# PARTIAL REMEDIATION OF SPEAKER AND LISTENER BEHAVIORS IN PEOPLE WITH SEVERE DEMENTIA

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We investigated the effects of contingent reinforcement (Intervention 1) and contingent reinforcement with modeling (Intervention 2) on speaker and listener behaviors in 5 people with severe dementia. Intervention 1 generally increased listener behavior; there was no clear effect on tacting, but echoic behavior increased in the one case investigated. Given the weak baseline repertoires of these clients and the paucity of other effective interventions, even the small increases in verbal behaviors found here are important. Further gains may be achieved, for example, if reinforcement opportunity per trial type were to be increased from one to several per day or if participants were trained to echo the listener stimulus in mand compliance tasks.
DESCRIPTORS:   dementia, reinforcement, modeling, verbal behavior

The prognosis for anyone diagnosed with dementia of the Alzheimer's type is still poor. Behavioral interventions appear to be as effective as and, consequently, preferable to current palliative medication, which has negative physiological side effects (Orrell & Woods, 1996). A key issue is whether a behavioral approach can be employed to raise the operant level of verbal behaviors and thus reestablish verbal communication in people with dementia. Although Skinner (1957) classified only speaker behaviors as verbal, to function as a member of the verbal community, a speaker must also learn the appropriate listener repertoire. Accordingly, the present study, conducted with 5 participants with severe dementia, investigated the functional properties of basic speaker and listener behaviors, and how they might be altered by (a) contingent reinforcement and (b) contingent reinforcement with modeling of correct responding.

## METHOD

### Participants, Setting, and Materials

Five elderly people with a diagnosis of severe dementia participated. Rita, Ali, and Con were presented with Intervention 1, and Brian and Dot received Intervention 1 followed by Intervention 2. Sessions were conducted in a quiet room in the nursing home where they lived. The 10 stimuli employed were those that were featured frequently in the participants' social environment. The names of the stimuli had approximately equal frequency in the English language.

### Procedure

Preexperimental repertoires for three speaker behaviors (echoing, tacting, and prepositional tacting) and three listener behaviors (mand compliance, prepositional mand compliance, and conditional mand compliance) were assessed for each participant; subsets of three (Con and Brian) or

four (Rita, Ali, and Dot) of these repertoires were selected such that, for each participant, at least one potential target repertoire was neither at ceiling nor at floor level. Each participant was presented with a range of items (e.g., coins, pens, candies, etc.) in a series of choice tests. The items reliably selected by each participant were employed as individually tailored reinforcers during the intervention phases of the study.

In each session, each target repertoire was assessed in a block of 10 randomly scheduled trial types for which the response period and the intertrial interval were 15 s. Each of the target repertoires was presented once per session, in counterbalanced order across sessions. For the echoic, the experimenter asked the participant, "Can you say cup?" (or another of the 10 stimulus words). For the tact, the experimenter placed the 10 experimental objects on a tray in front of the participant, selected, in turn, one of the 10 items and asked, "What's this?" For the prepositional tact, the experimenter selected a different two of the 10 objects from the tray, placed one of them in or on the other, and asked, "What is [in or on] what?"

In all three listener tasks the experimenter presented an array of the 10 stimulus items on a tray. For mand compliance, the participant was asked, for example, "Can you give me the cup?" For prepositional mand compliance, the experimenter asked the participant, for example, to "Put the cup in [or on] the brush." For the conditional mand compliance with count cue task, the participant was asked to "Count out loud, up to 10, and *then* give me the cup." In the pen cue version of the conditional mand compliance task, the participant was told, "When you see me hold up the pen, give me the cup."

No reinforcers were delivered during baseline. In Interventions 1 and 2, all correct responses (those that accorded with the instructions for the targeted repertoire) were followed by the delivery of praise and the reinforcers specified above. In Intervention 2, following an incorrect response, the experimenter modeled the correct response. This was done, in the case of mand compliance, by selecting the correct object and saying "No, give me this one"; for prepositional mand compliance, it was done by putting the two correct objects in the specified spatial relation and saying "No, this is what you should do"; and for the tact, it was done by saying "No, this is a cup." Immediately following the corrective model, the trial was repeated as before with reinforcement. A trained nurse independently scored all trials in a randomly selected 10% of sessions; interobserver agreement with the experimenter was 98%.

## RESULTS AND DISCUSSION

Figure 1 shows for 2 of the participants (Rita and Ali) correct responses (out of 10) for each target repertoire; the session-to-session variability is illustrative of responding by all 5 participants.

*Intervention 1.* The echoic was targeted in only 1 participant (Rita), whose mean level of echoing increased from 3.0 in baseline to 6.5 in Intervention 1. The tact was investigated in 3 participants (Con, Brian, and Dot). Relative to baseline, Con and Dot showed a slight decrease in tacting ($-0.7$ and $-0.25$ mean correct responses, respectively), whereas Brian's tacting increased ($+1.26$ mean correct responses). In sum, Intervention 1 strengthened Rita's echoic behavior, but the effect on the tact was inconclusive.

Mand compliance was targeted in 3 participants (Brian, Dot and Con). For both Brian and Dot mand compliance relative to baseline increased (by 1.97 and 1.84 mean correct responses, respectively) under Intervention 1, whereas Con's mand compliance declined by a mean of 0.64 correct respons-
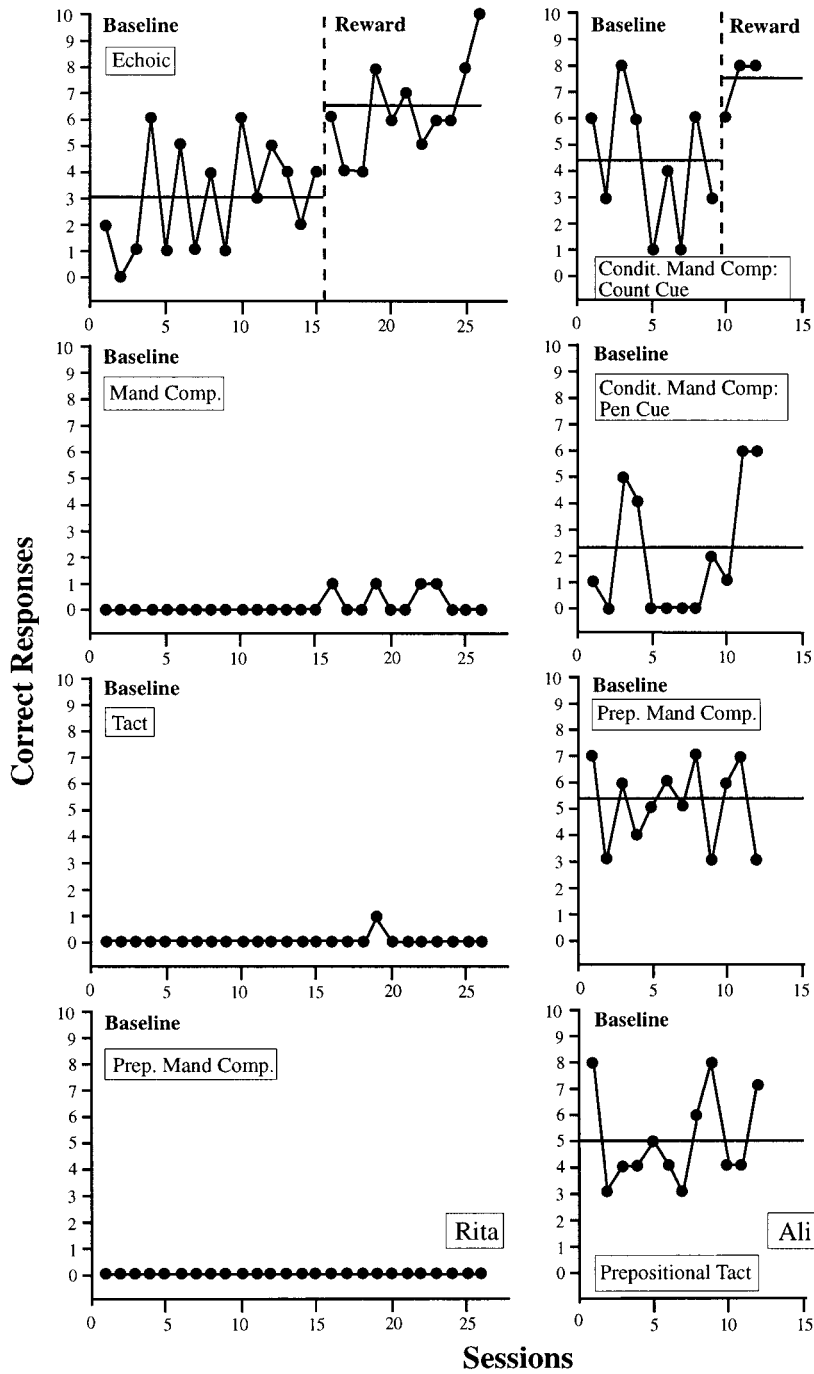
Figure 1.    For Rita and Ali, correct responses out of 10 for each of the experimentally assigned speaker and listener behaviors in baseline and contingent reinforcement (reward). Speaker behaviors included the echoic, the tact, and the prepositional tact. Listener behaviors included mand compliance (mand comp.), prepositional mand compliance (prep. mand comp.), and conditional mand compliance (condit. mand comp.), with either count cue or pen cue.

es. Conditional mand compliance with count cue was investigated only for Ali, whose mean correct responses increased from 4.2 in baseline to 7.5 in Intervention 1, an effect that appeared to generalize to the nontargeted pen cue version of the task. In sum, Intervention 1 strengthened the mand compliance behaviors of 2 of the 3 participants and also the conditional mand compliance behavior of Ali.

*Intervention 2.* The modeling intervention was introduced for the tact repertoires of Brian and Dot, both of whom showed a mean decrease in correct responses ($-2.17$ and $-0.8$, respectively) relative to Intervention 1. For Brian the modeling intervention was also accompanied by a mean decrease in both mand compliance (1.81 correct responses) and prepositional mand compliance ($-1.47$ correct responses) although the opposite was true for Dot (mean correct responses increased by 0.72 and 2.29, respectively).

Regardless of the particular repertoire targeted by the interventions, some operants showed an increase in response probability whereas others in the same repertoire showed no change (e.g., Rita's probability of correct echoic responding for "sock" increased from 0.18 in baseline to 0.91 in Intervention 1, but that for "cup" remained at 0.55 in both phases). This apparent lack of functional equivalence casts some doubt on the notion that these repertoires were functioning as higher order classes (see Catania, 1998, p. 156) and suggests that each operant within a target repertoire may need to be separately reestablished.

The need for further systematic replication of the procedures implemented in these five single-case studies is clear. The participants had very weak residual repertoires (Rita, only the echoic) and so provided an extreme test of the behavioral interventions. Nevertheless, increases in behavior were observed, particularly in the listener repertoires, despite the fact that there was only one reinforcement opportunity per trial type per day. It seems likely that greater effects may be obtained with more potent reinforcers, with more frequent trials using a smaller number of target trial types, and in people in a less advanced stage of disease. Indeed, people with mild to moderate dementia may have the necessary observational learning repertoires to benefit from the modeling intervention (and see Catania, 1998, pp. 228–230). It should be noted, however, that contingent reinforcement of tacting appeared to have little remedial effect in the present participants. Horne and Lowe (1996) propose that the tact may be established most readily when a listener stimulus jointly controls a listener and an echoic response in the presence of the corresponding object. Further research might therefore incorporate an intervention designed to promote such on-task echoing in the mand compliance task to reestablish this vital basic speaker repertoire in people with dementia.

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