

*INCREASED COMMUNICATIONS OF CHRONIC MENTAL  
PATIENTS BY REINFORCEMENT AND BY  
RESPONSE PRIMING<sup>1</sup>*

F. O'BRIEN, N. H. AZRIN, AND K. HENSON

ANNA STATE HOSPITAL

An attempt was made to increase the frequency with which chronic schizophrenic patients suggested feasible improvements in their treatment. A response priming procedure was devised that was comparable to a previously developed reinforcer exposure procedure. The patients were required to attend a structured meeting during which they were prompted to make suggestions. This priming procedure was compared with the more usual procedure of "welcoming" attendance and suggestions. It was found that more suggestions were made when attendance was required, rather than optional. This increase occurred during a group as well as a private meeting. An attempt was then made to analyze the probable reinforcer for the suggestions by experimentally varying the percentage of suggestions followed. Different staff members served as the discriminative stimuli within a multiple schedule. It was found that the number of suggestions was a direct function of the percentage followed. These results demonstrate the effectiveness of the priming procedure as an adjunct to reinforcement procedures for increasing desired behaviors of mental patients. Few suggestions were made when reinforcement or priming were used alone.

A major problem in treating chronic mental patients is their failure to communicate their needs, desires, problems, and possible solutions to the treatment staff. Methods of dealing with this problem have been "patient governments" (Greenblatt, York, and Brown, 1955), suggestions boxes (Roberts, 1960), open-door policy regarding access to the therapist's office (Sarwer-Foner, Ogle, and Dancey, 1960) and encouraging patients to talk out their problems (Rogers, 1951). The present study attempted to apply principles of operant conditioning to the problems of inadequate communication by chronic schizophrenics, specifically, to their making suggestions.

A straightforward method of applying reinforcement principles to increasing suggestions would be to reinforce suggestions immediately and consistently. Accordingly, a reinforcing event such as a cigarette, a token or praise could be given to the patient when a suggestion was made. An alternative type of reinforcing event is suggested by the analysis of verbal behavior by Skinner (1957). Suggestions are considered as "mands" which are

verbal statements that specify their own reinforcers. This analysis suggests that the event to be used as the reinforcer be the very one specified in the mand and predicts that the likelihood of suggestions will be a direct function of the frequency with which suggestions are granted. The present study evaluated the utility of this analysis by varying the consistency with which staff members made the changes suggested by the patients.

Another method of increasing patients' communications is suggested by the "reinforcer exposure" procedure, which is a method for increasing the frequency with which mental patients utilize a known reinforcer (Ayllon and Azrin, 1968a; Ayllon and Azrin, 1968b). This reinforcer exposure procedure was based on the principle that control by reinforcement is greater in stimulus situations that are in temporal proximity to the one in which reinforcement is given (Kelleher, 1958; Kelleher and Fry, 1962). In the previous reinforcer exposure studies, the procedure was to have the patient request the known reinforcers at the location of reinforcement, rather than elsewhere. As applied to the present problem of increasing patients' suggestions, the above rationale suggests that the ward staff require, rather than await or invite, attendance at the location where the suggestions would be immediately reinforced. Since the required at-

<sup>1</sup>This research was supported by the Mental Health Fund of the Illinois Department of Mental Health and Grant 4926 from the National Institute of Mental Health. Reprints may be obtained from F. O'Brien, Anna State Hospital, 1000 North Main St., Anna, Illinois 62906.

tendance also would constitute an interruption of competing behaviors, any change in the patients' requests might be attributable to this interruption, rather than to the patients' presence in the reinforcement situation. Accordingly, a control procedure was used in which the competing behaviors were similarly interrupted but without required attendance in the reinforcement situation. Changes in the patients' suggestions might also be attributed to imitation if the suggestions were made in a group situation. Accordingly, the response priming procedure was also evaluated in a situation where only one patient was present at a given time.

It seemed superfluous to many of the patients and staff to require attendance at the suggestion meeting; intuitively, the patient would naturally enter the meeting if she had any suggestions to make. Also, required attendance would not matter if the patient had nothing to say. The rationale for using the priming procedure, however, was that the presence of the patient in the suggestion situation would prime communications that otherwise would not have been made.

## METHOD

### *Subjects*

Thirteen chronic mental patients, living in the token reinforcement ward environment described elsewhere (Ayllon and Azrin, 1965; Ayllon and Azrin, 1968*b*), earned token-points for various adaptive behaviors during the normal working day; they exchanged these points for various consumables, articles, and activities after working hours and on weekends and holidays. Their ages ranged from 29 to 69 yr with a mean age of 50. Their mean duration of hospitalization was 18 yr, with a range of 6 to 35 yr. Ten were diagnosed as schizophrenic and three as mentally retarded with psychosis. Six patients were receiving maintenance doses of phenothiazine derivative drugs. These patients were chosen for the study because their long institutional history had resulted in a passive acceptance of their hospital environment.

### *Response Definition and Reliability*

A suggestion was defined as a direct and unequivocal request for an addition to, or change in, the ward treatment procedure. Several steps

were taken to assure impartial recording. First, the patient was required to state the request fully such as, "I would like to have an appointment with the dentist next week". The meeting leader, one of three staff members, then repeated the request and asked the patient if that was indeed her desire. Only if she answered affirmatively was the patient's statement scored as a suggestion. Secondly, present at all meetings was a recording secretary whose only responsibility was to record the suggestions; the secretary was unaware of the experimental nature of the meeting. Thirdly, three ward attendants independently scored the recording secretary's transcript at the end of the study to determine whether or not each item was a suggestion as defined above.

### *Procedure*

During each suggestion meeting, the meeting leader asked three questions of each patient: "Are you feeling well?"; "Is there anything about the ward program that upsets you, or is there anything about the program that you would like changed?"; and, "Is there anything you would like to earn that is not available now?". These three questions were designed to prompt suggestions regarding improved medical, administrative, and reinforcement procedures, respectively. All suggested changes were granted by the meeting leader's saying "Yes" if the change held any hope of improved treatment for the patient. If the change was for an additional reinforcer, as specified in the third question, the leader also stated the cost in token-points at the time the request was granted. For reinforcers that had to be purchased (a new dress), the cost was equal to about 1¢ per token-point. For reinforcers that did not require purchase (*e.g.*, attending a local rodeo of which the staff had not been aware), the standard cost for equivalent events was assigned.

Table 1 outlines the principal features of the procedure. Experiment I compared the response priming procedure with a non-priming procedure in an ABA design during a meeting held on the ward at the same time each weekday. All other ward activities and programs were discontinued for that time of day. Chimes sounded on the ward and all patients were required to assemble in a room where an attendant read a statement that a discussion and suggestion interview would

Table 1  
Procedural Outline and Sequence of the Three Experiments

Experiments	I				II				III			
Type of Meeting	Private Interview		Public Meeting				Public Meeting					
Procedure	No Priming	Priming	No Priming	No Priming	No Priming	No Priming	Priming	Priming	Priming	Priming	Priming	Priming
Meeting Leader	A	A	A	A	A	A	A B	A B	A B	A B	C + A	C + B
Per cent Reinforcement	100	100	100	100	100	100	100 0	0 100	25 75	100	0	
Days	2	14	4	5	5	5	4 4	4 4	4 4	4	4	

now be held in a nearby room. For the non-priming procedure, the statement invited the patients to attend. The statement was: "Mr \_\_\_\_\_ will spend the next 25 min in his office. During this time you *may* meet with him and may speak to him alone about anything you wish to discuss with him" (repeat). The priming procedure differed only in that the statement was: ". . . , you *will* meet with him . . . ", and all patients were required to attend the meeting in the psychologist's office.

The procedure for Exp. II was identical to that of Exp. I, except that the patients met as a group (each patient was still asked the three prompting questions). The patients, the meeting leader, the recording secretary, and the ward schedule were the same. The sequence of conditions was, again, ABA: five days each of non-priming, then priming, and then non-priming, again.

Experiment III evaluated the importance of the consistency with which the patients' suggestions were followed. A multiple schedule (see Ferster and Skinner, 1957) was arranged in which two meeting leaders served as the discriminative stimuli. Both leaders were supervisory personnel, and had the requisite administrative authority to make changes in the ward procedure. The two leaders conducted the meetings on alternate days. During the first eight days, leader A followed all suggestions made by the patients during his four meetings; leader B followed none during his four meetings. To control for the manner in which the leaders asked the three questions and conducted the meetings, their roles were reversed during the next eight days, Days 9 to 16. On Days 17 to 24, leader A followed 25% of the suggestions; leader B followed 75%. During these intermittent schedules, a table of random numbers was used to

determine which suggestions would be followed. During the final eight days, the procedure was identical to the first eight days, except that an individual with no prior knowledge of the study conducted the meetings. The leaders remained silent except to reply affirmatively or negatively after a suggestion was made. The introduction of a naive individual to conduct the meetings served as a further

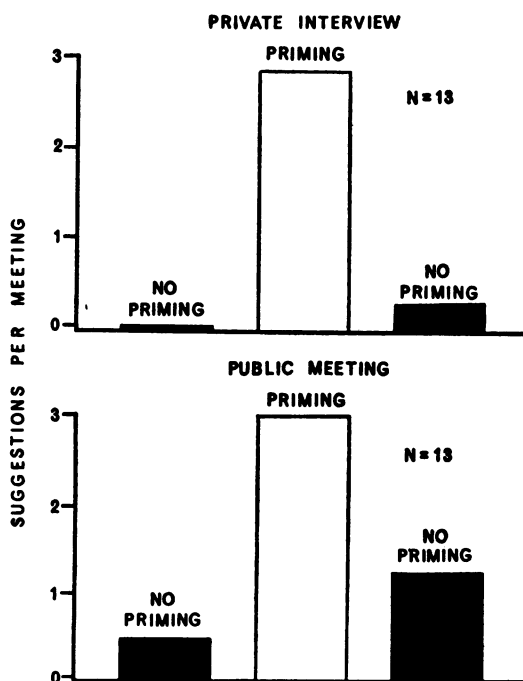


Fig. 1. Number of suggestions per meeting made by 13 chronic mental patients when they were invited to attend the meeting (no priming) and when attendance at the meeting was required (priming). The upper graph is the data for Exp. I during which the 13 patients met with the meeting leader individually and in private; the lower graph is for Exp. II during which the 13 patients met with the meeting leader as a group.

control for the manner in which the leaders conducted the meetings.

RESULTS

Throughout the study, 192 suggestions were recorded by the recording secretary. Only three of these were considered by the meeting leader as unfeasible or whimsical. Of the remaining suggestions, 5% were concerned with the medical program, 24% with the therapeutic program, and 71% with the reinforcers. Every patient made at least one suggestion. When the list of 192 suggestions was scored by the three independent and naive attendants, their agreement with the recording secretary was 100.0, 99.5, and 99.0%, respectively, as to whether the statement was a suggestion

and was of potential benefit. Questioning of the recording secretary, after the study, revealed that she was still unaware of the experimental nature of the meetings and the scheduled manipulation of the experimental variables. She did note that the patients responded more frequently when the group leader was "agreeable".

Figure 1 (upper) shows that the mean number of suggestions during the private interview of Exp. I increased from zero to about three per day when response priming was introduced. This increase occurred for 11 patients; the other two remained unchanged. This difference was statistically significant ( $P < 0.005$ ) according to the Wilcoxin Matched-Pairs Signed-Ranks Test (Siegel, 1956). When response priming was eliminated,

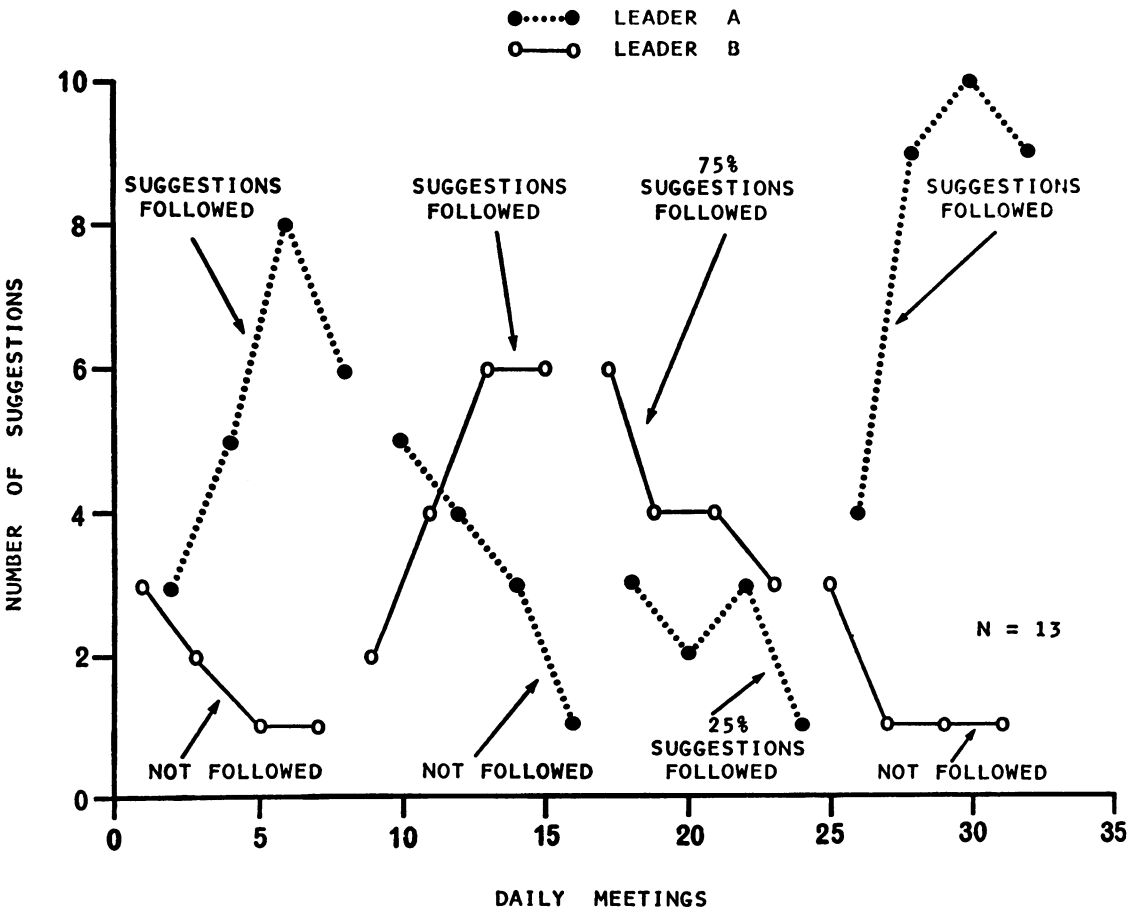


Fig. 2. The number of suggestions made by 13 mental patients daily, during the multiple schedule of Exp. III. The schedule stimuli were the two meeting leaders, A and B, who conducted the meetings and reacted to the suggestions. On Days 25 to 33, a third person conducted the meetings during which group leaders A and B reacted to the suggestions as noted.

the mean number of suggested improvements decreased to 0.3 per day ( $P < 0.005$ ). This decrease occurred for 11 patients; the other two, again, remained unchanged. The number of suggestions in the second no-priming condition was not significantly greater than in the first.

Figure 1 (lower) shows that the mean number of suggestions during the group meeting of Exp. II increased from 0.4 to 3.0 when response priming was introduced ( $P < 0.01$ ). Of the 13 patients, this increase occurred for seven, five remained unchanged, and one patient decreased. When response priming was eliminated, the mean number of suggested improvements decreased from 3.0 to 1.2 ( $P < 0.025$ ). Of the 13 patients, this decrease occurred for seven, five remained unchanged, and one patient increased. Again, the number of suggestions during the second no-priming condition was not significantly greater than the first.

Figure 2 shows the day-by-day changes in the number of suggestions made in the presence of each meeting leader in each phase of the multiple schedule of Exp. III. Initially, the same number of suggestions was made to each of the meeting leaders. During the next six days, the number of requests gradually increased for leader A, who followed 100% of the suggestions and gradually decreased for leader B, who granted 0% of the suggestions. When the meeting leaders reversed their roles on Day 9, the number of suggestions to leader A gradually decreased to one per day; those to leader B gradually increased to six per day. When leader A followed 25% instead of 0% of the suggestions on Days 17 to 24, the suggestions increased from one to about two per day. When leader B followed 75% instead of 100% of the suggestions during the same period, the suggestions gradually decreased from six to three per day. During the last eight days, the suggestions again changed as a function of the change in the consistency of following the suggestions, even though the naive discussion leader conducted the meetings. Suggestions gradually increased in the presence of leader A who granted 100% instead of 25%, and gradually decreased in the presence of leader B who now granted 0% instead of 75% of the suggestions.

In Fig. 3, both the number of suggestions made and the number of patients making sug-

gestions during Exp. III are presented as a function of the percentage of suggestions followed. The mean number of suggestions per meeting was based on the last four meetings of each phase, thereby including two meetings for each meeting leader. The data points for 0% and 100% are based on six meetings each; the data points for 25% and 75% are for two meetings. The mean number of suggestions per meeting increased as a direct function of the percentage granted from about one suggestion when none were granted to about seven when all were granted. Similarly, the mean number of patients who made a suggestion increased from about 1.0 to 4.5 per day. The differences in the number of suggestions between 0% and 100%, and 25% and 100% values were statistically significant ( $P < 0.025$ ). Of the nine patients who made at least one suggestion during this portion of the study, eight made more when all were granted than when none were granted. For the ninth patient, there was no difference.

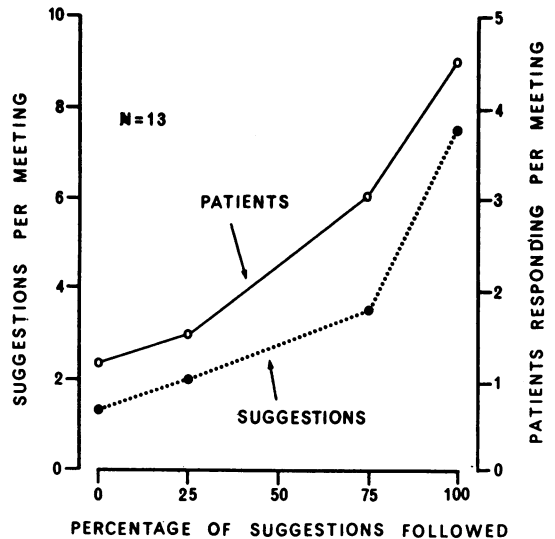


Fig. 3. The number of suggestions made by 13 patients and the number of patients making suggestions per meeting as a function of the percentage of suggestions followed. The data are based on the last four days of each eight-day phase of the multiple schedule of Exp. III.

## DISCUSSION

Patients' suggestions were increased by the response priming procedure which consisted of requiring, rather than inviting, the patient to be present in a structured response situa-

tion where suggestions were reinforced. Suggestions increased when priming was used and decreased when it was discontinued. A lingering effect of priming was seen in the slightly higher level of suggestions after the priming than before it. The increase was obtained for most of the patients whether the suggestion procedure was a group meeting or a private interview. The frequency of suggestions by patients was a direct function of the probability of the staff member following that suggestion. When one staff member followed the suggestions, and a second one did not, a high frequency of suggestions occurred in the presence of the member who did reinforce and a low frequency in the presence of the one who did not. The priming procedure was complementary to the reinforcement procedure in that few suggestions were made when priming was used without reinforcement, or when reinforcement was used without priming.

The rationale for the priming procedure was that control by a reinforcer is greatest during the terminal portion of a response sequence and weakest at the early portion. This phenomenon is indicated by the increasing response rate with increasing proximity to reinforcement during a fixed-interval or fixed-ratio schedule of reinforcement (Ferster and Skinner, 1957). When the stimulus situation changes as proximity to reinforcement changes, it has similarly been found that control by the reinforcer is weakest during the initial stimuli and greatest during the terminal stimulus. This is indicated by the low response rate in the initial stimuli and the high rate during the last stimulus of a chain schedule (Kelleher and Fry, 1962). This phenomenon has also been widely studied with rats in runways and is referred to as the "approach gradient": the strength of a response increases as the distance from the goal box decreases (Miller, 1944). These findings suggest a general response priming rule for increasing low-frequency behavior: do not require an individual to initiate a response sequence when he is in a stimulus situation remote from reinforcement, but rather, arrange or require his presence in a terminal portion of the sequence at the time for response initiation. The present study demonstrated that this priming procedure effectively increased the response of making suggestions. Response priming had previously been found

to increase utilization of many types of reinforcers (Ayllon and Azrin, 1968a; 1968b) and has more recently been applied in the development of a behavioral engineering apparatus (Azrin and Powell, *in press*). It may, therefore, be concluded that priming, as defined here, is a general procedure for increasing behavior involved in the response-reinforcer relation.

Several other interpretations of the priming effect may seem plausible but were not supported by the specific findings. The increased suggestions during priming can not be attributed to the interruption of competing activities because no other activities were scheduled at that time; in addition, the non-priming control procedure interrupted competing activities, but in a different location. The increase of suggestions during priming might have been caused by imitation of the other patients during the required attendance at the group meeting; the same increase occurred, however, during the individual meetings where no other patients were present. Simple familiarization resulting from the required attendance could not have been responsible because the suggestions decreased when priming was discontinued, and after familiarization had already taken place.

The increase of suggestions when the suggestions were followed demonstrates that the act of following a suggestion constitutes a reinforcer in accord with Skinner's (1957) analysis of mands. Two other properties of reinforcement were found to apply. First, the suggestions increased as a function of the frequency with which they were carried out; this relation conforms to the general finding that the frequency of a response is a direct function of the frequency of reinforcement (Skinner, 1938; Catania and Reynolds, 1968). Secondly, a stimulus discrimination based on reinforcement could be established, as evidenced by the high frequency of suggestions in the presence of whichever meeting leader was following them, but a low frequency in the presence of the meeting leader who was not. The correspondence of these findings with general reinforcement principles confirms the theoretical value of this analysis of verbal behavior.

The present results indicated that the priming procedure was of clinical value to the patient. The number of suggestions was large (about six per session) when one considers the withdrawn and passive condition of these

chronic schizophrenic patients. The importance of obtaining these suggestions can be estimated by the efforts of clinicians to elicit them by other methods, such as "patient governments" and having patients "talk out" their problem. Examples of their importance were seen here in suggestions which revealed medical disorders that were otherwise overlooked, as well as treatment possibilities that were not apparent. For example, several patients requested a home visit for the first time in several years. Also, many new reinforcers were requested, each of which the patient later obtained by engaging in adaptive behaviors that earned the required number of token-points. The alternative procedures of simply inviting suggestions or having group meetings for that purpose were found to be relatively ineffective as compared to the combined priming and reinforcement procedure. Few suggestions were made unless the suggestions were primed and reinforcement was given by granting the requests almost without exception. Subjectively, the effect was to impart a feeling of initiative and assurance to the patients as well as a feeling by the attendants that the program was continuously responsive to the desires and best interests of the individual patient.

#### REFERENCES

- Ayllon, T. and Azrin, N. H. The measurement and reinforcement of behavior of psychotics. *Journal of the Experimental Analysis of Behavior*, 1965, 8, 357-383.
- Ayllon, T. and Azrin, N. H. Reinforcer sampling: a technique for increasing the behavior of mental patients. *Journal of Applied Behavior Analysis*, 1968, 1, 21-34. (a)
- Ayllon, T. and Azrin, N. H. *The token economy: A motivational system for therapy and rehabilitation*. New York: Appleton-Century-Crofts, 1968. (b)
- Azrin, N. and Powell, J. Behavioral engineering: the use of response priming to improve prescribed self-medication. *Journal of Applied Behavior Analysis*, 1969, 2, 39-42.
- Catania, A. C. and Reynolds, G. S. A quantitative analysis of the responding maintained by interval schedules of reinforcement. *Journal of the Experimental Analysis of Behavior*, 1968, 11, 327-383.
- Ferster, C. B. and Skinner, B. F. *Schedules of reinforcement*. New York: Appleton-Century-Crofts, 1957.
- Greenblatt, M., York, R. H., and Brown, E. L. *From custodial to therapeutic patient care in mental hospitals*. New York: Russell Sage Foundation, 1955.
- Kelleher, R. T. Fixed-ratio schedules of conditioned reinforcement with chimpanzees. *Journal of the Experimental Analysis of Behavior*, 1958, 1, 281-289.
- Kelleher, R. T. and Fry, W. Stimulus functions in chained fixed-interval schedules. *Journal of the Experimental Analysis of Behavior*, 1962, 5, 167-173.
- Miller, N. E. Experimental studies of conflict. In J. McV. Hunt (Ed.). *Personality and the behavior disorders*. Vol. 1, New York: Ronald Press, 1944. Pp. 431-465.
- Roberts, L. M. Group meetings in a therapeutic community. In H. C. Denber (Ed.). *Therapeutic community*. Springfield, Ill.: Charles C Thomas, 1960. Pp. 129-146.
- Rogers, C. R. *Client centered therapy*. New York: Houghton-Mifflin, 1951.
- Sarwer-Foner, G. L., Ogle, W., and Dancey, T. E. A self-contained women's ward as a therapeutic community. In H. C. Denber (Ed.). *Therapeutic community*. Springfield, Ill.: Charles C Thomas, 1960. Pp. 79-96.
- Siegel, S. *Nonparametric statistics for the behavioral sciences*. New York: McGraw-Hill, 1956.
- Skinner, B. F. *The behavior of organisms: An experimental analysis*. New York: Appleton-Century-Crofts, 1938.
- Skinner, B. F. *Verbal behavior*. New York: Appleton-Century-Crofts, 1957.

Received 11 December 1968.