REINFORCEMENT OF AFFECT RESPONSES OF SCHIZOPHRENICS DURING THE CLINICAL INTERVIEW

KURT SALZINGER AND STEPHANIE PISONI

Biometrics Research, New York State Department of Mental Hygiene

Behavior theory has recently expanded its scope to deal with verbal behavior (6). Greenspoon (1) demonstrated the effectiveness of verbal reinforcers upon a subject's rate of utterance of plural vs. non-plural words. Hildum and Brown (2) showed the effect of verbal reinforcement upon attitude statements. Verplanck (7) used verbal reinforcers during conversations to condition opinion statements. Finally, Salzinger (3) investigated the conditioning process in clinical interviews with schizophrenics.

While these studies have supplied evidence for the validity of the application of reinforcement theory to verbal behavior, a good deal of research is still necessary. The present experiment is designed to study (a) reliability of response unit isolation, i.e., to what extent the interviewer can respond reliably with reinforcement to the patient's verbal behavior, (b) the effect of different sources of reinforcements (different interviewers) upon the verbal behavior of the interviewee, and (c) the relationship between the number of reinforcements and the number of responses in extinction.

Since a patient's ability to express affect is usually evaluated through the interview and is considered an important criterion both for diagnosis and prognosis of schizophrenia, the conditions under which affect is evoked by the interviewer might have theoretical importance for arriving at laws describing interview behavior and practical importance in furnishing an objective method for the evaluation of "flatness" of affect. An attempt was made, therefore, to examine the effect of reinforcement upon schizophrenics' output of affect responses in an interview.

METHOD

Subjects

Twenty-four female and twelve male hospitalized schizophrenics from the age of 18 to 50, with a median of 34.5 years, were selected from the admissions to Brooklyn State Hospital. Patients were classified as schizophrenic at the time of their current admission to the hospital and were then rediagnosed as manic-depressive. Nineteen had been hospitalized previously, and 17 had no history of previous hospitalization.

None of the patients received any somatotherapy such as insulin, electric shock, or tranquilizing drugs for at least one week before the first interview or during their participation in the study.

The first 20 patients interviewed were placed in the experimental group. Fourteen were females and six males, with a median age of 32.0 years and a median number of years of education of 10.3. The other 16 patients were placed in the control group. Twelve were females and 4 males with a median age of 34.5 years and a median number of years of education of 11.5.

Experimental Procedure

All patients were interviewed once a week after their arrival in the hospital. The Ss in the experimental group were interviewed once by a female E and once by a male E, each E on two consecutive days for a period of 30 minutes each. Eleven of the patients were first interviewed by the male; nine were first interviewed by the female. The Ss in the control group were interviewed once only, nine by the female and seven by the male. All interviews were recorded with the apparatus in full sight of both patient and interviewer.

The interview was presented to the patients as a routine mental hospital procedure. The first interview, E brought the patient into the experimental room and explained that the interview was being conducted to help him. The second interview was introduced by telling the patient that it is helpful to patients to be interviewed more than once despite the fact that this might mean a repetition of their story. All other interview procedures were the same for the second as for the first interview.

The E questioned the patient about the following items: name, age, marital status, children, and siblings. The patients answered these questions with little hesitation, thus making it possible for E to begin the interview by repeating the answer given, by writing it down, and by saying such words as "mum-hum," "uhuh," "I see," etc. This procedure was adopted in an effort to obtain factual information upon which subsequent
interview questions could be based and to establish $E$ as a source of reinforcement, in this way encouraging the patient to speak in the presence of $E$. The main part of the interview was then initiated with the question, "Would you tell me why you are here in this hospital?"

Interviews with the experimental group were conducted in the following manner: During the first 10 minutes (operant level), the base rate of spontaneous affect responses (see definition below) was determined. The $E$ asked questions but did not reinforce any statement made by the patient. Reinforcement was defined as $E$'s verbal agreement, through the use of such words as "m'm-hmm," "I see," "yeah," etc., with statements made by the patient.

During the second 10 minutes (conditioning), $E$ continued to question the patient and reinforced each affect response by immediately following each expression of affect with verbal agreement.

During the third 10-minute period (extinction), $E$ withheld all reinforcement but continued asking questions.

Interviews with the control group also lasted 30 minutes, during which time $E$ asked questions but did not reinforce any of the patient's responses. This procedure was identical with the operant level phase of the experimental group procedure.

Definition of Response

The response class of affect for this experiment was defined as any statement describing or evaluating the state (other than intellectual or physiological) of the patient himself. The response class therefore included all statements beginning with the pronouns "I" or "we" and followed by an expression of affect. Examples include such expressions as: I am satisfied, I'm happy, We enjoyed it, I like him, I'm very close to him, I was mad at him, We hated her, I'll always be jealous of him, I'm upset, I am a lonely person, I was so ashamed, I'm sorry for him, I feel... (followed by any words), I was frightened, We couldn't take it, I always suffer, I had a fright, etc.

Quotations in which affect is referred to the speaker, although fitting all other criteria, were excluded on the basis of not being direct expressions of the patient's affect. An example of this was, "My husband said I didn't feel good." Statements like "I am happy and excited" were considered as one affect statement only, since the pronouns "I" or "we" did not precede the second affective word. On the other hand, incomplete (in the sense that the object of the affect is not mentioned) statements like "I love..." or "We feared..." were viewed as separate responses.

Certain types of private events or internal states were excluded from the response class of affect because they referred primarily to intellectual processes, to actions which are sometimes but not always associated with affect, or to desires which appear to constitute a class of responses different from the affect class as defined here. I am confused, I am confident, I would like to... I want, I was surprised, I am not well, We forgave him, I threaten her constantly, I didn't trust them, etc., are examples.

A count per minute was taken of statements belonging to the general class of self-references (statements beginning with "I" or "We") in order to compare changes in the occurrence of this class with those of the class of self-referred affect statements. In other words, self-referred statements included both self-referred affect statements as well as self-referred nonaffect statements.

Interviewer Questions

After the initial question, "Why are you here?" $E$ asked additional questions only when the patient ceased talking for at least two seconds. Some or all of the following topics were discussed during each interview: reasons for being in the hospital and causes for illness; patient's relationships to his parents, siblings, fellow employees, employers, fellow students and teachers, wife or husband, children, friends; patient's activities during free time, and plans for the future.

The $E$ made an attempt to balance these topics over the different conditions. For instance, if the patient discussed the symptoms of his illness in the operant level condition, $E$ asked questions regarding the possible causes of the illness during conditioning and brought the patient back to these topics during extinction. As long as the topics were approximately balanced over the three conditions, however, $E$ took his cues as to topic from the content of the patient's statements. Both the number of topics and the order in which they were discussed varied from interview to interview.

Questions asking directly for affect such as, "How did you feel about that?" or "Were you happy?" were not used.

Results

Reliability of Response Unit Isolation

A sample of 15 recorded interviews was coded independently for self-referred affect by the two interviewers. Proportions of agreement based on the number of affect statements counted were computed separately for each condition of each interview and ranged from .79 to 1.00. Examination of the disagreements revealed that they were primarily due to poor recording. It was therefore concluded that the affect responses as defined in this experiment can be objectively isolated and counted.

A pilot study of the effect of interviewer questions of this type of interview was undertaken by the following four graduate students: Ruth Beach, R. S. Feldman, P. Goldberg, and Marilyn G. Hamlin. They found no significant relationship between the conditioning effect and the following: specific vs. nonspecific questions, the introduction of new topics vs. the continuation of old topics, the total number of questions asked, and the number of questions indirectly leading to affect (e.g., How did you react to that?). A larger more definitive study of question effects is presently being undertaken by the authors.
Interviewer Differences

The adequacy of the definition of the response was examined by having the two Es who served as interviewers in the experiment independently code the affect responses of the same 15 recorded interviews. This procedure made it possible to test whether both Es would have reinforced the same responses in identical interviews.

In order to determine whether the two interviewers evoked a different number of affect statements, comparisons were made between the two interviewers on each condition of the initial interviews of the experimental group and the control group interviews. The Mann-Whitney test yielded no statistically significant differences (p > .05), suggesting that the two interviewers evoked approximately the same number of affect statements in their respective interviews. The exact p levels for the experimental group interviews were .79 for the operant level, .54 for the conditioning period, and .52 for the extinction period. For the control interviews, the p levels were considerably lower, although still not significant. The p level for the first 10-minute period was .07, for the second .06, and for the third .22.

Base Level of Affect

In order to determine whether the experimental and control groups differed initially in the amount of affect spontaneously emitted, a statistical comparison of the number of affect statements given in the first 10 minutes of the control interviews with the number of such statements given during the operant level of the experimental interviews was made. The difference was not statistically significant (p = .37) by the Mann-Whitney test (4).

Conditioning Effect

The difference between operant level, conditioning, and extinction for the initial interviews of the experimental group was tested by Wilcoxon's nonparametric analysis of variance (8) and found to be statistically significant (p < .01). The greatest number of affect statements was emitted during conditioning (sum of ranks = 51.0), the next greatest during the operant level (sum of ranks = 39.5), and the least during extinction (sum of ranks = 29.5). The difference between the three conditions of the second interviews of the experimental group was not statistically significant (2 > p > .1). Inspection of the sums of ranks for the three conditions, however, still revealed the greatest number of affect statements in the conditioning period (sum of ranks = 45.0), the next greatest number of affect statements in extinction (sum of ranks = 41.5), and the smallest number during operant level (sum of ranks = 33.5). The fact that the second interview did not yield a statistically significant difference between the conditions appears to be due largely to the greater number of responses emitted during extinction in the second interview in contrast to the first. This is also evident in the comparison of Figs. 1 and 2, where responses during extinction were plotted as a function of number of reinforcements, from which one can see the steeper slope in the second than in the first interview. In other words, this result does not indicate a lack of reliability over time but, rather, that apparently fewer reinforcements were necessary for the same number of extinction responses in the second than in the initial interview. This effect is generally reported for reconditioning.

When the same test was used to compare the three 10-minute periods of control group interviews, no significant difference was found (p = .75). The greatest number of affect responses was emitted during the last 10 minutes of the interview (sum of ranks = 36.0), the next greatest during the second 10 minutes (sum of ranks = 34.0), and the smallest number during the first 10 minutes (sum of ranks = 32.0).

The Mann-Whitney test was used to compare each 10-minute period of the experimental group interviews to its corresponding period in the control interviews. Comparison of the first 10 minutes of the experimental with the control interviews yielded no significant difference (p = .37). Comparison of the last 10 minutes also yielded no significant difference (p = .92). The difference between the second 10-minute period of the control-group interviews and the conditioning period of the experimental-group interviews was statistically significant (p = .03), using the one-tailed test hypothesis that the experimental group would emit more affect than the control group.

Figs. 3 and 4 represent individual cumulative curves of affect responses over the three conditions of the experimental group interviews. Fig. 3 shows the curves of three individuals whose rate of response was modified by reinforcement.
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These individuals were selected on the basis of being representative of low, medium, and high rates of response in operant level. Fig. 4 shows the curves of three individuals whose rates of response were not modified by reinforcement. These individuals were also representative of their group.

In order to gauge the lawfulness of the process of conditioning in the experimental group, the number of responses of each patient during extinction was plotted against the number of reinforcements in conditioning. It was found that the relationship could be described by a linear equation, i.e., the greater the number of reinforcements administered, the greater the number of responses emitted during extinction. The goodness of fit can be seen by examining Figs. 1 and 2. Two patients appear to deviate markedly from the rest of the sample. The diagnosis of one of these patients was changed from schizo-affective to manic-depressive psychosis. She received 13 reinforcements and gave 20 extinction responses. The other deviate from the group, who received 27 reinforcements and gave only 9 extinction responses, was later found to be hard of hearing.

In order to investigate further the effects of reinforcement, rank-order correlation coefficients were computed between every pair of conditions, separately for the first and second experimental interviews and the control interviews. As expected for the experimental group, the highest correlations were found between the number of reinforcements and the number of extinction responses for both the first (.73) and second (.60) interviews. The correlations between all other pairs of conditions were much lower, varying within a restricted range from .41 to .50 (see Table 1). The correlation between the two extinction periods of Interviews 1 and 2 was .41 (p < .05) and that between extinction of Interview 1 and conditioning of Interview 2 was .44 (p < .05).
TABLE 1
RANK-ORDER CORRELATIONS BETWEEN THE THREE TEN-MINUTE PERIODS OF THE INTERVIEWS

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Experimental First Interview</th>
<th>Control First Interview</th>
<th>Experimental Second Interview</th>
<th>Control Second Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditioning vs. Extinction (2nd vs. 3rd 10 minutes)</td>
<td>.73**</td>
<td>.74**</td>
<td>.60**</td>
<td>.70**</td>
</tr>
<tr>
<td>Operant level vs. Conditioning (1st vs. 2nd 10 minutes)</td>
<td>.46*</td>
<td>.85**</td>
<td>.47*</td>
<td>.70**</td>
</tr>
<tr>
<td>Operant level vs. Extinction (1st vs. 3rd 10 minutes)</td>
<td>.41*</td>
<td>.70**</td>
<td>.50*</td>
<td>.70**</td>
</tr>
</tbody>
</table>

* p < .05.
** p < .01.

The rate of making self-referred statements was found to be invariant over the three conditions of the first and second interviews of the experimental group as well as the interviews of the control group. This was tested by Wilcoxon’s (8) nonparametric analysis of variance (p > .05). Inspection of the sums of ranks for the first experimental interview (based on an N of 20) indicated a trend toward decreasing frequency of self-referred statements from operant level (sum of ranks = 48.0) to conditioning (sum of ranks = 37.0) to extinction (sum of ranks = 35.0), while in the second interview, the greatest number of self-referred statements appeared in conditioning (sum of ranks = 46.0), the next greatest in extinction (sum of ranks = 39.0), and the smallest in operant level (sum of ranks = 35.0). In the control group (based on an N of 16), the greatest number of self-referred statements was emitted during the first 10 minutes (sum of ranks = 38.5), the next greatest during the third 10 minutes (sum of ranks = 3.5), and the smallest during the second 10 minutes (sum of ranks = 30.0).

DISCUSSION

While it is true that two different interviewers evoked the same number of affect statements within the margin of random error, the fact that two of the comparisons approached the .05 level of significance would seem to indicate that there is still room for greater control of interviewer behavior or that such interviewer characteristics as sex, age, appearance, etc., play an important role in controlling the interviewee’s behavior.

While Verplanck (7) was unable to test the constancy of the response used during any one conversation or among different conversations, the recording done in this experiment made it possible to demonstrate that a response class decided upon prior to the interview can be reliably reacted to by different interviewers and coders.

Although this experiment gave definite evidence for conditioning, there was much variability among individuals. This was not surprising in view of the fact that the interviewing was carried out with schizophrenics and the response conditioned one of affect statements. This variability, both in operant level and in susceptibility to reinforcement,
might well provide an objective prognostic measure of degree of flatness of affect. Such a measure would be of value since there are strong indications (10) that marked flatness of affect augurs badly for the outcome of schizophrenia. Follow-up of the patients interviewed in this sample may allow an exact test of the relationship between outcome of illness and flatness of affect.

Perhaps one of the most interesting findings of this study was the linear relationship between number of reinforcements and number of responses in extinction. In a similar study, Williams (9) found that the relationship between number of reinforcements and number of responses during extinction for food-deprived rats was also linear up to about 30 reinforcements. Since fewer reinforcements were administered in the present study, it will certainly be of interest to try to duplicate the rest of Williams' curve for verbal behavior. The results become even more dramatic when account is taken of the fact that flatness of affect, as defined here by frequency of affect statements, appears to vary directly as a function of the interviewer's reinforcing behavior. The implications for the regular psychiatric interview are self-evident.

The two patients in the experimental group who showed atypical relationships between reinforcement and extinction, are noteworthy because both deviated in directions that seem sensible on a post hoc basis. The hard-of-hearing individual got more reinforcements for the number of responses she emitted in extinction than the Ss in the rest of the sample. This, of course, is exactly what one might expect if S could not hear all the verbal reinforcements given her. The patient whose diagnosis was changed from schizophrenic to manic-depressive psychosis, manic stage, gave many more affect statements in extinction than might be expected from the number of reinforcements she received. This observation suggests the possibility that if a sample of manic-depressives was administered the same number of reinforcements as the schizophrenic group, a linear relationship might similarly be found but with a steeper slope. Manic-depressives may require a smaller number of reinforcements than schizophrenics for the same number of responses in extinction.

The correlation coefficients between all possible combinations of conditions were computed in an attempt to see whether the relationship between number of reinforcements and number of responses during extinction could be explained simply as a correlation that might be obtained between any two 10-minute periods of the same interviews. Table 1 shows that while correlations occurred between all conditions, the highest were between the number of reinforcements and number of responses during extinction in the experimental group. Furthermore, upon partialing out the operant level correlation to study the relationship to be expected between any two 10-minute periods, no substantial change occurred in the correlation between number of reinforcements and frequency of response in extinction. The correlations between the conditions in the control group yield further evidence for the conditioning effect in the experimental group. The fact that they are all approximately equally high, whereas the reinforcement-extinction correlations in the experimental group are outstandingly high by comparison to the operant-extinction and operant-reinforcement correlations, argues strongly for the effect of reinforcement.

A final control on the effect of reinforcement in the interview, that of the rate of self-referred statements, was used in order to check on the possibility that the reinforcement functioned merely to make the patient feel more at ease and therefore talk more about himself. This analysis indicated that the conditioning effect was specific in producing an increase in self-referred affect statements and not in increasing the general class of self-referred statements.

**Summary**

Thirty-six hospitalized schizophrenics were included in this study. Twenty of them (the experimental group) were interviewed for a period of 30 minutes each on two consecutive days by two interviewers. The other 16 (the control group) were given one interview only, which lasted for 30 minutes. Each interview in the experimental group consisted of a 10-minute operant level, during which E only asked questions necessary to keep up the patient's talk but did not respond to the patient's speech; 10 minutes of conditioning, during which E reinforced by agreement all self-referred affect statements; and, finally, 10 minutes of extinction, during which E with-
held all further reinforcement. Each interview in the control group consisted of 30 minutes of operant level only.

It was demonstrated that a difference in interviewers or sources of reinforcement per se need not produce discrepant results during an interview when utilizing a standard procedure for interviewing. It was further shown that a verbal response class can be reliably isolated and reacted to. Conditioning of the response class of self-referred affect statements was found to be possible with schizophrenics during an otherwise usual clinical interview. The relationship between number of reinforcements and number of responses in extinction was described by means of a straight line, i.e., the greater the number of reinforcements, the greater the number of extinction responses.

The lawfulness of these findings indicates that the clinical interview is subject to investigation by experimental techniques. Furthermore, a controlled interview may prove useful as a research tool.

REFERENCES


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