

*STAFF-ADMINISTERED FUNCTIONAL ANALYSIS AND
TREATMENT OF AGGRESSION BY AN ELDER WITH DEMENTIA*

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In the current study, nursing home staff were taught to administer functional analyses to determine the variables maintaining aggression by an elder with dementia. The results indicated that aggression was evoked during bathroom routines and that escape maintained aggression. Staff then reduced aggression to near-zero levels with noncontingent escape. Implications for the assessment and treatment of problem behaviors in nursing home settings are discussed.

DESCRIPTORS: aging, dementia, escape, functional analysis, noncontingent escape, noncontingent reinforcement

Zimmerman, Watson, and Treat (1984) estimated that 86% of elders with dementia in nursing homes engage in physical or verbal aggression, which typically occurs during bathing and toileting routines and results in frequent injuries to residents and staff (Sloane et al., 2004). Chemical restraints are the most common response to aggression and agitation in nursing homes (Burgio & Sinnott, 1990); however, the Omnibus Budget Reconciliation Act (OBRA) of 1987 mandates that behavior-management interventions be used prior to restraint.

Interventions for aggression in nursing homes include differential reinforcement of alternative (e.g., Haley, 1983) or other behavior (e.g., Lewin & Lundervold, 1987) and person-centered bathing (Sloane et al., 2004). Partly

because these interventions fail to specify the functional relation between treatment and the cause of aggression, it is unclear how to select these or other interventions. Because interventions developed without an understanding of behavioral function are prone to unreliable outcomes, in that effectiveness is predicated on overcoming an unknown response–reinforcer relation, it is important that functional analyses of aberrant behavior be conducted prior to designing interventions (Iwata, Kahng, Wallace, & Lindberg, 2000). Although behavioral function has been considered in the treatment literature for problem behaviors displayed by elders, behavioral function is often disconnected from treatment in practice. For instance, Lundervold and Jackson (1992) suggested that escape maintained the aggression of a man diagnosed with Huntington's disease, yet time-out (a likely form of escape) was included in their intervention.

When escape is identified as a reinforcer for aggression, common interventions include (a) extinction, (b) differential reinforcement of compliance or an alternative response, or (c) noncontingent reinforcement (NCR) (e.g., J. E. Carr, Coriaty, & Dozier, 2000). Escape extinction may not be an appropriate treatment for aggression in a nursing home due to the possibility of injury brought about by an increase in the frequency or intensity of aggression. Differential reinforcement is a pre-

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ferred intervention presumably because a more appropriate and functionally similar response is acquired. However, developing a novel response may not be possible or efficient in populations with severe memory and cognitive deficits.

Although NCR does not result in the development of any particular skill, and there is a possibility of accidental reinforcement (Vollmer, Ringdahl, Roane, & Marcus, 1997), there are several potential benefits to using the time-based delivery of reinforcement to treat aberrant behavior of elders: (a) NCR is associated with a higher rate of reinforcement than other interventions (e.g., differential reinforcement of other behavior); (b) NCR is associated with fewer extinction-induced behaviors; (c) NCR is relatively easy to implement; and (d) NCR is often associated with immediate decreases in problem behavior (Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993).

Therefore, the current study extends the functional analysis and treatment model to the aggression of an elder with dementia. Nursing home staff were taught to administer functional analyses and then to implement a time- and function-based intervention during relevant routines.

METHOD

Participant and Setting

The participant, who had been referred for assessment due to her severe aggression, was a 96-year-old nonambulatory woman with a diagnosis of dementia of Alzheimer's type. Prior to our assessment, the behavior plan for her aggression entailed a hierarchy of four responses: (a) attempt to sooth her with a calm voice; (b) try to redirect her; (c) provide a quiet time with a snack; and (d) administer Ativan[®], which is an anxiolytic typically prescribed as needed (0.5 to 1.0 mg) to calm agitation. One month prior to the intervention, she had been placed on daily doses of Ativan[®] (0.5 mg). After hospitalization for dehydration (following Session 20), however, she was returned to an "as

needed" schedule. The participant was also physically restrained throughout much of the day due to her severe aggression.

A 21-year-old female certified nurse's assistant (CNA) served as the primary caregiver during all observation sessions. She was a junior in a local college nursing program and had worked in the setting for 10 months. She had no experience with behavioral assessment or intervention. At various times another staff member was present during the observations.

All sessions took place in a nursing home special care unit for persons with dementia. Between 25 and 30 residents with dementia resided in the unit at any given time. Observation sessions were conducted in the participant's bathroom or bedroom or in the commons room. Sessions were 3 to 5 min in duration and were conducted two to three times per day, three to four times per week.

Measurement

Data were collected over a 3-month period. All observation sessions occurred immediately before or after breakfast or lunch because the participant was unrestrained at these times. Aggression, in the form of hitting, was the dependent variable, and was defined as forceful contact with a closed or open fist with a staff member. Using partial-interval recording, the first author noted occurrences of hitting within 10-s intervals. In addition, integrity measures were scored during the functional analysis. For the attention condition, integrity was scored for providing attention contingent on each episode of aggression and averaged 81%. For the escape condition, integrity was scored for stepping back 1 m for 10 s contingent on every episode of aggression and averaged 83%. For the control condition, integrity was scored for providing attention noncontingently, and non-integrity was scored for providing attention contingently (i.e., within 10 s of a hit), for placing demands on the participant, or for providing escape contingently. Integrity for the control condition averaged 100%.

Interobserver agreement was calculated for hitting using an interval-based agreement procedure. Agreement was collected for 25%, 30%, and 19% of the setting analysis, functional analysis, and intervention analysis sessions, respectively, and averaged 97%, 96%, and 100%, respectively. Agreement for the integrity of functional analysis consequences was calculated for 30% of the control, attention, and escape sessions, respectively, and averaged 98%, 100%, and 81%, respectively.

Experimental Design

The study was conducted in three phases. Phase 1 consisted of a setting analysis, which involved alternation between a bathroom routine and a recreational routine (i.e., a multielement design was used). Phase 2 consisted of a more typical functional analysis (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994) and used a multielement design with three experimental conditions: attention, escape, and control. Phase 3 was a treatment analysis that used a reversal design (consisting of an intervention, a baseline return, and a return to intervention).

Phase 1: Setting Analysis

Based on interviews with staff and caregivers as well as several direct observations, the bathroom routine appeared to be associated with the most hitting. Along with the hygiene demands embedded in this activity, this routine also involved staff proximity for the longest amount of time throughout the day. Therefore, we were interested in determining whether the functional analysis needed to be conducted in the bathroom or whether creating conditions that simply involved a staff member being nearby would be an appropriate context for our analysis. Therefore, a comparison of aggression during the bathroom routine was compared to that observed while a staff member was seated within arm's reach during a recreational routine.

The bathroom routine consisted of the CNA wheeling the participant into the bathroom and

lifting the participant while a second staff member moved the wheelchair out of the way and removed the participant's clothes. She then helped the participant onto the toilet and waited next to her until she voided. She was instructed to respond to the participant's hitting in her normal way (e.g., scolding the participant, stepping back to avoid being hit).

During the recreational routine condition, the CNA was instructed to sit in a chair beside the participant (the chair and the wheelchair were in contact with each other) and interact with the participant as she normally would (e.g., talking to the participant, holding her hand). All recreational routine conditions occurred in the participant's bedroom or in the commons room.

Phase 2: Functional Analysis

Based on the results of the setting analysis, a more thorough and controlled analysis was conducted by comparing levels of aggression in three conditions (control, attention, and escape). Because the participant could not engage in aggression without a person present, an alone condition was not included. Prior to conducting the functional analysis, the CNA was taught to implement the three conditions (1 day prior to the analysis, the primary investigator provided rationales, descriptions, role playing, performance feedback, and practice). The entire training sequence took approximately 30 min. No feedback for proper consequence delivery occurred during the actual test sessions for which data are reported.

The attention condition occurred in the bathroom while the CNA prompted the participant through the toileting routine. She systematically provided verbal reprimands for each episode of hitting, similar to those observed during the bathroom condition of the setting analysis. The escape condition also occurred while the CNA prompted the participant in the toileting routine. She provided escape following each episode of hitting by stating, "Okay, I'll stop" and then moving back

1 m for 10 s. Moving back 1 m for 10 s was used instead of the traditional escape consequence (i.e., completely terminating the task for 30 s) because of the exigencies of the toileting routine (i.e., the materials could not be removed) and because the CNA preferred to use a smaller escape interval to eventually complete the toileting routine. The control condition was similar to the recreational routine condition used in the setting analysis, with two important differences. In addition to the bedroom and commons room, control sessions also occurred in the bathroom (the CNA sat in a chair next to the participant, who was in her wheelchair) to control for the possibility that the bathroom context, independent of the routine interactions, was associated with hitting. Second, the CNA (a) delivered attention noncontingently, (b) placed no demands on the participant, and (c) provided no differential consequences for hitting.

Phase 3: Noncontingent Reinforcement

An intervention designed to provide time-based delivery of the reinforcer maintaining the participant's aggression was developed. To determine an acceptable and effective schedule of noncontingent escape (NCE), the average latency and the average interresponse time (IRT) from the pretreatment analyses were calculated (see Kahng, Iwata, DeLeon, & Wallace, 2000). The average latency was 33 s and the average IRT was 27 s. To ensure a relatively rich schedule of reinforcement while still allowing for the timely completion of the toileting routine, the NCE schedule was calculated by multiplying the smaller of the two sums (the mean IRT) by 0.75, which equaled 20 s. The duration of reinforcement was kept the same as it was during the escape sessions (10 s). Therefore, the CNA prompted the participant through the toileting routine for 20 s, provided a 10-s break by backing away from the participant for 10 s, and then resumed the routine for 20 s. Once low levels of responding were observed, the escape condition

from the functional analysis was used as the reversal condition.

RESULTS AND DISCUSSION

Figure 1 shows that hitting occurred for 3% of the intervals during the recreational routine of the setting analysis (no differences were observed during observations conducted in the bedroom and the commons room). By contrast, hitting was observed during 29% of the bathroom routine intervals. Hitting was never observed during control sessions of the functional analysis regardless of setting (bedroom, commons room, and bathroom). Hitting was observed, however, during 18% of the attention sessions and 41% of the escape sessions.

The initial NCE condition resulted in a decrease in hitting during the toileting routine ($M = 9\%$). Sessions with variable responding were followed by two sessions with no hitting. Hitting was observed during an average of 46% of the intervals during the return to contingent escape. Variability in hitting during this condition is most likely attributable to the administration of Ativan[®] by hospital staff during Session 36 due to the severity of aggression during the morning routine. During the later morning session following the Ativan[®] administration (Session 37), the participant was unresponsive and did not make eye contact with staff (this was atypical). Hitting was observed during an average of 9% of intervals during the return to the NCE condition, with no hitting observed during four of the last five sessions.

Our initial analysis demonstrated that hitting was not simply more likely when staff were close; rather, something that occurred during the bathroom routine seemed to be responsible for the hitting. The functional analysis was therefore conducted primarily during the bathroom routine, and consequences for hitting were varied across conditions. This analysis showed that hitting occurred only during the actual routine and that contingent escape resulted in the highest levels of this behavior.

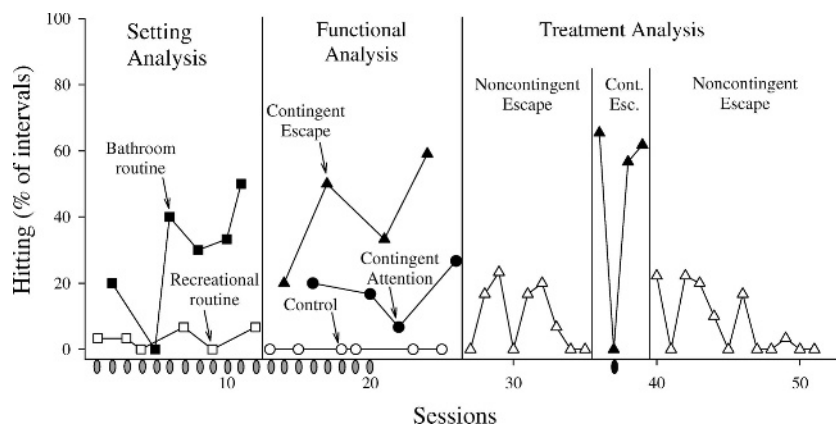


Figure 1. Percentage of 10-s intervals in which hitting occurred during the setting, functional, and treatment analysis sessions. Gray ovals along the abscissa depict sessions in which the participant was given scheduled doses of Ativan®, and the black oval depicts an Ativan® dose delivered due to severe aggression prior to the observation session.

The NCE intervention, which provided a 10-s break every 20 s, resulted in a decrease of aggression while the bathroom routine was completed. Although duration data were not collected, staff reported that the bathroom routine actually took no longer during NCE due to the elimination of hitting. The routine required only one staff member to accomplish as opposed to the three staff members typically required prior to our analyses.

Our results represent an extension of the functional analysis and treatment model to aggression by an elder with dementia. The effectiveness of a functional analysis administered by nursing home staff with no previous training in behavioral assessment was demonstrated. The training was brief and resulted in implementation with sufficient integrity to determine behavioral function. NCE was also shown to be an efficient and effective intervention for aggression maintained by escape in an adult with dementia. For the many persons who exhibit both problem behavior and communication deficits (e.g., children with autism, adults with profound mental retardation, adults with dementia), establishing a more appropriate mand would be an optimal intervention, because it would allow the development of socially desirable behavior (E. G.

Carr & Durand, 1985; Sundberg & Michael, 2001). However, because of the cognitive impairment associated with dementia and the busy schedule of CNAs, the acquisition of a novel response would take a substantial amount of time and was clearly not the preferred intervention by the staff with whom we were working. Nonetheless, by quickly decreasing aggression through NCE, attempts to establish more socially desirable behaviors may then be possible.

It is important to note a few constraints on the generality of our findings. First, although a CNA implemented the assessment and intervention based on 30 min of training, she did not develop the former or derive the latter. The socially important outcome was generated through a collaborative effort between a consultant knowledgeable in behavioral assessment and intervention and a staff person knowledgeable in the culture of the nursing home and in the personal history of the participant. It is likely that one without the other would not have produced a satisfactory outcome. Second, the CNA had a high education level and had been with the nursing home for over 10 months, neither of which is common in nursing home settings. Third, the current demonstration was conducted with only 1

participant; therefore, future research should use this collaborative approach with more participants who present with a wider range of problem behaviors to demonstrate the efficacy of functional analyses in nursing home settings.

Nevertheless, the current evaluation demonstrates the efficacy of a rather simple intervention for decreasing aggression by an elder with dementia who resided in a nursing home, and this intervention was clearly superior to medication, which either did not affect aggression (see Sessions 1 through 20) or did so by eliminating both aggression and socially relevant behavior (see Session 37). OBRA (1987) mandates that behavioral interventions be used before any chemical restraints are prescribed. However, the current study suggests that OBRA should be updated to require that interventions based on *behavioral function* be used prior to any chemical restraints being prescribed. This advancement would parallel that which occurred in public education, in which functional assessments are required prior to using strategies that remove children from classroom learning environments (Individuals with Disabilities Education Act, 1997).

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