

*IMPROVING SOCIAL INTERACTION IN A CHRONIC
PSYCHOTIC USING DISCRIMINATED AVOIDANCE
("NAGGING"): EXPERIMENTAL ANALYSIS AND
GENERALIZATION*

MANFRED M. FICHTER,¹ CHARLES J. WALLACE,
ROBERT PAUL LIBERMAN, AND JOHN R. DAVIS

CAMARILLO-NEUROPSYCHIATRIC INSTITUTE (UCLA) RESEARCH PROGRAM

Three social-interaction behaviors of a withdrawn, chronic schizophrenic were increased using a discriminated avoidance ("nagging") procedure. The three behaviors were: (a) voice volume loud enough so that two-thirds of his speech was intelligible at a distance of 3 m; (b) duration of speech of at least 15 sec; (c) placement of hands and elbows on the armrests of the chair in which he was sitting. "Nagging" consisted of verbal prompts to improve performance when the behaviors did not meet their criteria. A combined withdrawal and multiple-baseline design was used to evaluate the effectiveness of the procedure, and the contingency was sequentially applied to each of the three behaviors in each of four different interactions to determine the degree of stimulus and response generalization. Results indicated that the contingency was the effective element in increasing the patient's appropriate performance, and that there was a high degree of stimulus generalization and a moderate degree of response generalization. After the patient's discharge from the hospital, the durability of improvement across time and setting was determined in followup sessions conducted at a day treatment center and at a residential care home. Volume and duration generalized well to the new settings, while arm placement extinguished immediately.

DESCRIPTORS: social-interaction behaviors, discriminated avoidance, "nagging", isolate behavior, stimulus generalization, response generalization, multiple baseline, treatment gains, durability, psychotic patients, schizophrenic

Withdrawal, apathy, and lack of communication are common problems among chronic psychotic patients (Kant, 1948). Not only do these asocial behaviors increase the longer patients remain in the hospital (Murray and Cohen, 1959; Paul, 1969), but patients may also show deterioration of skills previously in their reper-

toire and are unlikely to learn new social skills (Zusman, 1967).

Attempts have been made to remedy these deficits. A number of token economies have dispensed tokens for behaviors such as smiles, verbal responses to greetings, and "participation" in social events (Greenberg, Scott, Pisa, and Friesen, 1975; Henderson and Scoles, 1970; Schaefer and Martin, 1966). Several studies, focusing exclusively on interpersonal behaviors, have reported increases in behaviors such as verbalizations irrespective of content (Lieberman, 1972; Wilson and Walters, 1966); verbalizations with a specified content (Kale, Kaye, Whelan, and Hopkins, 1968; Sabatasso and Jacobson, 1970); attending, asking, and answering questions (Bennett and Maley, 1973); making suggestions to improve ward functioning (O'Brien, Azrin, and Henson, 1969); talking positively about other patients and about avail-

¹The interpretations and conclusions in the paper are those of the authors and are not to be construed as official or as necessarily reflecting the policy of the California Department of Health or the Regents of the University of California. The authors are indebted to the nursing staff of the Clinical Research Unit and the staff of the Oxnard Day Treatment Center, whose efforts made both treatment and data collection possible. Particular acknowledgment goes to Eleanor Ramirez, Val Baker, Johnie Roberts, and Nancy Austin. This work was supported in part by NIMH research grant No. MH26207-01. Reprints may be obtained from Charles J. Wallace, Camarillo-NPI Research Program, Box A, Camarillo, California 93010.

able "therapeutic" activities (Tracey, Briddell, and Wilson, 1974); and "talking to, working with, or playing with another patient or staff member" (Milby, 1970, p. 150). Each of these studies used a positive reinforcement contingency. However, there are patients with whom positive reinforcement techniques are ineffective (Kazdin, 1973). These nonresponsive patients are generally the ones most in need of increasing their social skills. They are described as "apathetic and withdrawn" (Ayllon and Azrin, 1965), "catatonically withdrawn and isolated" (Atthowe and Krasner, 1968), and "socially withdrawn and submissive" (Steffy, 1969).

Unfortunately, there are few reports of techniques that could be used to increase the social interaction of nonresponsive patients. The few techniques that have been used have been variations of an escape procedure. Heckel, Wiggins, and Salzberg (1962) used an escape procedure to increase the amount of talk in a therapy group of chronic psychotics. Whenever silence exceeded a present duration, a noxious noise was presented that could be terminated only by talking. Wallace and Davis (1974) allowed a patient to escape talking to another patient contingent on his talking for a specified duration. Lindberg, Morrill, and Kilstrom (1974) terminated group therapy sessions only when participants had accumulated 45 min of "therapeutic work". They found that the amount of elapsed time in the session decreased from a mean of 248 min during baseline to a mean of 82 min under contingent conditions.

The purpose of the present research was to use a discriminated avoidance procedure ("nagging") to increase three social-interaction behavior (voice volume, duration of speech, and appropriate use of hands, in an extremely withdrawn) chronic schizophrenic with whom several positive reinforcement contingencies had proven ineffective. "Nagging" consisted of verbal prompts to improve performance when the three behaviors did not meet the criteria established for them. The degree of both stimulus and response generalization and durability of

effects were evaluated. In contrast to the escape-based studies cited above, the present procedure was implemented on the patient's living unit; involved naturally available, innocuous aversive stimuli; was convenient and easy to use; and evaluated generalization and durability more thoroughly than any of the other studies.

METHOD

Subject and Setting

Joe was a thin, slow-moving, 21-yr-old, chronic schizophrenic who had never developed friends and who had been involved in various psychiatric treatment modalities since age 13. After running the gamut of outpatient services, he was finally hospitalized at age 19. He spent some 2 yr on the typical "back wards" that house chronic schizophrenics, and he was then transferred to the hospital's Clinical Research Unit. The latter has a favorable staff-patient ratio (12 patients, 14 nursing, and four professional staff) that enables intensive and individualized behavioral treatment programs. The research was conducted on the unit with all members of the nursing and professional staffs directly involved in implementing the procedure.

Joe engaged in numerous inappropriate behaviors, including sitting and rocking for long periods of time with his hands between his thighs, smiling and grimacing with no one present, tapping his face and the walls with his fingers, biting his right index finger when asked to interact or when in the presence of a loud noise, engaging in aggressive tantrums, destroying property, and sitting away from others for hours at a time. Joe did not engage in activities nor consume items that could be easily used as reinforcers. He ate small portions of food and usually had to be prompted to go to meals. He did not smoke and he neither read nor watched television. He made no requests for privileges from the nursing or professional staffs, and he consistently rejected opportunities for conversation and recreation.

To determine if there were objects and/or events that Joe might desire, and which were not included in the unit's daily milieu, he was administered the Psychiatric Reinforcement Survey Schedule (Cautela and Kastenbaum, 1967). Joe reported that he liked "much" or "very much" 24 items, but when presented with free access to these items, he did not consume or engage in them.

A reinforcer sampling procedure was then instituted in an attempt to increase Joe's voluntary participation in three activities: playing tic-tac-toe, playing catch, and conversing for 2 min. Joe was prompted to engage in each of these activities twice a day, and was then asked twice a day if he voluntarily wanted to participate in each activity. He was prompted for more than 300 participations over a 60-day period. During that time, he chose to perform the activities only 12 times.

During his initial three months on the CRU, Joe received 60 mg per day of trifluoperazine, an antipsychotic, phenothiazine tranquilizer with properties that generally reduce delusions, hallucinations, aggression, and confusion in schizophrenics. While the medication had an apparent effect in decreasing his self-reported hallucinations and his aggression, it did not decrease his withdrawal, self-stimulatory behavior, uncommunicativeness, or destructiveness. Four weeks before, and throughout the experiment in the hospital setting, Joe was maintained on 15 mg daily of trifluoperazine. After discharge, this dosage was increased to 40 mg daily for one week to minimize the stressful effects of changing environments. At the start of the followup observations, the dosage was again reduced to 15 mg daily.

Response Measures

Joe's utterances had generally been inaudible and monosyllabic. As a first step toward improving conversational skills, increased loudness and duration of his vocalizations, and appropriate placement of hands were targeted for change.

Voice volume. Voice volume was defined as

appropriately loud if two-thirds of Joe's speech could be discriminated as recognizable words at a distance of 3 m. The use of a voice-operated relay as a measure for loudness had been considered, but it was rejected because its use would have meant conducting conversations in a limited number of locales on the unit.

Duration of verbal response. A stopwatch was used covertly for accurate measurement of the duration of Joe's verbal response; a duration of 15 sec or longer was defined as appropriate.

Use of hands. Use of hands was defined as meeting the criterion of appropriateness when both hands and elbows touched the armrests of the chair in which Joe was sitting for the duration of his verbal response (all interactions were done when Joe was sitting). The appropriate use of hands was incompatible with rocking, tapping, and fingerbiting.

Procedure (Hospital)

"Nagging" was conceptualized as a discriminated avoidance procedure in which the aversive stimuli were the staff members' prompts to Joe to talk louder, longer, or to place his hands correctly; Joe could avoid these prompts by responding correctly. There were five phases to implementation of the procedure.

Baseline. The three conversational behaviors were elicited in the following manner. Each staff member on duty approached Joe when he was sitting in a chair, stood 3 m away from him, called his name, and asked him to converse about one of four standard topics. 1. Tell me what you have been doing lately on the unit (activities). 2. Tell me what you had to eat for breakfast/lunch/dinner (meals). 3. Tell me about anything that you would like to talk about (choice). 4. Tell me about the article you read today (article).

Topic 4 was introduced at a later point in the experiment to provide a topic that Joe could not discuss using a stereotyped, "canned" reply. It had been observed that Joe showed little variation in the content of his answers to the first three topics. To provide potential conversational

material for Topic 4, every morning Joe read parts of a magazine or newspaper under supervision in the nurses' station.

Each member of the staff was instructed to approach Joe four times a day so that every topic was discussed daily with every staff member on duty. During Baseline 1, staff members approached and conversed with Joe, simply noting whether the three conversational behaviors met the criteria. A conversation was considered finished when Joe was silent for more than 3 sec.

Contingency. If Joe's conversational behaviors did not meet the criteria, he was prompted by staff members to improve his performance. They said "louder" if Joe's voice volume was inadequate, "longer" if duration was inadequate, or "put your hands and arms on the armrests of the chair" for inappropriate use of hands. Staff were instructed to wait 3 sec for compliance with the prompt. If not, they were to repeat the prompt at 3-sec intervals. Only Joe's first response to each topic was scored throughout the study; his responses to any prompts to improve were not scored. If and when Joe's conversational behaviors met the criteria, the staff member simply left when the discussion was finished (3 sec or longer of silence) without saying anything more or giving reinforcement or feedback.

Figure 1 illustrates that the contingency was applied in a multiple-baseline design (sequentially to each of the three behaviors in Topic 1) to provide evidence of the efficacy of the procedure. It was then applied to all three behaviors simultaneously in Topic 2 to determine the degree of stimulus generalization and, at a later point in time, simultaneously to all three behaviors in Topics 3 and 4.

Joe was informed of both the specific behavior and the specific topic to which the contingency was applied. For example, when the contingency was first applied to voice volume in Topic 1, he was told, "From now on, Joe, you have to talk loudly enough in an interaction, when you are asked to tell about what you have been doing lately on the unit. If you don't talk loudly enough, you will be made to repeat

until you do talk loudly enough so you can be heard at a distance of ten feet." Instructions to Joe regarding changes in the experimental conditions were given on the morning of the day of the change. To ensure that the instructions were comprehended and remembered, he was asked twice daily for two days to repeat the instructions, which he always did.

Baseline. The contingency was then withdrawn (ABAB designs) simultaneously from the three behaviors in Topic 1 to provide further evidence of the efficacy of the procedure and to determine if what seemed to be the high degree of generalization of the contingency would result in the generalization of its withdrawal. Joe was informed of the change with the instructions, "From now on, we will not make you repeat when we ask you what you have been doing lately on the unit. Even if you don't talk loudly enough, long enough, and do not use your hands appropriately, we will not make you repeat." No mention was made of the other topics, and comprehension and remembrance of the instructions were assessed as in the contingency phase.

Instructions, Topics 3 and 4. Since the withdrawal of the contingency from Topic 1 did not affect his performance in Topics 3 and 4, Joe was specifically instructed that the contingency did not apply first to Topic 3 and then to Topic 4. Up to this point, no instructions had been given concerning either of these topics. Comprehension and remembrance of the instructions were assessed as in the contingency phase.

All topics contingent. The contingency was finally applied simultaneously to all behaviors in all four topics. Joe was informed of the contingencies, and comprehension and remembrance of the instructions were assessed as in previous phases.

Procedure (Day Treatment Center)

After discharge from the hospital, Joe spent every weekday for 14 weeks at a local day treatment center. Starting one week after discharge, a total of 95 interactions using Topics 1 and 3

were conducted on 12 days by three staff members previously unknown to Joe. No contingency was employed, and the response measures were identical to those used in the hospital setting.

Procedure (Residential Care Home)

During the same 14-week period after Joe's discharge, a research assistant went to his residential care home on 10 days to conduct sessions using three new topics: 5. Tell me something about your family. 6. Tell me something about baseball, basketball, or football. 7. Tell me something about the other people in this place. Each topic was given in the above order once on each observation day for a total of 30 conversations. No contingency was employed, and the response measures were identical to those used in the hospital.

Reliability

In-hospital. Twenty reliability checks were made of each of the three behaviors, distributed equally among all phases of the experiment and all topics. A reliability check was conducted by two staff members who were out of view of each other but who were aware that a reliability check was being done. Fourteen different dyads of staff members were compared in reliability checks, and the results of the comparisons were not made available until the end of the study. Agreement for volume and use of hands was achieved if both staff members agreed that the behaviors had or had not reached criterion. Reliability for the two behaviors was computed using the formula:

$$R = \frac{\text{Number of observations with agreement}}{\text{Total number of observations}} \times 100.$$

For duration of verbal response, a Pearson correlation coefficient was calculated separately for each topic between the paired observations of seconds of response.

Day treatment center. Reliability checks were conducted for all three behaviors five times per

topic. The procedures and calculations were the same as those used in the hospital.

Residential care home. Reliability checks were conducted twice for each behavior in each topic. The procedures and calculations were the same as those used in the hospital.

RESULTS

Reliability

In the hospital setting, the agreement between staff members that the criteria were met for voice volume and use of hands was 100% for all 20 checks. For duration of speech, the Pearson correlation coefficient was above 0.99 for all four topics.

Interobserver agreement for observations in the day treatment center was, for Topics 1 and 3, respectively, 60% and 100% for volume, 100% and 100% for duration, and 100% and 100% for use of hands. The Pearson correlation coefficient was above 0.99 for duration.

Hospital

Figure 1 presents the daily percentage of conversations at criterion for each of the three behaviors separately for each topic. A total of 1866 conversations were conducted over the 15 weeks of the hospital phase for an average of 5.4 conversations per topic per day. Each interaction took less than a minute to complete the procedure and record the data. At no point did a prompt have to be administered more than twice in one session.

Experimental control. The results of both the withdrawal and multiple-baseline designs used in Topic 1 indicated that as the contingency was applied, voice volume rose from an average of 17.3% of conversations at criterion during baseline to 90.6% at criterion during the contingency; duration rose from 0% during baseline to 96.2% at criterion during the contingency; use of hands rose from 0% to 91.8%. The withdrawal of the contingency reduced volume to 27.3% of the conversations at criterion, duration to 29.0% at criterion, and use of hands to

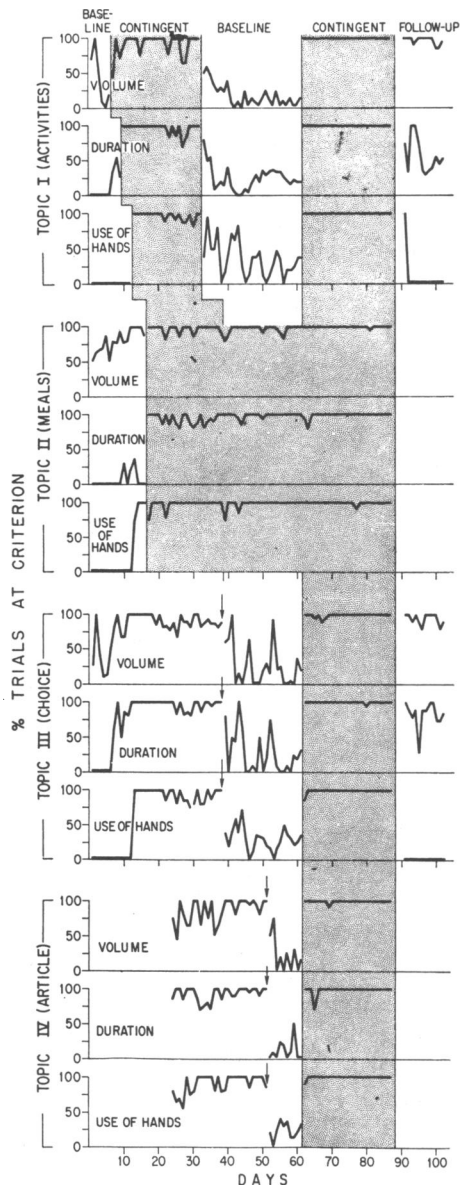


Fig. 1. Daily percentage of interactions at criterion for each of three behaviors in each of four topics. The blank areas indicate baseline, the stipled areas indicate application of the contingency, the arrows in Topics 3 and 4 indicate instructions to the subject that the contingency was not in effect for the particular topic.

35.4%. Each of these behaviors increased to 100% when the contingency was re-instated.

Response generalization. The results of the multiple-baseline application of the contingency in Topic 1 indicated little response generaliza-

tion. As the contingency was instated for volume, duration rose to 36.6% of conversations at criterion. No such increase was observed for the use of hands.

Stimulus generalization. The results of the sequential application of the contingency to the four topics indicated a high degree of stimulus generalization. Concomitant with the application of the contingency to the use of hands in Topic 1, the percentage of conversations at criterion increased to 91.7% for the same behavior in Topic 2 and to 100% in Topic 3. In addition, as the contingency was applied to volume in Topic 1, volume in Topic 2 rose from 76 to 88.9% of conversations at criterion and in Topic 3 from 41.6 to 54.0%. Furthermore, as the contingency was instated for duration in Topic 1, duration in Topic 2 concomitantly increased from 0 to 10.6% and in Topic 3 from 63.2% to 88%.

The later introduction of Topic 4 also demonstrated a high degree of stimulus generalization. The baseline phase of this topic was begun when the contingency was in operation for all three behaviors in Topics 1 and 2. Initial voice volume in Topic 4 was at criterion in 80.4% of baseline sessions, duration in 88.4%, and use of hands in 90.5%. Both the reduction of these levels when Joe was told that no contingency was in effect, and their return to high levels when the contingency was re-instated indicate that the initially high levels of performance were probably due to stimulus generalization from Topics 1 and 2.

Followup (Day Treatment Center)

During the observations at the day treatment center, volume for Topic 1 was at criterion in 92.5% of all conversations, duration in 55.2%, and use of hands in 4.5%. For Topic 3, volume was at criterion in 89.2%, duration in 74.2%, and use of hands in 0%. These levels were higher than the original hospital baseline levels, but lower than the immediately preceding hospital contingency phase, particularly for use of hands.

Followup (Residential Care Home)

During the 14-week followup period in the residential care home, volume was at criterion in 80%, 60%, and 40% of all conversations for Topics 5, 6, and 7 respectively; duration was at criterion in 70%, 70%, and 30% of all conversations. While duration was at criterion on the first seven observation days for Topics 6 and 7, it was not at criterion on the following three observation days. Use of hands was at criterion level on the first observation day in all three topics, and thereafter was never at criterion.

DISCUSSION

The results indicated that the avoidance contingency increased Joe's performance of the three social-interaction behaviors. The behaviors systematically increased in Topic 1 only when the contingency was applied, decreased when it was withdrawn, and increased again when it was re-instated. The results also indicated a high degree of stimulus generalization for all three behaviors across all four topics, and a moderate degree of response generalization between the two verbal behaviors in Topic 1. Generalization across settings and time was also relatively high for the verbal behaviors, even though conversations were conducted in new settings, by new staff members, and, in the residential care home, with topics not previously used.

This pattern of generalization suggests that the "critical" stimulus for Joe was simply the presence of a staff member. If the staff member approached and talked to Joe, he responded at criteria as long as he had been informed of the targeted behaviors and their criteria. This also explains why Joe did not generalize the withdrawal of the contingency from Topic 1 to the other topics. Apparently the critical stimulus was the staff member's presence when Topics 3 and 4 were discussed. Only when Joe was given information that no contingency was in effect did his performance deteriorate in much the

same fashion as it improved when he was instructed which criteria were in effect.

Although such a thorough determination of generalization and durability has been made for social and language shaping procedures with psychotic and normal children (*e.g.*, Gray and Fygetakis, 1968; Lovaas, Koegel, Simmons, and Long, 1973; Lovaas, Schaeffer, and Simmons, 1965; Lovaas and Simmons, 1969; Rubin and Stolz, 1974), this has not been the case for similar procedures with psychotic adults. Token economy programs occasionally report group variations in both targeted and nontargeted behaviors (Gripp and Magaro, 1971; Maley, Feldman, and Ruskin, 1973; Mulligan, Kaplan, and Reppucci, 1973; Winkler, 1970). Those studies dealing specifically with social interaction behaviors in psychotic adults have either ignored generalization (Heckel *et al.*, 1962; Lindberg *et al.*, 1974; O'Brien *et al.*, 1969; Wallace and Davis, 1974), have investigated only stimulus or response generalization (Kale *et al.*, 1968; Sabatasso and Jacobson, 1970; Tracey *et al.*, 1974), or have investigated a confounded combination of both (Bennett and Maley, 1973).

In addition to the moderate response generalization between the two verbal behaviors, Joe's socialization in the hospital improved in several other ways. His spontaneous interactions with staff increased from an average of one recorded per month to six recorded in the month before discharge. Property destruction reduced from a pretreatment level of two episodes per week to none during the last six weeks of the hospital phase. This is similar to other findings (Hamilton, Stevens, and Allen, 1967; Lovaas and Simmons, 1969; Risley, 1968; White and Taylor, 1967) indicating an increase in socially directed behavior as a beneficial side effect of using shock to punish self-destructive behavior in psychotic children.

Joe's medication was increased for a one-week period after discharge to provide a "buffer" against the potentially stressful effects of the sudden change in his living environment. There is evidence that antipsychotic medication, in

sufficient doses, protects individuals from relapse when they leave the hospital and re-enter a living situation characterized by a high level of expressed emotion or criticism (Brown, Birley, and Wing, 1972). This action was taken as a clinical priority over research considerations, the latter requiring, of course, a constant dose of medication throughout the study. Since generalization of the improved social behaviors, particularly the appropriate use of his hands, declined gradually from the point of discharge, it could be speculated that a higher sustained dosage level after discharge might have better maintained generalization. However, Joe's hand movements did not become grossly inappropriate; *i.e.*, he did not tap his face or the walls, he did not bite his fingers, and he did not rock with his hands between his thighs. He simply did not meet the stringent criterion for the appropriate use of hands; rather, he sat with his hands in his lap or folded across his chest.

Several aspects of the current procedure may be seen as lacking "ecological representativeness" (Kerlinger, 1973); *i.e.*, the procedure may not reflect what is generally considered to be "social interaction". The duration criterion of 15 sec was rather short, and the requirement of placing hands and elbows on the armrests of a chair precluded more animated gestures. However, the operationalization of the procedure was guided by the goal of discharging Joe from the hospital into a residential care home. It was hypothesized that the operator of the home would be more likely to return Joe to the hospital if Joe bit his finger, tapped his face, rocked back and forth, remained mute, or otherwise acted in an unusual or "bizarre" manner during interactions with the operator. Since the several homes to which Joe could be discharged had few staff and many patients, the opportunities for social interaction were likely to be low in frequency and short in duration. Hence, Joe might successfully remain in the community if he could be taught to respond in a minimal fashion and to refrain from unusual motor behavior.

In addition, it was felt that detailed informa-

tion regarding the effects of the procedure was required because the procedure could later be expanded in both the residential care home and in the day treatment center to approximate "normal" social interaction more closely. Thus, the in-hospital procedure was made as simple and controlled as possible. Indeed, after the follow-up observations, the staff of the residential care home and the day treatment center facilities were instructed in the "nagging" procedure, and suggestions were made about its expansion to broader response classes. The procedures and suggestions were implemented, and anecdotal reports from both facilities indicated increased social interaction behaviors. Joe joined a bowling league, spontaneously participated in numerous groups at the day treatment center, and participated in twice-daily recreation therapy at the residential care home. He was reported by his parents as markedly improved in sociability during his home visits, conversing appropriately with them, and joining them in watching television and going to restaurants. Previously, they had refused to invite him home because of his uncommunicativeness, self-stimulation, and destructiveness.

It should be noted that the avoidance procedure proved successful after several attempts with positive reinforcement techniques had failed. There simply seemed to be no objects or events that could be used as positive reinforcers; a reinforcer sampling procedure proved ineffective in establishing such items, and Joe refused to consume objects that he had verbally indicated that he liked "very much". In contrast, not only was "nagging" effective, but the effects were durable and generalized to the posthospital settings. Furthermore, the procedure was easy to apply: all that was required was the presence of a staff member who would not leave until the appropriate behaviors were emitted.

Of course, a minimum level of patient compliance was required. Joe could have defeated the program by refusing to talk and "outwaiting" the staff member. He did not do so, even though his last interaction before leaving the

unit was to tell one staff member how much he disliked the unit and the staff. There was no previous indication of Joe's dislike, and the procedure was not perceived as aversive by the staff. In fact, they indicated satisfaction with the procedure, since Joe was interacting, albeit in a minimal fashion. Thus, given some degree of compliance, a "nagging" procedure may be useful for establishing appropriate social and instrumental behaviors in patients who are unresponsive to the more "typical" positive reinforcement contingencies.

REFERENCES

- Atthowe, J. M. and Krasner, L. Preliminary report on the application of contingent reinforcement procedures (token economy) on a "chronic" psychiatric ward. *Journal of Abnormal Psychology*, 1968, **73**, 37-43.
- 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.
- Bennett, P. S. and Maley, R. F. Modification of interactive behaviors in chronic mental patients. *Journal of Applied Behavior Analysis*, 1973, **6**, 609-620.
- Brown, G. W., Birley, J. L. T., and Wing, J. K. Influence of family life on the course of schizophrenic disorders: A replication. *British Journal of Psychiatry*, 1972, **121**, 241-258.
- Cautela, J. R. and Kastenbaum, R. A. Reinforcement survey schedule for use in therapy training and research. *Psychological Reports*, 1967, **20**, 1115-1130.
- Gray, B. and Fygetakis, L. The development of language as a function of programmed conditioning. *Behaviour Research and Therapy*, 1968, **6**, 455-460.
- Greenberg, D. J., Scott, S. B., Pisa, A., and Friesen, D. D. Beyond the token economy: A comparison of two contingency programs. *Journal of Consulting and Clinical Psychology*, 1975, **43**, 498-503.
- Gripp, R. F. and Magaro, P. A. A token economy program evaluation with untreated control ward comparisons. *Behaviour Research and Therapy*, 1971, **9**, 137-149.
- Hamilton, J., Stephens, L., and Allen, P. Controlling aggressive and destructive behavior in severely retarded institutionalized residents. *American Journal of Mental Deficiency*, 1967, **71**, 852-856.
- Heckel, R. V., Wiggins, S. L., and Salzberg, H. C. Conditioning against silences in group therapy. *Journal of Clinical Psychology*, 1962, **18**, 216-217.
- Henderson, J. D. and Scoles, P. E., Jr. Conditioning techniques in a community-based operant environment for men. *Behavior Therapy*, 1970, **1**, 245-251.
- Kale, R. J., Kaye, J. H., Whelan, P. A., and Hopkins, B. L. The effects of reinforcement on the modification, maintenance, and generalization of social responses of mental patients. *Journal of Applied Behavior Analysis*, 1968, **1**, 307-314.
- Kant, O. Clinical investigation of simple schizophrenia. *Psychiatric Quarterly*, 1948, **22**, 141-151.
- Kazdin, A. E. The failure of some patients to respond to token programs. *Journal of Behavior Therapy and Experimental Psychiatry*, 1973, **4**, 7-14.
- Kerlinger, F. N. *Foundations of behavioral research*. New York: Holt, Rinehart & Winston, 1973.
- Liberman, R. P. Reinforcement of social interaction in a group of chronic mental patients. In R. D. Rubin, H. Fensterheim, J. Henderson, and L. P. Ullmann (Eds.), *Advances in behavior therapy*. New York: Academic Press, 1972. Pp. 151-159.
- Lindberg, F. H., Morrill, R. S., and Kilstrom, D. R. Conditioning therapeutic work. *Small Group Behavior*, 1974, **5**, 486-494.
- Lovaas, O. I., Koegel, R. L., Simmons, J. Q., and Long, J. S. Some generalization and follow-up measures on autistic children in behavior therapy. *Journal of Applied Behavior Analysis*, 1973, **6**, 131-165.
- Lovaas, O. I., Schaeffer, B., and Simmons, J. Q. Experimental studies in childhood schizophrenia: Building social behavior in autistic children by use of electric shock. *Journal of Experimental Research in Personality*, 1965, **1**, 99-109.
- Lovaas, O. I. and Simmons, J. Q. Manipulation of self-destruction in three retarded children. *Journal of Applied Behavior Analysis*, 1969, **2**, 143-157.
- Maley, R. F., Feldman, C. L., and Ruskin, R. S. Evaluation of patient improvement in a token economy treatment program. *Journal of Abnormal Psychology*, 1973, **82**, 141-144.
- Milby, J. B. Modification of extreme social isolation by contingent social reinforcement. *Journal of Applied Behavior Analysis*, 1970, **3**, 149-152.
- Mulligan, W., Kaplan, R. D., and Repucci, N. D. Changes in cognitive variables among behavior problem elementary school boys treated in a token economy special classroom. In R. D. Rubin, J. P. Brady, and J. D. Henderson (Eds.), *Advances in behavior therapy*, Vol. 4. New York: Academic Press, 1973. Pp. 83-92.
- Murray, E. J. and Cohen, M. Mental illness, milieu therapy, and social organization in ward groups.

- Journal of Abnormal and Social Psychology*, 1959, **58**, 48-54.
- O'Brien, F., Azrin, N. H., and Henson, K. Increased communications of chronic mental patients by reinforcement and response priming. *Journal of Applied Behavior Analysis*, 1969, **2**, 23-31.
- Paul, G. L. Chronic mental patient: Current status—future directions. *Psychological Bulletin*, 1969, **71**, 81-94.
- Risley, T. The effects and side effects of the use of punishment with an autistic child. *Journal of Applied Behavior Analysis*, 1968, **1**, 21-34.
- Rubin, B. K. and Stolz, S. B. Generalization of self-referent speech established in a retarded adolescent by operant procedures. *Behavior Therapy*, 1974, **5**, 93-106.
- Sabatasso, A. P. and Jacobson, L. I. Use of behavioral therapy in the reinstatement of verbal behavior in a mute psychotic with chronic brain syndrome: A case study. *Journal of Abnormal Psychology*, 1970, **76**, 322-324.
- Schaefer, H. H. and Martin, P. L. Behavioral therapy for "apathy" of hospitalized schizophrenics. *Psychological Reports*, 1966, **19**, 1147-1158.
- Steffy, R. A. Operant behavior modification techniques applied to a ward of severely regressed and aggressive patients. *Canadian Psychiatric Association Journal*, 1969, **14**, 59-67.
- Tracey, D. A., Briddell, D. W., and Wilson, G. T. Generalization of verbal conditioning to verbal and nonverbal behavior: group therapy with chronic psychiatric patient dyads. *Journal of Applied Behavior Analysis*, 1974, **7**, 391-402.
- Wallace, C. J. and Davis, J. R. Effects of reinforcement and information on the conversational behavior of chronic psychiatric patient dyads. *Journal of Consulting and Clinical Psychology*, 1974, **42**, 656-662.
- White, J. C. and Taylor, D. Noxious conditioning as a treatment for rumination. *Mental Retardation*, 1967, **6**, 30-33.
- Wilson, F. S. and Walters, R. H. Modification of speech output of near-mute schizophrenics through social learning procedures. *Behaviour Research and Therapy*, 1966, **4**, 59-67.
- Winkler, R. C. Management of chronic psychiatric patients by a token economy reinforcement system. *Journal of Applied Behavior Analysis*, 1970, **3**, 47-55.
- Zusman, J. Some explanations of the changing appearance of psychotic patients: Antecedents of the social breakdown syndrome concept. *International Journal of Psychiatry*, 1967, **3**, 216-237.

Received 21 April 1975.

(Final acceptance 22 March 1976.)