

ASSESSMENT AND TREATMENT OF VOCAL STEREOTYPY  
ASSOCIATED WITH TELEVISION: A PILOT STUDY

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A 6-year-old boy who had been diagnosed with autism participated in a pilot study that showed that (a) television was associated with increased vocal stereotypy and (b) sitting was associated with lower levels of vocal stereotypy. Subsequently, we reduced vocal stereotypy while the television was on by reinforcing sitting on a variable-interval schedule. Results suggest that conditional percentages may be useful for the identification of alternative behaviors as part of treatments for stereotypy.

*Key words:* autism, automatic reinforcement, differential reinforcement, television, vocal stereotypy

A handful of studies have shown that stereotypy may occur more frequently in the presence of certain idiosyncratic stimuli (e.g., Friman, 2000; Rapp, 2005; Van Camp et al., 2000). For example, Rapp (2005) found that turning on a television (TV) evoked multiple response forms of stereotypy and that contingent time-out (i.e., turning off the TV) effectively reduced this behavior. However, when other viewers are present, turning off the TV may not be a suitable intervention to reduce stereotypy. Although engaging in vocal stereotypy while viewing TV does not cause physical harm, it may be distract-

ing or disruptive to other viewers and socially stigmatizing for the individual during public viewing (e.g., when in a movie theater or at school). To our knowledge, no study has reported the effects of interventions other than time-out from the evocative stimulus to reduce stereotypy associated with idiosyncratic stimuli. Nonetheless, other research has shown that differential reinforcement may reduce stereotypy unrelated to specific idiosyncratic stimuli (e.g., Saunders, Saunders, & Marquis, 1998). The purpose of this study was to replicate and extend prior research by examining the effects of TV on vocal stereotypy and implementing a differential reinforcement procedure to reduce stereotypy when the TV was turned on.

## METHOD

### *Participant, Data Collection, and Interobserver Agreement*

The participant was Charles, a 6-year-old boy who had been diagnosed with autism and

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reportedly engaged in higher levels of vocal stereotypy when the TV was on than during other activities. His vocal stereotypy consisted mainly of monosyllable sounds. He also used two- to three-word statements to communicate with others. We conducted sessions in the participant's home in a room that was equipped with a cathode ray tube 20-in. (51-cm) TV, a chair, and toys. A graduate research assistant videotaped each session and subsequently scored the duration of vocal stereotypy during all sessions and the duration of sitting when the TV was on. Both measures were converted into percentages of time by dividing the total duration of the behavior by the duration of the session and converting the result to a percentage.

*Vocal stereotypy* was defined as noncontextual sounds or words produced by the vocal apparatus. To facilitate continuous data collection, the research assistant stopped scoring vocal stereotypy when the behavior had not occurred for 2 consecutive seconds. The emission of tacts, mands, and intraverbals related to items in the room or to the TV shows was not scored as vocal stereotypy. *Sitting* was defined as contact of the participant's buttocks with the seat of the chair with his feet in front of him while all legs of the chair were touching the floor. To calculate the conditional percentage of time engaged in vocal stereotypy given sitting, we divided the duration of vocal stereotypy during sitting only with the total duration of sitting and converted the result to a percentage. We also calculated the conditional percentage of time engaged in vocal stereotypy given the absence of sitting using a similar formula. We used the block-by-block method with 10-s intervals to calculate interobserver agreement scores for 38% of sessions (Mudford, Taylor, & Martin, 2009). Mean scores were 88% (range, 83% to 93%) for vocal stereotypy and 96% (range, 88% to 100%) for sitting.

#### *Design and Procedure*

*Effects of TV.* We used an ABABA reversal design to assess engagement in vocal stereotypy

when the TV was on and off. We conducted six to eight consecutive 5-min sessions per day. During the TV-off condition, we provided no social consequences for vocal stereotypy and the TV was turned off. The TV-on condition was the same except that the TV was turned on and tuned to the Disney Channel at a constant volume. The TV shows were usually the same from one day to another, but the episodes varied. In addition, toys already present in the room were accessible in both conditions, but the participant rarely interacted with them. During the TV-on sessions, the research assistant noted that Charles engaged in lower levels of vocal stereotypy when he appropriately sat in front of the television. To confirm this observation, we compared the conditional percentage of time he engaged in vocal stereotypy given sitting with the conditional percentage of the behavior given the absence of sitting (i.e., any behavior other than sitting appropriately) during the TV-on sessions.

*Treatment evaluation.* We implemented differential reinforcement of sitting as an intervention because our results indicated that sitting was associated with lower levels of vocal stereotypy during TV-on sessions. In addition, other behavior exhibited in the absence of sitting (e.g., wandering in front of the TV) may have been disruptive for other viewers. We conducted no more than one session per day and alternated between 10-min baseline and differential reinforcement of alternative behavior (DRA) sessions within a multielement design. The research assistant also measured postintervention levels of vocal stereotypy and sitting for 10 min immediately after sessions to determine whether the behavior changes persisted after withdrawal of the intervention. Baseline was similar to the initial TV-on condition with the exception of toys, which were no longer present. During the DRA condition, the environment was the same as in baseline, but the research assistant placed a large red poster board above the TV to signal the condition and used a 15-s variable-interval schedule to provide a preferred edible item (identified via a

paired-stimulus preference assessment) contingent on sitting. An audio file on a digital music player signaled the interval to the research assistant through earphones. The postintervention sessions were identical to baseline regardless of the preceding condition.

RESULTS AND DISCUSSION

Figure 1 (top) shows engagement in vocal stereotypy during TV-on and TV-off sessions and

in sitting during TV-on sessions. An examination of the means and patterns across the last four phases suggested that turning on the TV was associated with increases in vocal stereotypy. Sitting remained at low levels during all TV-on phases. The percentage of time Charles engaged in vocal stereotypy was considerably lower when he was sitting than when he was not sitting during the TV-on phases ( $M = 12\%$  vs.  $31\%$ ; data not depicted). Figure 1 (middle and bottom) shows the results of the treatment evaluation. Charles

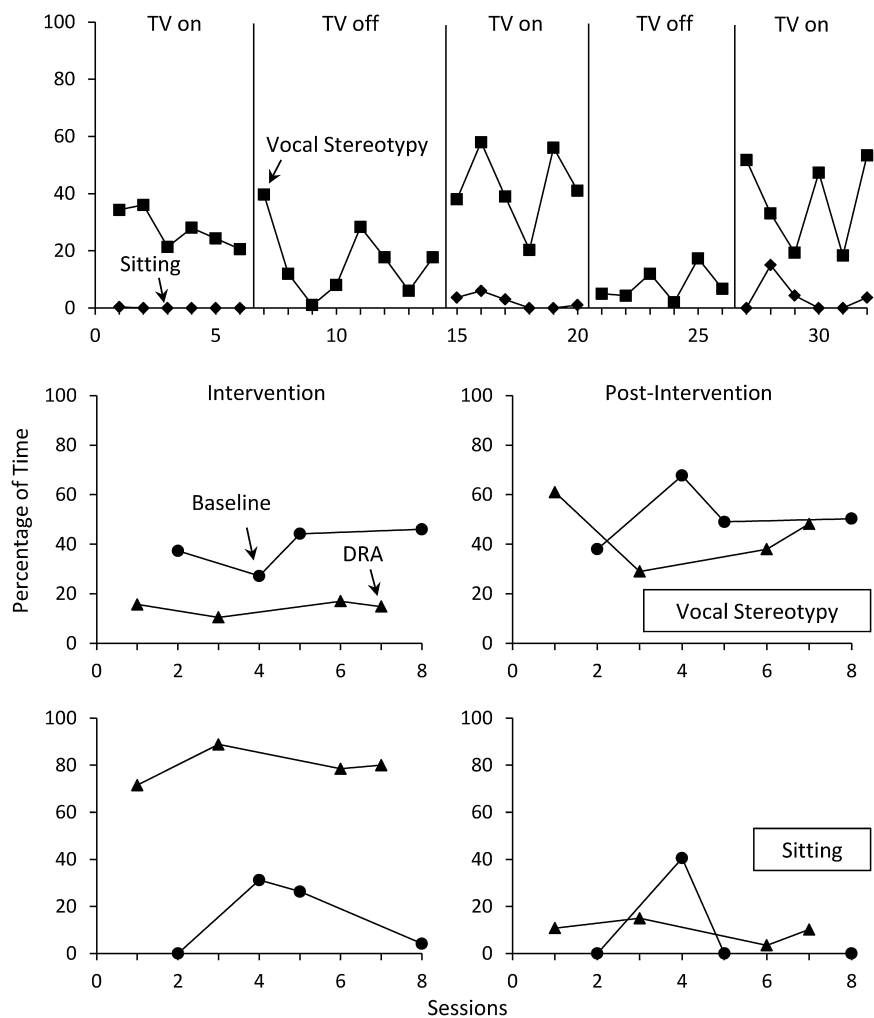


Figure 1. Percentage of time Charles engaged in vocal stereotypy when the television (TV) was on and off and in sitting when the TV was on (top). Percentage of time Charles engaged in vocal stereotypy and sitting during and after baseline and differential reinforcement of alternative behavior (DRA) sessions (middle and bottom).

consistently engaged in lower levels of vocal stereotypy and higher levels of sitting during DRA sessions than during baseline. Postintervention levels of vocal stereotypy remained similar after baseline and DRA sessions. Sitting was observed during only one of four sessions after baseline and during all four sessions after DRA. A within-session analysis indicated that sitting occurred most often during the first minutes of the postintervention sessions, suggesting that sitting was not yet under stimulus control of the poster board.

In sum, we showed that (a) stimulation from watching or listening to TV was associated with increased engagement in vocal stereotypy, (b) sitting was associated with lower levels of vocal stereotypy, and (c) differential reinforcement of sitting was effective in reducing engagement in vocal stereotypy while the TV was on. However, the observed effects did not persist immediately after withdrawal of the intervention. These results replicate those of Rapp (2005) by showing that turning on a TV may increase engagement in vocal stereotypy. That is, the visual and auditory stimulation generated by the TV may have produced an establishing operation for engaging in the target behavior. The treatment evaluation demonstrated that DRA could reduce vocal stereotypy while the TV was on, which also replicates and extends results of prior studies (e.g., Saunders et al., 1998). Sitting may have reduced the value of the reinforcer that maintained vocal stereotypy (i.e., produced an abolishing operation). Alternatively, vocal stereotypy may have covaried with behavior associated with the absence of sitting (e.g., wandering around the room). The study also extends research on the utility of using conditional probability measures during the assessment of problem behavior (Martens, DiGennaro, Reed, Szczech, & Rosenthal, 2008). Specifically, the results highlight the potential utility of using conditional probabilities to identify alternative behavior associated with low levels of problem behavior.

The initial assessment showed that vocal stereotypy persisted for 160 min despite the absence of social consequences. This pattern suggests that the behavior was at least in part maintained by automatic reinforcement, but the results are limited insofar as the assessment did not rule out social reinforcement functions. A second limitation is that our definition of sitting excluded some forms of sitting (e.g., sitting with his feet on the chair). Our anecdotal observations suggested that vocal stereotypy was at its lowest when Charles was sitting appropriately on a chair; furthermore, sitting inappropriately may be unsafe and disruptive. The low number and short duration of sessions also may limit the applicability of the results (e.g., to a 90-min movie). Finally, the changes produced by DRA were relatively modest (i.e., vocal stereotypy never approached zero) and did not persist after the intervention was removed. Replication of the procedures across a larger number of lengthier sessions and gradual thinning of the reinforcement schedule should be conducted in the future to address these concerns.

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