

*THE EFFECTS OF NONCONTINGENTLY AVAILABLE  
ALTERNATIVE STIMULI ON FUNCTIONAL  
ANALYSIS OUTCOMES*

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The effects of noncontingently available alternative stimuli on functional analysis outcomes were evaluated for 2 individuals. Results suggested that noncontingent access to preferred items resulted in reduced levels of attention-maintained behavior. The results are interpreted in terms of establishing operations.

DESCRIPTORS: functional analysis, establishing operation, developmental disabilities

Pretreatment functional analysis of problem behavior has allowed behavior analysts to tie results of assessment directly to treatment (Iwata et al., 1994). Recently, investigators have begun to evaluate the effects of certain antecedent variables on functional analysis outcomes (e.g., Mueller, Sterling-Turner, & Scattone, 2001). One such antecedent, called an *establishing operation* (EO), is any event that alters the reinforcing value of another stimulus (Michael, 2000). For example, Berg et al. (2000) found that pre-session exposure to attention resulted in lower rates of problem behavior during contingent attention sessions of a functional analysis, thus affecting the clarity of assessment outcomes. Other factors, such as the noncontingent availability of alternative stimuli during a given functional analysis session, also might decrease the value of the tested reinforcer (Hanley, Piazza, & Fisher, 1997). For example, preferred leisure items often are available during tests for sensitivity to adult

attention (e.g., Iwata et al., 1994). This practice may result in false-negative findings.

The purpose of this study was to evaluate the effects of noncontingently available alternative stimuli on responding during an assessment designed to evaluate the reinforcing effect of attention. These effects were evaluated while 1 individual's problem behavior and a 2nd individual's communicative behavior were assessed. A communication response was included to determine if the effects would be unique to problem behavior. When evaluating potential reinforcers, the effects of alternative stimuli may be important, regardless of whether the behavior is appropriate (and thus targeted for maintenance) or inappropriate (and thus targeted for reduction).

## METHOD

### *Participants and Setting*

Two individuals participated in the evaluation. Tony was a 5-year-old boy who had been referred for assessment and treatment of aggression. Tony functioned in the mild to moderate range of mental retardation, had good adaptive skills, and could communicate vocally. Roland was a 41-year-old man who had been referred for assessment and development of communication skills.

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The target behavior was activation of a microswitch. Roland functioned in the severe to profound range of mental retardation, was nonambulatory, and was totally dependent on others for daily care. The evaluation took place in therapy rooms on an inpatient hospital unit.

#### *Response Measurement and Interobserver Agreement*

*Aggression* was defined as hitting, kicking, or biting the therapist or caregiver. *Activating a microswitch* was defined as pressing the switch with enough pressure to play the recorded message ("talk to me" during the attention condition; "hello" during the control condition). Frequency data were collected for all target behaviors, with the data reported as number of responses per minute. Trained observers used a computerized data-collection program to record target behavior, toy play, and reinforcer delivery. All observations were conducted either from behind a one-way mirror or with a video-camera. Independent data collectors collected interobserver agreement data on 19% and 22% of Tony's and Roland's functional analysis sessions, respectively. Agreement percentages were calculated based on 10-s interval-by-interval comparisons of the observers' records. Mean interobserver agreement was 99% (range, 96% to 100%) for Tony and 98% (range, 90% to 100%) for Roland.

#### *Procedure and Design*

Conditions included a control condition and two attention conditions. During the control condition, noncontingent therapist attention and preferred stimuli (a toy car and a ball for Tony and noisemakers for Roland) were available continuously. No instructions were delivered, and there was no programmed consequence for the target behavior. During the attention-only condition, no alternative stimuli were available, and the

therapist delivered 30 s of attention following each occurrence of target behavior. During the attention-enriched condition, the participant had noncontingent access to preferred stimuli (identical to those stimuli available during the control condition), and the therapist delivered 30 s of attention following each occurrence of the target behavior. The effect of alternative stimuli on responding in the attention condition was evaluated via reversal and multielement designs.

## RESULTS AND DISCUSSION

For Tony, problem behavior was rarely observed during the control condition (top panel of Figure 1). Problem behavior occurred during both attention conditions but was differentially elevated during the attention-only condition. Thus, results of the functional analysis suggested that problem behavior was maintained by attention. However, if noncontingent access to alternative stimuli had been available during all attention sessions, the assessment likely would have produced a false negative.

Communication was rarely observed during the control condition for Roland, with the exception of sessions that occurred toward the end of the assessment (see bottom panel of Figure 1). Rates of problem behavior were higher during the attention-only condition than in the attention-enriched condition. Thus, communication appeared to be much less sensitive to attention as a reinforcer when alternative stimuli were available independent of responding.

These findings suggest that the availability of preferred items in a functional analysis may abolish the effects of attention as a reinforcer. Access to leisure items also established a concurrent-operants schedule (i.e., the reinforcer associated with toy play and the reinforcer for the target behaviors were concurrently available). Thus, an al-

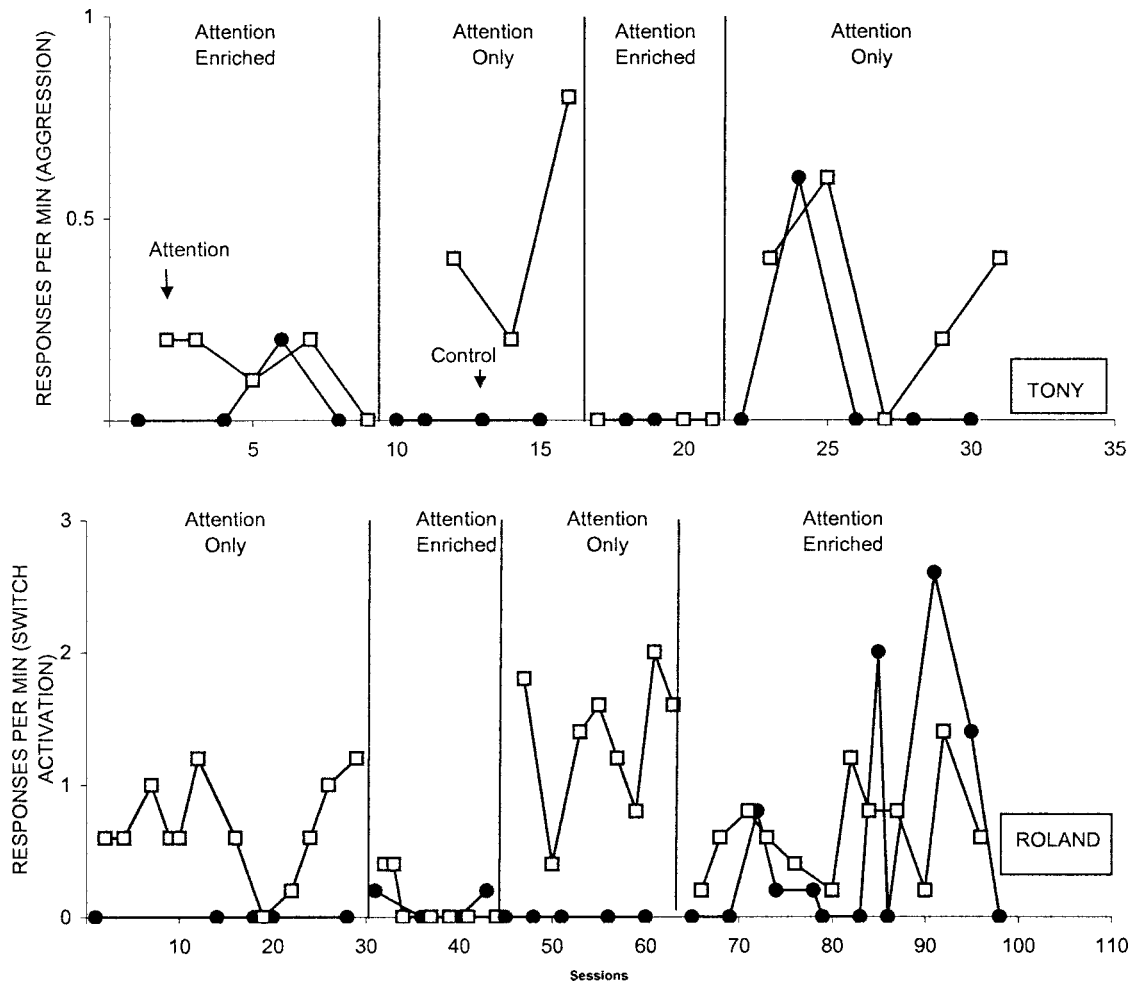


Figure 1. Number of responses per minute of target behavior during attention-only (squares), attention-enriched (squares), and control (circles) conditions. Tony's results are displayed in the top panel, and Roland's results are displayed in the bottom panel.

ternative interpretation is that toy play competed with the target behavior. These results should be evaluated further because leisure materials typically are included in the attention condition of a functional analysis (e.g., Iwata et al., 1994). The disruptive influence of stimuli at different preference levels (e.g., highly vs. moderately preferred items) and the effects of other putative EOs (e.g., pre-session exposure to the tested reinforcer) could be parametrically evaluated in future studies. Information gathered from these types of studies might add to our overall understanding of EO effects and

better enable us to interpret findings from functional analyses.

## REFERENCES

- Berg, W. K., Peck, S., Wacker, D. P., Harding, J., McComas, J., Richman, D., et al. (2000). The effects of pre-session exposure to attention on the results of assessments of attention as a reinforcer. *Journal of Applied Behavior Analysis, 33*, 463-477.
- Hanley, G. P., Piazza, C. C., & Fisher, W. W. (1997). Noncontingent presentation of attention and alternative stimuli in the treatment of attention-maintained destructive behavior. *Journal of Applied Behavior Analysis, 30*, 229-237.

- Iwata, B. A., Pace, G. M., Dorsey, M. F., Zarcone, J. R., Vollmer, T. R., Smith, R. G., et al. (1994). The functions of self-injurious behavior: An experimental-epidemiological analysis. *Journal of Applied Behavior Analysis, 27*, 215–240.
- Michael, J. (2000). Implications and refinements of the establishing operation concept. *Journal of Applied Behavior Analysis, 33*, 401–410.
- Mueller, M. M., Sterling-Turner, H. E., & Scattone, D. (2001). Functional assessment of hand flapping in a general education classroom. *Journal of Applied Behavior Analysis, 34*, 233–236.

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