizophrenia and the boundary indices, the second of which examines the issue of whether the boundary indices can be influenced by focusing awareness directly on the body. As was mentioned in the theory section, schizophrenia is characterized by vague body boundaries. In line with this, Fisher and Cleveland (1958) found the Barrier and Penetration scores discriminated schizophrenics, who had low Barrier and high Penetration scores, from normals and neurotics, who had high Barrier and low Penetration scores. There were no differences between the normals and the neurotics. Similar findings have been obtained using Holtzman inkblots (Holtzman, et al., 1961; Reitman and Cleveland, 1964). Cleveland (1960) also examined the Rorschach records obtained from schizophrenic patients both upon their admission to the hospital and upon their discharge. Those patients who had been rated as improved or well showed a significant decline in their Penetration scores.

Reitman and Cleveland (1964) investigated the change in body image, as measured by the boundary scores, for neurotics and schizophrenics following sensory isolation. Twenty neurotics and 20 schizophrenics were administered the inkblot test before and after being exposed to sensory

isolation conditions for four hours. A schizophrenic control group also received pre- and post-tests, but without the isolation conditions intervening. While no changes occurred in any of the scores for the control group, there were significant changes in both experimental groups. Schizophrenics obtained higher Barrier and lower Penetration scores following isolation while the neurotics obtained decreased Barrier and increased Penetration scores. In addition, following the isolation conditions, schizophrencs evidenced increased tactile sensitivity and decreased body size judgements whereas the neurotics evidenced decreased tactile sensitivity and increased body size judgements. For the schizophrenic patient, in other words, increased boundary definiteness was accompanied by increased body awareness as evidenced by increased tactile sensitivity and less expansive body size judgements (the schizophrenics generally overestimated body size initially). Thus, consistent relationships were demonstrated between changes in the body image, in skin sensitivity, and in perception of body size.

Three recent, essentially identical studies (Fisher and Renik, 1966; Renik and Fisher, 1968; Van De Mark, 1968) dealt with the question of whether or not producing increased somatic awareness through directly focusing on bodily sensations could influence perception on the Rorschach inkblots. In the most comprehensive of the three, and hence

the one elaborated upon here, Van De Mark (1968) utilized four experimental and two control groups, each group consisting of 20 normal undergraduate college students. The four experimental groups differed on two dimensions: 1. focus of awareness--either internal or external; 2. mode of inducing this awareness--either through direct somatic or cognitive means. Two of the measures used to evaluate the effects of his experimental manipulations were the Barrier and Penetration scores. His results indicated no differences between the two different modes of induction. Inducing bodily awareness achieved the same results regardless of whether it was induced by somatic or cognitive means. Van De Mark found that Penetration scores were highest in the internal awareness group, lowest in the external awareness group, and median in the control group. He also found that Barrier scores were highest for the external awareness group, next highest for the internal awareness group, and lowest for the control group. The results were conclusive in demonstrating that the boundary indices can be directly influenced by increasing body awareness and that these scores can be differentially affected depending upon the focus of this induced somatic awareness.

STATEMENT OF THE PROBLEM

Development of the Present Study

Reality exists for the individual because he has separated himself from what is not himself. The schizophrenic individual has lost contact with reality because he has lost the ability to cathect his own bodily boundaries, that is, to maintain this separateness. Thus, in providing the rationale for his method of treatment, Des Lauriers (1962) stated that "it should be possible to conceive of the process of recovery in schizophrenia as a progressive definition and demarcation of the schizophrenic's ego boundaries through a systematically increased cathexis of his bodily limits and his bodily self."

The studies conducted by Fisher and Cleveland (1958) and Cleveland (1960) lend support to this conception of schizophrenia and the recovery process. It will be recalled that in the Fisher and Cleveland (1958) study schizophrenics were differentiated from neurotics and normals on the basis of their low Barrier and high Penetration scores and that in the Cleveland (1960) study improved schizophrenics achieved a decrease in the Penetration score. Hence, we are provided with some empirical support for the theoretical conception

that schizophrenics exhibit a lack in boundary definition and that as they improve their capactiy to define boundaries increases.

To achieve this increased definition of ego boundaries, Des Lauriers (1962) attempts to stimulate in the schizophrenic patient "reactions of interest in, and attention to his bodily self as the separating boundary from what is not himself, and as the primary instrument of his contacts with and actions on his environment . . . the patient's attention is brought not only to the conscious awareness of the surface of the body but to each and every experience with the environment which, through stimulation, pleasant and unpleasant, affects each part of his body."

A crucial question for Des Lauriers' method of treatment is whether directly focusing the patient's awareness and attention on his own body and its separateness can effect this reestablishment of boundaries. The recent studies by Fisher and Renik (1966), Renik and Fisher (1968), and Van De Mark (1968) imply, at least, that it can. They demonstrated, with normal subjects, that focusing on somatic stimuli leads to subsequent changes in the boundary definiteness indices.

However, at least one study (Reitman and Cleveland, 1964) showed that imposing the same conditions (e.g., sensory isolation) upon schizophrenics and normals resulted in opposite alterations in these boundary indices for the two

groups. The present investigation was directed at establishing the validity of Des Lauriers' premise that focusing on body image can affect boundary definiteness in schizophrenic individuals.

The extent of the active involvement of the person focusing on the somatic stimuli may also be of some importance. Des Lauriers endeavors to get the schizophrenic individual to perceive his body " . . . as the primary instrument of his contacts with and actions on his environment" (Des Lauriers, 1962). It is important for the schizophrenic patient not only to view his body as a separate entity, but as a separate entity over which he has control and with which he can affect his environment. This study also endeavored to investigate the differential effects of this dimension on reestablishing body boundaries.

Des Lauriers places emphasis on the body because the way to establish the psychological experience of reality in the schizophrenic individual is to help him establish the ability to distinguish himself from what is not himself, to establish his separateness. Studies conducted by Wapner and Werner and reported in their book, The Body Percept, (Wapner and Werner, 1965), have shown that imagining oneself as "fused with" or "separate from" an object being viewed can affect the object's perceived position in the visual field. Since the feeling of separateness can affect perception, it is possible that perception could affect the feeling of

separateness. This dimension, in terms of the type of stimulation one presents a schizophrenic patient, is thus an important one in Des Lauriers' method of treatment. A further extension of the present study was to investigate what differential effects stimuli differing along the fusion-separateness dimension have on the boundary indices.

Summary of the Principal Questions to be Investigated

Question 1

a. Can inducing somatic awareness in schizophrenic individuals influence the boundary indices obtained from Holtzman Inkblot Tests?

b. Does the degree of active involvement effect the obtained boundary indices?

Question 2

Do stimuli differing along the fusion-separateness dimension have differential effects on the obtained boundary indices?

METHOD

Subjects

The subjects were male inpatients at the Veterans' Administration Hospital in Battle Creek, Michigan. They were randomly selected from that population of patients under 36 years of age whose current diagnosis was "schizophrenic reaction," by means of a table of random numbers. No patient with any diagnosed Central Nervous System pathology was used.

The subjects were randomly assigned to the various experimental and control groups. Fifteen subjects were assigned to each of five different groups--two experimental groups in Question 1, two experimental groups in Question 2, and one Control group. The same Control group was used for comparison purposes in both parts of the study. The experimental design is presented schematically in the accompanying diagram (see Figure 1).

Procedure

In order to evaluate the effect of the experimental manipulations on the body boundary measures, a pre- and post-test design was utilized. Following the administration of the first 25 cards of the Holtzman Inkblot Test, Form A,

Question 1 (1a & 1b)

GROUP	SOMATIC N-15			IMAGINATION N-15			CONTROL* N-15		
Score / Measure	pre-test	post-test	chg	pre-test	post-test	chg	pre-test	post test	chg
BARRIER									
PENETRAT.									

Question 2

GROUP	SEPARATENESS N=15			FUSION N=15			CONTROL* N=15		
Score / Measure	pre-test	post-test	chg	pre-test	post-test	chg	pre-test	post-test	chg
BARRIER									
PENETRAT.									

*This group and sets of scores is the same in both questions. There is, in fact, only one Control Group.

FIGURE 1

SCHEMATIC REPRESENTATION OF THE EXPERIMENTAL DESIGN

each S underwent the experimental or control conditions appropriate for the group to which he had been assigned. The first 25 cards of Form B of the HIT were then administered to S. S underwent the entire procedure individually with E. For a detailed presentation of the instructions given to the subjects, see Appendix A.

Experimental Manipulations

Question 1a.
Can inducing somatic awareness in schizophrenic individuals influence the boundary indices obtained from Holtzman Inkblot Tests?

In order to investigate this question, the "Somatic" group of Question 1 is compared to the Control group. The Somatic group subjects participated in three different activities, each lasting approximately five minutes. S was asked to focus his attention on body sensations at all times. The conditions were as follows:

1. Stretching exercises--S was requested to do six different stretching exercises. Each exercise was for a 25 second duration followed by a 20 second relaxing period.

2. Lifting weights--S was requested to do five different exercises with two 10-pound dumbbells. Each exercise was for a 25 second duration followed by a 20 second resting period.

3. Bicycle riding--S was requested to ride a stationary bicycle for four minutes.

Question 1b.
Does the degree of active involvement effect the obtained boundary indices?

In order to evaluate this question, the "Imagination" group is compared with the Somatic group. In the Imagination group, E briefly demonstrated the above exercises and asked S to imagine he was doing the exercises, and to focus his attention on how he thought his body would feel if he were actually doing them. At the end of each 25 second period, E asked S to indicate which parts of his body he would have used.

Question 2.

Do stimuli differing along the fusion-separateness dimension have differential effects on the obtained boundary indices?

In order to investigate this question, the "Fusion" and "Separateness" groups of Question 2 are compared. In the Fusion group, S was requested to do the following:

1. Lie on a soft air mattress for five minutes and then to describe the bodily sensations.

2. Hold his hands, one at a time, in a large container of water heated to approximately skin temperature for a period of one minute and to describe the sensations.

3. Write down as many similarities between himself and E as he could think of in a five minute period.

In the Separateness group, S was requested to do each of the following:

1. Lie on a hard table for five minutes and then to describe the bodily sensations.

2. Hold his hands, one at a time, in a large container of cold water and ice cubes and to describe the feelings.

3. Write down as many differences between himself and E as he could think of in a five minute period.

The total time for the experimental manipulations in these two groups was, as in Question 1, approximately 15 minutes.

Control Group. S was requested to look at a series of slides through an automatic table viewer for a period of 15 minutes. The slides consisted of pictures of flowers, landscapes, and automobiles selected such that their content did not represent either Barrier or Penetration responses.

Scoring the Holtzman Protocols

The Holtzman protocols of each S were coded so that the scorer was unable to identify to which group S belonged. Barrier and Penetration indices were computed for each S using the scoring method devised by Fisher and Cleveland (1958) and revised by Holtzman, et al. (1961) for use with the HIT. These scoring systems are reproduced, in full, in Appendix B. In brief, however, they call for a score of one to be assigned to each response which meets the requirements of the measure being scored. Since response totals on the HIT are controlled by the instructions which call for one response per card, and since each response theoretically could be scored Barrier, or Penetration, or both, the possible score range on each index is 0 - 25.

Two scorers were used, each scoring approximately one-half the total number of protocols. An interrater reliability coefficient was computed on a sample of 20 protocols scored by both scorers. The interrater reliabilities obtained were .97 for the Barrier score and .99 for the Penetration score. Both of these coefficients are within the range originally reported by Fisher and Cleveland (1958).

RESULTS

The Holtzman protocols were scored and score changes from the pre-test to the post-test were computed for each subject. The data in full detail along with some demographic data of importance appear in Appendix C. Mean pre- and post-test scores as well as standard deviations and mean score changes for the various groups are presented in Tables 1 and 2.

The pretest boundary scores of the five groups were compared using the Kruskal-Wallis H test, a non-parametric one-way analysis of variance. The results of these analyses indicated that no significant differences in pretest scores existed among any of the groups (see Table 3).

The boundary score change data for each question were also initially analyzed by means of the Kruskal-Wallis H test. Individual group comparisons were then conducted using the non-parametric Mann-Whitney U test. The results of these analyses are presented in Tables 4 and 5.

Significant variation on the Barrier score occurred among the groups in both Questions 1 and 2. In Question 1, as indicated by the individual comparisons carried out between the groups, this variation is due to the increase from

TABLE 1

Means and Standard Deviations for

Pretest-Posttest Barrier Scores

Group	Pretest		Posttest		Difference
	X	S.D.	X	S.D.	
Control	3.93	2.55	3.93	2.52	0.00
Imagination	2.87	2.20	3.20	2.81	+0.33
Somatic	3.00	2.17	6.00	3.25	+3.00
Separateness	4.73	2.40	7.46	3.62	+2.73
Fusion	3.20	2.78	5.47	3.02	+2.47

TABLE 2

Means and Standard Deviations for

Pretest-Posttest Penetration

Scores

Group	Pretest		Posttest		Difference
	X	S.D.	X	S.D.	
Control	3.87	2.85	3.67	2.32	-0.20
Imagination	2.73	2.94	2.33	2.26	-0.40
Somatic	3.47	3.15	2.33	2.72	-1.14
Separateness	2.80	1.42	2.93	1.79	+0.13
Fusion	2.47	2.17	3.07	1.62	+0.60

TABLE 3

Analyses of Between Group Pretest

Boundary Score Differences

Measure	Statistic Value	p
Barrier	H = 6.272	n.s.
Penetration	H = 3.323	n.s.

TABLE 4

Analyses of Differences between Groups in Boundary Score Changes from Pretest to Posttest: Question 1

Statistical Comparison	Barrier value	p*	Penetration value	p*
Kruskal-Wallis	H= 11.92	.01	H= 1.14	n.s.
Mann-Whitney				
Somatic x Control	U= 36.50	.001	U= 87.50	n.s.
Imagination x Control	U=106.00	n.s.	U=105.50	n.s.
Somatic x Imagination	U= 47.50	.01	U= 97.50	n.s.

*all probabilities are two-tailed.

TABLE 5

Analyses of Differences between Groups in

Boundary Score Changes from Pretest

to Posttest: Question 2

Statistical Comparison	Barrier value	p*	Penetration value	p*
Kruskal-Wallis	H= 8.93	.02	H= 2.09	n.s.
Mann-Whitney				
Separateness x Control	U= 50.50	.01	U=104.50	n.s.
Fusion x Control	U= 52.50	.01	U= 76.00	.12
Separateness x Fusion	U=109.00	n.s.	U= 94.50	n.s.

*all probabilities are two-tailed.

pretest to posttest achieved by the Somatic group. The change in the Somatic group's score was significantly greater than that evidenced by either the Imagination or the Control group. In addition, the Imagination and Control groups did not differ significantly from each other.

The individual comparisons between the groups in Question 2 indicated that the variation in Barrier score here is due to the increases from pretest to posttest achieved by both the Separateness group and the Fusion group. Both groups showed increases which were significantly greater than that shown by the Control group. The Separateness and Fusion groups did not differ significantly from each other in their pretest to posttest change on this measure.

The analyses of variance conducted on the Penetration score changes for both Questions 1 and 2 yielded non-significant H values which indicated no variation of significance existed among the groups on this measure. Individual group comparisons, as was then to be expected, subsequently yielded non-significant probabilities as well. The Fusion versus Control comparison in Question 2, however, did yield a difference which approached statistical significance.

When two-tailed sign tests were carried out on the boundary score changes manifested by each group individually, similar results were obtained (see Table 6). These analyses again indicated highly significant Barrier score changes in the direction expected from both theory and previous research.

TABLE 6

Analyses of Boundary Score Changes from Pre-test to Posttest for Each Group Individually

Group	Barrier			Penetration		
	Increase	Decrease	p*	Increase	Decrease	p*
Control	5	7	n.s.	4	5	n.s.
Imagination	5	6	n.s.	5	7	n.s.
Somatic	12	1	.004	4	9	n.s.
Separateness	11	2	.022	6	6	n.s.
Fusion	11	1	.006	9	2	.066

*all probabilities are two-tailed.

The Somatic, Separateness, and Fusion groups all evidenced significant increases in Barrier scores from pretest to posttest. Likewise, again none of the Penetration score changes achieved statistical significance. This time, however, the increase in Penetration score from pretest to posttest attained by the Fusion group closely approached the .05 level of significance.

The various groups differed among themselves on some of the demographic variables, particularly "total length of hospitalization" (see mean values presented in Appendix C). In order to determine if any of these characteristics of the sample population were related to the boundary indices, these data were correlated with the pretest boundary scores. As is indicated in Table 7, only one of these coefficients was of statistical significance. The Penetration score was positively correlated with the age of the patient at the time of his first hospitalization.

In addition, because it was felt that some of these characteristics might be related to the amount of change exhibited on the boundary measures, coefficients were computed between them and the amount of pretest to posttest score change. Since each group underwent different experimental manipulations, the coefficients were computed for each group separately. These data are presented in Tables 8 and 9.

One further correlation coefficient was computed. Fisher and Cleveland (1958) originally predicted that

TABLE 7

Correlations between Pretest Boundary Scores

and Certain Demographic Characteristics

Measure	Age	Education	Age of first Hospitalization	Number of Hospitalizations	Total length of Hospitalization
Barrier	-.11	.14	.10	.11	.14
Penetr.	-.09	.01	.21*	.02	.05

*$p < .05$

TABLE 8

Correlations between Changes in Barrier Score from Pretest to Posttest and Certain Demographic Characteristics for Each Group

Group	Age	Education	Age at first Hospitalization	Number of Hospitalizations	Total Length of Hospitalization
Control	.41	.06	.17	-.03	.30
Imagin.	.06	.20	.18	-.32	.07
Somatic	.25	.11	-.21	.02	.58*
Separ.	-.15	-.16	.15	-.08	.14
Fusion	.24	-.06	-.02	-.09	.35

*$p < .025$

TABLE 9

Correlations between Changes in Penetration Score from Pretest to Posttest and Certain Demographic Characteristics for Each Group

Group	Age	Education	Age at first Hospitalization	Number of Hospitalizations	Total Length of Hospitalization
Control	.46*	.08	.58**	.16	-.10
Imagin.	.05	.14	.06	.02	-.05
Somatic	.08	-.39	.06	.39	.02
Separ.	-.29	.28	.79****	-.62***	-.15
Fusion	.64***	-.17	.24	-.11	.40

*$p < .05$

**$p < .025$

***$p < .01$

****$p < .005$

Barrier and Penetration scores would be negatively related. Contrary to their expectations, they found that with normal groups the two scores were positively correlated. They did not present data for psychotic populations. Consequently, a correlation coefficient indicating the relationship between the Barrier and Penetration scores for the present schizophrenic sample was computed using the pretest scores of all 75 Ss. A product-moment correlation of +.35 was obtained which is significant at the .005 level. The positive relationship between the two scores thus appears to exist for schizophrenic subjects as well as for normals.

DISCUSSION

The Barrier and Penetration Scores

Fisher and Cleveland (1958) originally developed their two boundary indices on the assumption that the attributes of images elicited by the inkblots are correlated with differences in the way in which individuals perceive their body boundaries. They felt that the Barrier score would reflect the boundary dimension at a level of positive assertion of boundary definiteness, while the Penetration of Boundary score would tap feelings of boundary breakdown and fragility.

They predicted that since, theoretically, the Barrier score measures definiteness and firmness of boundaries and the Penetration score measures penetrability of boundaries, the two scores should be negatively correlated. This did not turn out to be the case. The statistically significant correlations between the two measures obtained by them were all positive (Fisher and Cleveland, 1958). In addition, while their preliminary studies indicated a definite relationship between body boundary and the Barrier score, the Penetration score proved to have no specifiable relationship to body boundary within their "normal"

groups. They concluded that the Penetration score did not neatly represent the opposite of the Barrier score, at least not for normal subjects. Therefore, they restricted their measure of body-image boundary definiteness entirely to the Barrier score in their subsequent research with nonpathological groups.

The present study also indicates that a positive relationship exists between the Penetration and Barrier scores, in this case for a schizophrenic sample. Furthermore, it is evident from the data that the experimental manipulations had differential effects on the two measures. Thus, Fisher and Cleveland's (1958) conclusion that the two measures are not opposites appears to apply for non-normal populations as well. This causes some confusion regarding the exact significance, or meaning, of the Penetration score. As a result, the questions raised in the Introduction of this study will be dealt with here in terms of the Barrier score alone, and the issue of the meaning of the Penetration score will be examined in more detail later.

Discussion of the Questions

Question 1a.
Can inducing somatic awareness in schizophrenic individuals influence the boundary indices obtained from Holtzman Inkblot Tests?

The answer to this question is an unequivocal "yes." Schizophrenic patients who engage in active physical exercises evidenced a highly significant increase in their

Barrier scores from the pretest to the posttest. Further support for this conclusion is provided by the significant increases in Barrier scores obtained by the patients in both the Fusion and Separateness groups of Question 2. Both of these groups also focused their attention on somatic stimulation. While the quality and type of stimulation received in each instance varied, the subsequent increases in Barrier scores obtained by each of the groups were no less evident.

These results are congruent with the recent studies of Fisher and Renik (1966), Renik and Fisher (1968), and Van De Mark (1968), all of which demonstrated that boundary definiteness in normal subjects could be influenced by focusing their attention on their bodies. In addition, the results provide direct empirical support for Des Lauriers' (1962) premise that the schizophrenic can be helped to recathect his own boundaries by forcing him to be aware of his body.

Question 1b.
Does the degree of active involvement effect the obtained boundary indices?

The answer to this question is also "yes." The Barrier scores of the Somatic group increased significantly more than did the Barrier scores of the Imagination group, whose Barrier scores evidenced no changes from the pretest to the posttest. In further support of this conclusion is, again, the Barrier score increases achieved by the two experimental groups of Question 2. Both of these groups

engaged in activities which required, for the most part, a passive involvement, but none-the-less an involvement which entailed an actual interaction with the external world.

The purely cognitive, non-experiential, approach was not effective in increasing boundary definiteness in these schizophrenic patients. This is in marked contrast with results obtained using normal subjects (Van De Mark, 1968) which indicated that, with normals, an imagination condition is just as powerful as an actual experiential one. It would thus seem that the actual experience of the body as an entity in opposition to an external reality is an important factor with schizophrenic individuals.

Two possible reasons for this difference between schizophrenic and normal subjects are readily apparent. The first is that the normal subject is already sufficiently cognizant of his body. The schizophrenic's awareness of his own body, on the other hand, is so vague and diffuse that it is difficult for him to imagine the effects certain types of stimulation would have on it. In fact, many of the patients frequently gave completely inaccurate answers when asked what parts of their body would have been used in the various exercises. A second possibility is that the imagination task was one in which these schizophrenic patients could avoid doing what was asked of them while at the same time appearing as though they were complying with the instructions.

One would assume that normal subjects would be much less likely to engage in this type of avoidant behavior.

However, regardless of the reason for the failure of the purely cognitive approach, it appears evident that an actual experiencing of stimulation which can be neither avoided nor ignored appears necessary to effect a change in the schizophrenic's boundary definiteness. As such, the results provide empirical support for the premise that the schizophrenic's experiential involvement is an important factor in recathecting boundaries.

Question 2.
Do stimuli differing along the fusion-separateness dimension have differential effects on the obtained boundary indices?

The answer to this question is "no." As long as the stimulation focuses the individual's attention on his body, it results in an increased definiteness of boundaries. Given the present experimental conditions, this does not seem unreasonable. Regardless of whether the bed was hard or soft, the subject was made aware of the physical sensations involved in lying on it. Regardless of the water temperature, the subject was made aware of his hands in the water. Regardless of whether the subject was describing similarities or differences between himself and the experimenter, he was made to be aware of his own characteristics.

Nevertheless, there does seem to be an intuitively logical trend in the mean Barrier score changes. There were

no changes for the Control and Imagination groups. There were, then, increasing changes from the Fusion group to the Separateness group to the Active Somatic group. A post-hoc analysis indicated that these latter three groups did not significantly differ among themselves. Nevertheless, this trend might indicate a relative difference in the strength of the effect achieved in each instance. In addition, as will be discussed presently, the different approaches had a slight differentiating effect on the Penetration score.

Interpretation of the Penetration of Boundary Score

Fisher and Cleveland (1958) originally predicted that the Penetration of Boundary score would be the inverse of the Barrier score. Instead, they found that the two measures were positively related. A positive correlation between the boundary indices was found for the present schizophrenic sample as well.

In one respect, perhaps, a positive relationship should have been expected. The penetration of a boundary, or the dissolution of one, is evidence of the individual's ability to conceive of the existence of boundaries, which is precisely what is reflected, at least in part, by the Barrier score. It would seem, then, that at least a slight positive relationship ought to exist almost by definition alone.

There is another factor, however, which is probably of more significance in the determination of the positive

relationships which have been obtained. At one point in their book, Body Image and Personality, Fisher and Cleveland (1958) remark that the unique Penetration responses frequently given by schizophrenic patients point up their feelings of helplessness, panic, and anxiety about their bodies. This definition suggests an affective component of body perception, and probably an affective component made up of more than one factor.

The first of these factors is anxiety about the body's integrity. In this light it must be noted that two of the three "normal" groups on which Fisher and Cleveland (1958) got positive correlations between the two measures were those with dermatitis and those with ulcerative colitis--both groups whose members might well be very aware of their bodies but nonetheless have some doubts or anxieties about their integrity.

But, what about the present schizophrenic sample? The majority of these patients were chronic schizophrenics and all had been in the hospital at least two months prior to the testing. These patients can be assumed to have made some minimal adjustment. We can speculate that they are trying to preserve what definiteness they have attained but live in constant fear of losing it again, not being convinced of their ability to maintain it. In addition, those who are most aware of their bodies at this point are probably those who are most uncertain about them.

Anxiety as a factor can also explain, at least in part, why stimulation which fostered an increase in awareness of bodily limits, as was evidenced by increases in Barrier scores, was not sufficient to cause appreciable changes in the Penetration score. A brief, isolated experiencing of one's body, while momentarily recathecting bodily boundaries, provides no assurance that those boundaries are either stable or impregnable. Within this line of thought, it must be noted that the one change in Penetration score which approached statistical significance was in the Fusion group, and this was an increase, not a decrease. It is somewhat easier to create anxiety about the body than it is to allay it.

In addition, it must also be noted that all of the patients who participated in this study were being maintained on heavy doses of tranquilizers. If, as is being suggested here, anxiety is a major factor represented in the Penetration score, this medication no doubt dampened any effects which the experimental manipulations had, or might have had, on the measure.

Support for this contention is contained in Cleveland's (1960) study. In this study, newly hospitalized schizophrenics were tested immediately following admission. They were then placed on tranquilizers in a double blind drug study and subsequently retested after 5 and 13 weeks. There was no Barrier score change but those patients rated

as improved evidenced a decrease in Penetration score. Cleveland interpreted this decrease as evidence of personality reorganization. However, the decrease in penetrability may just as well have been a consequence of the drop in anxiety brought on by the tranquilizers.

The Penetration score as representative of an affective component of body perception contains a second factor of note. The penetration of a boundary generally involves the existence of an outside force which is effecting the penetration, as well as one's own feelings of helplessness in the face of that force. Fifteen minutes of induced somatic awareness of his own body, may not be sufficient time to convince him of his own control over it or over outside forces impinging upon it.

With this in mind we might look at the Penetration score changes for those groups which achieved Barrier score changes. The trend is an interesting one. The condition which fostered activity under the patient's own control, the Active Somatic condition, resulted in both the largest increase in Barrier score and a decrease in Penetration score. The two groups which participated in rather passive conditions during which things were done to them increased in Penetration scores. Furthermore, the Fusion condition, which attempted to minimize definiteness of boundaries while at the same time fostering awareness of them, resulted in the

lowest Barrier score increase and showed the highest Penetration score increase.

Thus, the trends in the data tentatively support the interpretation that the Penetration score reflects feelings of anxiety over the body's integrity and lack of felt control over what happens to it. In addition, it seems that these feelings are probably altered, particularly when in the direction of the alleviation of these feelings, more slowly than is simple awareness of the body itself.

The Correlational Analyses

A number of the correlation coefficients computed between the boundary scores and the demographic characteristics were statistically significant (see Tables 7, 8, & 9). Only one of these involved the Barrier score and this was between the Barrier score change and the total length of hospitalization. The longer the patient had been hospitalized, the greater was the increase in his Barrier score following the Somatic condition. This is possibly due to the fact that this hospital is, in large part, custodial. Many of the older patients have become quite apathetic and, consequently, for them this was the most physical stimulation they had received in a very long time. However, a great deal of weight ought not to be placed on this one significant correlation in view of the number of coefficients (30) involving the Barrier score which were computed.

Three of the six statistically significant correlations computed between the Penetration score and the demographic characteristics involved the category of age at first hospitalization. On the pretest, the older the patient was at the time of his hospitalization, the greater was his Penetration score. Similarly, for the Separateness and Control groups, the older the patient when first hospitalized, the more his Penetration score was likely to increase from pretest to posttest.

While no explanations for the existence of these relationships are readily apparent, we might speculate about a few of them from the vantage point of a process-reactive conceptualization of schizophrenia. Higgins (1964) noted that the reactive schizophrenic has good affect available to him while the process schizophrenic, on the other hand, exhibits flat affect. We can assume that the patient who is hospitalized for the first time at a later point in his life has had a better premorbid adjustment. This would mean he would more likely fall at the reactive end of the continuum. As such, this patient would have more affect, including anxiety, available to him, and hence be more able, and likely, to exhibit an increase in his Penetration score.

The significant correlation between Penetration score change and the number of hospitalizations could be congruent with this conceptualization as well. The patient exhibiting fewer number of hospitalizations might also be expected to

fall at the reactive pole of the process-reactive continuum. Hence, he, too, would be more likely to achieve a Penetration score increase. This is highly speculative, however, insofar as often those patients with the fewest number of hospitalizations have been institutionalized the longest. For example, one patient with only one hospitalization had been continuously hospitalized for the past 15 years.

In the Fusion and Control groups, the older the patient was, the more probable was a Penetration score increase. This could be because the older patient is more likely to have made some minimal adjustment to his circumstances. As such, the experimental conditions may have been successful in disturbing this adjustment and regenerating anxiety that had previously been suppressed.

Implications for Treatment

Clinicians have long been impressed by, and concerned with, the prominence of the body and body image in the schizophrenic process. Body image distortions which occur particularly frequently early in the breakdown process have long been vividly documented. Much less well documented has been the role the body plays in the recovery process. However, this, too, has been observed and recorded by some clinicians, mostly those who have worked with schizophrenic children.

Bender (1952), for example, pointed out the importance of establishing the reality of a fundamental body image. Bettelheim (1950), in commenting upon the importance of the body to his schizophrenic children, mentioned that "one basis for development of ego is that the child is forced to recognize the body as something separate from the rest of the world, and at the same time as something that is subject to voluntary, conscious control."

Des Lauriers (1962) has probably placed the most emphasis on the importance of the body in the recovery process. He based his treatment approach on Federn's notion that schizophrenia involves a lack of cathexis of bodily ego boundaries and hence, theorized that "it should be possible to conceive of the process of recovery in schizophrenia as a progressive definition and demarcation of the schizophrenic's ego boundaries through a systematically increased cathexis of his bodily limits and his bodily self."

The studies conducted by Fisher and Cleveland (1958) and Cleveland (1960) lend some empirical support to this conception of schizophrenia and the recovery process. It will be recalled that in the Fisher and Cleveland (1958) study schizophrenics were differentiated from neurotics and normals on the basis of their low Barrier and high Penetration scores and that in the Cleveland (1960) study improved schizophrenics achieved a decrease in the Penetration score.

To achieve this needed increased definition of self, Des Lauriers (1962) attempts to stimulate in the schizophrenic patient "reactions of interest in, and attention to his bodily self as the separating boundary from what is not himself, and as the primary instrument of his contacts with and actions on his environment . . . " The results of the present study provide some empirical support for his major treatment contention that inducing somatic awareness can help the schizophrenic individual to redefine himself, that is, to recathect his own boundaries. Inducing somatic awareness in schizophrenic patients through a variety of means resulted in significant increases in Barrier scores.

However, assuming the Penetration of Boundary score to be indicative of feelings of vulnerability, there is some question as to whether simply inducing somatic awareness has any immediate therapeutic effect in reducing anxiety about the body. In a single 15 minute session, increasing body definiteness did not systematically decrease feelings of vulnerability. In fact, in one condition (Fusion) the Penetration score increased even though the Barrier score also increased.

The study by Cleveland (1960) mentioned above has indicated that, presumably, penetrability goes down with improvement in the patient. It may be that repeated experiencing of body boundaries as evident and stable is necessary for alleviation of this bodily anxiety to occur. In accord

with this, Bettelheim (1950) noted that in his schizophrenic children "the fear that their bodies are in poor working condition persists long after the disturbance has disappeared . . . the fear that they may be unable to control the movements of the body usually persists much longer than their actual failure to do so."

There is some suggestion that these feelings of vulnerability are closely related to the individual's perception of his external environment as well. Federn (1952) stated that schizophrenia involved a hyper-cathexis of objects as well as a lack of boundary cathexis. And, as we have discussed, penetrability reflects the existence of outside forces over which the schizophrenic experiences no feeling of control. A complementary treatment approach might then be to minimize the number of cathectable objects in the patient's environment and to make those present as predictable as possible. Support for this is provided by Reitman and Cleveland (1964) who found that Barrier scores of schizophrenics went up and Penetration scores went down following sensory deprivation. Des Lauriers (1952) emphasizes this, too, when he indicates that the therapist must be a consistent object.

While the results are far from definitive, there also appears to be a trend in the data indicating that experiences which emphasize the patient's control over his body are the most effective. This type of experience resulted

in the highest increase in boundary definiteness and a decrease in penetrability. This is, of course, congruent with Des Lauriers' position as well as the position of others who emphasize the schizophrenic's concern with controlling himself and his environment, and his need to learn to do so.

The cognitive approach used in the present study did not prove to be a successful way in which to stimulate boundary awareness. This failure probably indicates not so much that a purely cognitive treatment orientation is doomed to failure, but rather emphasizes that which has been discovered by most therapists who have been effective in treating schizophrenic patients. The therapist must intrude upon the patient; there must be no way the patient can ignore the stimulation; he must be forced to be aware.

Areas for Further Research

The present research raises at least as many questions as it answers. The first question, which arises in light of the fact that induced somatic awareness can indeed increase boundary definiteness, is "how long does the effect last?" The posttest in the present study was conducted immediately following the experimental conditions. That the effects achieved were as dramatic as they were is, in and of itself, remarkable. However, it would be

unreasonable to expect that an isolated 15 minute session would have any long term effect.

Assuming the temporary nature of the effect raises a second question. "Would a consistent program of induced somatic awareness carried out over time result, as Des Lauriers' theory would lead us to assume, in a stabilized increase in boundary definiteness?" And, if so, what are some of the important parameters of such a program? For example, would the consistency with which such a program was carried out, in terms of such things as regularity of the sessions and predictability of the stimulation received, be an important variable? Would keeping the patient in an isolated and restful state between sessions be of benefit, as both theory and the sensory deprivation findings might give us cause to expect? Is it important for a program such as this to be an interpersonal one?

An issue of particular concern is raised when the magnitude of change on the Barrier score obtained by the different groups is compared to the amount of subject activity demanded by the various between-test tasks. The magnitude of the Barrier score increases parallels the amount of activity called forth by these various tasks. There is, thus, a possibility that it is not somatic awareness which is responsible for changes in boundary definiteness, but activity *per se*. This possibility needs to be tested.

Another area of interest concerns the role of experienced control. Clinicians such as Des Lauriers and Bettelheim believe that the individual's perception of his body as something over which he has control is an important step in the recovery process. The trends in the present data, as mentioned previously, indicate that experiences which emphasize the patient's control over his own body seem to be the most effective in reestablishing boundaries. Assuming that this reestablishment of boundaries is an integral part of the recovery process, the present results provide some support of an intermediate nature for this position. More definitive evidence is still needed, however.

A more precise definition of the Penetration of Boundary score is of significance to future research into the recovery process. Is it, as was suggested here, really a measure of feelings of vulnerability or bodily anxiety? If so, would a consistent program of induced somatic awareness which resulted in a stabilized increase in body definiteness result in a subsequent decline in the Penetration score as well? Is it related to feelings of helplessness in the face of outside forces and hence would it decrease with increasing feelings of experienced control?

Another question which arises is "what effects does a reintegration of body ego have on other areas of behavior, most specifically cognitive dysfunctioning?" Of particular interest is the phenomenon of over-inclusion first developed

operationally by Cameron (1939) and defined by him as "the result of unstable ego organization which fails to limit the number and kind of simultaneously effective excitants to a relatively few coherent ones" (Cameron, 1963). The obvious prototype for adequate inclusion-exclusion is the accurate definition of one's own boundaries. If one can not distinguish between me and not-me, which is the most basic categorization, how can he be expected to be able to distinguish between this and that. Is boundary definiteness, then, related to over-inclusion and does over-inclusion decrease with increasing boundary definiteness?

SUMMARY

Federn (1952) theorized that schizophrenia involves a lack of cathexis of ego boundaries. At the most basic level this consists of a lack of bodily ego cathexis. Starting with this postulate, Des Lauriers (1962) developed a theory of psychotherapy in which the central premise is that the therapist must stimulate in the schizophrenic patient "reactions of interest in, and attention to this bodily self as the separating boundary from what is not himself, and as the primary instrument of his contacts with and actions on his environment."

The present study tested the proposition that inducing somatic awareness in schizophrenic patients can influence their body image boundaries. Seventy-five hospitalized schizophrenic males, 15 patients in each of five different groups, were given Form A of the Holtzman Inkblot Test (HIT), underwent the experimental or control conditions appropriate to the group to which they had been assigned, and were then administered Form B of the HIT. Only the first 25 cards of the Holtzman forms were used.

The between-test conditions imposed on the different groups were as follows:

A Somatic group did a number of physical exercises which induced somatic awareness in the subjects under conditions which maximized their involvement in the process.

Subjects in an Imagination group were asked to imagine what it would feel like to do those same exercises in order to induce somatic awareness in them while at the same time keeping their involvement minimal.

A Separateness group underwent a number of sensory experiences calculated to induce somatic awareness and to maximize boundary definiteness.

A Fusion group also underwent a number of sensory experiences which induced somatic awareness but which, at the same time, attempted to minimize boundary definiteness.

Subjects in the Control group spent the time between tests viewing colored slides through an automatic desk-top viewer.

The boundary indices developed by Fisher and Cleveland (1958), the Barrier and Penetration of Boundary scores, were used as measures of body boundary definiteness.

Inducing somatic awareness in these schizophrenic patients increased their boundary definiteness as indicated by the significant increases in Barrier score achieved by the Somatic, Separateness, and Fusion groups. This was interpreted as direct support for Des Lauriers' theory. The attempt to increase boundary definiteness under conditions of minimal involvement, i.e., through cognitive means,

failed. This failure was interpreted as demonstrating not so much that a cognitive approach is not feasible but that stimulation which the patient can not avoid or ignore is necessary in dealing with schizophrenic patients.

The Penetration of Boundary score was only slightly affected by the experimental manipulations. It was suggested that this score is a measure of an affective component of perceived boundary definiteness and is indicative of anxiety about body integrity and one's ability to control what happens to it. As such, it would not be much affected by isolated experiences, but would only be subject to stabilized, longer term gains in perceived definiteness. In addition, any effects the experimental manipulation had, or might have had, on this measure were no doubt depressed by the heavy tranquilization on which these patients were maintained.

A highly significant correlation between the Barrier and Penetration scores was obtained for the pretest data. In addition, the pretest boundary scores as well as the boundary score changes from pretest to posttest were correlated with selected demographic characteristics of the sample. The Barrier score was found to be independent of these characteristics for the most part. The Penetration score, however, was found to be positively related to the patients' ages and their ages at first hospitalization.

Various ramifications of these results and their implications for the psychotherapeutic treatment of schizophrenic patients were discussed. In addition, areas of needed future research were delineated.

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APPENDIX A

APPENDIX A

Instructions to Subjects

Well, Mr. _____, let me tell you why I asked you to come over to see me. I have a test of imagination here, an inkblot test. Have you ever taken an inkblot test before? Well, this is a fairly new one. It was just made in 1958 and we still don't know a whole lot about it. What I'm trying to do is to give it to as many people here in the hospital who are under 40 years of age as I can, just to see what kind of answers people give to the various cards. OK? Good! Now what I do is give you the cards one at a time. You look at them and tell me whatever you think they might look like, represent, or be. You don't have to worry about right answers or wrong answers or what it's supposed to look like--they're just inkblots and different people see different things. You'll probably see more than one thing on every card, but I only want one answer for each card. I'll be writing down what you say and I'll ask you a few questions about each one as we go along in order to try to see it the way you do. As you can see there are a lot of cards, and I do have a few other things I'd like you to do for me. So what I like to do is to go through half of the cards, take a

break and go do the other things, and then come back and finish this one up. Otherwise I think this one gets a little tedious. OK? OK, I guess that's all I need to tell you unless you have some questions? Alright, then, let's get started, shall we?

(Form A is administered)

OK, let's take a break from this and if you'll come in the other room with me I have a few other things I'd like you to do for me.

(Subject undergoes experimental conditions)

OK, let's go back and finish up that first test, shall we.

(Form B is administered)

OK, Mr. _____, that's it unless you have any questions? Thank you very much for your time and cooperation. I appreciate it very much.

Instructions to Subjects during Experimental Conditions

Control Group

OK, Mr. _____. Now I'd just like you to watch these slides and relax for 15 minutes.

Imagination Group

OK, Mr. _____. Now I'd like to demonstrate some exercises for you. I'll do the exercise a couple of times and then I want you to imagine, just imagine, that you are doing that exercise. While you are imagining doing the exercise, I want you to focus your attention on how you think your body would feel. (Demonstration) OK, just imagine you are doing that exercise. Remember, focus your attention on how you think your body would feel at all times—the feelings, physical sensations, and so on.

Somatic Group

OK, Mr. _____. Now I'd like you to do some exercises. I'll demonstrate the exercise a couple of times and then I want you to do that exercise. While you are doing the exercise, I want you to focus your attention on how your body feels. (Demonstration) OK, now I want you to do that exercise. Remember, focus your attention on how your body feels at all times--the feelings, physical sensations, and so on.

Separateness Group

OK, Mr. _____. Now I'd like you to lie on this table for a few minutes. That's a pretty hard table and while you're lying there I want you to focus your attention on how your body feels while you're lying on it. Think about the feelings, physical sensations, and so on. (after 4½ minutes) OK, now would you describe to me as best you can how your body feels.

Good! Now here I have a bucket of water. I would like you to put your hand in it and hold it there for a minute. While your hand is in the water, I want you to focus your attention on how it feels and describe all the sensations you experience. (this is done a second time with the other hand)

Alright! Now, if you will, I'd like you to take five minutes and write down all the ways you can think of in which you and I are different. For example, (E then points out a physical difference).

Fusion Group

OK, Mr. _____. Now I'd like you to lie on this mattress for a few minutes. That's a nice soft mattress and while you're lying there I want you to focus your attention on how your body feels while you're lying on it. Think about the feelings, physical sensations, and so on.

(after 4½ minutes) OK, now would you describe to me as best you can how your body feels.

Good! Now here I have a bucket of water. I would like you to put your hand in it and hold it there for a minute. While your hand is in the water, I want you to focus your attention on how it feels and describe all the sensations you experience (this is done a second time with the other hand).

Alright! Now, if you will, I'd like you to take five minutes and write down all the ways you can think of in which you and I are alike. For example, (E then points out a physical similarity).

APPENDIX B

APPENDIX B

Rules for Scoring Barrier*

The scoring of Barrier adheres closely to the system outlined by Fisher and Cleveland in their studies of body image and personality. The concept of Barrier refers to any protective covering, membrane, shell, or skin that might be symbolically related to the perception of body-image boundaries. A score of 1 is given each response where Barrier is present; a score of 0 is given when Barrier is absent. With minor editorial revision, detailed instructions for scoring Barrier have been taken directly from Fisher and Cleveland.

(a) All separate articles of clothing are scored Barrier. This is true also of all articles of clothing worn by animals and birds. Clothing worn by a person is scored only if it is unusual in its covering or decorative function.

woman in a high-necked dress
person in a fancy costume
woman in a long nightdress
man with a crown
man in coat with a lace collar
man in robe
man with a high collar
imp with a cap that has a tassel on it
person with mittens or gloves
people with hoods
feet with fancy red socks
man with a cook's hat
man with chaps

*Reproduced in full from W. H. Holtzman, et al., Inkblot perception and personality. Austin, Texas: University of Texas Press, 1961.

Examples of clothing being worn which are scored 0.

woman in a dress
man with a hat
man with a coat on

(b) Animals or creatures whose skins are distinctive or unusual are scored only if more than the head is given.

alligator	fox	lynx	prairie dog	skunk
badger	goat	mink	rabbit	tiger
beaver	hippo	mole	rhinoceros	walrus
bobcat	hyena	mountain goat	scorpion	weasel
chameleon	leopard	peacock	sea lion	wildcat
coyote	lion	penquin	sheep or lamb	wolverine
crocodile	lizard	porcupine	Siamese cat	zebra

An ordinary cat is scored 0.

Any animal skin may be considered Barrier if unusual emphasis is placed on the textured, fuzzy, mottled, or striped character of the surface.

fuzzy skin
skin with spots
skin with stripes

Included are all shelled creatures except crabs and lobsters.

mussel snail shrimp clam turtle

(c) Score reference to enclosed openings in the earth.

valley ravine mine-shaft well canal

(d) Score references to unusual animal containers.

bloated cat pregnant woman kangaroo udder

(e) Score references to overhanging or protective surfaces.

umbrella awning dome shield

(f) Score references to things that are armored or much dependent on their own containing walls for protection.

tank battleship armored car man in armor rocket ship in space

(g) Score references to things being covered, surrounded, or concealed.

bowl overgrown by a plant
house covered by smoke
log covered by moss
person behind a tree
person caught between two stones
man covered with a blanket
person hidden by something
someone peeking out from behind a stone
donkey with a load covering his back

(h) Score references to things with unusual container-like shapes or properties.

bagpipes throne ferris wheel chair

(i) Masks or buildings are generally scored 0. There are, however, a few exceptional instances in which unique structures are scored 1.

tents arch quonset hut igloo fort

(j) Additional general examples of Barrier responses scored 1.

basket
bay
bell
book
book ends
bottle
bubble
cage
candleholder
cave
cocoon
cove
curtain
dancer with veil
frosting on cake
fuzzy poodle
globe
harbor
headdress
hedge along a walk
helmet
inlet
lake surrounded by land
mountain covered with snow
net
pot
river
screen
spoon
urn
wall
wallpaper
wig
land surrounded by water

Rules for Scoring Penetration*

As in the case of Barrier, the scoring of Penetration is taken directly from Fisher and Cleveland. Any concept which might be symbolic of an individual's feeling that his body exterior is of little protective value and can be easily penetrated is likely to be scored 1 on Penetration. Fisher and Cleveland have suggested three types of images with which the subject may express such feelings of body penetration: (1) images that involve the penetration, disruption, or wearing away of the outer surface of things ("bullet penetrating flesh," "squashed bug"); (2) images that emphasize modes or channels for getting into the interior of things or for passing from the interior outward to the exterior ("open mouth," "doorway"); and (3) images that involve the surface of things as being easily permeable or fragile ("soft ball of cotton candy," "fluffy cloud"). Detailed instructions are given below:

(a) Score 1 for all references to the mouth being opened or being used for intake or expulsion.

dog eating	man vomiting
dog yawning	person with mouth open
man sticking tongue out	animal drinking
man spitting	

*Reproduced in full from W. H. Holtzman, et al., Inkblot perception and personality. Austin, Texas: University of Texas Press, 1961.

References to use of the mouth for singing or talking are scored 0.

(b) Score 1 for all references to evading, bypassing, or penetrating through the exterior of an object and getting to the interior.

X-ray picture
body as seen through a flouroscope
cross section of an organ
body cut open
inside of the body
autopsy

(c) Score 1 for references to the body wall being broken, fractured, injured or damaged.

mashed bug
wounded man
person bleeding
wound
man stabbed
man's skin stripped off

(d) Score 1 for responses involving some kind of degeneration of surface.

withering skin
diseased skin
withered leaf
deteriorating flesh

(e) Score 1 for openings in the earth that have no set boundaries, or from which things are being expelled.

bottomless abyss
fountain shooting up
geyser spurting out of ground
oil gusher coming in

(f) Score 1 for all openings.

anus
birth canal
window
doorway
entrance
looking into the throat
nostril
rectum
vagina

(g) Score 1 for references to things which are insubstantial and without palpable boundaries.

cotton candy
ghost
shadow
soft mud

(h) Score 1 for all references to transparency.

can see through the dress
transparent window

(i) Further general examples of Penetration responses that are scored 1:

animal chewing on a tree
broken-up butterfly
jigsaw not put together
doorway
fish with meat taken off
broken body
bat with holes
torn fur coat
frayed wings
deteriorated wings
grasshopper pecking at something
harbor entrance
man defecating

APPENDIX C

TABLE 1

Test scores and demographic data: Control Group

Subject	Age	Education	Marital Status	Occupation	Age at first Hospitalization	Number of Hospitalizations	Total length of Hospitalizations*	Barrier			Penetration		
								Pretest	Posttest	Change	Pretest	Posttest	Change
10	21	10	S	apprentice	18	1	32	8	6	-2	5	3	-2
13	23	12	S	sales trainee	23	1	3	4	4	0	6	6	0
14	34	12	D	tool & die	31	2	42	1	5	+4	1	1	0
19	34	11	S	machinist	33	1	10	4	5	+1	2	5	+3
26	32	10	M	clerk	28	1	51	5	2	-3	3	3	0
32	28	12	S	none	20	4	46	8	9	+1	4	4	0
37	34	10	S	none	20	1	167	1	5	+4	1	2	+1
46	33	12	S	odd jobs	32	2	15	0	0	0	3	4	+1
49	22	8	S	odd jobs	20	3	19	2	1	-1	5	4	-1
56	24	12	S	odd jobs	22	2	30	1	0	-1	0	0	0
65	25	13	S	sheet metal	23	3	13	4	2	-2	3	2	-1
80	32	11	M	laborer	26	1	74	4	4	0	3	3	0
83	26	11	S	none	20	1	81	5	6	+1	5	2	-3
88	35	12	S	factory	25	4	120	5	4	-1	5	8	+3
89	33	12	S	laborer	21	2	135	7	6	-1	12	8	-4
$\bar{X}$	29.06	11.20			24.13	1.93	55.86	3.93	3.93	0.00	3.87	3.67	-0.20

*in months.

TABLE 2

Test scores and demographic data: Imagination Group

Subject	Age	Education	Marital Status	Occupation	Age at first Hospitalization	Number of Hospitalizations	Total length of Hospitalizations*	Barrier			Penetration		
								Pretest	Posttest	Change	Pretest	Posttest	Change
4	31	16	S	teacher	29	3	12	2	1	-1	4	1	-3
5	34	10	S	laborer	24	1	126	2	4	+2	0	0	0
25	31	12	S	kitchen labor	27	3	52	4	4	0	1	1	0
33	30	13	S	engineer work	26	1	42	4	8	+4	6	3	-3
43	33	12	S	clerk	31	1	20	2	4	+2	1	0	-1
50	32	10	S	clerk	20	1	144	0	0	0	1	1	0
51	23	12	S	odd jobs	23	1	4	3	1	-2	4	0	-4
61	26	12	S	construction	24	2	23	5	9	+4	3	4	+1
67	35	13	S	none	22	3	156	0	3	+3	1	3	+2
68	32	9	S	odd jobs	21	8	65	4	2	-2	5	4	-1
69	30	11	S	auto factory	26	4	29	0	0	0	1	0	-1
76	30	12	S	odd jobs	25	1	56	8	6	-2	1	7	+6
78	35	9	S	odd jobs	21	2	158	2	0	-2	11	5	-6
82	31	12	S	odd jobs	24	4	15	5	4	-1	2	5	+3
85	32	15	D	student	30	2	33	2	2	0	0	1	+1
$\bar{X}$	31.00	11.86			24.86	2.46	62.33	2.87	3.20	+0.33	2.73	2.33	-0.40

*in months

TABLE 3

Test scores and demographic data: Somatic Group

Subject	Age	Education	Marital Status	Occupation	Age at first Hospitalization	Number of Hospitalizations	Total length of Hospitalizations*	Barrier			Penetration		
								Pretest	Posttest	Change	Pretest	Posttest	Change
6	31	12	S	laborer	21	2	122	4	9	+5	1	1	0
7	20	12	S	truck loader	20	1	6	1	1	0	1	0	-1
8	29	--	S	none	19	3	120	5	10	+5	13	10	-3
23	35	11	S	none	35	1	2	2	4	+2	3	1	-2
24	33	12	S	milling operator	31	2	32	2	3	+1	2	1	-1
36	33	12	S	odd jobs	20	1	162	3	8	+5	7	2	-5
44	32	15	S	general office	26	2	9	5	7	+2	12	5	-7
45	33	10	S	odd jobs	24	2	30	8	7	-1	2	4	+2
52	34	12	D	landscaping	27	11	46	4	6	+2	0	3	+3
59	22	10	S	odd jobs	20	3	17	0	0	0	2	0	-2
62	32	8	S	odd jobs	21	4	96	1	9	+8	2	0	-2
64	28	10	S	odd jobs	19	1	108	0	2	+2	0	1	+1
79	32	12	S	welder	21	2	101	4	7	+3	4	1	-3
81	26	13	S	reupolstering	26	1	5	4	10	+6	1	1	0
86	35	11	S	porter	23	3	141	2	7	+5	2	5	+3
$\bar{X}$	30.33	10.67			23.53	2.60	66.46	3.00	6.00	+3.00	3.47	2.33	-1.14

*in months.

TABLE 4

Test scores and demographic data: Separateness Group

Subject	Age	Education	Marital Status	Occupation	Age at first Hospitalization	Number of Hospitalizations	Total length of Hospitalizations*	Barrier			Penetration		
								Pretest	Posttest	Change	Pretest	Posttest	Change
1	31	10	S	odd jobs	30	2	12	4	3	-1	1	3	+2
2	32	12	D	IBM operator	26	3	21	4	5	+1	1	0	-1
15	35	10	M	none	20	1	180	4	8	+4	2	2	0
40	20	11	S	cook	20	1	2	4	8	+4	5	3	-2
54	35	12	M	none	27	3	84	6	15	+9	1	1	0
71	33	12	S	none	28	2	58	6	10	+4	2	4	+2
73	35	12	S	odd jobs	20	4	36	6	5	-1	3	0	-3
96	28	12	S	odd jobs	25	2	24	10	11	+1	3	5	+2
101	34	12	S	odd jobs	25	2	82	1	2	+1	3	2	-1
102	34	8	M	factory	30	6	8	5	9	+4	5	2	-3
104	21	--	-	----	--	-	---	3	12	+9	3	6	+3
105	25	12	S	janitor	24	3	3	5	5	0	4	3	-1
106	29	12	S	none	22	3	59	6	6	0	4	4	0
108	25	12	S	none	22	1	36	7	9	+2	4	5	+1
111	28	--	S	none	25	1	40	0	4	+4	1	4	+3
$\bar{X}$	30.28	11.30			24.57	2.42	46.07	4.73	7.46	+2.73	2.80	2.93	+0.13

*in months.

TABLE 5

Test scores and demographic data: Fusion Group

Subject	Age	Education	Marital Status	Occupation	Age at first Hospitalization	Number of Hospitalizations	Total length of Hospitalizations*	Barrier			Penetration		
								Pretest	Posttest	Change	Pretest	Posttest	Change
9	24	12	S	porter	18	5	10	2	7	+5	2	2	0
11	31	12	S	dish washer	29	2	6	2	2	0	5	5	0
17	33	10	S	none	24	3	29	0	0	0	0	3	**+3**
30	34	--	S	none	21	1	156	3	5	+2	1	3	**+2**
60	25	12	S	dish washer	20	4	43	8	9	+1	2	3	**+1**
87	29	6	S	odd jobs	24	1	67	1	4	+3	0	0	0
92	21	12	S	none	20	3	6	8	5	-3	8	4	-4
93	26	12	S	stock boy	23	2	20	8	9	+1	3	5	+2
95	35	9	S	none	20	1	174	3	8	+5	2	4	+2
98	22	9	M	odd jobs	18	3	10	3	6	+3	4	5	+1
99	25	12	S	factory	24	1	19	1	5	+4	3	4	+1
107	26	12	S	factory	25	1	10	4	5	+1	2	4	+2
110	20	12	S	welder	20	1	4	4	8	+4	4	2	-2
114	23	12	S	none	20	1	27	0	0	0	0	0	0
115	32	13	S	odd jobs	26	2	72	1	9	+8	1	2	+1
$\bar{X}$	27.06	11.07			22.13	2.06	43.53	3.20	5.47	+2.47	2.47	3.07	+0.60

*in months.