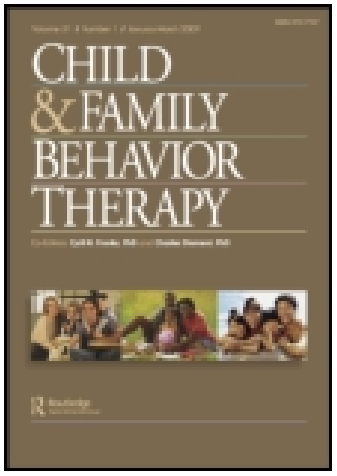

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Use of an Antecedent Intervention to Decrease Vocal Stereotypy of a Student With Autism in the General Education Classroom

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Case Study

Use of an Antecedent Intervention to Decrease Vocal Stereotypy of a Student With Autism in the General Education Classroom

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This study examined the use of an antecedent-based intervention to reduce the vocal stereotypy of a student diagnosed with Autism within the general education classroom. The student displayed frequent nonfunctional speech and disruptive vocal sounds. An antecedent-based intervention, involving the use of qualitatively different cards—to cue the student when it was appropriate or inappropriate to engage in vocal stereotypy—was designed and implemented. An adaptive alternating treatment design was utilized and conditions were randomized and counterbalanced across treatment sessions. Data on vocal stereotypy were collected using partial interval recording. The results indicated the participant was successful in discriminating between cues and decreased stereotypy during intervention compared to baseline conditions. Similar findings were found when the intervention was implemented across a second school setting.

KEYWORDS *antecedent intervention, autism, vocal stereotypy*

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Data from the Center for Disease Control's Autism and Developmental Disabilities Monitoring Network reports the incidence of children diagnosed with Autism Spectrum Disorder (ASD) to be 1 in 150 (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2007). Increasingly, students with ASD are being educated in the general education classroom (U.S. Department of Education, Office of Special Education Programs, 2003). By diagnostic standards, individuals with ASD demonstrate some form of repetitive behaviors (*Diagnostic and Statistical Manual of Mental Disorders* [*DSM-IV-TR*]; American Psychiatric Association, 2000), commonly referred to as stereotypy. When engaged in stereotypical behaviors these students are socially unavailable and present teaching challenges (Lovaas, Newsom, & Hickman, 1987).

Wehmeyer (1995) points out those stereotypical behaviors are complex and complete eradication is not a reasonable expectation. Strategies have been developed to reduce stereotypical behaviors, including consequence-based interventions such as response cost (Falcomata, Roane, Hovanetz & Kettering, 2004; Rapp, 2004), reinforcing an alternative behavior (Lovaas et al., 1987; Rehfeldt & Chambers, 2003), differential reinforcement of other behaviors (Rapp, 2007; Ringdahl et al., 2002; Taylor, Hoch, & Weissman, 2005), response interruption (Ahearn, Clark, MacDonald, & Chung, 2007), noncontingent access to a matched sensory stimulus (Higbee, Chang, & Endicott, 2005), and conditioning items or activities as reinforcers (Nuzzolo-Gomez, Leonard, Ortiz, Rivera, & Greer, 2002). However, to be effective, intervention procedures should be matched to the variables (social and non-social) that maintain stereotypy, as identified by a functional behavioral assessment (FBA) or functional analysis (FA; Hanley, Iwata, & McCord, 2003). For example, in cases where stereotypical behaviors are maintained by automatic reinforcement, intervention could focus on teaching a student when and where stereotypy is and is not permitted. Using this method of discrimination training, Conroy, Asmus, Sellers, and Ladwig (2005) and Brusa and Richman (2008) targeted students who had ASD within general education and special education classrooms, respectively, by conditioning visual cues which signaled when it was acceptable and unacceptable for them to engage in stereotypical behaviors. As a type of antecedent intervention (Luiselli, 2006), this cueing procedure effectively reduced stereotypy.

The current study builds on the work of Conroy et al. (2005) and Brusa and Richman (2008) by evaluating the effects of a discrimination training intervention on vocal stereotypy of a second-grade student with ASD attending a general education classroom. The study also included a generalization phase in which the intervention was extended to a non-classroom setting.

METHOD

Participant

The participant ("Sean") was an 8-year-old Caucasian male diagnosed with Autism according to the criteria of the *DSM-IV-TR* (American Psychiatric Association, 2000). He scored within the moderate range of autism as measured by the *Childhood Autism Rating Scale* (Schopler, Reichler, & Renner, 1988) when evaluated by an independent licensed psychologist. Sean spent the majority of his school day in a general education classroom. He received reading and writing support in a special education classroom. He also received occupational therapy, speech and language therapy, and one-to-one paraprofessional support.

Sean engaged in vocal stereotypy during all school activities. His parents, the general education teacher, and the special education teacher expressed concern that these vocalizations interfered with his learning and made him look different from his peers. Sean's parents provided informed written consent for him to participate in the study.

According to the results of testing administered by the school psychologist, Sean functioned in the average range with a Mental Processing Index (MPI) of 101 which fell at the 53rd percentile on the *Kaufman Assessment Battery for Children* (Kaufman & Kaufman, 2004). On the *Vineland Adaptive Behavior Scale* (Sparrow, Balla, & Cicchetti, 1984), Sean scored in the adequate range on the adaptive behavior composite (SS = 99) and on the communication domain (SS = 100). For the latter, his written skills were stronger than his receptive and expressive language. Behaviors that were related to his expressive language included repeating phrases and repetitive noises.

Setting

The study was conducted in a general education second-grade classroom within a public elementary school located in a suburban community. There were 18 typically developed students and 3 special needs students in the class. The class was staffed with a general education teacher and two special education paraprofessionals.

Dependent Measure

The dependent measure for this study was the percent of intervals in which Sean demonstrated vocal stereotypy, defined as any audible vocalizing of noncontextual or nonfunctional speech that included repetitive sounds, singing, humming, and phrases unrelated to the activity in progress. Examples included reciting phrases from a favorite television show, movie, or book,

and laughing when there was no apparent humorous event. Nonexamples included answering a question, responding to a direction, and repeating a direction.

Measurement

During all phases, data were recorded using 15-second partial interval recording. Based on a review of past data collected on Sean's vocal stereotypy by the special education paraprofessional, it was determined that he engaged in this behavior during all school activities throughout the school day. Accordingly, a consistent 30-minute time of day in place of a specific academic subject area was selected for baseline and intervention sessions. The researcher (first author), who was the primary observer for the study, recorded vocal stereotypy data at the same time each day within the general education classroom.

Interobserver Agreement

The researcher trained a special education professional to assess interobserver agreement (IOA). Both individuals conducted simultaneous and independent observations during 36% of sessions comprising the study. An agreement was scored when the two observers recorded vocal stereotypy during the same recording interval. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Average IOA was 92.4% (86.6% to 98.3%).

Procedures and Experimental Design

Procedures were evaluated in an alternating treatments design that included baseline and reversal phases. The two discrimination training conditions during intervention were randomized and counterbalanced across 20 daily sessions.

Baseline

A procedure that had been designed by Sean's special education teacher to reduce his vocal stereotypy and implemented by his paraprofessional was in place preceding the study. This procedure included verbal interruption of the behavior and redirection to the task at hand. Verbal interruption consisted of identifying the vocalization and adding "is all done" (i.e.,: "Sponge Bob is all done") or "shhh." Additionally, if Sean was able to refrain from stereotypy for 2 consecutive minutes he received a check on a chart. Ten checks resulted in a reward of a 5-minute activity of his choice. This procedure was not implemented during the intervention phases of the study.

Functional behavioral assessment

Classroom observations conducted by the senior author revealed that Sean displayed vocal stereotypy throughout the school day. That is, the behavior was not restricted to certain activities, times of day, or the presence of specific people. Sean's special education teacher also confirmed that vocal stereotypy did not appear to be socially mediated because Sean frequently exhibited the behavior when he was alone. Accordingly, it was hypothesized that vocal stereotypy was automatically reinforced by the (auditory) sensory stimulation it produced.

Intervention

Two visuals were created, consisting of one red 3-inch × 5-inch card containing the student's name and the word "quiet" written in the center of it and one green card of the same dimensions bearing the student's name and the phrase "okay to speak out." Materials relevant to the completion of activities occurring in the general education classroom (i.e., worksheets, pencils, books) were present during the study but were not provided as part of the intervention.

Prior to all general education classroom interventions, a 10-minute pre-instructional session in Sean's special education classroom was conducted. In these sessions, Sean was taught to discriminate times when it was appropriate for him to engage in vocal stereotypy (green card present) and times when it was inappropriate for him to engage in this behavior (red card present). The researcher or the special education paraprofessional under the supervision of the researcher conducted these sessions. During these sessions, Sean was specifically told when the red card was on his desk he was to be quiet and not speak out, but when the green card was on his desk it was okay for him to speak out.

At the beginning of each intervention session, the special education paraprofessional placed the relevant colored card on the center left side of Sean's desk with a verbal instruction of its meaning. When Sean engaged in vocal stereotypy when the red card was present, the paraprofessional picked up the card and held it at a distance of approximately 6 inches in front of his face. This level of cueing was determined as necessary since Sean did not respond to gestural cueing during the initial pre-instruction sessions. No verbal reminders or other consequences accompanied this visual presentation. This correction procedure was performed to assist Sean in learning the expected behavior this card represented. When the green card was present and he engaged in vocal stereotypy no consequences were presented. Each visual card was presented for 15 minutes of the 30-minute intervention session and the two antecedent conditions were randomly assigned and counterbalanced during these times.

Treatment integrity data were collected by the researcher to ensure that intervention procedures were correctly implemented. Data were collected on the appropriate verbal introduction of the green and read cards, providing no consequences for speaking out when the green card was present, and for visually re-presenting the red card when the subject spoke out in the red card condition.

Generalization

During the 5-week generalization period, the intervention was implemented during a weekly art class that Sean attended within his school but outside of his classroom. The green card and the red card were presented for 15 minutes of each 30-minute session and were randomly assigned and counterbalanced. At the beginning of each generalization session, the special education paraprofessional showed the colored card to Sean with a verbal instruction of its meaning. The card was then placed in the left hand corner of Sean's art table. When Sean engaged in vocal stereotypy when the red card was present, the paraprofessional picked up the card and held it at about 6 inches in front of his face. No verbal reminders or other consequences accompanied this visual presentation. When the green card was present and he engaged in vocal stereotypy, no consequences occurred. Additionally, changes were made to check for generalization of materials and procedures. This included reducing the size of the red and green cards to 1.5 inches × 2.5 inches, removing the participants name, words and phrases from the cards, and no longer providing pre-instruction discrimination sessions prior to the generalization sessions.

RESULTS

Figure 1 depicts the results of the study. During the initial baseline, phase vocal stereotypy occurred at a mean percentage of 48% (range 40%–56%). During the initial intervention phase, Sean's mean percentage of vocal stereotypy dropped to 21% (range 12%–28%) when he was shown the red card which indicated it was inappropriate to engage in vocal stereotypy. When the green card was present, indicating it was appropriate for Sean to engage in stereotypy, his percentage of vocal stereotypy was 46% (range 25%–73%).

During the withdrawal phase, Sean's observed stereotypy occurred at a percentage and range similar to the original baseline data ($M = 43\%$; range 34%–48%). During the return to intervention phase, Sean's mean percentage of stereotypy was 18% (range 10%–27%) when presented with the red card in contrast to a mean of 50% (range 35%–63%) when the green card was presented. During the generalization phase, the mean percentage of vocal

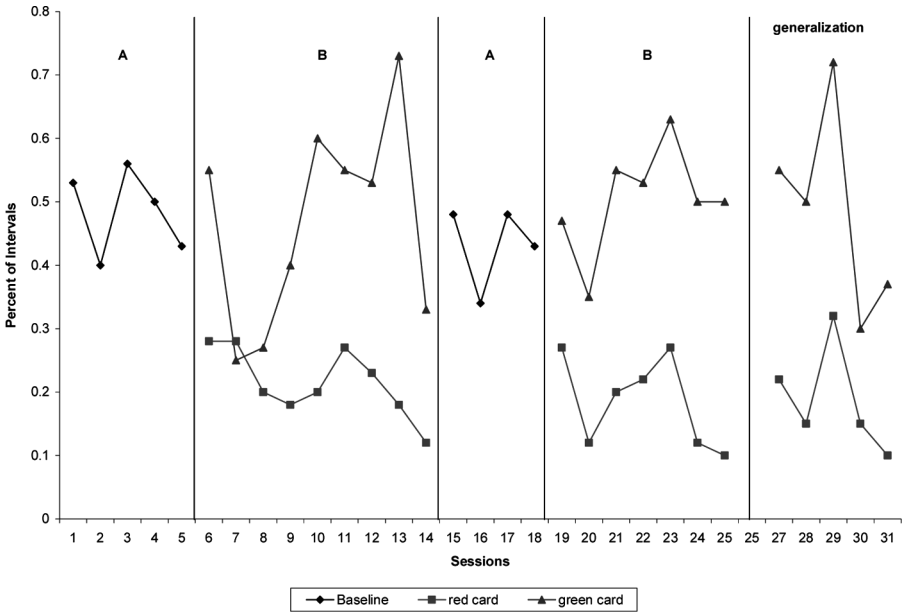

FIGURE 1 Percentage of intervals Sean demonstrated vocal stereotypy during baseline (A), intervention (B), and generalization phases.

stereotypy was 19% (range 10%–32%) and 49% (range 30%–72%) during the red and green card presentation conditions, respectively. There is an overall change in percent of vocal stereotypy between baselines ($M = 46\%$) and intervention ($M = 21\%$) phases.

The results clearly indicate an immediate decrease in level of responding when the red card was implemented during intervention phases compared to baseline phases. In addition, an immediate increase in level of responding was evident when the intervention was removed during the withdrawal phase. A change in trend was also observed during the red card conditions (i.e., decreasing trend) compared to baseline phases and green card conditions (i.e., flat or increasing trends). There were no overlapping data points between the baseline phases and the red card intervention and minimal overlap between the red and green card conditions across intervention and generalization phases. This overlap might be attributable to Sean's initially learning to try to discriminate between the two qualitatively different cards. Lastly, similar responding was observed in the green and red conditions across intervention and generalization phases. Overall, the results reflected repeated verification and replication of therapeutic effects and, subsequently, demonstrated a functional relationship between the independent and dependent variables.

Treatment integrity was calculated on 31% of the intervention sessions. This was calculated by dividing the number of correctly presented visuals

(red card/green card) divided by the number of incorrectly presented visuals plus the number of correctly presented visuals and multiplying by 100%. Average treatment integrity was 96.2% (range 89.4%–100%).

DISCUSSION

The purpose of this study was to evaluate an antecedent intervention using visual cues to reduce automatically reinforced vocal stereotypy of a second grade student with ASD while included in the general education classroom. Sean's vocal stereotypy decreased when he was presented with a red card which indicated it was an inappropriate time for him to engage in the behavior. These results support previous research on using discrimination training to reduce stereotypy demonstrated by students with ASD in classroom settings (Conroy et al., 2005; Brusa & Richman, 2008). Additionally, the intervention was extended to a different topography of stereotypy from prior studies and implemented successfully in a non-academic classroom setting. Indeed, the antecedent intervention implemented with Sean appeared to function effectively as a stimulus control procedure.

These findings also are meaningful from a social perspective. When engaged in stereotypical behaviors, students with ASD are less responsive to instruction (Lovaas et al., 1987). As noted previously, Sean's parents, the general education teacher, and the special education teacher expressed concern that his vocalizations interfered with his learning and made him appear different from his peers. Determining that Sean's stereotypical behavior was changed using qualitatively different cue cards provided an intervention for teaching him when it was inappropriate or appropriate to engage in this behavior. Additionally, this method could be used to make an otherwise unaware student aware of the acceptable times to engage in stereotypy (Conroy et al., 2005).

Although his vocal stereotypy was substantially reduced, it continued to be observed approximately 20% of the time during the red card condition. When questioned about Sean's successful reduction yet continuing stereotypy in the classroom, his teacher and paraprofessional reminded the primary author that, prior to the intervention, students in the classroom were already somewhat tolerant of his behavior. Although social validity was not formally assessed, anecdotal reports indicated that his teachers were pleased with the positive outcome. Sean's peers demonstrated an interest in his intervention and would comment on his behavior after the end of a red or green card interval (e.g.,: "Sean, good job. You were quiet when the red card was out"; "You remembered it was okay to talk when the green card was out"). In addition, his special education paraprofessional found the intervention easy to use. Achieving good treatment integrity, as reported in this study, should be realized when practitioners are afforded relatively simple procedures they find acceptable. Classroom staff also rated intervention favorably because it did

not limit or otherwise compromise Sean's language skills. In addition, his parents requested a set of cards to use with Sean in the community. These were subsequently used with success during a community theater production.

Several limitations within the current study should be noted. First, because the study only targeted one participant, the generalization of treatment effects to other students was not examined. Future studies may want to examine the potential effect of this intervention on other students with similar or other challenging stereotypic behavior. Verbal reports from Sean's teacher indicated that additional teachers within his school were interested in trying the intervention with other students in other general and special education settings. Second, the study was only conducted during a small portion (30 minutes) of the school day. The authors chose to implement the intervention during this limited window of his school day to facilitate empirical control. It was the intent of the authors to establish the effectiveness of the intervention prior to attempting its implementation across greater amounts of his school day. It is conceivable that the intervention could be easily extended throughout his entire school day. Indeed, the current results suggest that the intervention could also simply be targeted at the most problematic times of the school day. Third, although the intervention reduced vocal stereotypy to levels below baseline, other procedures might have decreased responding further. Fourth, the participant was fairly compliant with the intervention. Additional procedures (e.g., reinforcement contingencies) might be necessary with students who are likely to be non-compliant with similar antecedent strategies. Finally, we did not evaluate long-term outcomes (maintenance), improvement in student learning, or whether stereotypical behavior would have remained low without intervention.

It should be acknowledged that the hypothesis informing intervention selection in the study was derived from classroom observation and teacher opinion. We did not conduct a formal functional analysis (FA) to confirm that Sean's vocal stereotypy was maintained by automatic reinforcement. Although a FA provides experimental rigor, it sometimes can be difficult to perform in an applied setting such as a public school. For this reason, indirect and descriptive methods of functional behavioral assessment (FBA) may have to be the methodology of choice when designing interventions in non-research settings or when consultation by professionals with requisite behavior analysis expertise is not available.

In summary, we found that an antecedent intervention reduced vocal stereotypy of a second-grade student with ASD while included in the general education classroom. As noted, less frequent stereotypy may be socially significant for children with ASD as such behavior interferes with learning, competes with instruction, and is socially stigmatizing. Future research should examine additional antecedent procedures for problem behavior of children with ASD (Luiselli, Russo, Christian, & Wilczynski, 2008) as well as the social validity and intervention maintenance of these procedures.

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