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Steven J. Simon is Supervising Psychologist at Seven Counties Services Community Mental Health Center, Louisville, Kentucky. His interests include behavioral approaches to child and adolescent disorders and the analysis of community mental health service delivery systems.

Teodoro Ayllon is Professor of Psychology and Special Education at Georgia State University, Atlanta, Georgia. His research interests include behavioral medicine and behavioral approaches to coaching and athletic instruction.

Michael A. Milan is Associate Professor of Clinical and Community Psychology at Georgia State University, Atlanta, Georgia. His interests include social skills training and the generalization and maintenance of intervention effects.

Hallucinatory-delusional verbalizations in a 40-year-old schizophrentic female were temporarily reduced by social interference and by self-control instructions. When instructed to self-control or not as she elected, the patient continued to emit a high frequency of hallucinatory-delusional verbalizations. During these phases of treatment no change in target behaviors was observed in the patient's behavior on the ward. Following two verbal therapy sessions in which attempts were made to change the hypothetical intrinsic *valence* of the hallucinatory-delusional behavior from positive to negative, a marked deceleration of these target behaviors occurred.

Hallucinatory-Delusional Verbalizations

Modification in a Chronic Schizophrenic by Self-Control and Cognitive Restructuring

GEARY S. ALFORD
University of Mississippi Medical Center
LOUIS FLEECE
University of Alabama Medical Center
ESTHER ROTHBLUM
Yale University

Although auditory hallucinations and delusional verbal behaviors occurring in schizophrenic patients are usually responsive to neuroleptic pharmacotherapy (Alford & Williams, 1980), various behavioral techniques have also been successfully utilized, particularly where such behaviors have persisted in spite of medica-

AUTHORS' NOTE: *Reprint requests may be addressed to Dr. Geary S. Alford, Department of Psychiatry and Human Behavior, University of Mississippi Medical Center, 2500 North State Street, Jackson, MS 39216.*

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tion (Hersen & Bellack, 1977). Behavioral procedures have included, for example, faradic aversion (Alford & Turner, 1976), feedback plus token reinforcement (Winze, Leitenberg, & Agras, 1973), reinforcement of competing responses (Anderson & Alpert, 1974) and time-out (Davis, Wallace, Liberman, & Finch, 1976). While most therapeutic procedures require a significant amount of cooperation on the part of the patient, therapeutic procedures involving intraorganismic events as behavioral targets (e.g., hallucinations) or as "self-control" treatment components (e.g., "thought stopping") may require an unusual degree of active cooperation by the patient. With respect to hallucinatory and delusional behavior, for example, clinicans have historically noted that although most patients appear frightened, anxious, or disturbed by such experiences (Arieti, 1967; Alford & Turner, 1976), other patients appear to find these events rewarding, desirable, or reinforcing (Arieti, 1967). The degree to which some patients consider hallucinatory-delusional behavior desirable or reinforcing, even where aversive, external consequences result, can present special complications in attempting to modify those behaviors. The present study employed a single-subject experimental design (compare Hersen & Barlow, 1976) to assess the effects of social interference, self-control, prompted self-control, and modification of the "valence" of hallucinations through cognitive reinterpretation on hallucinatory-delusional verbalizations in a chronic schizophrenic.

METHOD

PATIENT

The patient was a 40-year-old female with a 15-year history of bizarre and maladaptive behavior. She was diagnosed as schizophrenic, paranoid type. She had previously been hospitalized four times over the 15-year period, and was followed on an outpatient basis by a mental health center in her local community. She had been treated with psychotherapy and antipsychotic

medication, which both she and her physician-husband reported she had regularly taken. Although previous treatments had resulted in substantial improvement in her functioning (e.g., decreased looseness of association, more appropriate affect), she continued to report and exhibit evidence of hallucinatory behavior and an associated religious delusional belief system. It was this behavior that led to her current inpatient admission. On admission, the patient exhibited some looseness of association, blunted affect, reported auditory hallucinations, and described a delusional system that involved a belief that "the Holy Spirit" was talking to her through her own lips. This belief was associated with a mystic religious sect she had joined through the mail (via an advertisement in a magazine). However, she was an active member of a traditional Christian denomination.

Careful examination of the patient's records revealed that such beliefs and hallucinatory behavior had persisted over a 10-year period of time. Records further revealed that she had been tried on various neuroleptics at various doses and that optimum functioning had been obtained on her current medication, thioridazine (Mellaril). The patient readily acknowledged that the Holy Spirit regularly talked to her and that this was accomplished by the Holy Spirit making her lips move and using her vocal cords. In other words, she was able to hear the Holy Spirit by listening to what her own voice said as the Holy Spirit directed it. Although she stated that she was in control of her speech most of the time, she claimed she was not in control of and could not control the vocalization when the Holy Spirit "used" her voice to tell her things and that she always knew when the Holy Spirit was "using her." At these times she reported feeling "Him" moving her lips, and the vocal sounds were different from her own (the Holy Spirit's were softer, almost a whisper). She claimed she did not know what the Holy Spirit was going to say until she heard it from her own voice. Further, the patient felt no anxiety over this and, to the contrary, felt it quite a positive sign that she was "chosen" for this. She admitted little desire to change this behavior, except that it disturbed her husband and other people who, she admitted, thought she was "crazy." For these

reasons she had agreed to voluntary admission to try and modify this behavior. Since these problem behaviors involved both *sensations* of an external force moving her vocal cords and lips as well as the *belief* that the Holy Spirit had chosen her for these special messages, the target behaviors were considered both hallucinatory as well as delusional in nature. The actual content of these hallucinatory-delusional verbalizations consisted of rather simple entreatments to "be good," "do the right thing," and so forth and did not involve persecutory or command messages.

PROCEDURE

Initial observation of the patient on the ward and in a one-way mirrored observation room revealed that she occasionally appeared to be mumbling to herself. Her lips moved as if forming words, but the sounds emitted were barely audible. In contrast, when speaking with someone else, her speech was relatively clear and audible. During the initial evaluation the patient reported that these "mumblings" were, in fact, the hallucinations and whenever she was observed engaged in the mumbling and queried, she acknowledged that it had been the Holy Spirit talking through her lips. The hallucinatory-delusional verbalizations were, thus, easily discriminable from her nonhallucinatory speech. She did not describe, nor was other evidence found that any additional hallucinatory behavior occurred other than these mumblings. The observation that this patient's hallucinatory-perceptions appeared to parallel perfectly the mumbling behavior provided an external measure in addition to self-report on the occurrence of hallucinatory behavior.

Throughout the course of hospitalization and treatment no contingencies were instituted for the patient's on-ward behavior, and her medication and dosage were not changed. A time-sampling procedure was instituted to assess the frequency of the patient's on-ward hallucinatory-delusional verbalizations. Every 15 minutes throughout the patient's waking day the patient was surreptitiously observed for 30 seconds to detect "delusional verbalizations," defined as evidence of speechlike mouth movements in the absence of a conversational partner. This sampling procedure was conducted across all experimental phases and yielded 60 samples per day. An independent reliability observer was present at 10% of the samples. Calculation of percentage agreement of occurrence/nonoccurrence (ratio of total agreements divided by total agreements plus disagreements) exceeded 95%. A telemetry-equipped room with one-way mirrors was also used for more extended, one-hour observations and for treatment. During these observation room sessions the patient was provided a handswitch connected to a polygraph signal marker in an adjacent chamber. She was instructed to depress the switch whenever and for as long as the hallucinatory-delusional verbalization continued, thereby producing a time-calibrated paper record of frequency and duration. Percentage agreement (as defined and calculated above) during observation room sessions was 100%. Importantly, virtually no temporal discrepancy between experimenter's observations and the patient's "report" via the handswitch was obtained. The following phases constituted the treatment schedule:

Phase I (baseline 1). The patient was instructed to speak with or allow the Holy Spirit to talk through her at will. Phase I involved three observation room sessions distributed across 8 days. On-ward observations occurred daily, as previously described, across this and all experimental phases.

Phase II (social interference). This phase consisted of three observation room sessions over 4 days and involved a therapist sitting in the observation room with the patient actively engaging her in conversation on topics irrelevant to her delusional beliefs. The patient was, however, instructed that she should press the switch if the Holy Spirit spoke to or through her.

Phase III (baseline 2). This consisted of a return to the baseline conditions of Phase I.

Phase IV (self-control). During the five observation-room sessions of this phase, the patient was instructed to stop or inhibit

the hallucinatory-delusional verbalizations any way that she could. At the end of this phase, the patient was shown data from the observation room: The fact that she had successfully self-controlled (i.e., reduced the target behavior) was discussed with her. The extrinsic adverse effects or results of this behavior were again reviewed and discussed, thus emphasizing the undesirability of the behavior.

Phase V (baseline 3). This phase consisted of a return to the baseline conditions.

Phase VI (prompted and at liberty self-control). During this phase, each observation room session was divided into twelve 5-minute segments alternating between *prompted self-control* and *at liberty self-control.* Prompted self-control involved the experimenter instructing the patient at the beginning of the segment to stop or inhibit the target behavior. In the six *self-control at liberty* segments, the experimenter instructed the patient that she should either stop or inhibit the behavior or not as she chose or desired. In other words, six mini-baseline segments were interspersed and alternated with six segments of instructed self-control during each session.

Phase VII (baseline 4, cognitive intervention, and *follow-up).* Ward observations were recorded for two days on which there were no other experimental or therapeutic contacts with the patient (baseline 4). On the evening of the second day of this phase, a one hour cognitive intervention session was conducted. A second, longer (90-minute) verbal therapy session was administered two days later. In these two interviews, the senior author engaged the patient in religious-philosophical discussions of her beliefs and hallucinatory-delusional verbalizations. Instead of further attempting to motivate the patient to practice self-control because of the diverse *extrinsic* aversive consequences (e.g., her husband's reactions), discussions were designed to convince the patient that the hallucinatory-delusional verbalizations were sacrilegious, blasphemous, and evil. In other

words, the object of these two "cognitive restructuring" sessions was to alter an hypothesized intrinsic *valence* of the target behavior: to shift this valence of the behavior itself from positive (rewarding or reinforcing) to negative (aversive or punishing). In attempting to accomplish this, the therapist utilized verbal shaping and simple syllogistic reasoning incorporating the patient's own emotionally loaded religious beliefs. For example, the patient was prompted to cite and discuss the meaning of "a tree should be judged by it's fruits," "a wolf in sheep's clothing," and the idea of evil posing as good but bearing evil "fruit." Eventually, the patient was led to review the "evil" that had resulted from her "self-talk" and was slowly, carefully led to (at least orally) conclude that the target behaviors were not the Holy Spirit, but in fact if anything, "evil in sheep's clothing": Therefore, they were to be resisted and stopped. Every attempt was made to lead or shape the patient to arrive at her own conclusions without appearing to dictate these conclusions. Other than these two interviews, no other interventions were administered during this phase.

One follow-up observation room session was conducted four months after discharge.

RESULTS

Frequency and duration of delusional verbalizations emitted in the observation room across all experimental phases are presented in Figure 1. Experimenters observed no instances in which the patient's engagement of the handswitch failed to parallel observed verbalizations.

Inspection of Figure 1 reveals an initial baseline mean frequency of 98 delusional verbalizations per session, with an average 26-second duration per verbalization. During Phase II (social interference) frequency declined to 6.4 per session with an average duration of only 2.3 seconds. Mean frequency and duration returned to 68 and 31 seconds, respectively, in Phase III (baseline 2). When the patient was instructed to use whatever means she could to stop or inhibit the target behavior (Phase IV: self-control), number of verbalizations declined rather sharply to zero

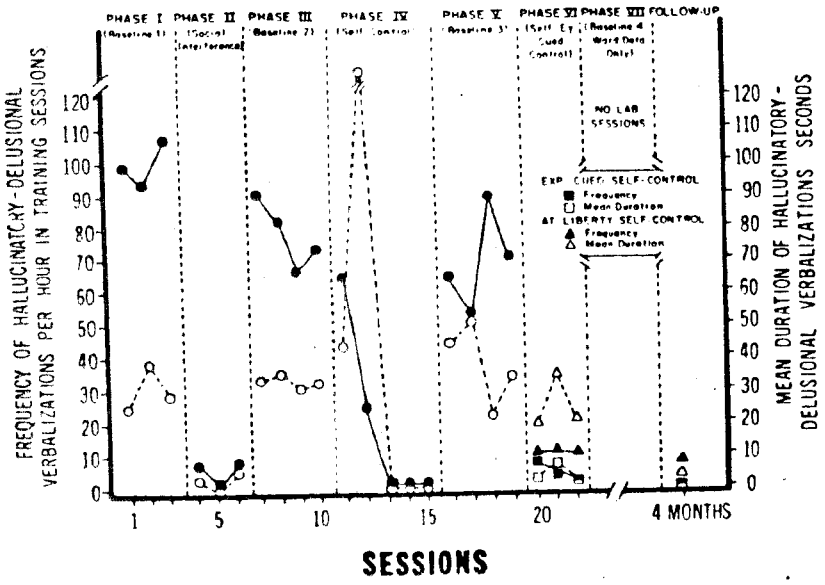

Figure 1: Frequency and Mean Duration of Hallucinatory-Delusional Verbalizations Within Each Observation Room Session Across Phases

frequency in the last three sessions of that phase. Curiously, in the second session of this phase the patient emitted verbalizations of substantially longer duration. During Phase V (baseline 3), response rate and average duration returned to previous baseline levels. In Phase VI, frequency of verbalizations during externally prompted self-control segments was half of that obtained during "free talk" periods (mean of 4.6 compared to 9.4) and average duration during prompted self-control was only 2.8 seconds contrasted with a mean duration of 22.6 seconds recorded in the free talk segments.

During the follow-up session, frequency of verbalizations was again lower during the prompted self-control segment (none occurred) than in the at liberty segments (six delusional verbalizations were emitted). Mean duration of verbalizations in these two conditions was zero and 2.93 seconds, respectively.

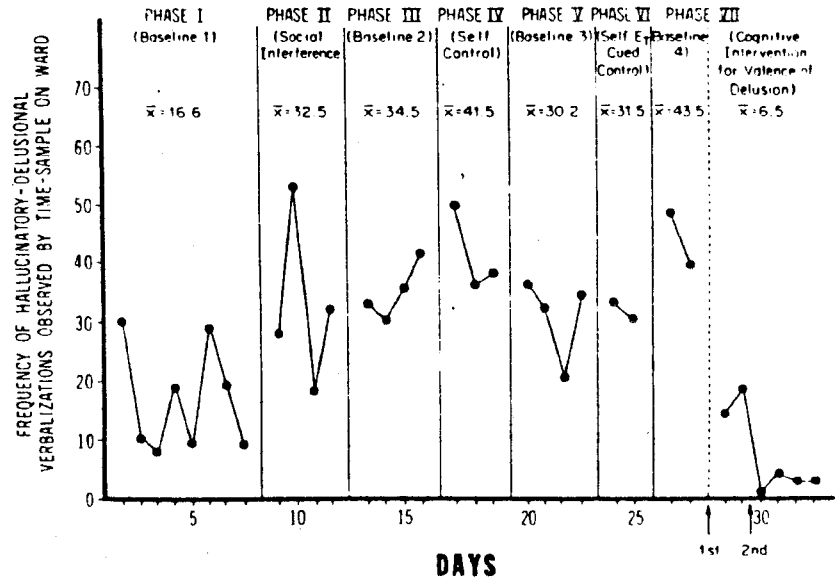

Figure 2: Daily Frequency of Observed Hallucinatory-Delusional Verbalizations Obtained by Time Sample on Ward

Frequencies of delusional verbalizations obtained on the ward are presented across experimental phases in Figure 2.

After an initial baseline frequency of 16.6 scored intervals (i.e., time samples in which patient was observed emitting hallucinatory-delusional verbalizations), mean frequencies per day accelerated to 32.5, 34.4, 41.5, 30.2, and 31.5 across Phase II through VI, respectively. During the first two days of Phase VII (baseline 4; prior to cognitive restructuring sessions and during which there were no observation room sessions), mean frequency of time samples in which the patient was emitting delusional verbalizations on the ward was 42.5. Following the first cognitive restructuring session, this frequency fell to a two-day mean of 15 and following the second, longer verbal intervention session, the rate dropped to an average of 2.25 scored intervals over the last four days of the case study.

DISCUSSION

The rapid but temporary reduction in frequency and duration of hallucinatory-delusional verbalization emitted in observation room sessions during Phase II replicates a similar finding by Alford and Turner (1976). They found social interference effective in temporarily reducing auditory hallucinations and interpreted this effect to be a consequence of attracting and maintaining the patient's attention to competitive sensoriperceptual signals. In the present case, this result also supported anecdotal reports from the staff that the patient appeared to exhibit fewer delusional verbalizations when actively engaged in conversation with other people than when she was alone or even when sitting inattentively among other people. The marked drop in both frequency and duration of the target behaviors in Phase IV (self-control; see Figure 1) reveals that the patient was, in fact, capable of exerting some control over the verbalizations, at least for brief periods. She claimed, however, no knowledge of how she had accomplished the reduction and even when repeatedly urged, was unable to describe any stratagems she had used. The return to response strength in Phase V (baseline 3) demonstrated that when left to her own choice or guidance, she continued to emit a rather high rate of delusional verbalizations. This contrast is even more evident in Phase VI where the patient exhibited less self-talk during externally prompted self-control segments than during the *at liberty* segments with each session (Figure 1).

Inspection of Figure 2, however, reveals that during the various observation room phases no significant or systematic changes occurred in the patient's on-ward hallucinatory-delusional verbalizations. Whatever control the patient exhibited or acquired during observation room sessions clearly did not generalize to the ward. This finding was not surprising in light of the patient's claim that these experiences were desirable and her behavior in Phases V and Phase VI in the observation room. But, it did further support the notion that these behaviors were more positively reinforcing, if not pleasurable, than aversive or punishing for this patient. This was inspite of discussions with her regarding the aversive effects of this behavior on others (e.g.,

husband) and its general undesirability. Following the two interviews, in which attempts were made to change the *valence* of the target behavior itself (i.e., to make it "intrinsically" negative, aversive), subsequent on-ward frequencies declined substantially (Phase VII, Figure 2). Since no contingencies regarding target behaviors on the ward were ever instituted (and on-ward raters were blind to experimental conditions), this marked and rapid deceleration appears to be the results of the cognitive intervention aimed at the valence of the delusional behavior. Although the patient at that point verbally reported accepting the new belief that the target events were more "satanic" and "blasphemous" than "holy," it could not be determined to what extent her private conceptions had actually changed. What is clear, however, is that the most substantial change in her overt behavior was exhibited after these two interviews.

These results did not endure after discharge. Telephone reports from the patient's husband indicated that although the patient's self-talk appeared "amazingly less" the first several weeks after discharge, she gradually accelerated the delusional verbalizations toward prehospitalization levels. During the one 4-month follow-up visit (Figure 1), her target verbalization frequency was very close to her Phase VI level. Discussions with her and her husband revealed that the patient returned to reading her mystical sect literature shortly after returning home. Since the patient (who lived a relatively long distance from this hospital) could not return for regular out-patient follow-up therapy nor would she regularly visit her local mental health center, we postulate that whatever changes in her religious and/or delusional belief system had been attained in the hospital were temporary, and were rather quickly reversed, in part, by her reinvolvement in the mail-order mystical sect. It is important to bear in mind that this patient had a major thought disorder that was only partially controlled by neuroleptic medication. Thus, the derailed associative cognitive processes and idiosyncratic logic common to such thought disorders contributed to her delusional behavior. Only with consultation with her husband and the minister of the local traditional church to which she belonged, were we able to

ethically distinguish between clinically pathological behavior and potential infringement on a patient's private religious beliefs.

The hallucinatory-delusional verbalizations in the present case appeared to entail a form of subvocal speech for which the patient ascribed an external control. That this patient's mumblings appeared to reliably parallel her report of the Holy Spirit talking to her does suggest that subvocal speech was an active contributor to her hallucinatory-delusional behavior. This also provided for a somewhat more reliable if not more direct measure of her behavioral problem. What is more difficult to determine is the extent to which changes in her overt behavior in fact paralleled changes in her sensoriperceptual experience. Thus, this behavior was consistent with McGuigan's finding that chin and tongue movements, breathing, and whispering increase in many patients just before the report of auditory hallucinations (McGuigan, 1966). To what extent such subvocal speech activity parallels auditory hallucinations in most such patients is not yet known.

That alternative procedures (such as on-ward contingencies) might have generated similar or even better results is possible, but this does not vitiate the present findings. However, did the cognitive intervention result in the observed changes or were these changes the consequence of other factors? Inspection of Figures 1 and 2 reveals that although the patient demonstrated a capacity to at least temporarily decrease the frequency of hallucinatory-delusional verbalizations in the observation room sessions (Figure 1), no significant change in her behavior on the ward was obtained until immediately after the cognitive intervention treatments (Figure 2). Because of the nature of such intervention (e.g., attempting to modify emotionally loaded beliefs), one cannot present and remove these variables as might be done with contingent reinforcement. Thus, the pragmatic restriction to an AB component phase in this single case experimental design (Hersen & Barlow, 1976) limits the degree of certainty that can be placed in attributing dependent variable changes to specific independent variable manipulations. In the present case several factors must be considered: (1) Repeated discussions with the patient reviewing the wide range of extrinsic

aversive consequences of her problem behaviors resulted in no measurable change in this 10-year problem. This was true even after demonstrating that she could modify the behavior at least for brief intervals. (2) The patient acknowledged that other people thought the target behavior was "crazy," "pathological," "undesirable," and, according to her pastor, "blasphemous." Thus, her perceptions of the attitudes of others, including the treatment staff, about the target behaviors resulted in no observable changes. (3) No contingencies, restrictions, or other ward manipulations were instituted at any time during the experiment, and ward personnel were blind to the treatment phases. (4) Rather dramatic deceleration of the target behaviors occurred immediately following the cognitive intervention sessions. Further, incidental evidence from the husband indicated that these behaviors appeared much less frequently than before treatment and relatively gradually (over approximately 12 to 14 weeks) accelerated toward the prehospitalization level. It therefore seems reasonable to conclude that the most likely factor to which the change should be attributed is the presentation of the two cognitive intervention sessions.

Further, since previous discussions focusing on the extrinsic consequences of the target behavior resulted in no change, the results obtained in Phase VII (Figure 2) cannot be accounted for on the basis of: (a) discussion with the patient, or (b) a review of extrinsic effects or consequences of her behavior on other people. However, the two cognitive intervention sessions did address and attempt to change her own perceptions of and emotional reaction to the target behavior. In other words, when the focus of intervention was directed at the patient's internal stimulus events, attempting to modify the the potential intrinsic reinforcing effects of the behavior, marked and rapid deceleration in the overt targets occurred.

Results of the present case, then, do support the view that where patients report their hallucinatory and delusional behavior to be positive, such intrinsic reactions may serve a reinforcing function in maintaining the problem behaviors and in diminishing compliance and active cooperation with treatment. More

importantly, these results suggest that instructional and verbal tactics designed to alter this hypothetical reinforcing value may contribute to the modification of empirically measurable behaviors in certain patients. In his analysis of social cueing processes, Rosenthal (1980) reviews a wide variety of clinical operations derived from cognitive and social learning models and marshals the empirical evidence supporting the utility and therapeutic efficacy of such clinical tactics. Additional, more controlled, and more extensive studies are needed to document and determine the magnitude, utility, and comparative efficacy of operations designed to modify the intrinsically reinforcing value of hallucinatory sensations and delusional beliefs in those patients in whom such factors appear to play a part.

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Geary S. Alford is Associate Professor of Psychiatry-Psychology, Assistant Professor of Pharmacology and Toxicology, and Clinical Assistant Professor of Family Medicine at the University of Mississippi Medical Center. His research interests and publications cover a broad range of clinical problems and general behavior therapy. Recent publications include chapters on hypnotic-sedative abuse and another on the therapeutic use of pharmacologic agents in behavior therapy.

Louis Fleece is a clinical psychologist, currently Assistant Professor of Psychiatry at the University of Alabama Medical School and consultation-liaison psychologist at the Birmingham VA Medical Center. His other research interests include behavioral approaches to medication compliance and child behavior management.

Esther Rothblum is currently at the Depression Research Unit at Yale University. Her research has included functional analysis and treatment of depression, and investigation of environmental and behavioral problems and issues predominantly associated with women. She is presently involved in a long-term outcome study of depression, an investigation of childhood depression, and is editing a book on women's issues in mental health.