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The evaluation of noncontingent reinforcement (NCR) and functional communication training (FCT) on the rates of attention-maintained perseverative speech

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The Evaluation of Noncontingent Reinforcement (NCR) and
Functional Communication Training (FCT) on the Rates of
Attention-Maintained Perseverative Speech

A Thesis Presented

By

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Abstract

Many children with developmental disabilities also demonstrate delays in communication. These delays have been demonstrated in all aspects of communication, including skills such as manding, tacting and other social communication. Many of these children also evidence atypical speech patterns such as perseverative speech. This study evaluated the effects of noncontingent reinforcement (NCR) and functional communication training (FCT) on rates of perseverative speech maintained by attention. Results showed that both procedures were effective in reducing problem behavior; however, manding only occurred in the FCT condition. It appears as though an extinction component was in part responsible for the behavior change, and an increase in play skills may have contributed to a decrease in motivation to access attention. Nonetheless, without a component analysis, it cannot be determined which variable or variables were responsible for the decrease in problem behavior.

The Evaluation of Noncontingent Reinforcement (NCR) and Functional Communication Training (FCT) on the Rates of Attention-Maintained Perseverative Speech

According to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR; American Psychiatric Association, 2000), impairments in communication are one of the criteria used to diagnose autism in young children. These impairments include both verbal and nonverbal forms of communication. The level of impairment, as well as the manner in which communication develops, varies considerably among individuals with autism. Some individuals display deficits with their speech production, whereas others engage in echolalia, the repetition of or mimicking of the vocalizations of others. Other individuals with autism rely on pointing to specific items or leading their communicative partner by the hand to indicate their needs and wants. Regardless of what form the deficit takes, without effective communication skills, it is likely that children with autism and other developmental delays will face many obstacles due to their difficulty or inability to express their needs and wants. When children are unable to effectively communicate their needs and wants, they are more likely engage in other behaviors that meet those needs and wants. These behaviors are often maladaptive and problematic. For example, Willinger et al., (2003) found that maladaptive behaviors were more common with children who have delays in communication when compared to children who do not have communication delays.

Communication delays are prevalent among children with developmental disabilities (Rosales & Rehfeldt, 2007). These delays have been demonstrated in all aspects of communication, including tacts, mands, and intraverbals. Communication delays often result in the limited form of speech being shaped into problem behavior,

such as bizarre speech and perseverative speech. Teaching appropriate and effective forms of communication is and should be a primary goal when working with children with developmental disabilities, in particular those on the autism spectrum. Previous research has shown that a variety of treatment procedures have been effective in increasing manding in children with communication delays. Some of these procedures have included the establishment of tacts, using conditional discrimination training, and differential reinforcement procedures (Wallace, Iwata, & Hanley, 2006; Rehfeldt & Root, 2005; Drasgow, Halle, & Ostrosky, 1998). Past research has also utilized other procedures, including noncontingent reinforcement (NCR), extinction, and differential reinforcement, to decrease behavior problems such as bizarre speech (Buchanan & Fisher, 2002; Rehfeldt & Chambers, 2003; Winborn, Wacker, Richman, Asmus, & Geier, 2002).

Most research on communication delays combines procedures to support the acquisition of appropriate communication skills with procedures to reduce problem behavior. Two common treatments include noncontingent reinforcement (NCR) and functional communication training (FCT). Both of these procedures have been shown to be effective in increasing manding and decreasing bizarre speech (Winborn et al., 2002; Goh, Iwata, & DeLeon, 2000; Rehfeldt & Chambers, 2003).

NCR is a treatment procedure where reinforcement is delivered according to a time-based schedule that is independent of the occurrence of the target behavior (Rescorla & Skucy, 1969). When NCR is utilized as a treatment to decrease maladaptive behaviors, there is an extinction component added to the treatment package. Reinforcement is delivered on a time-based schedule, instead of being delivered after the

occurrence of the problem behavior. In NCR, the occurrence of target behavior at any point other than the time based schedule results in the withholding of reinforcement. Therefore, the problem behavior is placed on extinction (Lindberg, Iwata, Roscoe, Worsdell, & Hanley, 2003). Mace and Lalli (1991) conducted a study in order to decrease attention maintained vocalizations. By utilizing NCR procedures, attention was delivered based on a variable time schedule, and that attention was withheld following the occurrence of the target behavior. However, since NCR is delivered on a time-based schedule, it is possible that the problem behavior may accidentally contact reinforcement; therefore, that behavior may be maintained due to adventitious reinforcement (Thompson, Iwata, Hanley, Dozier, & Samaha, 2003).

Vollmer, Iwata, Zarcone, Smith, and Mazaleski (1993) compared the effectiveness of NCR and differential reinforcement of other behavior (DRO) in reducing attention-maintained self-injurious behavior (SIB) among three adults with mental retardation. Although the results showed that both NCR and DRO were equally effective in reducing the problem behavior, NCR was thought to be easier to implement, and therefore, was more beneficial than the DRO procedure. Other benefits of NCR procedures include the consistent delivery of reinforcement and the elimination of extinction bursts (Hagopian, Fisher, & Legacy, 1994; Mace & Lalli, 1991).

Although previous research demonstrates that NCR is effective in reducing maladaptive behaviors (Buchanan & Fisher, 2002), other research shows that NCR may not lead to an increase in appropriate behavior. Goh, Iwata, and DeLeon (2000) looked at the effects of combining NCR plus differential reinforcement of alternative behavior (DRA) in reducing SIB in two individuals with developmental disabilities. Results

showed that during the combination of the two procedures, there was a decrease in SIB; however, there was little or no increase in appropriate mands. When NCR was thinned while the DRA procedure was still in place, problem behavior remained low yet there was also an increase in appropriate behavior. Dixon, Benedict, and Larson (2001) used DRA to decrease inappropriate verbal behavior maintained by attention in an adult with moderate mental retardation. In this study, appropriate comments were reinforced and no reinforcement was provided for inappropriate vocalizations. Results showed that there was a decrease in inappropriate vocals and an increase in appropriate vocals.

The type of reinforcement procedures used in teaching functional communication is the DRA procedure. During FCT procedures, the individual is taught to emit an alternative response (a mand) to obtain the reinforcer that maintains the problem behavior in order to replace aberrant behavior (Brown et al., 2000; Hagopian, Contrucci Kuhn, Long, & Rush, 2005). Through this procedure, two components are typically utilized, and those include placing the problem behavior on extinction and prompting an alternative behavior using the same reinforcer that maintained the problem behavior (Worsdell, Iwata, Hanley, Thompson, & Kahng, 2000). In fact, many studies have demonstrated that an additional component, such as extinction or punishment, is necessary when implementing FCT procedures (Worsdell et al., 2000; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998). Lalli, Casey, and Kates (1995) found that during FCT plus extinction, there was an increase in verbal responses and a decrease in problem behavior. Fisher et al. (1993) demonstrated that FCT (with or without extinction) was not as effective in decreasing problem behavior in four individuals compared to FCT with the addition of punishment. Hagopian et al. (1998) showed that FCT was successful in

reducing aberrant behavior in individuals with mental retardation when the FCT procedure was combined with other procedures, such as extinction or punishment.

Another consideration when implementing FCT procedures is determining what type of response should be taught as an alternative communicative behavior. Past studies have used parent reports to choose an alternative response (Winborn, Wacker, Richman, Asmus, & Geier, 2002) or responses that already exist in the individual's repertoire (Grow, Kelley, Roane, & Shillingsburg, 2008). Furthermore, it has been demonstrated that FCT was more effective if the mand was reinforced in the natural environment (Durand & Carr, 1991), if it took less effort to emit the mand (Horner & Day, 1991), and if the reinforcement for the alternative response competed with the reinforcement for the problem behavior (Kelley, Lerman, & Van Camp, 2002). Brown et al. (2000) looked at the effects of FCT during conditions where the establishing operation (EO) was present and when it was absent. Results showed that not only did problem behavior decrease, but also more relevant mands were emitted during the EO-present condition compared to the EO-absent condition.

Although FCT is considered a DRA procedure, it differs from traditional DRA schedules in that FCT teaches an alternative response that specifies its reinforcer, it requires that the alternative response selected be a response that involves a lower amount of response effort to access reinforcement, it is typically reinforced on a more dense schedule than is occurring at baseline, and that the alternative response can be reinforced across all environmental settings (Fisher, 1998). FCT procedures were thought to be more effective because they allowed the participant to control the delivery of reinforcement (Carr & Durand, 1985; Wacker et al., 1990). During NCR conditions,

reinforcement is delivered on a fixed schedule; therefore, although the individual may temporarily discriminate when the reinforcement will be delivered, he cannot discriminate which response will produce that reinforcement. Furthermore, he is not taught an appropriate way of requesting that reinforcer. However, FCT allows the participant to control when they gain access to reinforcement by teaching that individual an appropriate way to mand for the reinforcer. By teaching this alternative mode of communication, the individual learns a new functional skill, and he also has control over when he will receive that reinforcement. However, other studies have shown that noncontingent reinforcement (NCR), which does not give the participant control over the delivery of reinforcement, resulted in equivalent reductions in problem behavior (Hanley, Piazza, Fisher, Contrucci, & Maglieri, 1997; Kahng et al., 1997). Nonetheless, other studies including Carr and Durand (1985) assert that the ability to exert control over the schedule of reinforcement delivery does affect the suppression of maladaptive behaviors.

Past researchers have implemented NCR procedures by utilizing reinforcers that are functionally equivalent to the reinforcer that maintained the problem behavior (Thompson et al., 2003), whereas past researchers have implemented FCT procedures that tend to focus on reinforcement that is functionally relevant to the reinforcer that maintained the problem behavior (Brown et al., 2000). Functional equivalence occurs when the mands and problem behavior are both maintained by the same reinforcer (Carr, 1988). Functional relevance occurs when the mands are matched to the function of the problem behavior and only reinforced when the relevant establishing operation was present (Brown et al., 2000). With NCR procedures, the type of reinforcer delivered is typically the type of reinforcer that maintained the problem behavior. For example, if a

behavior was maintained by attention, then the therapist would deliver attention on a time-based schedule independent of the occurrence of the target behavior. However, with FCT, the participant can be taught to request the specific type of attention that actually affects the motivating operation (MO) in place. For example, Carr and Durand (1985) taught a child to request help or to request praise during difficult demands. The child requested help more often than he requested praise since help was functionally relevant. They suggested that FCT should match the current MOs, but also to the function of the problem behavior.

Individuals with autism frequently engage in peculiar communication behaviors, such as repeating words or phrases or perseverating on the same topic (Rehfeldt & Chambers, 2003). Past research has demonstrated that these atypical forms of language and communication tend to be maintained by conditions occurring within their environment (Rehfeldt & Chambers). Furthermore, prior studies have shown that the peculiar speech of individuals with various developmental disorders can be maintained by positive reinforcement in the form of attention (e.g., Dixon et al., 2001; Mace & Lalli, 1991). Past research has also demonstrated that the type of verbal attention can affect the occurrence of the aberrant speech. DeLeon, Arnold, Rodriguez-Catter, and Uy (2003) observed that bizarre speech occurred more frequently when the type of attention given related to the participant's bizarre speech than when it was unrelated.

The purpose of the present study was to assess the effectiveness of noncontingent reinforcement and functional communication training to decrease perseverative speech maintained by attention. Although it was hypothesized that both treatments would be effective in decreasing the aberrant behavior, it was hypothesized that functional

communication training may be more efficient because not only would it facilitate a decrease in the aberrant behavior, but it would also teach the individual a functional and appropriate way to mand for attention.

Method

Participant, Setting, and Materials

Robert was a four-year-old boy diagnosed with Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS). He engaged in perseverative speech that included repeating a word or phrase more than one time. He was verbal and communicated in four and five word sentences. He appropriately requested toys and food items, as well as for others to engage in actions. The participant also asked some appropriate basic WH questions, including “Where’s doggie?” and “Who is it?.” He did not reliably request attention from adults via appropriate vocal behavior. He received 7 hours of one-to one Applied Behavior Analysis (ABA) teaching sessions at his home, and he also received 2.25 hours of one- to one ABA teaching sessions at school. Robert attended school four days a week, where two of the days were half days at school and the other two days were full days at school. The present study was conducted in multiple rooms throughout the participant’s house during his one-to one ABA teaching sessions. Each session lasted ten minutes, and 2-4 sessions were conducted during each home ABA session. These sessions occurred during his breaks; therefore, he had access to toys and other preferred tangibles throughout each session.

Dependent Variables and Data Collection

Data were collected during 10-minute sessions on perseverative speech and manding. Perseverative speech was defined as repetitive statements that occurred

between 1-5 s apart on a specific topic (e.g., lights, singing, questions). All subsequent comments emitted during a session that focused on the initial topic were scored as perseverative. A partial interval recording (30 s intervals) system was used to collect data on perseverative speech. Data were recorded on total, occurrence, and non-occurrence of the target behavior. Manding was defined as any occurrence of verbally stating the specific request “I want to talk” to his communicative partner. Variations of this phrase, such as “Let’s talk” or “I want talk,” were also scored as a mand. The frequency of manding during sessions was recorded. Mands for preferred objects or activities were not scored.

Reliability

A second observer independently scored 20% of sessions. Interobserver agreement for perseverative speech was calculated for total, occurrence, and nonoccurrence agreement by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. An interval was scored as an agreement if both observers scored the same result for that one interval, regardless if the score was an occurrence or a non-occurrence. Interobserver agreement for manding was calculated by dividing the smaller frequency by the larger frequency and multiplying by 100%. Interobserver agreement for perseverative speech and manding was 89% (range, 80% to 100%) and 100%, respectively.

Procedure

Functional analysis. A functional analysis was conducted based on the procedures described by Iwata, Dorsey, Slifer, Bauman, & Richman (1994). The conditions included free play, attention, tangible, escape, and alone, which were alternated in a multielement

design. An alone condition was also included because it was observed that Robert occasionally engaged in the target behavior when he was alone in a room. Each condition lasted for five minutes, and 2-3 conditions were conducted on each day across several days.

During the free play condition, the participant was given free access to preferred items. The therapist played with the participant and provided him with noncontingent attention lasting for 10 seconds, every 30 seconds. There were no differential consequences for aberrant behavior. During the attention condition, the participant was given free access to preferred items and was ignored unless aberrant behavior occurred. Contingent on aberrant behavior, the therapist provided brief social attention for 10 s in the form of reprimands (e.g., “We are not talking about that anymore”, “I don’t want to talk about that”) or repetition of what was being said (e.g., “The white light is on”, “Mom should sing.”). When aberrant behavior stopped, the therapist moved away and ignored the participant. During the tangible condition, a preferred toy was removed from the participant and was then provided contingent upon aberrant behavior for 10 s. No other interactions or verbal comments occurred. During the escape condition, all preferred items and toys were removed and the participant was directed to complete a demanding task, such as letter identification or block imitation. Aberrant behavior resulted in the contingent removal of the task for 10 s or until aberrant behavior stopped. When aberrant behavior stopped, the task was re-presented. No other interactions or verbal comments were provided. During the alone condition, all preferred items and toys were removed, and the therapist was in a different part of the room, away from the participant,

pretending to be doing work. No attention or demands were provided during this condition. In addition, there were no differential consequences for aberrant behavior.

Parametric analysis. After the functional analysis was conducted and demonstrated that attention maintained the aberrant behavior, a parametric analysis was conducted in order to evaluate different forms of attention. The conditions included acknowledgement, reprimands, redirection, and repetition. These conditions, which were alternated in a multielement design, were chosen because they were the different types of attention that were usually given in response to the target behavior prior to the study. Each condition lasted for five minutes, and 2-3 sessions were conducted each day across several days. Each of the conditions was similar to the attention condition of the first functional analysis, except that they differed in the topography of attention that was given contingent upon aberrant behavior.

During the acknowledgement condition, the therapist delivered several statements that lasted for 10 s to indicate that she heard what the participant was saying (e.g., “Yup”, “You’re right”) contingent upon aberrant behavior. During the reprimands condition, the therapist delivered statements to discourage him from talking about the topic that lasted for 10 s (e.g., “We are not talking about that right now, I do not want to talk about that.”) contingent upon aberrant behavior. During the redirection condition, the therapist delivered statements that lasted for 10 s to encourage the participant to play with the item/toy he was with which he was previously engaged (e.g., “Play with the train”, “You’re playing with the cars.”) contingent upon aberrant behavior. During the repetition condition, the therapist delivered statements that lasted for 10 s that mimicked what the

participant was saying (e.g., “The white light is on”, “Mom should sing.”) contingent upon aberrant behavior.

Baseline. Baseline sessions consisted of 10-min sessions. During these sessions, the therapist acknowledged the participant one time with verbal attention and eye contact after the occurrence of perseverative speech (e.g., “You’re right, the white light is on, Yes, it is break time.”), and then ignored every subsequent occurrence of perseverative speech with no eye contact, no verbal contact, and no physical contact. This procedure was employed prior to the current experiment, and thus was the reason it was utilized as the baseline measure.

Non-contingent reinforcement (NCR). Noncontingent reinforcement conditions consisted of 10-min sessions. During the NCR conditions, the therapist delivered statements that were related to the environment (e.g. “The cars are going fast, You’re building a tall tower.”) every 30 seconds for 10 seconds. Perseverative speech was placed on extinction during this condition (i.e., no longer produced attention in the form of no eye contact, no verbal contact, and no physical contact).

Functional Communication Training (FCT). Functional communication training conditions consisted of 10-min sessions. During the FCT conditions, the therapist utilized a time delay plus modeling. After the initial occurrence of perseverative speech, the therapist waited 2 s and then modeled the phrase “I want to talk”. Correct imitation of the modeled phrase or a spontaneous mand was immediately reinforced with 10 s of verbal attention about the specific topic from the therapist. The therapist continued to model the phrase upon all subsequent occurrences of perseverative speech. By talking about the

specific topic, the participant would gain access to the form of attention that reinforced the aberrant behavior (as shown in the modified attention functional analysis).

Experimental Design

An ABABCBC reversal design was used during this study to assess the effects of noncontingent reinforcement and functional communication training on perseverative speech.

Results

The results of the functional analysis are presented in Figure 1. The results show that the perseverative speech occurred in the highest percentage of intervals during the attention condition. During the other four conditions, the percentage of intervals with perseverative speech was very low. Therefore, it was concluded that the aberrant behavior was maintained by social attention. The results of the parametric analysis are presented in Figure 2. For the first half of the modified functional analysis, it was not clear what form of attention was maintaining the behavior. However, as the functional analysis continued, a higher percentage of perseverative speech emerged in the repetition condition. The results suggested that the perseverative speech was maintained by verbal attention in the form of repeating what the participant had said.

Figure 3 depicts the results of perseverative speech across the different conditions. During baseline, perseverative speech occurred at a high percentage of intervals, averaging at 63% of intervals. When noncontingent reinforcement was introduced, the level of perseverative speech decreased immediately, averaging at 25% of intervals. Although there were two outlier data points during the NCR condition, the level of perseverative speech remained relatively stable throughout the condition. When

noncontingent reinforcement was removed (baseline), perseverative speech returned to initial baseline levels. When noncontingent reinforcement was reintroduced, perseverative speech returned to low levels immediately, which was similar to the initial noncontingent reinforcement condition. Unlike the initial NCR condition, the second NCR condition had more variable occurrences of perseverative speech, ranging from 50% to 0%. Essentially, thin and dense reinforcement schedules were compared. The results show that levels of perseverative speech were low during dense schedules of reinforcement. Upon introduction of functional communication training, rates of perseverative speech were maintained at a low level consistent to the previous NCR phase, but during the Session 7, rates of perseverative speech decreased to 0%. When noncontingent reinforcement was introduced for the third time, there was an initial slight increase in perseverative speech, but rates quickly return to 0%. Upon the reintroduction of FCT, rates of perseverative speech were maintained at 0%.

Figure 4 depicts the rates of manding across the different conditions. During baseline, rates of both prompted and independent mands were at 0%. When noncontingent reinforcement was introduced, rates of both prompted and independent manding remained at zero. When noncontingent reinforcement was removed (baseline), rates of prompted and independent manding remained at zero. When noncontingent reinforcement was reintroduced, rates of prompting and independent manding remained at zero. Rates of prompted mands increased initially when FCT was introduced, while rates of independent mands remained at zero. However, rates of prompted mands eventually decreased to zero at the same time that the perseverative speech decreased to zero. When noncontingent reinforcement was introduced for the third time, rates of both

prompted and independent mands remained at zero. Upon reintroduction of FCT, rates of both prompted and independent mands remained at zero.

Discussion

In the current study, the effects of noncontingent reinforcement and functional communication training on rates of perseverative speech maintained by attention were evaluated. Rates of perseverative speech decreased across all conditions. A functional relationship was demonstrated between the NCR procedure and rates of perseverative speech.

Based upon data collected via naturalistic observations conducted prior to the study, it was hypothesized that the participant's perseverative speech was maintained by attention in the form of verbally talking about the perseverative statement in a back and forth manner. The parametric analysis demonstrated that the perseverative speech occurred at higher rates when attention in the form of verbal repetition of the statement was provided as a consequence when compared to other topographies of attention. As a result the experimenter hypothesized that this form of reinforcement for the aberrant behavior could be used to teach a replacement behavior that would allow the participant to gain access to reinforcement via a more appropriate behavior (requesting to talk). Extinction was in effect during the FCT condition because the actual back and forth form of verbal attention was withheld. It is possible that neither the NCR nor the FCT conditions provided access to similar reinforcement that had maintained the aberrant behavior.

In each of the treatment conditions, the effects of extinction appear to be responsible, at least in part, for the decrease in the problem behavior. During the fifth

session within each of the first three treatment conditions, there was an increase in the percent of intervals with perseverative speech. The increase in problem behavior may be representative of an extinction burst, which was followed by a decrease of the problem behavior (Lindberg et al., 2003; Worsdell et al., 2000). When the two treatment conditions were reversed, the percent of intervals where problem behavior continued to decrease, and eventually remained stable at zero.

During the NCR conditions, rates of the problem behavior decreased; however, there was no increase in appropriate manding. Goh et al.'s (2000) findings show that although decreases in problem behavior were noted in the NCR condition, NCR does not teach explicitly teach a pre-specified appropriate behavior. Furthermore, it is possible that the NCR condition may have weakened the effects of an extinction burst in this study. This weakening of the extinction burst could be viewed as a potential benefit for using the NCR condition (Mace & Lalli, 1991). Public schools cannot tolerate long or escalated extinction bursts; therefore, NCR procedures may be highly desirable to use in settings such as these.

Satiation is another variable that could explain why NCR was effective. This establishing operation decreases the effectiveness of a reinforcer due to prior exposure to that reinforcer. During the NCR conditions, attention, which was maintaining the problem reinforcer, was delivered frequently. The reinforcing attributes of attention may have decreased due to the frequent exposure, thus resulting in a decrease in the behavior that was maintained by attention (Hagopian, Crockett, Stone, DeLeon, & Bowman, 2000). Satiation could be an explanation as to why the second NCR condition had more variable occurrences of perseverative speech, ranging from 50% to 0%.

Past research has shown that with FCT plus extinction, a decrease in problem behavior as well as an increase in verbal responses may occur (Lalli et al., 1995). In the current study, there was a decrease in problem behavior, but the increase in verbal responses was short lived. It is possible that the reinforcement for the alternative response did not compete with the reinforcement for the problem behavior (Kelley et al., 2002). The parametric analysis demonstrated that the perseverative speech was maintained by attention in the form of repeating what the participant said. Since simply repeating the participant's statements was not considered socially appropriate, the author developed a mand that had more social validity in the treatment setting, and would also lead to a topography of reinforcement that competed with the form of reinforcement that maintained problem behavior. Based upon these criteria, the mand "I want to talk" was chosen. This enabled the participant to appropriately mand for attention to talk about a specific subject. However, the attention delivered after the emission of the mand was in the form of talking about the topic, and not simply repeating the statement. Thus, the reinforcement for the alternative behavior may not have competed with the reinforcement for the problem behavior. However, the problem behavior did decrease, and the most likely explanation is the fact that reinforcement was withheld contingent upon the occurrence of the problem behavior.

Another potential explanation for the decrease of perseverative behavior could be that the FCT procedure resulted in an increase in a behavior that accessed the same reinforcer more efficiently and effectively than the problem behavior. Another variable to consider is the fact that this study was being conducted at the same time the participant's home therapy sessions were occurring. During home sessions, play skills were addressed

via ongoing instructional programs. It is possible that as the subject gained appropriate independent social play skills, that there was a decrease in motivation to access to attention. However, the experimental design did not account for this variable and thus it is not possible to evaluate this hypothesis from these data.

There are several limitations to this study that should be acknowledged. There were no data collected to evaluate if treatments were implemented as designed. The lack of treatment integrity data limit the strength of any conclusions. Inter-observer agreement data were collected; however, the percentage of sessions where IOA was collected was less than desirable (only 20%). Furthermore, the participant continued to be exposed to direct teaching of adaptive skills with individuals involved in experimental sessions (in his ABA therapy sessions). It is unclear as to what effect this instruction and thus competing reinforcement history may have had on rates of the problem behavior. A component analysis would be necessary in order to tease out the effects of extinction, NCR, and FCT. Thus, it is possible that extinction alone might have yielded similar results. Similarly, an alternating treatments design may have permitted a more direct comparison of NCR and FCT. Another limitation is that the treatment conditions may not have given the participant access to the true reinforcer (i.e., adults repeating the participant's statements) that was maintaining his aberrant behavior. This study attempted to determine what that true reinforcer was by conducting a parametric analysis. Although there was a difference in the topography of the words in each of the conditions, there were other components of the delivery of those words, such as eye contact, tone of voice, and volume, that were not directly controlled for.

Future research addressing perseverative speech maintained by attention should focus on matching the new reinforcer to the reinforcer that maintains the aberrant behavior. Once a true reinforcer is established, the participant may be more motivated to engage in mands to access the reinforcer. Once the participant demonstrates the skill to independently mand for the specified reinforcer, future research can then look into expanding from that mand into more complex conversational exchanges. These conversational exchanges would match the true reinforcer for the participant, but it would also teach more appropriate social skills.

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Figure Captions

Figure 1. Percent of intervals in which perseverative speech occurred during the functional analysis.

Figure 2. Total number of intervals in which perseverative speech occurred during the parametric analysis.

Figure 3. Percent of intervals in which perseverative speech occurred across NCR and FCT conditions.

Figure 4. Frequency of prompted and independent mands across NCR and FCT conditions.







