THE UTILIZATION OF SOCIAL REWARD, CENSURE, AND ADDITIONAL INFORMATIONAL FEEDBACK WITH SCHIZOPHRENIC PATIENTS IN A QUASI-THERAPEUTIC SITUATION

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CHAPTER I

THE PROBLEM

General statement of the problem. A professional therapist who is interested in the effective treatment of schizophrenic patients in the classical, one-to-one, therapist-client relationship, is aware that the therapist's activities in the therapy session strongly influence his patient. Three such activities are: (1) verbal approval (social reward) for statements, actions, interpretations, decisions, etc., made by his client; (2) verbal disapproval (social censure) for the client's statements, actions, interpretations, decisions, etc., and (3) presentation of special information (additional informational feedback) related to the topics of discussion during the therapy session. The use of the first two activities (reward and censure) as therapeutic maneuvers closely parallels those techniques in which both physical and social reinforcement are applied to bring about behavioral changes. These procedures are categorized with the behavioral therapies in which there is a conscious effort to apply some of the more well-substantiated and reliable principles of learning to the treatment of persons exhibiting pathological behavior patterns. The third activity, "feeding" information to the patient, may be aligned most closely with techniques that are based on the assumption that the therapist is an expert in the methods of social adjustment, and that it is his task to teach his client the skills with which that client might successfully adjust to

society and to life in general.

The purpose of this present study is to manipulate systematically several aspects of the three variables in an attempt to discover their relative and combined effectiveness in improving the performances of schizophrenic patients on a transfer of training, problem-solving task. Both presence and absence of social reward and censure, as well as four levels of additional informational feedback (neutral, positive, negative and combined) are investigated in a factorial arrangement of treatments. The task from which measures of performance effectiveness are taken is designed to contain many of the structural factors and elements found in therapeutic and social situations.

Hypotheses. This study is intended primarily as an empirical search to determine which combinations of reward, censure and informational feedback result in the best performance by schizophrenic patients. Even though it is not the special interest of this study to supply evidence for or against any of the numerous theories dealing with the dynamics underlying schizophrenic behavior, the design of the experiment does relate to several theoretical notions about schizophrenic performance, and the results can be discussed in the light of these notions. With this in mind, the following, very general, hypotheses about the performance of schizophrenic patients are advanced:

1. Schizophrenic patients will perform more accurately in a problem-solving situation following training in which reinforcement, as opposed to no reinforcement, is applied. That is, performance will be superior for those subjects who are rewarded and/or censured than for those who are neither rewarded nor censured.

2. Performance will be best for those patients who receive a

maximum amount of information about solutions to the task problems during training.

3. There will be differences in the final performance levels related to the type of information given during training.

4. The experimental treatment effects will not interact with one another. This form of the hypothesis is presented since little is known about the combined effects of these factors with schizophrenics.

The literature related to these hypotheses is reviewed in the next chapter.

CHAPTER II

REVIEW OF THE LITERATURE

Physical reward and punishment. Behavior therapists have manipulated physical reward and punishment variables effectively to bring about behavioral change in schizophrenics. Isaacs, Thomas and Goldiamond (1960) described a patient who gradually began speaking after 19 years of silence in order to obtain chewing gum. A similar patient began verbalizing and exhibiting several types of cooperative behaviors when chewing gum was employed as a reward. Ayllon (1963) described a case in which a female schizophrenic learned to keep to a diet and to shed over 21 pounds of extra clothing. The hospital staff punished those instances of her behavior that supported the symptoms by removing some of her meal privileges, and rewarded dieting and clothes-shedding behavior by permitting her to eat as usual.

While these and many similar studies that have been produced by behavioral therapists and researchers (see Krasner and Ullman, 1965; Ullman and Krasner, 1965; Eysenck, 1964) are only slightly comparable to situations in which the patient solves problems in a therapist-patient setting, they do demonstrate the effectiveness of the use of physical reward and punishment in treating schizophrenics.

Studies utilizing physical rewards such as cigarettes, candy, money, and physical punishments such as electrical shock and noxious sounds, have been carried out with schizophrenics in non-therapeutic perform-

ance and learning situations. Three major reviewers, Maher (1966), Silverman (1963), and Buss and Lang (1965), all agree that administration of physical, noxious reinforcement has a greater facilitative effect on the patients' performances than do applications of physical, positive reinforcement, or no reinforcement. Schizophrenics, however, do tend to learn at least something when such physical rewards are employed.

Social reward and punishment (censure). The research literature dealing with the nature and extent of the effects of social reward and punishment (hereafter referred to as social censure), which more closely resemble activities that can occur in therapy sessions, has not led to such close agreement about conclusions as is the case with the work concerned with physical reinforcement. Social reinforcement is usually defined as reinforcement given by, or interpreted as being administered by, social agents. The basic paradigm for studies investigating the effects of social reinforcement with schizophrenics usually has the patients performing on some relatively simple psycho-motor task such as reaction time, pegboard activites, pursuit rotor, letter cancellation, digit-symbol tasks, and so forth. At times, more complex problems dealing with concept formation and verbal learning are employed. While performing on these tasks, various reinforcement conditions are introduced. Social reward conditions might involve telling the subjects, "That's right," or, "Good," or, "You're doing well," and so on. Other variations of praising, positive urging and complimentary accuracy communications, whether response contingent or not, have been employed. Examples of procedures for application of social censure are telling the subjects, "That's wrong," or, "You're doing poorly," or using other

critical phrases and actions to convey that performance is unsatisfactory. Analyses are then carried out with dependent measures taken from the performances of the subjects who worked under one or more of the conditions of reinforcement.

The results that have been obtained from such studies, and the conclusions drawn about them, have been quite variable. One opinion based on these studies argues for the effectiveness of social censure. Silverman (1963), in a review of the literature, concludes that "verbal response-contingent noxious reinforcement produce[s] more significant facilitative effects on schizophrenics' performances than do positive reinforcements or no reinforcements" (p. 201). Atkinson and Robinson (1961) conclude that "When punishment follows any incorrect response or failure to respond, this differential leads to faster learning by schizophrenic subjects under punishment conditions than reward conditions" (p. 322). Several studies cited by these authors support this conclusion.

Buss, Weiner and Buss (1954) studied three groups of mildly disturbed neuropsychiatric patients who performed on a type of height discrimination task. The dependent variable was the amount of primary stimulus generalization. Group I (RIGHT-WRONG) subjects were told, "Right," after correct choices and, "Wrong," after incorrect choices. Group II (NOTHING-WRONG) subjects were told nothing after choosing correctly, and "Wrong" after incorrect responses. Group III (RIGHT-NOTHING) subjects were rewarded by being told, "Right," after correct choices and were told nothing after making incorrect choices. The results showed that the RIGHT-WRONG and NOTHING-WRONG groups had steeper generalization gradients (better discrimination) than the RIGHT-

NOTHING group. This finding would indicate that as long as censure for incorrect responses is employed it will result in better performance by patients whether reward is used or not.

The same three reinforcement conditions were used in a study by Buss, Braden, Orgel and Buss (1956). A total of 130 neuropsychiatric patients performed at an object identification task in three experiments in which either two or all three of the treatment combinations were studied. The results, consistent across all three experiments, indicated that the RIGHT-NOTHING groups learned more slowly than the RIGHT-WRONG and NOTHING-WRONG groups. The latter two groups' performances were similar.

Buss and Buss (1956) employed the Wisconsin Card Sorting Test to study these three reinforcement combinations. Eighty-five neuropsychiatric patients were tested in two experiments. Again it was found that the RIGHT-WRONG and NOTHING-WRONG groups were equal to each other and superior to the RIGHT-NOTHING group in both number and color concept tasks.

The three preceding studies all conclude that censure is more critical in the learning and performance of neuropsychiatric patients than is reward.

Bleke (1955) found that a group of schizophrenics with poor premorbid adjustment who were censured for incorrect performances on a task requiring them to learn a series of push and pull lever responses to a list of words, showed greater reminiscence, and thus, presumably, more original learning, than a similar group of patients who had been rewarded for correct performances. The reward and censure were applied by flashing on signs saying RIGHT and WRONG respectively.

In two experiments involving a total of 63 male schizophrenics, Cavanaugh, Cohen and Lang (1960) studied reaction-time performances under the following four conditions: CENSURE, where the subjects were told, "That was bad--too slow," whenever reaction times were slow; REWARD, where the subjects were told, "That was good--very fast," whenever their reaction times were quick; NEUTRAL INFORMATION, where a non-noxious tone was presented whenever a subject responded too slowly; and CONTROL, where no information of any kind was given. Both the NEUTRAL INFORMATION and the CENSURE groups improved in performance equally, and significantly more than did the REWARD and CONTROL groups. The REWARD subjects performed no better than did the CONTROLS. These findings were interpreted as showing that social censure can effectively modify the behavior of schizophrenics. In this case, censure was much more effective than reward.

Goldman (1961) studied 72 male schizophrenics divided into high-dependency anxious and low-dependency anxious groups. These patients performed on a paired-associate learning task. One-third in each dependency grouping was rewarded ("good") for correct responses; one-third was censured ("wrong") for incorrect responses; and the remaining third made up a control group. While somewhat different results were found for the two dependency divisions, the censure condition tended to result in superior overall performance. In the high dependency subjects, censure facilitated both acquisition and improvement scores while reward was least effective. In the low dependency subjects, rapid learning took place under both reward and control conditions while some disruption took place under the censure condition. However, once the disruption ceased, improvement took place most rapidly

in the censured subjects.

Goodstein, Guertin and Blackburn (1961) studied the choice reaction times of 42 schizophrenics and 42 general medical patients. All subjects practiced for thirty trials and then 14 in each group were told they had done very well; another 14 were informed that they had done poorly; and the remaining 14 were given nonevaluative statements. Then, all subjects performed for thirty more trials. The schizophrenic subjects performed more poorly than the medical patients. In the schizophrenic group, the "failure" subjects made the most improvement, the "success" subjects were next, with the controls making the least improvement. While the "failure" subjects were significantly more improved than the controls, they were not quite significantly better than the "success" group ($p. < .10$). The "success" group also barely missed being significantly better than the controls ($p. < .10$).

Losen (1961) studied arithmetical reasoning and digit-span performances in four groups of "good premorbid" schizophrenics. One group received censure ("No, that was wrong") after every incorrect response, while another group was censured after <u>every other</u> incorrect response. The two remaining groups received no censure. One of these latter groups was shown the correct solution whenever a mistake was made. Both the 100 per cent and 50 per cent censure groups showed significant improvement in performance on both tasks while the remaining two groups showed no improvement on either task. While this study again demonstrates the power of social censure on the performance of schizophrenics, it unfortunately did not include a rewarded group for comparison.

In a study by Johannsen (1962), 105 schizophrenics, separated into three groups, performed for several sessions at a letter-cancellation

task. After each performance session the subjects were either punished (told their performances were inadequate and below the average), rewarded (told their performances were above average), or given no reinforcement of any kind. The results indicated that performance was best under punishment, poorest under control and intermediate under reward conditions.

Ullman and Forsythe (1959) tested 32 schizophrenics in a paired-associate learning task under conditions of either positive or negative examiner responses. They found that performance under the negative condition tended to be superior.

Other similar studies that have also concluded that social censure is quite effective with schizophrenics include those of Brooker (1962), Fischer (1963) and Koppenhaver (1961). Overall, the bulk of the studies supporting this conclusion is quite extensive.

On the basis of some of their own work, Atkinson and Robinson (1961) have even suggested that "Reward with schizophrenic subjects in this kind of situation does not serve as positive reinforcement and may actually have some debilitating effects" (p. 325). These authors report two studies using a total of 140 schizophrenics to demonstrate their point. In the first experiment there were two groups of female schizophrenics performing on three paired-associate learning tasks. One group received social approval (e.g., "good") for correct responses, and the other received social censure (e.g., "wrong") for incorrect responses. Across the three lists the reward group's performance became worse, whereas the censured subjects improved steadily.

In the second study, several male schizophrenic groups were used. Of interest here are the reward and censure groups which were reinforced

in the same manner as in the previous study. The results again showed the censure group as performing better. While the reward group did not perform statistically less efficiently than a control group, its performance tended in that direction.

In some contrast to the conclusions drawn above, Maher (1966) has decided that "Both praise and censure serve to improve the learning of responses by schizophrenics, when compared with learning without social reinforcement. Praise seems to be, on the whole, more effective than censure in this respect" (p. 388). He describes studies by Olson (1958), and Stotsky (1957) to support his position. In general, these researchers found that praise (social reward) facilitated performance in relatively simple tasks.

Olsen (1958) administered fifteen timed trials of a digit-symbol task to three groups of 15 male schizophrenics each. During two rest periods, one group was told it was doing very well; another group was informed it was doing very poorly; and the third group was given no evaluative information. The two groups receiving the evaluation statements improved their performances more than the controls did. However, the group receiving the positive evaluation statement improved significantly more than the negative evaluation group.

Thirty male schizophrenics were tested for reaction-time and Purdue Pegboard performance in the study by Stotsky (1957). Twenty of these patients were praised and urged to do better by their own therapists after having had some practice on the tasks. The praised subjects' performances improved more than the controls'. Praise was, however, less effective on the more complex task (pegboard) than on the simple task (reaction time).

The findings of previously reviewed studies (Goldman, 1961; Goodstein, Guertin and Blackburn, 1961; and Johannsen, 1962) are consistent with the results of the Stotsky research in that the rewarded groups performed better than did non-reinforced controls. While these studies tend to support Maher's viewpoint, his position regarding the superiority of social reward in affecting schizophrenics' performances is difficult to accept in light of the numerous studies which have concluded that social censure is more beneficial.

In holding to an alternate viewpoint, Rodnick and Garmezy (1957) have elaborated on a type of "social censure hypothesis" which contends that censure conditions are more detrimental to schizophrenics in learning and performance than reward or control conditions. They reason that schizophrenics tend to be overly sensitive to criticism and threats of censure. In censure situations they therefore experience strong affect which is inhibiting and deleterious to performance.

To support this thesis, the Bleke (1955) study, the same study that was used to support the opposite position as described by Silverman (1963), was reinterpreted. It was argued that the better reminiscence in the poor premorbid schizophrenics resulted because the inhibiting censure conditions that had been present during original learning were no longer present at the time of the later recall test and, therefore, more adequate functioning was possible.

Webb (1955) administered two equivalent forms of a similarities test to two groups of schizophrenic patients. In the time period between the administration of the first and second forms, the experimental group was critized while the control group was given neither criticism nor praise. The results clearly indicated that the perform-

ance of the experimental subjects became progressively worse while the controls improved.

Garmezy (1952) had schizophrenic patients perform on a discrimination problem where the object was to pull a lever whenever a certain training tone sounded, and to push the lever whenever one of four different tones was presented. For one group, the word RIGHT flashed on when the pull response to the training tone was made. The same reinforcement was also given to the second group with the addition that the word WRONG flashed on whenever a subject erred by pulling the lever in response to the tone that was most unlike the training tone. The group of subjects which received the additional censure information, even though this was delivered quite seldom, performed less efficiently than did the rewarded group.

In summary, to this point the bulk of the literature dealing with the effects of the use of social reward and censure with schizophrenics tends to support the conclusion that reward, if not always beneficial for performance, is usually not detrimental; and that censure seems to be much more effective in increasing efficiency of performance. However, as indicated by other research, these conclusions are not uncontested.

Additional informational feedback. A different interpretation of the effects of reward and censure is given by Buss and Lang (1965). They present both sides of the controversy and decide that "positiveness" or "negativeness" of social reinforcement is not the important factor since similar studies come up with both types of results. They offer the suggestion that the pertinent factor involved is the information that is conveyed to the subject whenever he is reinforced.

Whenever contingent reward and punishment are administered during task performance, the subject has available to him some cues about how well he is performing. He might use the cues associated with the reception of reward as information to rigorously maintain ongoing response patterns, or react to being punished by altering and adjusting his response strategy. Normal individuals seem to make good use of such information. However, there is some question as to how effectively schizophrenics utilize the same information. Buss and Lang conclude that schizophrenics are less able than normals either to maintain correct, or to alter incorrect, response patterns. These patients are also more likely to fail to observe relationships or important task-relevant elements if their attention has not been specifically directed to them. This conclusion is supported by studies of incidental learning in schizophrenics.

Greenberg (1954) studied undirected learning (incidental learning) in 44 male schizophrenics and 44 general medical patients. The subjects were instructed to perform on three different memory tasks (memory for colors, paragraph content, and "metal" items). In the test situation the patients were required to recall items and information which only incidentally accompanied the directed learning task (positions instead of colors, contents of a different paragraph, and "nonmetal" items). The results indicated that the schizophrenic subjects were consistently inferior to the non-psychiatric patients in such recall activity.

Winer (1954) studied four groups of schizophrenics from different nosological categories and one group of normals. The subjects first performed on a manipulative sorting task and later had to recall incidental information relating to the task as well as information about the examiner's person and the environment in which the original task

was performed. Three of the schizophrenic groups performed significantly less efficiently than the normals, while a paranoid group was generally indistinguishable from the normals.

Generally, however, a therapist does not depend upon incidental learning to bring about desired results. If a therapy session is thought of as being somewhat comparable to a classroom situation, the therapist transmits more information to the client than just whether that client is correct or incorrect about the topics of discussion. In classroom techniques, such things as methods, principles, solutions, strategies and so forth are discussed, and, hopefully, absorbed for future use. The question arises as to what amount and type of additional information or feedback is most beneficial for improving performance of schizophrenic patients. In schizophrenics, is it more beneficial for learning and performance to explain principles and solutions explicitly, or to give no information beyond "right" or "wrong" and allow the individuals to discover these principles and solutions for themselves? Scandura (1964) points out that a controversy about this matter exists in teaching philosophies of today and that there is literature that supports both viewpoints. Losen (1961) found that supplying schizophrenics with correct answers to arithmetic problems they had just solved incorrectly did not improve their subsequent performances above that of a control group. Sherman (1964) found opposite trends when he administered extra-reinforcement information to schizophrenics in a paired-associate learning task.

Much research has been carried out with non-schizophrenics in attempts to find the optimal amount and type of information to "feed back" to the student to obtain best performance and transfer. Kittell

(1957), after reporting that the literature tends to support the general view that active discovery of solutions by the pupils themselves is better than having correct responses directly emphasized to them, was interested in the question of teachers aiding the students in discovering solutions. He concluded that there are studies to support any position. Some demonstrate that no help is best (Stacey, 1945; Haselrud and Meyers, 1958). Others show that revealing related, underlying principles leading to discovery is most beneficial (Craig, 1953; Craig, 1956). In his own research, Kittell concludes that giving an "intermediate" amount of direction results in as good as, or better, learning and transfer than imparting either maximum or minimum direction. To further complicate matters, Corman (1957), using twelfth-grade pupils, found that the relationship between amount of guidance and subsequent performance is not a simple one. He suggests that explicit instruction might help the bright students most, whereas less explicit instruction will be just as effective for the less able students. With psychotic patients, Waters (1963) found that chronic schizophrenics performed best when maximal cues were present, whereas acute schizophrenics performed best under minimal cues.

The research with schizophrenics in the area of instruction and informational feedback is sparse. What amount and type of informational feedback is most helpful, over and above being informed of the accuracy of performance, is still an empirical question. In an attempt to gather information about this question, this study includes four levels of an informational feedback factor. These levels vary in both amount and type of information about the solutions to problems that are presented to schizophrenic subjects.

CHAPTER III

METHOD

Subjects. One-hundred and twenty-eight inpatients, 64 males and 64 females, from the Larned State Hospital at Larned, Kansas, were used as subjects in the experiment. All of these patients had been officially diagnosed as schizophrenic. All subjects were above retardation levels of intellectual ability and were literate, verbal and cooperative. Most of the patients were taking drug medication at the time the study was carried out.

Materials. A problem-solving task was specially designed for this study (see Appendix A). The rationale used in its development was based on an attempt to simulate a situation with some of the structural aspects that are contained in therapy and in social situations without having too much of the usual specific, individual content. A type of transfer of training task seemed most appropriate since therapy can be conceived of as being a special learning experience where the client is supposed to acquire that "something" (skill, insight, emotional control, support, etc.) that will aid him in making a better adjustment in the world outside the therapy room. Using a problem-solving task seemed reasonable because good adjustment depends on correctly handling complex living situations where there are many possible alternatives for action, both adaptive and not adaptive. In such circumstances, correct selection from among these alternatives is essential in order to remain

socially adequate and acceptable, as well as physically healthy.

The task consists of fifty-one (51) items. Each item is made up of a set of three words (sometimes with adjectives) printed on a separate card. Forty-eight (48) of these items (the remaining three are samples) are made up of six types of eight items each. The six types correspond to six categories or dimensions: Anatomy, Emotions, Reality-Fantasy, Morality-Immorality, Healthy-Not Healthy, and First Names. As examples, an item from the Anatomy dimension is, lips-kiss-foot. An item from the Morality-Immorality category is, honesty-drunkenness-lying.

These particular dimensions were selected because they relate to significant areas of mental and emotional involvement in the schizophrenic patient (and in the normal person, for that matter). In glancing through Appendix A it can be seen that many of the terms are probably quite high in emotional association value (e.g., guilt, kiss, ghost, sin, lunacy, etc.). This feature was included because the topics which come up in therapy are highly emotional, meaningful, involving and threatening.

The subject's task is to select the one word in each set of three that does not belong with the remaining two. Each item has more than one feasible solution, and, in order to choose correctly with consistency, the subject is required to learn, and apply, up to six rules. These rules relate directly to the six dimensional categories mentioned previously. For successful performance the subject must be able to identify the dimension to which each item belongs and then choose the one term that differs either because it (1) falls outside the dimension, or because (2) one term emphasizes a different aspect of the dimension than the other two. To exemplify the first condition, the correct

choice for the item, lips-kiss-foot, is the word, kiss, since it is not a part of anatomy as are lips and foot. An example of the second condition occurs in such items as, honesty-drunkenness-lying. The correct answer is honesty since it describes a virtue whereas drunkenness and lying are considered immoral. In some cases of items in this latter dimension (as in some other dimensions), two "moral" terms might be present and the correct solution is the choice of the "immoral" word. Appendix A contains a listing of all the items, their dimensional categories and correct solutions.

Since the complex nature of the task called for items which had feasible solutions based on many possible rules and dimensional categories, it was necessary to ensure that each item could, not necessarily would, also be recognized as belonging to its own dimension of the six to which it had been intuitively assigned. Therefore, all of the items were given to undergraduate college students over two occasions to be placed into the six dimensional categories. These judges (24 on one occasion and 19 on another) were informed about the nature of the problem-solving task and the many dimensions the items could belong to. It was explained to them that it was their job to see if these items could be made to fit into the six categories used in this study. These categories were described to them without giving examples about how any particular item could fit into them. They were then asked to place each item into the dimensional category it fit best.

Every item that was not consistently placed into its previously, intuitively assigned category was either revamped or replaced and then rejudged until the final series of items was obtained. For the final list of items, the average agreement by the judges on item assignments

was 95.3 per cent with a range from 88 per cent to 100 per cent. Therefore, even though the items can be seen as belonging to many dimensional categories, they can also fit within the categories of interest in this study.

The first three items of the task are sample problems which have no specified correct solutions. They serve to introduce the subject to the task and to demonstrate the appropriate procedure. The next eighteen problems are training items consisting of three items from each dimensional category arranged in a random fashion. No two items from the same category are listed in succession. Printed on the reverse side of each training item card are the exact statements the experimenter uses in each treatment condition (described in procedure section). These statements are so placed on each card that a master card for each treatment condition can be placed over the back so that the statement(s) for that particular treatment situation appears in the "window(s)" of the master card.

The remaining thirty items make up the test problems from which the dependent measure (number of correct solutions) is taken.

A card rack was constructed to hold the item and master cards in a vertical position on the table in front of the subjects. The rack holds the master card firmly in place but allows swift and easy placement and removal of the item cards.

Procedure. The basic experimental procedure consisted of two phases: (a) training each of the 128 subjects individually under one of sixteen treatment conditions, and, in the same session, (b) testing each subject to determine performance efficiency after training.

In the assignment of the subjects to the sixteen treatment combi-

nations it was necessary to take steps to ensure that intellectual ability across groups would be approximately equal. Intellectual ability estimates and information about education were obtained from hospital chart data. In most cases, psychological reports gave estimates of intellectual functioning and, usually, accompanying intelligence test scores. Where direct estimates and scores were not available, intellectual ability levels were determined from social history data about academic achievement or other information about the patient's abilities.

The subjects were first assigned to one of three intellectual categories labeled Bright, Average or Dull. Whenever intelligence test scores were available, patients were assigned to the categories on the following basis: Bright, 110 and above; Average, 90 to 109; Dull, 70 to 89. In all other cases the patients were assigned to categories on the basis of the informational data gathered from the charts.

The patients were then assigned to eight groups of 16 subjects each so that the subjects in each grouping were fairly homogenous as to intellectual category and range of educational experience. Following this procedure the subjects within each of these preliminary groupings were randomly numbered from 1 to 16. Subjects with identical numbers across the eight groupings made up the sixteen experimental groups. It was necessary in some cases to randomly reassign some subjects toward the last in order to keep the sex ratio at one-half (since the hospital's schizophrenic sex ratio is about one-half). It was also necessary in 27 cases to replace subjects because, for various reasons, they became unavailable for testing. In all of these instances the sex and intellectual rating of the new subjects matched the subjects they

were replacing. Finally, each of the sixteen groups was randomly assigned to one of the sixteen treatment conditions. In this manner each group of eight subjects contained one subject from the Bright intellectual category, five from the Average, and two from the Dull (with a few exceptions). Appendix B presents the intellectual category and educational level, along with the age, length of hospitalization and the specific diagnosis of each patient in each treatment condition.

The same basic test administration procedure was followed for all subjects. Each subject was seated directly across from the experimenter. The first sample item was held up before the subject who was then told, "Please read these three words aloud." Whenever a word was mispronounced the experimenter merely pronounced it correctly but never gave the definition. The experimenter then instructed the subject by saying, "Now pick out and tell me which word in this group does not go with the other two words." After the subject responded, the choice was recorded. The card was removed about three to five seconds after the response was given in order that the subject might study it if he wished. The same directions and procedures were repeated for the last two sample items. The subject was not informed about the accuracy of his choices.

After the third sample item had been administered the experimenter said:

> That is the general idea. I have several more groups of words to show you. I want you to do the same thing you have done with the first three--that is, pick out the word that doesn't fit with the others. Many times there will seem to be more than one possible way to choose. You have to try to find out how to make the correct choices as you go along. Each time be sure to read the words out loud and then tell me the word that doesn't fit with the other two.

Following this it was sometimes necessary to remind the subject to

read the words out loud, but the complete instructions were never repeated. However, in order to ensure that the subjects were constantly aware of the task objectives, one of the following phrases, with small variations, was stated immediately after each item, or periodically after several items: "Which one doesn't fit here?", "Which one doesn't go with the others?", "Which one doesn't belong with the other two?".

The experimental treatment conditions were put into effect during the administration of the next eighteen "training" items. After the subject made his choice on any item, the experimenter responded with the appropriate "training" reply for the particular treatment condition to which that subject had been assigned.

During the administration of the last thirty "test" items, all verbalizations related to the experimental conditions ceased. The experimenter presented the items, gave the usual short phrases of instruction when appropriate, and corrected any mispronunciations.

Whenever a subject had not replied to an item within thirty seconds he was told, "Please make a choice. Which one does not fit?" This urging was continued periodically until a choice was made.

Whenever a subject inquired about how well he was doing, or whether he had been correct or incorrect, or said anything which required an informational reply not related to the experimental conditions, the examiner said in a matter-of-fact tone, "I can't say," or, "I can't tell you that now."

All testing was done in rooms very close to the wards from which the patients came. Thus, while the physical surroundings were not identical for all the patients, each location was generally familiar to the individual subject.

Experimental conditions. The factorial arrangement of treatments consisted of two levels of the Reward factor, a reward condition (R) and a no-reward condition (NR); two levels of the Censure factor, a censure condition (C) and a no-censure condition (NC); and four levels of Additional Informational Feedback (AIF), Neutral AIF, Positive AIF, Negative AIF and Combined AIF. "Additional information" refers to the information the subject was given above that which he obtained whenever he was rewarded or censured.

A general description of these three factors follows:

1. R and NR. Whenever a subject in the R treatment condition chose correctly on any of the eighteen training problems, he was told, "Yes, that's right," with a single nod of the experimenter's head. No such verbalization followed a correct selection whenever the NR condition was in effect.

2. C and NC. Whenever a subject in the C treatment condition chose incorrectly on any of the training items he was told, "No, that's wrong," with a single shake of the experimenter's head. No such censure reply followed an incorrect choice for subjects in the NC condition.

3. Neutral, Positive, Negative and Combined AIF. When the Neutral AIF condition was in effect, no additional information was given to the subject. In the Positive AIF condition, a simple statement describing why the correct solution was correct was given to the subject. For the Negative AIF condition, a simple statement describing why the incorrect solutions were incorrect was given to the subject. In the Combined AIF condition, the subject was given both the Negative AIF and Positive AIF information. A complete listing of the exact AIF statements used with each of the eighteen training items is given in Appen-

dix C.

It is felt that all sixteen treatment combinations represent procedures that could be feasibly manipulated in a therapy situation with real problems. Many of them describe common living situations. These sixteen treatment combinations, with examples and discussions of each, can be found in Appendix D.

Dependent measure. The principle dependent measure for this research was simply the number of correct solutions on the thirty test items. The number of correct solutions on the eighteen training items and the total forty-eight (training and test) items was also examined to determine whether relationships between the factors were constant throughout the entire experimental procedure.

CHAPTER IV

RESULTS

The raw data used in the analysis are presented in Appendix E. The mean number of correct choices on the thirty test items for all the combinations of the experimental conditions are presented in Table I. The results of the statistical analysis of these data are presented in Table II.

Table II shows that significant treatment effects were found for the Additional Informational Feedback factor and for the Censure factor. The Additional Informational Feedback by Reward interaction (AB) was also significant. Table I shows that the group making up the Combined AIF condition had the highest mean (17.19 mean correct choices). The Negative AIF condition was next highest (15.63 mean correct choices) followed by the Positive AIF condition (15.47 mean correct choices). The Neutral AIF condition had the lowest mean (11.28 mean correct choices). A procedure involving the studentized range statistic, the Newman-Keuls method as described by Winer (1962), was used to make statistical comparisons between the four levels of the Additional Informational Feedback factor. It was found that Positive, Negative and Combined AIF scores were all significantly greater than the Neutral AIF scores ($p. < .05$). However, the differences between the Positive, Negative and Combined AIF conditions were not statistically significant.

The significant Additional Informational Feedback by Reward inter-

TABLE I

MEAN NUMBER CORRECT CHOICES ON THE THIRTY TEST ITEMS

Main Effects

Neutral AIF	Positive AIF	Negative AIF	Combined AIF	No Reward	Reward	No Censure	Censure
11.28	15.47	15.63	17.19	15.05	14.73	14.00	15.78

Treatment Combinations

		Neutral AIF	Positive AIF	Negative AIF	Combined AIF
No Reward	No Censure	11.13	12.25	13.75	17.00
	Censure	12.13	15.63	18.13	20.38
Reward	No Censure	10.63	16.13	15.13	16.00
	Censure	11.25	17.88	15.50	15.38

TABLE II

ANALYSIS OF VARIANCE FOR THE THIRTY TEST ITEM SCORES

Source of Variation	Adjusted Sum of Squares	Degrees of Freedom	Mean Square	F
Experimental Treatment Combinations	955.219	15	63.681	4.288**
A. Additional Informational Feedback	613.656	3	204.552	13.774**
B. Reward	3.125	1	3.125	- -
C. Censure	101.531	1	101.531	6.837*
AB	150.813	3	50.270	3.385*
AC	16.531	3	5.510	- -
BC	50.000	1	50.000	3.367
ABC	19.563	3	6.521	- -
Within Cells	1663.250	112	14.850	
Total	2618.469	127		

* .05
** .01

action requires special attention. The mean number of correct choices for the four Additional Informational Feedback conditions over the two levels of the Reward factor are plotted in Figure 1. Inspection of the figure indicates that in going from the NR to the R level the overall effects of the Neutral, Negative and Combined AIF conditions tended to be pulled down, whereas the Positive AIF effect increased. F-tests were made according to a procedure outlined by Winer (1962, p. 256-257), and it was found that the increase in performance for the Positive AIF condition was statistically significant ($F=5.053$; $F_{.95(1,112)}=3.93$). The decrease in performance for the Combined AIF condition was also significant ($F=4.848$; $F_{.95(1,112)}=3.93$). The slight changes in performance for the Neutral and Negative AIF levels were not statistically significant (F values less than 1).

F-tests were also made on the performance changes for the Reward factor going across the four levels of the Additional Informational Feedback factor. The differences in the effects of the Additional Informational Feedback levels were found to be significant at both the NR and R levels of the Reward factor ($F=9.692$ and 7.467 respectively; $F_{.01(3,112)}=3.96$). The Newman-Keuls procedure revealed that at the NR level of the Reward factor, the Combined AIF condition was significantly greater than all other levels while the Negative AIF condition was significantly greater than the Neutral AIF condition ($p.<.05$). All other differences were not significant. At the R level of the Reward factor (after the significant increase in the Positive AIF, and significant decrease in the Combined AIF conditions) the pattern of significant differences changed. The Negative, Positive and Combined AIF conditions were all significantly greater than the Neutral AIF condition

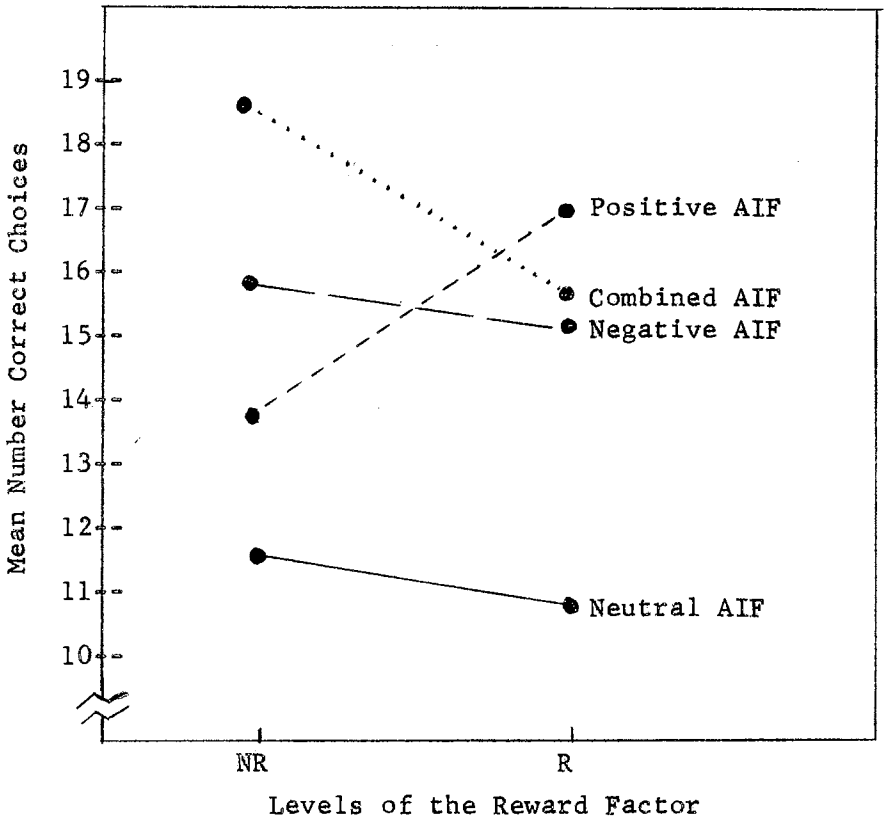

Figure 1. The AB Interaction for the Thirty Test Items.

($p. < .05$) but were not significantly different from each other.

Even though the Reward by Censure interaction (BC) was not statistically significant, there was a strong tendency toward significance. Figure 2 plots the relationship between the two levels of each factor. As can be seen, the C level of the Censure factor remains superior to the NC level at both levels of the Reward factor, but this superiority is somewhat reduced at the R level of the Reward factor.

Additional statistical analyses were performed on the scores from the eighteen training items and on the total scores made on all forty-eight items (the eighteen training and thirty test items combined). Tables III and IV present the mean number of correct choices for the training items and the total items respectively. The results of the statistical analyses of these data are presented in Tables V and VI.

For the eighteen training items the Additional Informational Feedback and Censure effects were significant. The Newman-Keuls procedure was carried out and, again, the Positive, Negative and Combined AIF scores were significantly greater than the scores obtained under the Neutral AIF conditions, but they were not significantly different from each other. The AB interaction did not approach significance.

The analysis of the total scores showed the Additional Informational Feedback and Censure factors to be significant as well as the AB interaction. The same statistical relationships between the four Additional Informational Feedback levels found in the previous analyses held. A breakdown of the AB interaction, presented in Figure 3, showed that an increase in the Positive AIF scores going from the NR to the R level was not significant, but that the performance decreased significantly ($F=7.095$; $F_{.99(1,112)}=6.89$) for the Combined AIF group. F-tests

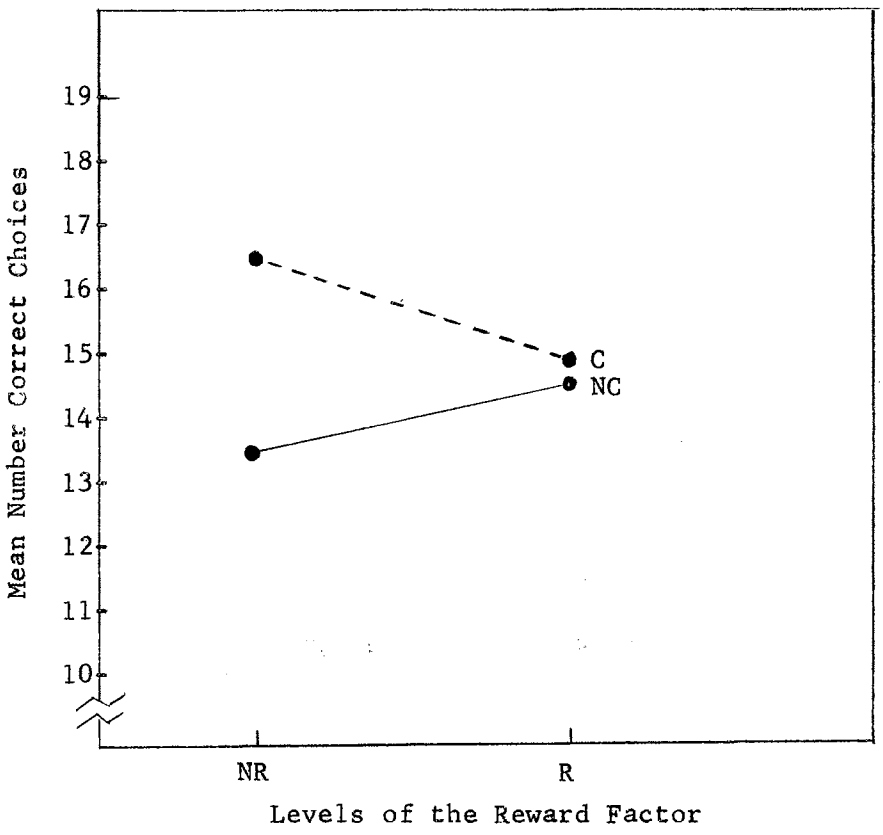

Figure 2. The BC Interaction for the Thirty Test Items.

TABLE III

MEAN NUMBER CORRECT CHOICES ON THE EIGHTEEN TRAINING ITEMS

Main Effects

Neutral AIF	Positive AIF	Negative AIF	Combined AIF	No Reward	Reward	No Censure	Censure
6.31	7.81	7.75	7.78	7.77	7.06	6.81	8.02

Treatment Combinations

		Neutral AIF	Positive AIF	Negative AIF	Combined AIF
No Reward	No Censure	5.88	7.63	7.38	7.63
	Censure	6.38	8.13	9.25	9.88
Reward	No Censure	6.13	7.13	6.38	6.38
	Censure	6.88	8.38	8.00	7.25

TABLE IV

MEAN NUMBER CORRECT CHOICES ON THE TOTAL FORTY-EIGHT (TRAINING AND TEST) ITEMS

Main Effects

Neutral AIF	Positive AIF	Negative AIF	Combined AIF	No Reward	Reward	No Censure	Censure
17.59	23.28	23.38	24.97	22.81	21.80	20.81	23.80

Treatment Combinations

		Neutral AIF	Positive AIF	Negative AIF	Combined AIF
No Reward	No Censure	17.00	19.88	21.13	24.63
	Censure	18.50	23.75	27.38	30.25
Reward	No Censure	16.75	23.25	21.50	22.38
	Censure	18.13	26.25	23.50	22.63

TABLE V

ANALYSIS OF VARIANCE FOR THE EIGHTEEN TRAINING ITEM SCORES

Source of Variation	Adjusted Sum of Squares	Degrees of Freedom	Mean Square	F
Experimental Treatment Combinations	151.680	15	10.112	1.935*
A. Additional Informational Feedback	51.836	3	17.279	3.306*
B. Reward	15.821	1	15.821	3.027
C. Censure	46.321	1	46.321	8.862**
AB	19.461	3	6.487	1.241
AC	6.961	3	2.320	- -
BC	.194	1	.194	- -
ABC	11.086	3	3.695	- -
Within Cells	585.375	112	5.227	
Total	737.055	127		

* .05
** .01

TABLE VI

ANALYSIS OF VARIANCE FOR THE TOTAL FORTY-EIGHT ITEM (TRAINING AND TEST) SCORES

Source of Variation	Adjusted Sum of Squares	Degrees of Freedom	Mean Square	F
Experimental Treatment Combinations	1705.492	15	113.699	4.138**
A. Additional Informational Feedback	1004.460	3	334.820	12.185**
B. Reward	33.007	1	33.007	1.201
C. Censure	285.007	1	285.007	10.327**
AB	256.337	3	85.446	3.113*
AC	31.212	3	10.404	- -
BC	56.446	1	56.446	2.054
ABC	39.023	3	13.008	- -
Within Cells	3077.625	112	27.479	
Total	4783.117	127		

* .05
** .01

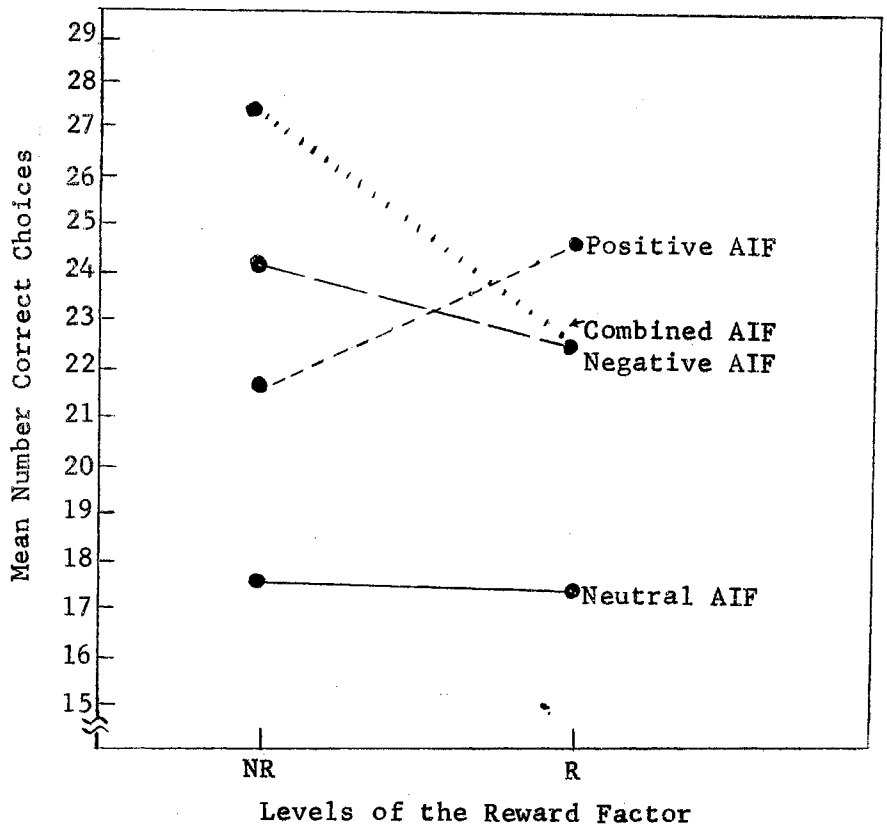

Figure 3. The AB Interaction for the Total Forty-Eight (Training and Test) Items

made on the differences between the levels of the Additional Informational Feedback factor at each level of the Reward factor were significant ($F=9.72$ at NR, and $F=5.573$ at R; $F_{.99(3,112)}=3.96$). The Newman-Keuls procedure indicated that at the NR level the Neutral AIF condition was significantly lower than the other three AIF conditions, and that the Combined AIF condition was higher than the Positive AIF condition ($p. < .05$). All other differences were not significant. At the R level of the Reward factor, after the significant decrease in the Combined AIF condition, the Negative, Positive and Combined AIF conditions were again not significantly different from each other, but all were significantly greater than the Neutral AIF condition ($p. < .05$).

A comparison of the performance levels of the two sexes on all forty-eight items showed that the males' average score was 22.80 correct, while the females averaged 21.81. The difference was not statistically significant ($t=.91$; $t_{.05,60df,}=2.00$).

A comparison of the Bright, Average and Dull subjects was also made. The performance scores, on all forty-eight items, were 25.69, 22.45, and 20.54 for the Bright, Average and Dull groups respectively. These values are in the expected direction. The difference between the Bright and Average subjects approached significance ($t=1.93$; $t_{.05,89df,}=1.99$). The difference between the Average and Dull subjects also approached significance ($t=1.64$; $t_{.05,110df,}=1.98$). The difference between the Bright and Dull groups was significant ($t=2.77$; $t_{.05,51df,}=2.01$).

CHAPTER V

DISCUSSION

The findings that social censure facilitated performance while social reward had no overall facilitating effect are in agreement with the position taken by Silverman (1963) and with the conclusion drawn by Atkinson and Robinson (1961). A large number of the studies reviewed in Chapter II, the majority of them employing less complex performance tasks, also report the same effects. Thus, the first hypothesis, which predicted significant performance facilitation following reinforced training, both reward and censure, was only partially verified.

The second hypothesis, which stated that patients receiving a maximum amount of information about problem solutions would perform best, was also not fully supported. The subjects that were given only partial information (Positive or Negative AIF) performed about the same as those who obtained complete information (Combined AIF). However, giving at least some informational feedback, whether partial or complete, was much superior to giving no feedback (Neutral AIF). These findings are in agreement with educational theories that recommend the more directive, informative teaching strategies.

These same results tend, to a certain extent, to oppose the contention by Buss and Lang (1965) that schizophrenics are likely to fail to observe relationships or important task-relevant elements if their attention has not been strictly directed to them. The patients per-

forming under the Positive and Negative AIF conditions, both of which do not state explicitly the entire relationships involved in deriving the correct problem-solving strategies, nevertheless performed about as well as those subjects who received the much more complete statement about the relationships in the Combined AIF condition. It is important to note that this conclusion is based on the relative performances of schizophrenics only. It implies that total or complete direction does not seem to be necessary to obtain high performance among schizophrenics. It may well be that a certain amount of direction is required before schizophrenics will attend well in problem-solving situations, and this minimum amount may be more than is necessary for good performance in normals. The schizophrenic patients in the Neutral AIF condition, where there was minimum information, did most poorly. Perhaps normal subjects would perform quite well under these low information conditions. In that case, Buss and Lang's position would be supported. A study with appropriate comparison groups of normals is needed to settle this question.

The third hypothesis, which stated that there would be performance differences related to type of information given during training, was basically not supported. Administration of both Positive and Negative AIF resulted in equal main effects.

The hypothesis of no interaction was not accepted. The significant Additional Informational Feedback by Reward interaction, as well as a tendency toward significance for the Reward by Censure interaction, indicates that Reward does have some kind of effect, although a complicated one. The introduction of social reward sometimes facilitated (Positive AIF group) and sometimes lowered (Combined AIF group) per-

formance levels. This interaction effect was not present, however, during the training phase of the research. All of this indicates that the contention by Maher (1966) to the effect that reward or "praise" is effective in improving performance, requires more exact specification of the conditions under which it is administered. Such specification is also necessary to strengthen the suggestion by Atkinson and Robinson (1961) concerning the detrimental effects of administering social reward to schizophrenics. If the findings of this research can be generalized to therapy situations at all, they indicate that the therapist who desires to employ social reward, which often seems to be so powerful, as well as being an aid in the establishment of rapport, should take steps to discover under what circumstances it will be effective.

The primary goal of this research was to determine empirically what combination of social Reward, Censure and Additional Informational Feedback would result in best performance on a problem-solving task by schizophrenics. In summary form, therefore, the findings indicate that contingent social censure for incorrect responses (statements, suggestions, plans, etc.) accompanied by instructional reasoning and guidance is effective in improving schizophrenic performance. However, the Reward factor should be considered in both cases because it may act, at times, to further facilitate performance, but at other times may reduce it.

What are the implications of these data for theory and dynamics of schizophrenia? The Rodnick and Garmezy (1957) "social censure hypothesis" is not supported for, under censure conditions, schizophrenics in this study improved. Rodnick and Garmezy may be correct regarding the

schizophrenic's over-sensitivity to social censure but, instead of resulting in a debilitating effect, there is a facilitating effect. It may well be that schizophrenics are much less sensitive in rewarding or "praising" situations. Throughout the data collection procedure, non-quantified observation of behavioral reactions indicated generally stronger reactions after being censured than after being rewarded. Patients often apologized for poor performances, perhaps attempting to prevent future censure. Other comments during training and testing included references about "doing so poorly" and not being able "to do anything correctly." Often the patients were upset in an angry sort of way, usually at themselves. Reward was frequently accepted in a way suggesting relief at having finally solved a problem correctly and therefore preventing the occurrence of censure. Of course, many patients gave the more common reaction of showing pride and happiness at being correct. Studies employing physiological measures and introspective reports may be of value in shedding light on the nature of the schizophrenic's reactions to social reward and censure.

All of the preceding factors indicate that both reward and censure are effective reinforcers, as they are with normals, but the nature of these effects are probably different. The reward factor, which is regularly found to be most beneficial with normals (Atkinson and Robinson, 1961) is not so reliably beneficial in performances by schizophrenics. This would lead to the conclusion that in late stages of psychotherapy, positive reinforcement factors should become more effective with schizophrenic patients since they are presumably approaching normalcy. This conclusion might be checked out empirically with further investigations of these variables.

Social censure, or punishment, when accompanied by information that can be utilized to improve performance and thus avoid further punishment, as in this study, is effective with schizophrenics as it is with normals.

Future research with the effects of these variables on schizophrenic behavior should begin to involve situations resembling the therapeutic situation much more closely. A certain amount of structure would be required so that the various levels of the factors could be systematically manipulated. Special emphasis should be placed on determination of the specific effects of social reward at the various levels of the other factors.

CHAPTER VI

SUMMARY AND CONCLUSIONS

The primary purpose of this research was to study systematically several aspects of social reinforcement and informational feedback in an attempt to discover their relative and combined effectiveness in improving the performances of schizophrenic patients. In a factorial arrangement of treatments (2 x 2 x 4), both presence and absence of social reward and censure, as well as four levels of additional informational feedback (neutral, positive, negative and combined) were investigated. The task from which measures of performance effectiveness were taken was designed to contain many of the structural factors and elements found in therapeutic and social situations.

A total of 128 schizophrenic patients from a state hospital were randomly assigned to one of the 16 treatment combinations. Through eighteen "training" problems the subjects, depending upon group assignment, received reward ("Yes, that's right") or no reward when correct; censure ("No, that's wrong") or no censure when incorrect; and various amounts and types of additional information about problem solutions. Following this training, all treatment procedures ceased and thirty "test" problems were presented for solutions. The number of correct solutions was the dependent measure.

The major findings were as follows:

1. Social censure facilitated performance while social reward had

no overall facilitating effect.

2. Giving at least some amount of information about problem-solving strategy resulted in better performance than giving none. However, giving partial information functioned about as well as giving more complete information in facilitating performance.

3. No differential effects were found for the types of informational feedback employed in this study.

4. The social reward factor interacted significantly with the informational feedback factor.

The general conclusion reached regarding the achievement of best performance by schizophrenics was that contingent social censure for incorrect responses (statements, suggestions, plans, etc.) accompanied by instructional reasoning and guidance is effective in improving schizophrenic performance. However, the social reward factor should be considered in both cases because it may act, at times, to further facilitate performance, but at other times may reduce it.

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APPENDICES

APPENDIX A

A LISTING OF THE TASK ITEMS, CORRECT SOLUTIONS (UNDERLINED), AND DIMENSIONAL CATEGORIES

No.	Item	Category
1	cold freezing hot	None
2	house dress building	None
3	man animal woman	None
4	tickle finger elbow	Anatomy
5	sin bragging humility	Morality-Immorality
6	lunacy death energy	Healthy-Not Healthy
7	haunted castle mighty mouse rattlesnake	Reality-Fantasy
8	mike microphone pearl	First-Names
9	lips kiss foot	Anatomy
10	ignorance rationality strength	Healthy-Not Healthy
11	danger panic anxiety	Emotions
12	sincerity theft falsehood	Morality-Immorality
13	flying carpet airplane persian rug	Reality-Fantasy
14	grief teardrops yearning	Emotions
15	trophy may oscar	First-Names
16	love hug jealousy	Emotions
17	honesty drunkenness lying	Morality-Immorality
18	belt thigh waist	Anatomy
19	winter santa claus gifts	Reality-Fantasy
20	eve dawn awakening	First-Names
21	wisdom weirdness levelheaded	Healthy-Not Healthy
22	spirit fish mermaid	Reality-Fantasy
23	joy laughter sorrow	Emotions

APPENDIX A (Continued)

No.	Item	Category
24	hand pet nose	Anatomy
25	stupidity cleverness awkwardness	Healthy-Not Healthy
26	ruby diamond daisy	First-Names
27	fear escape guilt	Emotions
28	sickness alertness foolishness	Healthy-Not Healthy
29	outburst anger surprise	Emotions
30	mercy wickedness greed	Morality-Immorality
31	lizard dragon fire	Reality-Fantasy
32	vitality witty dunce	Healthy-Not Healthy
33	breast kick leg	Anatomy
34	happiness affection embrace	Emotions
35	sue payment bill	First-Names
36	pelvis head idea	Anatomy
37	purity rape helpfulness	Morality-Immorality
38	sandman hag witch	Reality-Fantasy
39	disease craziness keenness	Healthy-Not Healthy
40	superman ghost bird	Reality-Fantasy
41	tongue lick ear	Anatomy
42	virginia new york caroline	First-Names
43	rubbing eye belly	Anatomy
44	hate murder passion	Emotions
45	gossiping truthfulness charity	Morality-Immorality
46	ray beam june	First-Names
47	offense forgiveness justice	Morality-Immorality
48	weakness liveliness sensibleness	Healthy-Not Healthy

APPENDIX A (Continued)

No.	Item	Category
49	book automobile fairytale	Reality-Fantasy
50	winner victor rose	First-Names
51	virtue obedience crime	Morality-Immorality

APPENDIX B

IN THIS APPENDIX IS PRESENTED THE INFORMATION ABOUT THE SEX, INTELLECTUAL CATEGORY, EDUCATIONAL LEVEL, AGE, TOTAL LENGTH OF HOSPITALIZATION, AND THE SPECIFIC DIAGNOSIS OF EACH PATIENT IN EACH GROUP OF THE EXPERIMENT

Treatment Combination	Subject Number	Sex (M-F)	Age	Intellectual Category	Educational Level (Years)	Length of Hospitalization (Total Days)	Specific Schizophrenic Diagnosis
	1	F	36	Bright	14	14	Schizo-Affective
	2	M	30	Average	14	3456	Chronic Undifferentiated
No Reward,	3	M	35	Average	11	4238	Paranoid
No Censure,	4	F	50	Average	11	4671	Paranoid
Neutral AIF	5	F	47	Average	10	222	Paranoid
	6	F	17	Dull	8	667	Childhood Type
	7	M	57	Dull	12	3746	Chronic Undifferentiated
	8	M	17	Dull	9	157	Paranoid
	1	F	35	Bright	16	1035	Schizophrenic Depression
	2	F	58	Average	13	8284	Mixed Type
Reward,	3	M	18	Average	12	14	Paranoid
No Censure,	4	F	30	Average	11	584	Chronic Undifferentiated
Neutral AIF	5	F	44	Average	8	629	Schizo-Affective
	6	M	31	Average	12	4533	Catatonic
	7	M	30	Dull	12	1197	Catatonic
	8	M	25	Dull	9	1135	Chronic Undifferentiated
	1	M	56	Bright	16	39+ (?)	Paranoid
	2	M	26	Average	14	947	Paranoid (Chronic)
No Reward,	3	M	35	Average	12	681	Chronic Undifferentiated
Censure,	4	F	49	Average	12	3872	Chronic Undifferentiated
Neutral AIF	5	F	25	Average	10	1907	Chronic Undifferentiated

APPENDIX B (Continued)

Treatment Combination	Subject Number	Sex (M-F)	Age	Intellectual Category	Educational Level (Years)	Length of Hospitalization (Total Days)	Specific Schizophrenic Diagnosis
	6	F	56	Average	8	159+ (?)	Paranoid
	7	M	57	Dull	7	10779	Chronic Undifferentiated
	8	F	26	Dull	12	671	Chronic Undifferentiated
	1	M	37	Bright	16	1872	Chronic Undifferentiated
	2	M	26	Average	12	1545	Chronic Undifferentiated
Reward,	3	M	26	Average	11	827	Acute Undifferentiated
Censure,	4	F	51	Average	12	901	Paranoid
Neutral AIF	5	M	17	Average	9	183	Chronic Undifferentiated
	6	F	42	Dull	9	2535	Chronic Undifferentiated
	7	F	44	Dull	11	1954+ (?)	Chronic Undifferentiated
	8	F	47	Dull	5	195	Paranoid
	1	F	40	Bright	10	8+ (?)	Chronic Undifferentiated
	2	F	30	Average	12	481	Chronic Undifferentiated
No Reward,	3	M	24	Average	12	2020	Chronic Undifferentiated
No Censure,	4	F	54	Average	12	3152	Paranoid (Chronic)
Positive AIF	5	M	28	Average	9	161	Chronic Undifferentiated
	6	M	57	Average	8	4466	Paranoid
	7	M	21	Dull	12	134	Chronic Undifferentiated
	8	F	39	Dull	8	3945	Paranoid
	1	F	45	Bright	16	3019	Chronic Undifferentiated
	2	M	41	Average	14	288	Chronic Undifferentiated
Reward,	3	M	64	Average	11	934	Chronic Undifferentiated
No Censure,	4	F	46	Average	12	1890	Paranoid

APPENDIX B (Continued)

Treatment Combination	Subject Number	Sex (M-F)	Age	Intellectual Category	Educational Level (Years)	Length of Hospitalization (Total Days)	Specific Schizophrenic Diagnosis
Positive AIF	5	M	41	Average	8	9079	Paranoid
	6	F	46	Average	9	1098	Chronic Undifferentiated
	7	F	43	Dull	12	1967	Paranoid
	8	M	16	Dull	9	115	Simple
	1	M	49	Bright	17.5	347	Paranoid
	2	F	43	Average	12.5	2396	Schizo-Affective
No Reward,	3	M	23	Average	11	2137	Chronic Undifferentiated
Censure,	4	F	39	Average	12	3674	Chronic Undifferentiated
Positive AIF	5	M	17	Average	9	422	Schizo-Affective
	6	M	45	Dull	12	3915	Chronic Undifferentiated
	7	F	43	Dull	12	4535	Chronic Undifferentiated
	8	F	59	Dull	8	8506	Hebephrenic
	1	M	32	Bright	14.5	2498	Schizo-Affective (Chronic)
	2	M	25	Average	13	67	Paranoid
Reward,	3	M	45	Average	12	302	Chronic Undifferentiated
Censure,	4	F	53	Average	11	981	Chronic Undifferentiated
Positive AIF	5	F	47	Average	8	4269	Chronic Undifferentiated
	6	F	22	Average	12	28	Schizo-Affective
	7	F	25	Dull	12	943	Chronic Undifferentiated
	8	M	52	Dull	8	3628	Catatonic
	1	M	36	Bright	16	3416	Chronic Undifferentiated
	2	F	42	Average	14	4414	Paranoid
No Reward,	3	M	47	Average	12	6334	Chronic Undifferentiated

APPENDIX B (Continued)

Treatment Combination	Subject Number	Sex (M-F)	Age	Intellectual Category	Educational Level (Years)	Length of Hospitalization (Total Days)	Specific Schizophrenic Diagnosis
No Censure, Negative AIF	4	F	36	Average	12	4897	Chronic Undifferentiated
	5	F	42	Average	8	4774	Paranoid
	6	M	30	Average	10	98	Acute Undifferentiated
	7	M	46	Dull	7	4468	Chronic Undifferentiated
	8	F	39	Dull	10	1086	Chronic Undifferentiated
Reward, No Censure, Negative AIF	1	M	62	Bright	10	2134	Chronic Undifferentiated
	2	M	36	Average	14	2837	Chronic Undifferentiated
	3	M	38	Average	11	1464	Paranoid
	4	F	39	Average	12	3562	Catatonic (Chronic)
	5	F	48	Average	8	2402	Paranoid
	6	F	15	Average	9	42	Undifferentiated
	7	F	35	Dull	12	2836	Chronic Undifferentiated
	8	M	53	Dull	8	751	Paranoid
No Reward, Censure, Negative AIF	1	F	53	Bright	12	962	Schizo-Affective
	2	M	38	Average	15	395	Paranoid
	3	M	27	Average	12	107	Chronic Undifferentiated
	4	F	43	Average	12	1530	Paranoid
	5	M	22	Average	12	51	Chronic Undifferentiated
	6	F	36	Average	10	1828	Schizo-Affective
	7	M	47	Dull	11	7878	Simple
	8	F	23	Dull	23	2156	Chronic Undifferentiated
	1	F	37	Bright	12	82	Chronic Undifferentiated
	2	F	20	Average	13	31	Chronic Undifferentiated

APPENDIX B (Continued)

Treatment Combination	Subject Number	Sex (M-F)	Age	Intellectual Category	Educational Level (Years)	Length of Hospitalization (Total Days)	Specific Schizophrenic Diagnosis
Reward,	3	M	49	Average	12	2288	Chronic Undifferentiated
Censure,	4	F	36	Average	12	82	Acute Paranoid
Negative AIF	5	M	44	Average	8	313	Chronic Paranoid
	6	M	40	Dull	7	6089	Chronic Undifferentiated
	7	F	29	Dull	10	1567	Acute Undifferentiated
	8	M	21	Dull	9	502	Simple
	1	F	63	Bright	10	1858	Paranoid
	2	F	34	Average	16	1272	Chronic Undifferentiated
No Reward,	3	M	30	Average	12	1686	Paranoid
No Censure,	4	F	38	Average	12	5803	Undifferentiated
Combined AIF	5	M	45	Average	8	796	Simple
	6	M	62	Average	9	8307	Simple
	7	F	36	Dull	11	2959	Simple
	8	M	21	Dull	10	44	Chronic Undifferentiated
	1	M	54	Bright	14	1090	Chronic Undifferentiated
	2	F	37	Average	14	930	Chronic Undifferentiated
Reward,	3	M	48	Average	12	2782	Paranoid
No Censure,	4	F	53	Average	12	916	Schizo-Affective
Combined AIF	5	F	48	Average	8	394	Chronic Paranoid
	6	M	34	Average	8	42	Paranoid
	7	M	16	Dull	7	3253	Childhood
	8	F	36	Dull	4	49	Undifferentiated

APPENDIX B (Continued)

Treatment Combination	Subject Number	Sex (M-F)	Age	Intellectual Category	Educational Level (Years)	Length of Hospitalization (Total Days)	Specific Schizophrenic Diagnosis
	1	F	25	Bright	12.5	30	Chronic Undifferentiated
	2	F	43	Average	14	3203	Chronic Undifferentiated
No Reward,	3	M	28	Average	11	3375	Chronic Undifferentiated
Censure,	4	F	54	Average	12	7642	Chronic Undifferentiated
Combined AIF	5	M	33	Average	10	4133	Chronic Undifferentiated
	6	M	30	Average	12	165	Schizo-Affective
	7	F	35	Dull	12	1330	Chronic Undifferentiated
	8	M	29	Dull	8	1562	Chronic Undifferentiated
	1	M	26	Bright	15	88	Schizophrenic Reaction
	2	M	36	Average	14.5	1330	Paranoid
Reward,	3	M	43	Average	12	799	Chronic Undifferentiated
Censure,	4	F	47	Average	11	3323	Chronic Undifferentiated
Combined AIF	5	F	51	Average	9	1662	Chronic Undifferentiated
	6	F	29	Dull	10	4211	Catatonic
	7	M	32	Dull	12	1221	Chronic Undifferentiated
	8	F	55	Dull	8	5296	Chronic Undifferentiated

APPENDIX C

A COMPLETE LISTING OF THE EXACT POSITIVE, NEGATIVE AND COMBINED ADDITIONAL INFORMATIONAL FEEDBACK (AIF) STATEMENTS USED WITH EACH OF THE 18 TRAINING ITEMS

Item (Correct Choice Underlined)	Positive AIF Statement	Negative AIF Statement	Combined AIF Statement
tickle finger elbow	"Tickle is not a part of the body."	"Both finger and elbow are parts of the body."	"Tickle is not a part of the body. Both finger and elbow are parts of the body."
sin bragging humility	"Humility is good."	"Both sin and bragging are bad."	"Both sin and bragging are bad. Humility is good."
lunacy death energy	"Energy is healthy."	"Both lunacy and death are not healthy."	"Both lunacy and death are not healthy. Energy is healthy."
haunted castle mighty mouse rattlesnake	"A rattlesnake is a real thing."	"Both haunted castles and Mighty Mouse are not real things."	"A rattlesnake is a real thing. Both haunted castles and Mighty Mouse are not real things."
mike microphone pearl	"Microphone is not the name of a person."	"Both Mike and Pearl are the names of persons."	"Microphone is not the name of a person. Both Mike and Pearl are the names of persons."
lips kiss foot	"Kiss is not a part of the body."	"Both lips and foot are parts of the body."	"Both lips and foot are parts of the body. Kiss is not a part of the body."

APPENDIX C (Continued)

Item (Correct Choice Underlined)	Positive AIF Statement	Negative AIF Statement	Combined AIF Statement
ignorance rationality strength	"Ignorance is not healthy."	"Both rationality and strength are healthy."	"Ignorance is not healthy. Both rationality and strength are healthy."
danger panic anxiety	"Danger is not an emotion."	"Both panic and anxiety are emotions."	"Danger is not an emotion. Both panic and anxiety are emotions."
sincerity theft falsehood	"Sincerity is good."	"Both theft and falsehood are bad."	"Sincerity is good. Both theft and falsehood are bad."
flying carpet airplane persian rug	"A flying carpet is not a real thing."	"Both airplanes and Persian rugs are real things."	"Both airplanes and Persian rugs are real things. A flying carpet is not a real thing."
grief teardrops yearning	"Teardrops is not an emotion."	"Both grief and yearning are emotions."	"Both grief and yearning are emotions. Teardrops is not an emotion."
trophy may oscar	"Trophy is not the name of a person."	"Both May and Oscar are names of persons."	"Both May and Oscar are names of persons. Trophy is not the name of a person."
love hug jealousy	"Hug is not an emotion."	"Both love and jealousy are emotions."	"Both love and jealousy are emotions. Hug is not an emotion."

APPENDIX C (Continued)

Item (Correct Choice Underlined)	Positive AIF Statement	Negative AIF Statement	Combined AIF Statement
honesty drunkenness lying	"Honesty is good."	"Both drunkenness and lying are bad."	"Both drunkenness and lying are bad. Honesty is good."
belt thigh waist	"Belt is not a part of the body."	"Both thigh and waist are parts of the body."	"Both thigh and waist are parts of the body. Belt is not a part of the body."
winter santa claus gifts	"Santa Claus is not real."	"Both winter and gifts are real things."	"Santa Claus is not real. Both winter and gifts are real things."
eve dawn awakening	"Awakening is not the name of a person."	"Both Eve and Dawn are names of persons."	"Awakening is not the name of a person. Both Eve and Dawn are names of persons."
wisdom weirdness levelheaded	"Weirdness is not healthy."	"Both wisdom and level-headed are healthy."	"Weirdness is not healthy. Both wisdom and levelheaded are healthy."

APPENDIX D

A DESCRIPTION AND DISCUSSION OF EACH OF THE SIXTEEN POSSIBLE TREATMENT COMBINATIONS

1. NR, NC with Neutral AIF. This is basically a control group where no reward, censure or information is given to the subject. It is perhaps similar to situations in nondirective therapy.

2. R, NC with Neutral AIF. Under this combination each subject is told, "Yes, that's right," whenever he chooses correctly during the training trials. Nothing is said or done when the subject chooses incorrectly. This condition resembles many behavioral approaches in which the "laws of reinforcement" are employed to bring about changes in behavior.

3. NR, C with Neutral AIF. During the training trials the subject is told, "No, that's wrong," whenever he chooses incorrectly. Nothing is said to him when he chooses correctly. As with the second combination, this treatment represents a special application of reinforcement principles.

4. R, C with Neutral AIF. During the training trials the subject is told, "Yes, that's right," whenever he chooses correctly, and, "No, that's wrong," whenever he chooses incorrectly. This is probably a more popular version of the application of reinforcement.

5. NR, NC with Positive AIF. Regardless what choice is made, the experimenter gives a statement that indicates why the correct solution is correct without giving reinforcement of any kind nor indicating in any way why any particular choice is incorrect. For any choice from the item, lips-kiss-foot, the experimenter would say, "Kiss is not a part of the body," since that is the reason kiss is correct. For the item,

APPENDIX D (Continued)

sincerity-theft-falsehood, the experimenter's reply is, "Sincerity is good."

This situation resembles many everyday situations where a correct solution is given but the underlying reasoning is unclear. Information as to why other solutions are incorrect is also missing. It has been hypothesized that schizophrenics do not verbalize to themselves, or instruct themselves, in situations like this. A self-instruction such as, "Kiss does not fit because it is not a part of the body like lips and feet are," would be helpful in arriving at general rules and solutions.

Also note that in this situation there is no actual feedback concerning the accuracy of the subject's choice, or any direct indications that kiss or sincerity are correct solutions. This does not automatically mean that the subject will perform worse here than under other conditions. As suggested in several parts of the review of the literature (Chapter II), solutions arrived at with only partial assistance may be more beneficial for learning and retention than solutions acquired from straight forward instruction.

6. R, NC with Positive AIF. Whenever the subject gives the correct answer the experimenter says, "Yes, that's right," followed by the statement that indicates why the correct solution is correct. This last statement is used, as described in the previous combination, both when the subject gives the correct choice and when he gives the incorrect choice. Thus, if the subject chooses the word kiss, as in the example above, the experimenter replies, "Yes, that's right. Kiss is not a part of the body." If he chooses lips or foot, he is told, "Kiss is

APPENDIX D (Continued)

not a part of the body."

This situation is similar to the preceding condition except here there is the possibility of getting feedback as to whether the choice made is correct. In cases where he is correct, the subject also receives social reward. He may or may not consider himself wrong when no such social reward is forthcoming.

7. NR, C with Positive AIF. Whenever the subject gives the wrong solution, the usual censure phrase is stated to him. The reward phrase is never used. Then, whether correct or incorrect, the statement indicating why the correct solution is correct, is given. Thus, for example, if the subject chooses the word lips, he is told, "No, that's wrong. Kiss is not a part of the body."

This situation has many of the same components as in the preceding condition except that censure, rather than reward, is the only type of reinforcement possible. In both cases, additional verbalizations to oneself would seem to be highly beneficial in leading to the discovery of the rules. For example, a verbalization such as, "Since lips is wrong, either kiss or foot is correct. Kiss is not a part of the body like the other two are. Therefore, kiss is probably the right answer."

8. R, C with Positive AIF. Whenever the subject gives the correct answer he is given the usual reward verbalization. The usual censure phrase follows incorrect choices. Each of these is then followed by the statement that indicates why the correct solution is correct.

Here the subject receives definite information about the accuracy of his choice as well as information about the rule which determines why a particular choice is correct. Discovery of the rule itself still

APPENDIX D (Continued)

requires some integrative work on the part of the subject.

9. NR, NC with Negative AIF. Regardless what answer is given, neither the positive nor negative reinforcement phrase is given. But, the experimenter always gives a statement that indicates why the incorrect solutions are incorrect without in any way indicating directly why any particular choice is correct. In the lips-kiss-foot example, the experimenter would say, "Both lips and foot are parts of the body," since that is the reason why both of them are incorrect. In the sincerity-theft-falsehood example, the negative AIF statement is, "Both theft and falsehood are bad."

This situation resembles the NR, NC with Positive AIF condition in many ways except that the subject is being told what is wrong rather than what is right. This, of course, is a commonly occurring situation in teaching, communication, disciplining, and so forth. The subject doesn't know directly which is the correct alternative, but just a bit of self instruction should give him that information.

10. R, NC with Negative AIF. As earlier, the positive reward phrase is given whenever the subject chooses the correct alternative and the censure phrase is never stated. After all choices, the Negative AIF statement is given.

This is simply a situation in which a subject is told whenever he is correct and informed as to why other solutions are incorrect. The subject still has to do some intellectual solidifying if he is to know the rule well.

11. NR, C with Negative AIF. The censure information is given after incorrect choices. In all cases, the Negative AIF statement is

APPENDIX D (Continued)

verbalized. No reward is ever given.

This is somewhat the reverse of the preceding situation. It resembles a common situation, especially in child rearing (harsh) where a child is only informed or scolded about things he's done wrong and is always told about why he shouldn't do certain things, or, at least, the emphasis is placed on the negative aspects rather than the positive.

12. R, C with Negative AIF. The usual reward and censure statements are given after correct and incorrect choices respectively. After both, the Negative AIF phrase is given. Here the subject knows each time whether he has been correct or incorrect and also has the negative information at his disposal.

13. NR, NC with Combined AIF. Regardless what choice is made, the experimenter gives a statement to the subject that indicates both why the correct solution is correct and why the incorrect solutions are incorrect. No direct indications are given about the accuracy of the subject's choices (even though the solutions seem so easily derivable). The experimenter's response in the case of the lips-kiss-foot item is, "Both lips and foot are parts of the body. Kiss is not a part of the body." In the case of the sincerity-theft-falsehood example, the reply would be, "Sincerity is good. Both theft and falsehood are bad."

This situation is much like classroom instruction. It almost gives the solution and explains why it is the solution, and why no other is correct. The subject has merely to follow the directions about choosing the word that doesn't fit with the other two. He must also realize that any other solution he has in mind is incorrect.

APPENDIX D (Continued)

These questions might then come up: Is this feedback effective in getting the subject to give up other, incorrect, rules for solving the problems? Or, is accompanying censure or reward more effective in convincing him?

14. R, NC with Combined AIF. The reward statement is given following correct choices. The Combined AIF statement follows all choices. Here is a situation in which a little more information about accuracy is given as well as reward for correct solutions.

15. NR, C with Combined AIF. The censure statement follows incorrect choices with the Combined AIF following both correct and incorrect choices. No reward is ever given. The situation here is much like in the preceding combination except the emphasis on the negative aspects is more pronounced.

16. R, C, with Combined AIF. Here the subject is told when he's correct and when he is incorrect. He is also given information as to why correct choices are correct and incorrect choices are incorrect. This condition contains the most information and stands at the other extreme when compared with the NR, NC, Neutral AIF condition. If improvement in performance is purely a function of amount of information given, the subjects in this group should do best.

APPENDIX E

RAW DATA. NUMBER OF CORRECT CHOICES MADE BY THE 128 SUBJECTS ON THE 18 TRAINING, 30 TEST, AND 48 TOTAL, ITEMS

			Neutral AIF			Positive AIF			Negative AIF			Combined AIF		
		S	Tr	Ts	Tot	Tr	Ts	Tot	Tr	Ts	Tot	Tr	Ts	Tot
No Reward	No Censure	1	6	10	16	6	13	19	11	20	31	10	20	30
		2	6	11	17	13	21	34	6	14	20	6	14	20
		3	5	12	17	7	6	13	9	14	23	4	21	25
		4	6	12	18	8	11	19	5	10	15	8	19	27
		5	5	10	15	5	9	14	5	10	15	8	15	23
		6	5	8	13	10	7	17	10	15	25	11	15	26
		7	9	13	22	8	22	30	6	10	16	4	11	15
		8	5	13	18	4	9	13	7	17	24	10	21	31
	Censure	1	7	14	21	7	17	24	12	25	37	14	24	38
		2	8	13	21	4	13	17	12	25	37	8	17	25
		3	6	15	21	10	16	26	9	14	23	11	21	32
		4	5	13	18	10	14	24	10	18	28	11	26	37
		5	7	12	19	10	17	27	10	16	26	13	21	34
		6	7	10	17	7	13	20	5	16	21	10	18	28
		7	10	12	22	10	23	33	8	12	20	4	18	22
		8	1	8	9	7	12	19	8	19	27	8	18	26
Reward	No Censure	1	7	11	18	9	11	20	9	8	17	6	22	28
		2	5	6	11	10	21	31	9	22	31	5	15	20
		3	4	12	16	6	12	18	6	13	19	7	17	24
		4	9	14	23	7	17	24	5	12	17	7	15	22
		5	7	11	18	9	18	27	6	14	20	6	17	23
		6	8	11	19	10	22	32	4	17	21	7	13	20
		7	7	11	18	3	15	18	6	18	24	7	13	20
		8	2	9	11	3	13	16	6	17	23	6	16	22
	Censure	1	7	14	21	12	22	34	10	16	26	11	20	31
		2	7	6	13	9	19	28	8	19	27	6	13	19
		3	9	9	18	6	10	16	9	16	25	5	26	31
		4	5	11	16	5	18	23	8	17	25	7	16	23
		5	9	12	21	6	14	20	7	16	23	7	16	23
		6	6	9	15	11	22	33	6	12	18	5	9	14
		7	6	12	18	11	21	32	8	17	25	10	14	24
		8	6	17	23	7	17	24	8	11	19	8	8	16

Key: AIF Additional Informational Feedback
S Subject
Tr Training Items
Ts Testing Items
Tot Total Items

VITA

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Candidate for the Degree of

Doctor of Philosophy

Thesis: THE UTILIZATION OF SOCIAL REWARD, CENSURE, AND ADDITIONAL INFORMATIONAL FEEDBACK WITH SCHIZOPHRENIC PATIENTS IN A QUASI-THERAPEUTIC SITUATION

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