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Treating Vocal Stereotypy with Response Interruption and Redirection

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Treating Vocal Stereotypy with Response Interruption and Redirection

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Abstract

Stereotyped behavior is a defining characteristic of Autism Spectrum Disorders (ASD), and is reported to occur at high rates in that population. Vocal stereotypy, in particular, presents unique clinical challenges from a behavior analytic perspective since the therapist is unable to control access to the reinforcer. Response interruption and redirection (RIRD) involves response blocking and then immediately presenting directions requiring a verbal response in order to redirect the client to engage in appropriate vocalizations. RIRD has been empirically demonstrated across several studies to reduce vocal stereotypy. The present study evaluated the use of RIRD for two 14 year old male students with ASD in an ABACA withdrawal design comparing two procedural variations (3 directions versus 1 direction) of RIRD. Results indicate a clinically significant reduction in stereotypy for both participants for both interventions. These findings further support the use of RIRD to treat vocal stereotypy in students with ASD, and replicate an earlier finding that a shorter, more efficient procedural variation may be sufficient to produce the desired effect.

Keywords: response interruption and redirection, vocal stereotypy, autism, behavior analysis

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Treating Vocal Stereotypy with Response Interruption and Redirection

Literature Review

Autism Spectrum Disorder (ASD) is a developmental disability marked by restricted, repetitive, or stereotyped behaviors or interests as well as deficits in social interaction and communication. Initial indications of symptoms begin to appear early in development and cause significant delays in functioning across the lifespan (American Psychiatric Association, 2013). According to the Centers for Disease Control and Prevention (2014), ASD is now estimated to affect one in every 68 children, which represents a substantial increase over the past 25 years and makes ASD the fastest growing diagnosis among children (Gonzalez, Cassel, & Boutot, 2011).

ASD impedes development in such a way that it would be unlikely for a person with autism to lead what would be typically described as a normal adult life. Furthermore, implementing behavior change in persons with ASD is significantly more challenging than in their typically developing peers (Baer, 2005). Accordingly, practitioners treating children with ASD must use “the most powerful techniques known to behavioral science, applied intensively and extensively” (Baer, 2005, pp. 5-6) in order to give children with autism the greatest chance of a normal life.

Powerful techniques for this population typically come from the field of applied behavior analysis (ABA). ABA is a science which has evolved to provide a theoretical and clinical paradigm with which one can engage in the systematic experimental analysis of behavior, applied to the most salient and socially relevant behaviors in an individual’s life (Baer, Wolf, & Risley, 1968). Research suggests that intensive and high quality ABA therapy can increase the likelihood that a child with severe autism will live a normal or near-normal life as an adult by

approximately 50% (Bristol, et al., 1996) and ABA-based interventions have been demonstrated to produce clinically significant improvements in hundreds of well-controlled and scientifically robust studies (Baer, 2005). Therefore, it appears that ABA is precisely the field of study to which we must turn for the techniques needed to improve the lives of individuals with ASD. In particular, the present study will seek to identify applied behavior analytic interventions as a way of addressing restricted, repetitive, or stereotyped behaviors.

As mentioned previously, restricted, repetitive, or stereotyped behaviors are a defining characteristic of ASD (American Psychiatric Association, 2013). Behaviors that meet this description are largely referred to as stereotypy. While there is some variation in the use of this term across researchers, it is generally used to describe behaviors that lack variability, persist over time, are not age appropriate, are nonfunctional, and are not preceded by a clear antecedent stimulus. Further, behaviors described as stereotypy must be operant, rather than respondent, meaning that they are maintained by the consequences that follow them and are voluntary rather than reflexive. Finally, stereotypy is generally maintained by automatic reinforcement rather than socially mediated (Rapp & Vollmer, 2005). That is to say, the sensory consequences produced when engaging in the behavior serve as the primary reinforcer for that behavior.

Stereotypy presents in a wide variety of topographies including both motoric and vocal responses. Rapp and Vollmer (2005) describe motor stereotypy as noncontextual and repetitive fine or gross motor responses. Commonly observed examples include hand flapping, body rocking, and head twisting. Vocal stereotypy, on the other hand, is contextually inappropriate repeating sounds, words, or phrases (Ahearn, Clark, MacDonald, & Chung, 2007); (Schreibman & Carr, 1978). Parent surveys indicate that 85% of children with ASD engage in vocal

stereotypy (Mayes & Calhoun, 2011) suggesting that vocal stereotypy is quite common among this population.

Given the pervasiveness of stereotypy among people diagnosed with ASD, it is important to consider the broader implications of engaging in such behaviors. Research indicates that engaging in stereotypy interferes with skill acquisition, appropriate social interactions, and appropriate play (Dunlap, Dyer, & Kogel, 1983); as these are areas which already impede normal functioning in ASD, this additional barrier is certainly concerning. Further, engaging in this set of behaviors can be socially stigmatizing (MacDonald, et al., 2006; Schreibman & Carr, 1978), which might limit opportunities to engage in appropriate social interactions by reducing the pool of typically developing people who are willing to engage in social interactions with children who engage in such behaviors. For example, a child may master the skill of responding to a social greeting, (e.g., “Hi”) but that skill will become irrelevant if members of the community avoid initiating interactions with him because he is perceived as socially inappropriate. Finally, stereotypy can be disruptive to others in the environment (Athens, Vollmer, Sloman, & Pipkin, 2008) insofar as it may distract classmates or coworkers from their own obligations. Accordingly, identifying effective behavior reduction techniques for stereotypy is imperative in order to mitigate these effects.

A variety of interventions have been developed for treating stereotypy (Rapp & Vollmer, 2005), the majority of which were originally developed to treat motor stereotypy. Therefore, the present study will focus on vocal stereotypy in particular, as further research into interventions in vocal stereotypy is needed. It is of particular interest to note that vocal stereotypy presents some unique clinical challenges compared to motor stereotypy because the nature of the behavior makes physical prompting or response blocking untenable, and there is concern that steps taken

to reduce noncontextual vocalizations might inadvertently reduce appropriate communication (Lanovaz & Sladeczek, 2012).

Reducing appropriate communication is a concern and not a desired result. Ahearn and colleagues in 2007 proposed an intervention, response interruption and redirection (RIRD), which addresses those concerns and has amassed a notable amount of empirical support in recent years. Ahearn et al. (2007) examined previous research involving response blocking and proposed that redirecting the individual to engage in an appropriate response would produce better results. Each time an episode of vocal stereotypy occurred, a researcher immediately responded by presenting three demands that required a verbal response (e.g. a social question or verbal imitation request). Among all four children in the study, the researchers were able to demonstrate a decrease in vocal stereotypy. In addition, they demonstrated an increase in appropriate vocalizations in three participants.

A variety of studies have followed, successfully replicating RIRD. In 2013, Martinez and Betz reviewed eight RIRD studies published in the *Journal of Applied Behavior Analysis* between 2007 and 2012, identifying several variations across studies. They found that despite the variety and inconsistency of procedures used, every study demonstrated a reduction in automatically maintained stereotypic behavior using the RIRD procedure. Additionally, Vanderkerken and colleagues (2013) completed a meta-analysis of studies between 2007 and 2011 targeting “vocal challenging behavior” which included several RIRD studies, and found that RIRD was among the most effective treatments (Vanderkerken, Heyvaert, Maes, & Onghena, 2013). These data suggest that RIRD is a highly effective intervention for vocal stereotypy and the effect is sizable enough to withstand procedural variations.

Although effective, the consistent therapeutic effects of RIRD come at the cost of a highly labor intensive and time consuming procedure, since the clinician is required to intervene upon each instance of vocal stereotypy. That is, getting the participant to comply with three consecutive demands in the absence of vocal stereotypy can consume a large amount of time, which might otherwise be spent on the acquisition of important skills. Accordingly, Martinez and Betz (2013) encouraged future researchers to consider procedural variations that would make the intervention more efficient while maintaining effectiveness.

Saini and colleagues (2015) answered this call by implementing RIRD using both the standard three-demand requirement as well as a one-demand condition and comparing the effect on stereotypy and time spent in treatment. The researchers found that the one-demand variation was just as effective as three demands for each of their participants and required less implementation time for two participants, indicating that RIRD using fewer demands may be just as effective while being more efficient (Saini, Gregory, Uran, & Fantetti, 2015).

In summary, vocal stereotypy creates additional barriers to success in children with autism and presents unique clinical challenges in treatments, requiring a specialized and well-focused approach. RIRD has been repeatedly demonstrated to be a highly effective intervention, but is also demanding in terms of the amount of time and effort required to implement it correctly. One recent study (Saini, Gregory, Uran, & Fantetti, 2015) achieved a significant therapeutic reduction in vocal stereotypy using a procedural variation which required only one demand compared to the standard three-demand procedure.

The present study will seek to use the RIRD procedure to reduce the frequency of vocal stereotypy in students with autism in a nonpublic school setting. Further, this study will attempt

to replicate Saini and colleagues' (2015) finding that RIRD continues to be effective when using only one demand.

Method

Participants and Setting

Two students with autism participated after being referred by their Special Education teacher on the basis that they engage in vocal stereotypy, which is socially and/or educationally disruptive. Additional students in the same classroom who met the same criterion were excluded because they already had an effective behavior reduction treatment in place to address vocal stereotypy. All participants live at home with their parents and attend a nonpublic school in Santa Cruz, CA that serves approximately 50 students with autism and other related developmental disabilities using an applied behavior analytic approach in a one-to-one staff to student ratio. To protect participant privacy, all materials were deidentified and students were given pseudonyms.

Scott, a 14-year-old male, used a speech-generating device (SGD) paired with modified sign language and verbal approximations to communicate. Scott's vocal stereotypy topographically presented as elongated vowel sounds, often at a volume much higher than typical speaking volume. Kevin, a 14-year-old male, communicated verbally; however his intelligibility is impeded by deficits in articulation. Kevin engaged in high rates of vocal stereotypy comprised of a variety of sounds, including some which resembled words which his parents and teacher speculate may be delayed echolalia.

For both participants, experimental sessions were conducted in the conference room at their school. The students and experimenters were seated alone at a table with no extraneous stimuli present to avoid confounds.

Response Definitions and Measurement

Vocal stereotypy, for all participants, was defined as “any instance of noncontextual or nonfunctional speech” (Ahearn, Clark, MacDonald, & Chung, 2007, p. 266). Examples include sustained vowel sounds, repeated consonant sounds, and any other words or sounds not related to the current context. Nonexamples include requests for preferred items or activities, singing, or laughing. Each occurrence of vocal stereotypy lasting longer than 1 second was tallied to obtain a frequency count. A new occurrence was scored after 3 seconds in the absence of vocal stereotypy.

Design and Procedure

The effects of RIRD were examined in an ABACA design. During baseline, the teacher and student were seated at a table with no other materials present for each session. No programmed consequences were provided for vocal stereotypy or any other challenging behaviors. If the student independently emitted a mand (request) the teacher reinforced it if available (e.g., tickles, squeezes) and if the student manded for an item or activity which was not available, the teacher responded, “Nice job asking, we can get [item] later.” Baseline continued for at least 3 sessions until the frequency of vocal stereotypy was stable.

The *RIRD-3* (Response Interruption and Redirection procedure using 3 demands) procedure resembled baseline except that upon each occurrence of vocal stereotypy the teacher immediately interrupted the behavior, obtained the student’s attention, and redirected the student to engage in appropriate vocalizations. The teacher continued to verbally prompt appropriate responding until the student compliantly responded to 3 consecutive directions or questions in the absence of vocal stereotypy. A session timer ran for 5 minutes, and the timer was paused each time the student engaged in vocal stereotypy and restarted after praise was reinstated

following the 3 compliant responses, such that the session was comprised of 5 minutes of time during which the student had the opportunity to engage in vocal stereotypy (Ahearn et al., 2007).

The *RIRD-1* procedure was identical to RIRD-3 except that praise was reinstated and the timer restarted after the student correctly responded to 1 direction in the absence of vocal stereotypy. All other characteristics of the session remained the same.

Interobserver Agreement

A secondary researcher was trained on the response definitions and procedures described above. For 20% of sessions, a second researcher collected her or his own frequency data.

Interobserver agreement was calculated by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100%. Overall interobserver agreement was 90% for Scott and 98% for Kevin.

Procedural Fidelity

For 20% of sessions, a secondary researcher counted the number of times the principal researcher correctly implemented the procedure as previously described. The number of correct implementations (i.e., in intervention, each time vocal stereotypy occurred it was immediately followed by the correct RIRD procedure) was divided by the number of opportunities to implement the procedure (i.e. episodes of vocal stereotypy) and multiplied by 100% to obtain a measure of procedural fidelity. Overall, procedural fidelity was 100%.

Social Validity

The parents and special education teacher of each of the participants in the present study have reported that these students' vocal stereotypy is incompatible with their ability to access their social environments, interferes with their academic progress, and is socially stigmatizing. When interviewed, all parents and teacher agree that achieving a measurable and lasting decrease

in rates of vocal stereotypy will positively impact the lives of the participants and their families, and is a socially valid target.

Results

During baseline, Scott (see Figure 1) engaged in vocal stereotypy an average of 4.8 times with a range of 4-6. During the first intervention (RIRD-3), vocal stereotypy quickly dropped to an average of 1.8 and a range of 0-4. During the return to baseline, Scott's frequency of vocal stereotypy was an average of 1.6 with a range of 0-3. During the second intervention (*RIRD-1*) vocal stereotypy had an average of 1 with a range of 0-2. In the final return to baseline, vocal stereotypy increased slightly to a level exceeding RIRD-1, though still not recapturing initial baseline ($M=2.5$, range 2-3).

During initial baseline, Kevin (see Figure 2) engaged in moderate to high frequency of vocal stereotypy with an average of 16 and a range of 10-19, which sharply decreased to low levels, averaging 7.6 with a range of 2-16, during the first intervention (*RIRD-3*). Upon return to baseline, vocal stereotypy returned to moderate levels with an average of 12 and range of 11-14. During the second intervention (*RIRD-1*), frequency of vocal stereotypy averaged 7.5, which was below baseline but with a less clear trend than *RIRD-3* (range 1-14). In the final return to baseline, stereotypy returned to high levels, similar to what was seen in initial baseline averaging 15.4 with a range of 12-17.

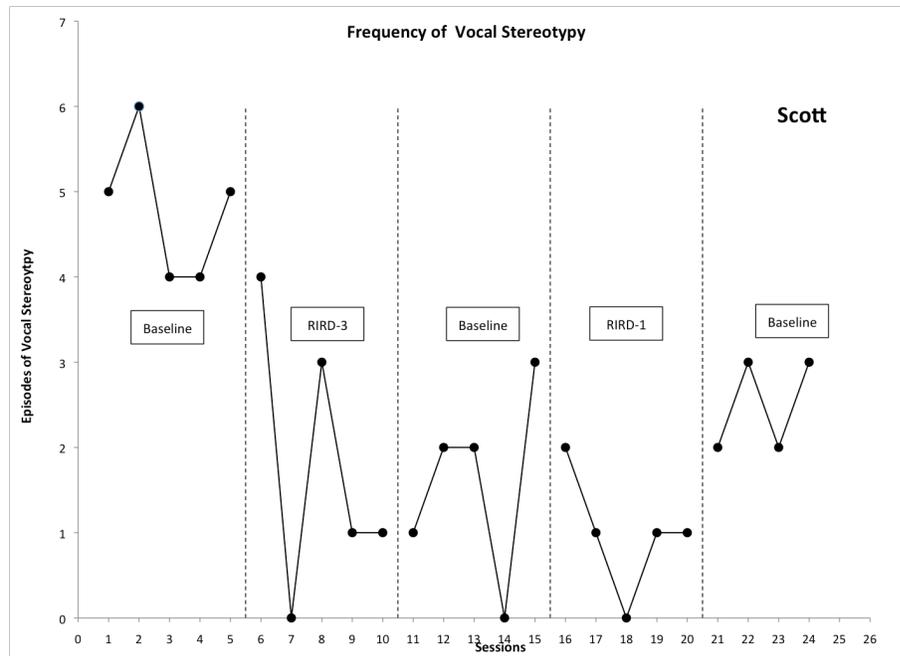


Figure 1. Scott's frequency of vocal stereotypy episodes per session.

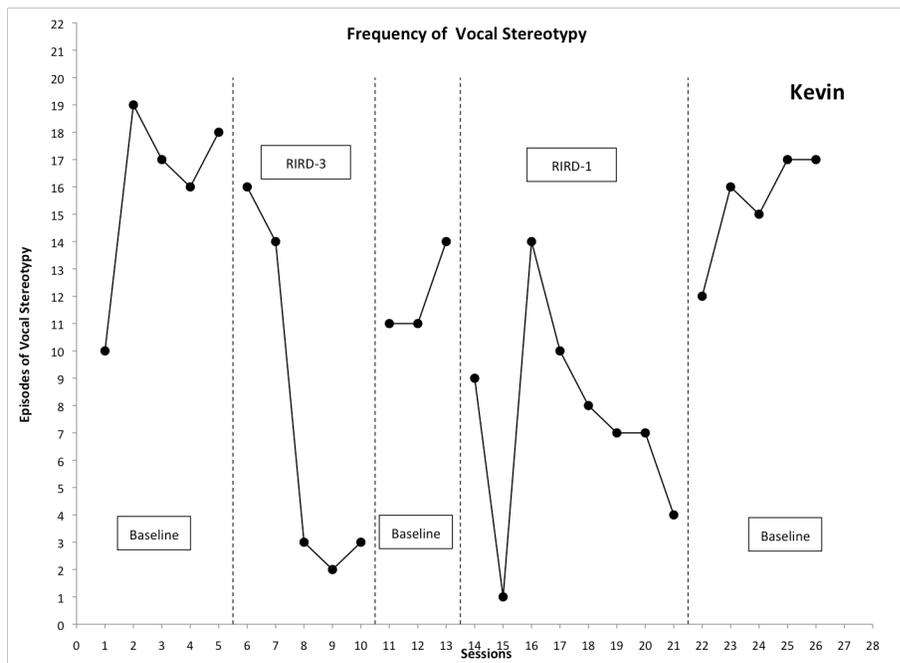


Figure 2. Kevin's frequency of vocal stereotypy episodes per session.

Discussion

The present study sought to determine if RIRD would reduce vocal stereotypy to a clinically significant degree using both the initially described three demand procedure (Ahearn, Clark, MacDonald, & Chung, 2007) as well as the one demand procedural variation used by Saini and colleagues (2015). For the two participants in this study, RIRD-3 was demonstrated to produce a reduction in vocal stereotypy compared to baseline, reconfirming the findings of several previous studies (see Martinez & Betz, 2013 for a review). Furthermore, the data indicate that RIRD-1 continued to be effective for the reduction of vocal stereotypy, lending further support to the existing literature describing that procedural variation (Saini, Gregory, Uran, & Fantetti, 2015).

The addition of this study to the current literature on RIRD provides for even more robust evidence in favor of using RIRD-3 to treat vocal stereotypy in children with ASD. Further, the evidence suggesting that RIRD-1 is equally effective is quite beneficial, because RIRD-1 has clear practical and clinical benefits due to the decreased requirement on the clinician's time as well as instructional time available for student skill acquisition. Accordingly, augmented evidentiary support for this procedural variation increases the likelihood that RIRD will be adopted as an intervention in applied clinical settings.

The results of the current study are potentially limited insofar as Scott's frequency of vocal stereotypy in the return to baseline conditions never fully recaptured baseline levels, limited the confidence that the reduction in vocal stereotypy was in fact due to RIRD rather than some other confounding variable. Conversely, the clear change in levels for Kevin's data between baseline and treatment conditions offers support that the use of RIRD was in fact the controlling variable.

The present study examined the use of RIRD in isolation during the experimental session. Further research should examine the use of RIRD in a more typical applied setting (e.g., within the classroom) as well as potentially exploring the use of RIRD as part of a treatment package for the reduction of vocal stereotypy. For example, combining RIRD with other antecedent and consequent interventions.

References

- Ahearn, W. H., Clark, K., MacDonald, R., & Chung, B. I. (2007). Assessing and treating vocal stereotypy in children with autism. *Journal of Applied Behavior Analysis, 40*, 263-275. doi:10.1901/jaba.2007.30-06
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Arlington, VA: American Psychiatric Association.
- Athens, E. S., Vollmer, T. R., Sloman, K. N., & Pipkin, C. S. (2008). An analysis of vocal stereotypy and therapist fading. *Journal of Applied Behavior Analysis, 41*, 291-297.
- Baer, D. M. (2005). Letters to a lawyer. In W. L. Heward, T. E. Heron, N. A. Neef, S. M. Peterson, D. M. Sainato, G. Cartledge (Eds.), *Focus on Behavior Analysis in Education: Achievements, Challenges, and Opportunities* (pp. 3-30). Upper Saddle River, NJ: Pearson Prentice Hall.
- Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 1*, 91-97.
- Bristol, M., Cohen, D., Costello, J., Denckla, M., Eckberg, T., Kallen, R., ... Spence, M. (1996). State of the science in autism: Report to the National Institute of Health. *Journal of Autism and Developmental Disorders, 26*, 121-154.
- Centers for Disease Control and Prevention. (2014). Prevalence of autism spectrum disorder among children aged 8 years - autism and developmental disabilities monitoring network, 11 sites, united states, 2010. *Morbidity and Mortality Weekly Report, 63* (2), 1-22.

- Dunlap, G., Dyer, K., & Kogel, R. L. (1983). Autistic self-stimulation and intertrial interval duration. *American Journal of Mental Retardation*, *88*, 194-202.
- Gonzalez, K., Cassel, T., & Boutot, E. A. (2011). Overview of Autism Spectrum Disorders. In E. A. Boutot, & B. S. Myles, *Autism Spectrum Disorders: Foundations, Characteristics, and Effective Strategies*. Upper Saddle River, NJ: Pearson.
- Lanovaz, M. J., & Sladeczek, I. E. (2012). Vocal stereotypy in individuals with autism spectrum disorders: A review of behavioral interventions. *Behavior Modification*, *36* (2), 146-164.
- MacDonald, R., Green, G., Mansfield, R., Geckeler, A., Gardenier, N., Anderson, J. (2006). Stereotypy in young children with autism and typically developing children. *Research in Developmental Disabilities*, *28*, 266-277.
- Martinez, C. K., & Betz, A. M. (2013). Response interruption and redirection: current research trends and clinical application. *Journal of Applied Behavior Analysis*, *46*, 549-554.
- Mayes, S. D., & Calhoun, S. L. (2011). Impact of IQ, age, SES, gender, and race on autistic symptoms. *Research in Autism Spectrum Disorders*, *5*, 749-757.
- Rapp, J., & Vollmer, T. (2005). Stereotypy I: A review of behavioral assessment and treatment. *Research in Developmental Disabilities*, *26* (6), 527-547.
- Saini, V., Gregory, M. K., Uran, K. J., & Fantetti, M. A. (2015). Parametric analysis of response interruption and redirection as treatment for stereotypy. *Journal of Applied Behavior Analysis*, *48*, 96-106.

- Schreibman, L., & Carr, E. G. (1978). Elimination of echolalic responding to questions through the training of a generalized verbal response. *Journal of Applied Behavior Analysis, 11*, 453-463.
- Vanderkerken, L., Heyvaert, M., Maes, B., & Onghena, P. (2013). Psychosocial interventions for reducing vocal challenging behavior in persons with autistic disorder: a multilevel meta-analysis of single-case experiments. *Research in Developmental Disabilities, 34*, 4515-33.