The Use of Response Interruption Redirection (RIRD), Timeout, and Differential Reinforcement to Decrease Stereotypy

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THE USE OF RESPONSE INTERRUPTION REDIRECTION, TIME-OUT, AND DIFFERENTIAL REINFORCEMENT TO DECREASE STEREOTYPY

by

Jessica Korneder

A dissertation submitted to the Graduate College in partial fulfillment of the requirements for the degree of Doctor of Philosophy
Psychology
Western Michigan University
December 2014

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Steve Ragotzy, Ph.D.
THE USE OF RESPONSE INTERRUPTION REDIRECTION, TIME-OUT, AND DIFFERENTIAL REINFORCEMENT TO DECREASE STEREOTYPY

Jessica Ann Korneder, Ph.D.

Western Michigan University, 2014

Behaviors such as toe walking, hand flapping, nonfunctional vocalizations, and rocking are all examples of stereotypy. Stereotypy can occur at high rates in children with and without developmental delays (Smith & Van Houten, 1996). These behaviors can interfere with the acquisition of new skills (e.g., Dunlap, Dyer, & Koegel, 1983; Morrison & Rosales-Ruiz, 1997) and social interactions (Jones, Wint, & Ellis, 1990). The purpose of this study was to assess the effectiveness of response interruption and redirection (RIRD), time-out, and differential reinforcement of other behavior (DRO) in reducing vocal and motor stereotypy with children who engage in automatically reinforced high-rates of stereotypy. For this intervention, during leisure skills the participant was given an iPad® or LEGO® and a DRO was conducted with highly preferred foods as the reinforcer. Each instance of stereotypy resulted in the loss of the iPad® or LEGO® and the presentation of a RIRD sequence. During academic instruction, the combination of RIRD and DRO were assessed. The combination of techniques decreased stereotypy from 90% to below 30% of 10-s intervals during leisure activities and to approximately 40% during academic instruction.
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Jessica Korneder
# TABLE OF CONTENTS

ACKNOWLEDGMENTS ........................................................................................................................................... ii

LIST OF TABLES .................................................................................................................................................. v

LIST OF FIGURES ................................................................................................................................................ vi

THE USE OF RESPONSE INTERRUPTION REDIRECTION, TIME-OUT, AND DIFFERENTIAL REINFORCEMENT TO DECREASE STEREOTYPY .............................................................................................................. 1

Method ............................................................................................................................................................... 4

Participant ......................................................................................................................................................... 4

Setting and Materials ...................................................................................................................................... 5

Dependent Variables ...................................................................................................................................... 6

Independent Variable .................................................................................................................................... 6

Research Design .............................................................................................................................................. 6

Measurement ..................................................................................................................................................... 7

Interobserver Agreement (IOA) .......................................................................................................................... 7

Treatment Integrity .......................................................................................................................................... 8

Experiment 1: Academic Work Task ................................................................................................................ 9

Experiment 2: Leisure Time Activity (iPad®) .................................................................................................... 15

Experiment 3: Academic Work Task 2 (Naming) .......................................................................................... 23

Experiment 4: Leisure Time (LEGOS®) Activity 2 ......................................................................................... 27

Interobserver Agreement ................................................................................................................................. 31

Discussion ......................................................................................................................................................... 31
<table>
<thead>
<tr>
<th>REFERENCES</th>
<th>APPENDICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFERENCES</td>
<td>A Functional Analysis Results</td>
</tr>
<tr>
<td></td>
<td>B Stereotypy Data Sheet</td>
</tr>
<tr>
<td></td>
<td>C Treatment Integrity Data Sheet</td>
</tr>
<tr>
<td></td>
<td>D Stereotypic Behaviors That Meet Response Definition</td>
</tr>
<tr>
<td></td>
<td>E Thesis Data on Response Interruption and Time-out</td>
</tr>
<tr>
<td></td>
<td>F Interobserver Agreement (IOA) Charts</td>
</tr>
<tr>
<td></td>
<td>G HSIRB Approval</td>
</tr>
</tbody>
</table>

37
43
46
48
50
52
63
69
LIST OF TABLES

1. Treatment Integrity Scores for Experiment 1: Academic Work Task .......... 9
2. Treatment Integrity Scores for Experiment 3: Work Task 2 (Naming) ...... 9
3. Number of Reinforcers Delivered .................................................. 17
4. Mastery Dates for Naming, Two-Dimensional Academic Targets .......... 26
5. DRO Results .................................................................................. 30
LIST OF FIGURES

1. Percentage of 10-s Intervals Containing Stereotypy for Experiment 1: Academic Work Task, Baseline through Phase 5 .......... 11
2. Percentage of 10-s Intervals Containing Stereotypy for Experiment 1: Academic Work Task, Phase 6 through Phase 13 .......... 13
3. Percentage of 10-s Intervals Containing Stereotypy for Experiment 2: Leisure Time Activity (iPad®) ......................................... 15
4. Percentage of 10-s Intervals Containing Stereotypy for Experiment 2: Leisure Time Activity (iPad®) with the Addition of the Modified DRO, Phases 11 through 17 ...................................................... 19
5. Mean Frequency of Individual Topographies of Stereotypy per Session .... 19
6. Frequency of Topography without Contingent RIRD and TO .............. 20
7. Percentage of 10-s Intervals Containing Stereotypy in the Absence of Highly Discriminative Stimuli .................................................. 21
8. Percentage of 10-s Intervals Containing Stereotypy in the Presence of Highly Discriminative Stimuli .................................................. 22
9. Percentage of 10-s Intervals Containing Stereotypy During Academic Instruction (Naming) ......................................................... 25
10. Percentage of 10-s Intervals Containing Stereotypy During Experiment 4: Leisure Time (LEGOS®) ............................................. 28
11. Percentage of Correct Trials during the LEGOS® Procedure .............. 28
THE USE OF RESPONSE INTERRUPTION REDIRECTION, TIME-OUT, AND DIFFERENTIAL REINFORCEMENT TO DECREASE STEREOTYPY

Vocal and motor stereotypy can include operant behavior that lacks variability, persists over time, is resistant to environmental changes, tends not to have a social function, is socially awkward, and is developmentally inappropriate (Berkson, 1983, Rapp & Vollmer, 2005). Stereotypy can adversely affect the person who engages in the behavior by interfering with more desirable behavior and can be disruptive to those around them (Athens, Vollmer, Sloman, & St Peter Pipkin, 2008). People with developmental delays may engage in stereotypy 7% to 47% of their waking hours (Repp & Barton, 1980).

High rates of stereotypy were associated with decreases in task performance and skill acquisition such as simple shape discrimination (Chock & Glahn, 1983; Koegel & Covert, 1972). Also, decreases in positive behaviors such as playing with toys were attributed to stereotypy (Koegel, Firestone, Kramme, & Dunlap, 1974). Furthermore, when presented with novel leisure items, people who engage in high rates of stereotypy manipulated novel objects less than people who in engage in low rates of stereotypy (Davenport & Berkson, 1963).

Stereotypy can be difficult to reduce because it is often maintained by automatic reinforcement. In attempts to compete with the sensory stimulation provided by automatically reinforced stereotypy, participants were provided with high-preference and high-engagement leisure activities. Decreases in stereotypy were observed whether the
sensory stimulation was matched (i.e., produced the same sensory stimulation as the stereotypy) or unmatched (i.e., didn’t produce the same sensory stimulation as the stereotypy) (Ahearn, Clark, Debar, & Florentino, 2005). Additionally, various forms of automatically reinforced problem behavior have decreased when continuous non-contingent access to preferred items were provided (Rapp, 2006) and when clients were taught to obtain alternative appropriate automatic reinforcers in situations when aberrant behaviors were most likely to occur (i.e., when the client was alone) (Favell, McGimsey, & Schell, 1982). During continuous non-contingent access, more dramatic reductions in stereotypy occurred when the experimenter handed the preferred item to the participant versus placing the item near the participant (Britton, Carr, Landaburu, & Romick, 2002). Similarly, during environmental enrichment sessions, participants were more likely to have increased adaptive behavior if object manipulations were prompted and reinforced rather than when leisure materials were just available (Paredes, 2012; Horner, 1980).

Also, various forms of differential reinforcement have been effective in reducing stereotypy and other aberrant behaviors. Differential reinforcement of alternative behaviors (DRA) has been used to decrease self-injurious behaviors through functional communication training (Wacker et al., 1990). Differential reinforcement of other behavior (DRO) was also effective in decreasing chronic vocal tics (Wagaman, Miltenberger, & Williams, 1995) and self-injurious automatically-reinforced scratching (Cowdery, Iwata, & Pace, 1990).

Differential reinforcement of incompatible behaviors (DRI) was moderately successful in reducing thumb sucking (Skiba, Pettigrew, & Alden, 1971) and highly
successful in reducing cigarette pica (Donnelly & Olczak, 1990). The efficacy of
differential reinforcement depends on the ability of the alternative reinforcer to compete
with the automatic reinforcement from the stereotypy (Vollmer, 1994).

Even though there are numerous accounts of successful reductions in stereotypy
and other aberrant behavior with the use of the differential reinforcement there are also
many with mixed results (Favell et al., 1982). As a result, researchers have also evaluated
punishment-based procedures in the reduction of stereotypy. For example, when time-out
(e.g., 10-s removal of attention), overcorrection (e.g., 10, prompted hand claps above the
head) and DRO were compared, overcorrection was the most effective for all three
participants (Harris & Wolchik, 1979).

Response interruption and redirection (RIRD) is a punishment-based procedure
that interrupts stereotypy and redirects participants to engage in three high-probability
behaviors. When targeting vocal stereotypy, all four participants showed reductions in
stereotypy when RIRD was utilized (Ahearn, Clark, MacDonald, & Chung, 2007) and,
when reviewed, eight studies utilizing RIRD, all showed reductions in vocal stereotypy
(Cassella, Sidener, Sidener, & Progar, 2011).

To decrease stereotypy it may be necessary to combine differential reinforcement
with extinction, time-out, redirection, or response blocking (Athens et al., 2008;
Schumacher & Rapp, 2011; Vollmer, 1994). As the probability of reinforcement for
stereotypy is reduced, responding shifts toward appropriate behavior even though the
relative value of the automatic reinforcers may consistently outweigh the value of the
reinforcer used in differential reinforcement (Vollmer, 1994). For example, response
interruption and DRO together were more effective in reducing hand mouthing than either alone (Richmond & Bell, 1983). Similar results were found with multiple forms of stereotypy when DRO and DRI individually were compared to DRO, DRI, and response interruption combined (Fellner, Laroche, & Sulzer-Azaroff, 1984).

The purpose of the current study was to assess the effects of RIRD, time-out, and DRO on vocal and motor stereotypy. Previous research has only looked at stereotypy during leisure activities, but the current study also looked at stereotypy during academic instruction. And previous research has mainly looked at the effects of RIRD on vocal stereotypy, but the current study looked at the effects of RIRD on motor stereotypy as well as vocal stereotypy. To get the maximum impact on the reduction of the participant’s stereotypy, two academic tasks and two leisure activities were targeted. Lastly, data were collected on the changes of topographies in the stereotypy over the course of the experiment, to assess the modality of the sensory reinforcers.

Method

Participant

This study involved one male participant, Jack, age nine, who had been diagnosed with autism spectrum disorder and had been receiving ABA instruction since age two and a half. He was selected because he exhibited high, steady percentages of automatically reinforced stereotypy (see Appendix A for functional analysis description and data), which occurred in more than 30% of the 10-s intervals during 5-min functional-analysis sessions. The 30% criterion for intervention was frequently used in current research (Ahearn et al., 2007; Farber, 2010).
During the time of the intervention, Jack had an expressive vocabulary (tacting repertoire) and a receptive vocabulary (listener repertoire) of approximately 500 words, could follow 2-steps directions, and required minimal assistance with most daily living activities. His motor stereotypy included all of the following: covering his ears with his fingers and/or turning so his ear was on his shoulder, covering his face with his arm, placing his fingers in his nose or against his face, licking his fingers, placing his fingers in his mouth, sucking his thumb, biting the heal of his hand, balancing items on the backs of his hands and bouncing them, running the palm of one hand over the back of the other hand, leaning on the table, bouncing in his chair, leaning his body side to side, rotating his upper body in a circle motion, and placing his hand up his shirt or down his pants. The vocal stereotypy included blowing air out of his mouth and non-contextual vocalizations such as mmmmm, eeee, and meemee. Vocal and motor stereotypy occurred together and separately.

**Setting and Materials**

All sessions were conducted at Jack’s individual work area and at a group skills table within the Kalamazoo Autism Center (KAC). Included in this space were the following items: an activity table, two chairs, rolling storage cart, edible and tangible reinforcers, and procedure materials. The rolling carts contained the reinforcers, materials for current procedures, and materials for mastered procedures.
Dependent Variables

The dependent variable was vocal and motor stereotypy. Vocal stereotypy was defined as any instance of non-functional sounds, words or phrases. Motor stereotypy was defined as repetitive non-functional gross or fine-motor behaviors.

Independent Variable

The independent variables were response interruption and redirection (RIRD), time-out (TO), and differential reinforcement of other behavior (DRO) or combinations thereof. The RIRD sequence consisted of the presentation of brief, high-probability requests until three requests were completed in a row without stereotypy. The first request given during the RIRD sequence was either “sit better” or “quiet hands” followed by three additional requests. The high-probability requests included mastered vocal responses such as answering social identification questions and motor responses such as identifying body parts and following basic requests. For motor RIRD responses, physical prompts were avoided because they occasionally evoked problem behavior or resistance from Jack. TO was utilized in all the experiments in that the work task, the iPad® and LEGOS® were removed during the RIRD sequence and returned once the sequence was complete. All experiments included DRO such that a reinforcer was delivered after a predetermined time with no stereotypy. The reinforcer for DRO was either a lick of a lollipop or one to two NERDs®.

Research Design

To assess the effectiveness of a treatment package on vocal and motor stereotypy, RIRD, TO, and a changing criterion for DRO were implemented during academic tasks.
and leisure activities. During the initial leisure activity (i.e., iPad®) and the initial academic instruction task, a changing criteria designed was used on the time component of the DRO. With the second academic task (i.e., naming procedure) and the second leisure task (LEGOS®) an ABCBC design was implemented with A as baseline, B as DRO alone, and C as RIRD, TO, and DRO combined.

Measurement

All sessions were 5 min and videotaped; data were recorded from the videos at a later time. Partial interval recording was used to the extent that the percentage of 10-s intervals containing at least one instance of stereotypy was calculated for each session (See Appendix B for data sheet). Within a session, during each episode of RIRD, data on stereotypy were not collected and the session clock was paused which resulted in the overall session time lasting longer than 5 min. If the total session time went longer than 30 min the session was terminated.

Interobserver Agreement (IOA)

IOA, was collected on 30% percent of sessions across all experiments and phases within the individual experiments. Three measures of IOA were calculated for each scored session: overall agreement (overall agreements divided by the sum of agreements plus disagreements), occurrence (occurrence agreements divided by the sum of occurrence agreements plus occurrence disagreements), and nonoccurrence (nonoccurrence agreements divided by the sum of nonoccurrence agreements plus nonoccurrence disagreements). The range and means of the IOA percentages were calculated for each phase and reported with each experiment.
Treatment Integrity

During the two academic experiments, a minimum of 30% of sessions involving the RIRD procedure were analyzed for treatment integrity (see Tables 1 and 2). Treatment integrity was assessed through two measures: reliability of the use of the RIRD procedure and analysis of the accuracy of implementation of the RIRD procedure utilizing the RIRD checklist (see Appendix C). Reliability of RIRD was calculated by dividing the total number of RIRD procedures conducted by the total episodes of stereotypy for a session. The resulting percentage displayed the reliability of the RIRD procedures conducted. The RIRD procedure checklist consisted of four yes or no components: the initial redirection was performed within three seconds of the episode of stereotypy, the first request followed the redirected response within three seconds, at least one redirection, and three additional requests in the absence of stereotypy were used and no stereotypy was occurring at the end of the RIRD procedure. This checklist offered the experimenter and research assistants direct feedback on their performance during the RIRD protocol and set explicit standards for RIRD implementation. It also allowed the experimenter to continually update the operational definitions (see Appendix D) of stereotypy as new behaviors emerged. These measures add to the validity of the results of the experiment, by ensuring that the RIRD treatment procedures were performed consistently across experimenters and sessions.
Table 1

Treatment Integrity Scores for Experiment 1: Academic Work Task

<table>
<thead>
<tr>
<th>Experiment 4: Leisure Time (LEGOS®)</th>
<th>Reliability of the Use of RIRD</th>
<th>RIRD Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>87.5%-100%</td>
<td>78.57%-100%</td>
</tr>
<tr>
<td>Mean</td>
<td>97.51%</td>
<td>93.72%</td>
</tr>
</tbody>
</table>

Table 2

Treatment Integrity Scores for Experiment 3: Academic Work Task 2 (Naming)

<table>
<thead>
<tr>
<th>Experiment 3: Academic Work Task 2 (Naming)</th>
<th>Reliability of the Use of RIRD</th>
<th>RIRD Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>16.67%-100%</td>
<td>75%-100%</td>
</tr>
<tr>
<td>Mean</td>
<td>91.67%</td>
<td>94.13%</td>
</tr>
</tbody>
</table>

Note: The low percentage was due to a new form of stereotypy that was not yet added to the response definitions and thus RIRD did not follow that behavior.

Experiment 1: Academic Work Task

Baseline. During baseline, academic instruction such as labeling the sounds of common objects, complex direction following, and labeling prepositions were all presented. An undergraduate research assistant conducted all sessions during baseline. Jack was seated at his table when academic instruction was presented. If stereotypy occurred in between academic instruction, he was asked to engage in “quiet hands” or asked to “get ready” (i.e., place both of his hands on the table). Outside of experimental sessions, “quiet hands” and “get ready” were frequently used to interrupt stereotypy and increase behaviors related to attending (i.e., sitting up, hands on the table, and eye
contact). Physical prompts were avoided; and once Jack complied, social praise and requests were provided. If stereotypy occurred after an academic instruction, the instruction would be repeated until he complied. For correct prompted and unprompted responses, tokens were delivered and placed on his token board with the option of a choice of reinforcers after 10 tokens were earned. Reinforcers included items such as: 15 seconds of access to his iPad®, 15 seconds of movie watching, and options of his preferred foods or drinks.

During this baseline phase, stereotypy typically occurred in primarily 70% to 90% of the 10-s intervals (see Figure 1).

**Intervention**

**Phase 1: Vocal and Motor RIRD.** During this phase, academic instruction was similar to baseline. A token economy was in place for correct responding and no physical prompts were provided. The undergraduate research assistant conducted all sessions.

During the RIRD sequence, high-probability requests were presented at a fast pace and the research assistant avoided eye contact with Jack to reduce any social reinforcers that eye contact might produce. Social praise, tokens, and/or edibles were provided at the completion of the RIRD sequence, because it was necessary to reinforce compliance to the RIRD sequence to ensure Jack would engage in the responses.

In Phase 1, both motor and vocal RIRD were presented contingent on stereotypy. Additionally, if stereotypy occurred after Jack had received all of his tokens and was able to earn the back-up reinforcer, the RIRD procedure was implemented before the delivery of the that back-up reinforcer. Also, when stereotypy occurred after an instruction was
Figure 1. Percentage of 10-s Intervals Containing Stereotypy for Experiment 1: Academic Work Task, Baseline through Phase 5.

presented, the RIRD sequence was conducted and then followed by a return to the original instruction.

In spite of the addition of the motor and vocal RIRD, stereotypy remained variable and high (see Figure 1).

**Phase 2: Motor RIRD and Differential Reinforcement (5 s).** Due to curriculum changes, the academic instruction now included labeling colors, shapes, and the function of items; identifying and labeling letters, and one-to-one correspondence counting. To ensure procedural integrity the experimenter conducted all sessions.

The RIRD sequence was altered to include only high-probability motor requests. Before session 17 within this phase, the RIRD sequence started immediately after the
stereotypy was observed even if Jack had not yet responded to the presented instruction. But after the 17th session, he was required to emit a response to the academic instruction before the RIRD sequence. This change was made to reduce the possibility of the RIRD sequence producing an escape contingency.

DRO was also introduced during this phase, starting at 5 s, such that every 5 s that passed without stereotypy a preferred edible (i.e., lick of a lollipop) was delivered. The token economy was removed after session 11 because the lollipop lick was sufficient to maintain lower stereotypy and to reinforce prompted and unprompted correct responses.

Within 17 sessions, this combination of motor RIRD and DRO 5 s reduced stereotypy from a mean of 73% of the 10-s intervals during baseline to less than 30% of intervals (see Figure 1).

**Phase 3: Motor RIRD and DRO (10 s).** During this phase the DRO was increased to 10 s, so that now every 10 s that passed without stereotypy a preferred edible was provided. To ensure that the stereotypy stayed low, the academic instruction was reduced in difficulty to include only labeling mastered items. Throughout this phase, stereotypy generally remained below 30% (see Figure 1).

**Phase 4: Motor RIRD and DRO (10 s).** During Phase 4, the intervention remained the same except that the academic instruction was altered to include previously mastered tasks that were not maintained. This instruction included the reacquisition of labeling actions and identifying pictures in books.

Stereotypy stabilized at less than 30% within 22 sessions. Only 9 of the 29 total sessions were above 30% (see Figure 1).
Phase 5: Motor RIRD and DRO (15 s). During Phase 5, the DRO increased to 15 s and all other components of the experiment remained the same. When the DRO was increased to 15 s over half of the 23 sessions had percentages of stereotypy above 30% (see Figure 1).

Phase 6-9: Motor RIRD and DRO (5 s-30 s). In Phase 6, the DRO was reduced to 5 s due to an increase in stereotypy during the 15-s DRO. The DRO stayed at 5 s for four sessions, and then 10 s for nine sessions, and 15 s for six sessions, with stereotypy generally remaining below 30%. However, when the DRO was increased to 30 s, stereotypy immediately increased to 40% to 47% of intervals (see Figure 2).

Figure 2 Percentage of 10-s Intervals Containing Stereotypy for Experiment 1: Academic Work Task, Phase 6 through Phase 13.
**Phase 10: Motor RIRD and DRO (5 s).** During this phase, the DRO was decreased to 5 s, due to increased stereotypy during the 30-s DRO. This was done, even though Jack had previously had a low rate of stereotypy at 15 s, as a conservative measure to ensure that his stereotypy again reached that low level. Due to changes in Jack’s schedule and breaks from KAC, reductions in stereotypy took longer then the previous DRO, 5-s phase. But after five sessions, percentages stabilized at less than 30% of 10-s intervals (see Figure 2).

**Phase 11: Motor RIRD and DRO (10 s).** The DRO was once again increased to 10 s and stereotypy did not increase above 33% (see Figure 2).

**Phase 12: Motor RIRD and DRO (15 s).** With an additional return to DRO 15 s, stereotypy never increased above 33% (see Figure 2).

**Phase 13: Motor RIRD and DRO (11 R+).** In Phase 9 (DRO 30 s) of this experiment, stereotypy increased to 45% so durations of DRO were decreased and then once again increased to 15-s. In the iPad® experiment, data were shown on the possible effects that the number of delivered reinforcers has on the percentage of stereotypy (see Table 3). Considering, 11 reinforcers delivered during iPad® sessions produced the lowest percentages of stereotypy and the difficulty in maintaining low stereotypy during academic works tasks with 15-s and 30-s DROs, a modified DRO was put into place. Within an academic-work task, 11 reinforcers were scheduled to be delivered at predetermined durations (10 s, 20 s, 30 s, 45 s) equaling 5 min. The first session of the modified DRO within this experiment included 11 reinforcers and stereotypy remained under 30% of 10-s intervals (see Figure 2). The number of reinforcers will continued to
be decreased until stereotypy is maintained at the 30% criterion with the least amount of reinforcers delivered.

**Interobserver Agreement.** Overall IOA, ranged from 57% to 100% with means ranging from 82% to 100%. For occurrence IOA, scores ranged from 16.7% to 100% with means ranging from 55.6% to 100%. Lastly for nonoccurrence IOA, scores ranged from 17% to 100% with means ranging from 74.6% to 100% (see Appendix F for data chart).

**Experiment 2: Leisure Time Activity (iPad®)**

**Baseline.** During baseline, Jack received an iPad® for 5 min while he was seated at his desk. No programmed consequences for stereotypy were provided.

Stereotypy during baseline was primarily between 75% and 90% of the 10-s intervals. There was one session when the stereotypy was at 10%, perhaps because he was highly engaged in a game on the iPad® (see Figure 3).
**Intervention**

**Phase 1: Vocal RIRD, Time-out (TO), and DRO (2 s).** During Phase 1, Jack had his iPad® while seated at his desk. For every 2 s without stereotypy, he was provided with a brief lick of a lollipop. Contingent on stereotypy, the iPad® was removed (i.e., TO) and the RIRD sequence with vocal high-probability requests was conducted. If he did not comply with the high-probability task, the instruction was repeated until he did. Vocal prompts were provided if necessary. Once the three high-probability requests without stereotypy was emitted, the iPad® was returned.

*Figure 3.* Percentage of 10-s Intervals Containing Stereotypy for Experiment 2: Leisure Time Activity (iPad®), Baseline through Phase 15.
Stereotypy was variable and ranged between 10% and 60% of 10-s intervals. While these reductions were notable they were not down to the goal level of less than 30% of intervals (see Figure 3).

**Phases 2-14: Motor RIRD, Time-out (TO), and DRO (5 s-3 min).** Because of the success with the motor RIRD in the first academic-instruction experiment, in this iPad® experiment, the experimenter replaced the vocal RIRD with a motor RIRD of high-probability behaviors such as clap hands, wave, arms up, and identifying body parts. The DRO began at 2 s and was gradually increased to 3 min (see Figure 3).

Compared to the academic-task experiments, stereotypy occurred less frequently in the iPad® experiment, perhaps for the following reason: In order to do the RIRD sequence, the iPad® had to be removed, resulting in an added TO contingency. The removal of the iPad® as the TO contingency was probably more aversive than the removal of an academic work task as in the academic task experiments.

And, as the DRO duration increased, stereotypy remained below 30% of the intervals for most of the sessions until Phase 14 (DRO 3 min) at which point stereotypy increased to 40% to 45% of the 10-s intervals. This was still considerably below baseline, but not below our 30% criterion.

The increase in stereotypy may be because the DRO 3 min resulted in many of the 5-min sessions occurring without any reinforcement (see Table 3). In other words, with the 3-min DRO, the RIRD and TO alone kept Jack’s stereotypy below baseline, but
Table 3

Number of Reinforcers Delivered

<table>
<thead>
<tr>
<th>Date</th>
<th>Phases within iPad® Experiment</th>
<th>Number of Reinforcers For the One Session Selected</th>
<th>Mean % of 10-s Intervals Containing Stereotypy for the Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/11/13</td>
<td>Vocal RIRD, TO, DRO 2 s</td>
<td>52</td>
<td>34%</td>
</tr>
<tr>
<td>6/12/13</td>
<td>Motor RIRD, TO, DRO 2 s</td>
<td>44</td>
<td>21%</td>
</tr>
<tr>
<td>7/19/13</td>
<td>Motor RIRD, TO, DRO 5 s</td>
<td>27</td>
<td>22%</td>
</tr>
<tr>
<td>8/9/13</td>
<td>Motor RIRD, TO, DRO 10 s</td>
<td>19</td>
<td>21%</td>
</tr>
<tr>
<td>9/23/13</td>
<td>Motor RIRD, TO, DRO 15 s</td>
<td>11</td>
<td>18%</td>
</tr>
<tr>
<td>10/2/13</td>
<td>Motor RIRD, TO, DRO 20 s</td>
<td>10</td>
<td>11%</td>
</tr>
<tr>
<td>10/25/13</td>
<td>Motor RIRD, TO, DRO 30 s</td>
<td>8</td>
<td>13.65%</td>
</tr>
<tr>
<td>1/13/14</td>
<td>Motor RIRD, TO, DRO 45 s</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>2/12/14</td>
<td>Motor RIRD, TO, DRO 1 min</td>
<td>1</td>
<td>19%</td>
</tr>
<tr>
<td>3/13/14</td>
<td>Motor RIRD, TO, DRO 1 min 15 s</td>
<td>2</td>
<td>21%</td>
</tr>
<tr>
<td>3/28/14</td>
<td>Motor RIRD, TO, DRO 1 min 30 s</td>
<td>3</td>
<td>14%</td>
</tr>
<tr>
<td>4/14/14</td>
<td>Motor RIRD, TO, DRO 2 min,</td>
<td>1</td>
<td>15%</td>
</tr>
<tr>
<td>4/24/14</td>
<td></td>
<td>0</td>
<td>28%</td>
</tr>
<tr>
<td>5/15/14 - 6/9/14</td>
<td>Motor RIRD, TO, DRO 3 min, Sessions 1-6</td>
<td>0</td>
<td>35%</td>
</tr>
<tr>
<td>6/13/14</td>
<td>Motor RIRD, TO, DRO 30s</td>
<td>6</td>
<td>22%</td>
</tr>
</tbody>
</table>

Note: One video was randomly selected from each phase.

without some contact with the edible reinforcer in the DRO contingency, his stereotypy increased.

Therefore, to regain the consistent low percentages of stereotypy, the DRO was reduced back to 30 s; and stereotypy again decreased to below 30% within the first three sessions (see Figure 3). Then we did a more detailed analysis of Jack’s stereotypy to prepare a slight modification of the treatment package to ensure that Jack received at enough reinforcers to maintain low percentages of stereotypy as part of the modified DRO contingency.
**Phase 15: Modified DRO.** In this modified DRO, reinforcers were provided based on a time component and a predetermined number of reinforcers per session. Initially, sessions contained 11 reinforcers that were provided after predetermined durations of 10 s, 20 s, 30 s, or 45 s. As a result of low percentages of stereotypy during the 11-reinforcer phase, a 9-reinforcer phase was introduced (see Figure 4). The number of reinforcers will continue to be decreased until stereotypy is maintained at the 30% criterion with the least amount of reinforcers delivered.

**Topography of Responding.** When the topography of the responses was evaluated it was observed that the topographies were primarily plugging his ears with his fingers and covering his ears with his shoulder (see Figure 5). These two behaviors were more discreet than hand flapping, loud vocalizations, and bouncing in his seat and they did not appear to interfere with Jack’s engagement in academic tasks but they did still cause him to look socially awkward. In an effort to develop even more discreet forms of stereotypy, since September 2013, specific topographies such as flicking fingers, clicking nails, and pushing fingers together, were free to occur without contingent RIRD and TO. However, this did not seem to increase, these discreet behaviors (see Figure 6).
Figure 4. Percentage of 10-s Intervals Containing Stereotypy for Experiment 2: Leisure Time Activity (iPad®) with the Addition of the Modified DRO, Phases 11 through 17.

Figure 5. Mean Frequency of Individual Topographies of Stereotypy per Session.
Generality of Instruction. Intervention on Jack’s stereotypy has been occurring for three years and has produced reductions within intervention sessions but not across his typical day. During the iPad® experiment the generality of the impact of the intervention was assessed by scoring percentages of stereotypy in the absence of intervention immediately before an intervention session and immediately following a session. During these before and after-intervention sessions, Jack was given his iPad® for 5 min, and no intervention on stereotypy was provided. Data were collected on percentages of stereotypy using a partial interval recording method just as intervention session data was collected. In the first scenario (see Figure 7), the experimenter sat near
Jack but turned her attention away from him with minimal interactions unless he requested a break or attempted to leave the work area. If this occurred, the experimenter would request that Jack sit down or state that a break wasn’t available. Both the before and after-session data suggested that the intervention had minimal effect on stereotypy outside of intervention sessions. Stereotypy was equally as high immediately before a session as compared to immediately following a session even with intervention sessions containing percentages as low 23% of 10-s intervals.

The second scenario (see Figure 8) included the experimenter facing Jack with intervention materials in hand (i.e., timer and reinforcers). These sessions and resulted in
more variable percentages even though stereotypy during intervention remained between 10% and 30% of 10-s intervals. The before-session percentages ranged from 23% to 83% and the after-session scores ranged from 10% to 97%. From the first scenario it was observed that intervention had minimal effect on stereotypy (before-session means 93%, after-sessions means 93%) whereas the second scenario had variable effects on the percentages of stereotypy (before-session means 64%, after-session means 50%) (see Figure 8).

**Interobserver Agreement.** Overall IOA, ranged from 57% to 100% with means ranging from 75.2% to 97%. For occurrence IOA, scores ranged from 20% to 100% with
means ranging from 46.2% to 100%. Lastly for nonoccurrence IOA, scores ranged from 50% to 100% with means ranging from 68.8% to 100% (see Appendix F for data chart).

**Experiment 3: Academic Work Task 2 (Naming)**

For this experiment, Jack was presented with a naming-acquisition procedure. Naming is said to exist when reinforcement of a listener behavior is accompanied by the emergence of a speaker behavior and vice-versa (Horne & Lowe, 1996; Miguel, Petursdottir, Carr, & Michael, 2008). For example, if a child is taught and provided with reinforcement to pick up their shoes, they can without additional teaching or reinforcement label their shoes. The naming acquisition procedure inspired by Greer & Ross (2008) involved three target behaviors: tacting (labeling), matching, and identification of pictures (listener behavior). For tacting trials, one of three pictured cards was held up in front of Jack and he would vocally label the card. For matching trials, three different pictured cards were placed on the table and one identical card was held up. Jack was then asked to point to the identical card on the table. Lastly, identification of pictures also required three pictured cards on the table. However, only a vocal instruction, the name of the picture, was used for the Jack to identify (i.e., touch) the correct card. Within a naming session, the three targeted behaviors were presented six times for three different picture cards resulting in 54 total trials. Social praise was delivered for correct responding to the three naming acquisition tasks. If Jack made an incorrect response, the instruction was represented and a vocal prompt or a gestural prompt was provided for the correct response. For this experiment, the experimenter and the undergraduate research assistants conducted the interventions.
Baseline. The naming procedure was conducted as described above. There were no programmed consequences for stereotypy unless the stereotypy interfered with the completion of a naming procedure trial. At which point the instruction for “quiet hands” or “get ready” with a model was presented. Stereotypy was variable until the 10th session where it stabilized at 60% to 70% of 10-s intervals (see Figure 9).

Intervention

Phase 1: DRO (5 s). In Phase 1 of this experiment, the DRO was assessed on its own, without the RIRD procedure. Lollipops and NERDs® were delivered for all intervals without stereotypy for the given DRO duration. After 27 sessions there was no reduction in stereotypy and significant variability with ranges from 40% to 100% of 10-s intervals. Within the 5-min sessions, he rarely reached 5 s without engaging in stereotypy thus he was not provided with the preferred edible. The mean percentage of stereotypy during this phase was 73% (see Figure 9).

Phase 2: RIRD and DRO (5 s). During DRO plus RIRD phases, engaging in stereotypy would result in the implementation of the RIRD procedure. The DRO remained in place at 5 s.

The mean percentage of 10-s intervals containing stereotypy during RIRD and DRO 5 s was 36%, which was down from Phase 2 at, 73%. The range of scores was from 7% to 85% with the last 10 sessions having no percentage above 40%. It was due to this notable reduction in stereotypy that the return to DRO 5 s alone was made even without reaching the goal of less than 30% of 10-s intervals containing stereotypy (see Figure 9).
**Phase 3: DRO (5 s).** With the return to DRO 5 s alone, stereotypy quickly resumed to previous high levels and stabilized within nine sessions (see Figure 9).

![Figure 9](image_url)

*Figure 9.* Percentage of 10-s Intervals Containing Stereotypy During Academic Instruction (Naming).

**Phase 4: RIRD and DRO (5 s).** Phase 4 resulted in a return to DRO 5 s with RIRD. Stereotypy immediately dropped to below 30%, with no percentages above 30% (see Figure 9).

**Phase 5: DRO (5 s).** With the return to DRO 5 s alone, again stereotypy quickly resumed to previous high levels and stabilized within five sessions (see Figure 9).
Phase 6: RIRD and DRO (5 s). Phase 6 resulted in a return to DRO 5 s without RIRD. Stereotypy immediately reduced with percentages between 20% to 40% (see Figure 9).

Academic Instruction (Naming) Procedure Results. While the acquisition of targets was secondary to reductions in stereotypy, acquisition rates within experimental sessions were compared to acquisition rates outside of the experimental sessions. Over the course of the experiment Jack acquired 10 of 13 targets. The intervention took place for six months resulting in approximately one to two targets per month. These acquisition rates compare to the acquisition rates during academic instruction outside of experimental sessions. So, while RIRD is time consuming and laborious, it does not appear to interfere with acquisition of academic targets (see Table 4). Additionally, as the intervention progressed and stereotypy was occurring less, anecdotally, it was observed that an increased numbers of academic trials were presented and responded to within a 5-min session.

Interobserver Agreement

Overall IOA, ranged from 76.66% to 100% with means ranging from 88.6% to 100%. For occurrence IOA, scores ranged from 41.66% to 100% with means ranging from 76% to 100%. Lastly for nonoccurrence IOA, scores ranged from 0% to 100% with means ranging from 66.35% to 100% (see Appendix F for data chart).
Table 4

*Mastery Dates for Naming, Two-Dimensional Academic Targets*

<table>
<thead>
<tr>
<th>Target</th>
<th>Date Introduced</th>
<th>Date Mastered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playhome</td>
<td>2/3/14</td>
<td>6/27/14</td>
</tr>
<tr>
<td>Sidewalker</td>
<td>2/3/14</td>
<td>Discontinued</td>
</tr>
<tr>
<td>Rio</td>
<td>3/31/14</td>
<td>7/9/14</td>
</tr>
<tr>
<td>Beach</td>
<td>4/1/14</td>
<td>7/9/14</td>
</tr>
<tr>
<td>Playground (Park)</td>
<td>4/14/14</td>
<td>7/9/14</td>
</tr>
<tr>
<td>Helmet</td>
<td>4/21/14</td>
<td>5/19/14</td>
</tr>
<tr>
<td>Sunscreen</td>
<td>6/2/14</td>
<td>6/27/14</td>
</tr>
<tr>
<td>Sand</td>
<td>6/2/14</td>
<td>6/27/14</td>
</tr>
<tr>
<td>Blue</td>
<td>7/10/14</td>
<td>7/16/14</td>
</tr>
<tr>
<td>Orange</td>
<td>7/10/14</td>
<td>7/16/14</td>
</tr>
<tr>
<td>Purple</td>
<td>7/17/14</td>
<td>In Progress</td>
</tr>
<tr>
<td>Yellow</td>
<td>7/17/14</td>
<td>7/17/14</td>
</tr>
<tr>
<td>Black</td>
<td>7/18/14</td>
<td>In Progress</td>
</tr>
</tbody>
</table>
Experiment 4: Leisure Time (LEGOS®) Activity 2

A LEGOS® training procedure designed for this experiment was introduced. This procedure was designed to teach Jack to build a fire truck out of LEGOS®. The first phase consisted on teaching generic LEGOS® movements, such as connecting different sized pieces. The second phase included following directions to build the first tier of the fire truck. Each subsequent phase included an additional tier, starting with prompted phases and unprompted phases for each tier (see Figure 11). The phase numbers and phase changes for the LEGOS® procedure were independent from the phases for the stereotypy intervention.

**Baseline.** Sessions lasted for 5 min and no programmed consequences were provided contingent on stereotypy. Preferred edible reinforcers were provided for prompted and independent correct responses. Jack did very well with the LEGOS® procedure and quickly moved through the first phase of the procedure (see Figure 11). Stereotypy during baseline was primarily between 73% and 100% of the 10-s intervals with a mean of 77% (see Figure 10).

**Intervention**

**Phase 1: DRO (5 s).** In Phase 1 of this experiment, the DRO was assessed without RIRD and TO interventions. Lollipops or Nerds™ were provided when 5 s passed without any stereotypy.

After 14 sessions, there was still no decrease in stereotypy; and in contrast, a steady increase in the percentage of stereotypy occurred. The mean percentage was 61%,
Figure 10: Percentage of 10-s Intervals Containing Stereotypy During Experiment 4: Leisure Time (LEGOS®) Activity 2.

Figure 11: Percentage of Correct Trials during the LEGOS® Procedure.
with ranges from 30% to 100% of 10-s intervals (see Figure 10). While stereotypy gradually increased to 100% in the last two sessions of this phase, the percentages were initially moderate and variable. After reviewing the videos of those sessions, it was observed that, in the first four sessions, Jack was provided with 2-19 reinforcers per session; starting with the fifth session, Jack began to hold the lollipop in his mouth and would not release it for up to 20-30 s (see Table 5). During that time he usually did not engage in stereotypy and would continue to respond to some instruction to complete the fire truck. Holding on to the lollipop may have resulted in more time with the lollipop but it also reduced the overall number of times the lollipop was delivered. On the eighth session, Jack stopped holding on to the lollipop and eight reinforcers were delivered. Because of the high frequency of stereotypy, the remaining two sessions resulted in 0-1 reinforcers per session. This gradual increase in stereotypy may have been the result of the decreased number of reinforcers delivered per session. Reductions in stereotypy during the DRO alone phases rely on Jack coming into contact with the edible reinforcer or the high reinforcing value of the activity at hand. Otherwise, the reinforcing value of the automatic reinforcers from the stereotypy can maintain or increase stereotypy.

**Phase 2: RIRD and DRO (5 s).** Instruction on building the fire truck continued and Jack progressed quickly through the phases (see Figure 11). For this phase, RIRD and TO was added to the DRO 5 s intervention. With the addition of RIRD and TO, 4 out of 6 sessions resulted in percentages of stereotypy under 30% of intervals (see Figure 10).
Table 5

DRO Results

<table>
<thead>
<tr>
<th>Session Date</th>
<th>Number of Reinforcers First Reinforcer Delivery</th>
<th>First Stereotypy</th>
<th>Stereotypy</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/17/14</td>
<td>15 lollipop First: 13 s</td>
<td>:00-09</td>
<td>14/27=52</td>
<td>Quiet Room Moving feet</td>
</tr>
<tr>
<td>2/27/14</td>
<td>16 Lollipop First :36 s</td>
<td>:00-09</td>
<td>12/27=44</td>
<td>Moderately loud room Moving Feet</td>
</tr>
<tr>
<td>3/13/14</td>
<td>2 lollipop First :08 s</td>
<td>:20-29</td>
<td>28/30=93</td>
<td>Mod. to loud room Sitting still Fingers in ears Cover ear w/ shoulder Playing with spit Noncompliant Good eye contact Looking around room</td>
</tr>
<tr>
<td>3/17/14</td>
<td>19 lollipop First :10-s</td>
<td>:00-09</td>
<td>11/30=37</td>
<td>Quiet Room Moving feet</td>
</tr>
<tr>
<td>3/21/14</td>
<td>10 lollipop First : 22 s</td>
<td>:00-09</td>
<td>14/30=47</td>
<td>Mod. to loud room Holding onto lollipop Looking around room Playing with ear</td>
</tr>
<tr>
<td>3/21/14</td>
<td>9 lollipop First :09 s</td>
<td>:20-29</td>
<td>12/30=40</td>
<td>Quiet Room Holding onto lollipop Finger in ear Flapping hands Bouncing in chair Out of chair Holding onto lollipop Bouncing in chair Vocal stereotypy Covering face w/ hand Silly behavior</td>
</tr>
<tr>
<td>3/24/14</td>
<td>8 lollipop First :50 s</td>
<td>:00-09</td>
<td>9/30=30</td>
<td>Moderate to loud room Didn’t hold lollipop Fingers in ears Ear on shoulder Compliant Good eye contact</td>
</tr>
<tr>
<td>3/27/14</td>
<td>8 lollipop first :1 min:35-s</td>
<td>:00-09</td>
<td>21/30=70</td>
<td>Quiet room Finger in ear Ear on shoulder Looking around room Compliant</td>
</tr>
<tr>
<td>3/28/14</td>
<td>1 NERD® First : 2 min :35-s</td>
<td>:00-09</td>
<td>29/30=97</td>
<td>Quiet room Closing eyes Finger in ear Ear on shoulder Looking around room Compliant</td>
</tr>
<tr>
<td>3/31/14</td>
<td>0 lollipop First : n/a</td>
<td>:00-09</td>
<td>30/30=100</td>
<td>Quiet room Closing eyes Finger in ear Ear on shoulder Looking around room Compliant</td>
</tr>
</tbody>
</table>

*Note. Analysis of DRO results during Phase 2.*
Phase 3: DRO (5 s). Again Jack continued to quickly master phases of the LEGOS® procedure (see Figure 11). The intervention on stereotypy returned to DRO 5 s alone and stereotypy immediately increased to 100% of 10-s intervals (see Figure 10). Without the response interruption and/or redirection, stereotypy was free to occur and Jack did not come in contact with the reinforcers associated with the absence of stereotypy.

Phase 4: RIRD and DRO (5 s). RIRD was reintroduced and stereotypy initially dropped to 20% to 23%. Some variability occurred with percentages ranging from 3% to 60% and a mean of 30% (see Figure 11).

Phase 5: DRO (5 s). Once again, DRO without RIRD and TO was implemented. During two of the first four sessions, stereotypy was high, similar to Phase 3 (DRO 5 s). However, the stereotypy decreased so much that, in 6 of the 11 sessions, it was below the target goal of 30% (see Figure 11). This correlated with Jack’s starting to use both hands to play with the LEGOS®, perhaps as a result of the increasing reinforcing value of that play. And with both hands occupied, the possibility of stereotypy with his hands was eliminated, leaving only placing his head and ear on his shoulder as his major form of stereotypy. But that may have been too effortful and uncomfortable for him to maintain for long periods of time during these sessions. Additionally, during this phase, due to unavailability of space, sessions were moved from a table in the middle of the room to Jack’s table in the back corner of KAC. This area was much quieter than the original table used for LEGOS®, and if there was an escape function this move may have
contributed to Jack’s reduction of plugging of his ears and shrugging his shoulders to cover his ears at that time.

Interestingly, as the intervention progressed and stereotypy was occurring less, anecdotally, it was observed that an increased number of LEGO® trials were presented and responded to within a 5-min session. It was also reported that LEGO® play at home had increased. So, as a result of the intervention, it may be possible that decreased stereotypy resulted in more learning occurring and reinforcement for playing with LEGOS® increased choosing LEGOS® as a leisure activity at home.

**Interobserver Agreement**

Overall IOA, ranged from 37% to 100% with means ranging from 82.6% to 100%. For occurrence IOA, scores ranged from 17% to 100% with means ranging from 78% to 100%. Lastly for nonoccurrence IOA, scores ranged from 26% to 100% with means ranging from 45.6% to 100% (see Appendix F for data chart).

**Discussion**

In this intervention, a treatment package, including a reinforcement contingency and multiple punishment contingencies, was utilized. The treatment package included: (a) differential reinforcement of other behavior (DRO), (b) response interruption combined with redirection (RIRD), and (c) time-out (TO). This treatment package set up multiple concurrent contingencies with the option of engaging in the targeted stereotypies, other forms of stereotypy, an alternate appropriate response, or a non-targeted appropriate response.
The allocation of responding depended on how likely the new appropriate behavior was to be reinforced, the likelihood that the stereotypy would be followed by an effective aversive condition, and the value of the automatic reinforcer maintaining the stereotypy. With this treatment package, the most sizable reductions in stereotypy occurred when the new appropriate behavior had a high probability of receiving contingent, effective reinforcers and when the stereotypy had a high probability of receiving a contingent aversive condition.

It was found that each of the three contingencies in the treatment package had an impact on the reduction of stereotypy but the entire treatment package was necessary to produce the best results.

With regard to DRO, phases without DRO had higher percentages of stereotypy than phases with DRO. This was demonstrated in the first academic-work experiment and the iPad® experiment. Additionally, in the naming experiment, it was demonstrated that DRO alone was not sufficient to maintain low percentages of stereotypy.¹

In a previous experiment, response interruption was also evaluated alone and did not produce the desired reductions in stereotypy (see Appendix E for response interruption data). Therefore, in the present study, RIRD was included in all the treatment packages. However, even with the addition of RIRD, the other components of the treatment package were necessary. As noted in the iPad® experiment, durations of the DRO up through 1 min 30 s had positive effects on the percentages of stereotypy. At lower DRO durations, each instance of stereotypy postponed the delivery of a reinforcer

¹ Rather than considering DRO to be a reinforcement procedure, it may be analyzed more appropriately as punishment by prevention of a reinforcer; in other words, each time the behavior occurred, the delivery of the reinforce was postponed (punishment) (Malott, 2014).
but opportunities for reinforcement still remained. Whereas with higher durations of the DRO, each instance of stereotypy postponed the reinforcer, resulting in minimal opportunities or no opportunities available for reinforcement. Therefore, when the DRO durations were increased to 2 min and then later 3 min, a gradual increase in stereotypy was observed. While these percentages were considerably lower than baseline, they were higher than previous phases where each instance of stereotypy did not considerably decrease the chances of receiving future reinforcers.² So, it may be the case that RIRD alone would be not be effective in maintaining low percentages of stereotypy across all the experiments.

As the RIRD procedure was performed by removing the item that Jack was engaged with, it was not feasible to report the effects of RIRD alone. The treatment package, TO from the iPad® combined with RIRD and DRO, was more effective than TO alone (see Appendix E). Furthermore, this treatment package was more effective than the same treatment package of TO from work.

Throughout the experiments, frequent procedural changes had to be made that may have interfered with a clear demonstration of experimental control. But, these procedural changes have produced reductions in stereotypy and provided further directions for this line of research.

During Phase 2 of the initial academic-work task, the addition of a 5-s DRO and a change to a motor RIRD were made in the same phase. As a result it cannot be determined the individual role of the DRO or the change from vocal and motor RIRD to

² Incidentally, with RIRD, the reduced number of stereotypic behavior was probably not the result of extinction of that behavior, because the response blocking, prevented that behavior from occurring and thus did not allow for extinction to occur.
motor RIRD in the reduced stereotypy. However, it was decided that it was more important to do everything possible to reduce Jack’s stereotypy quickly rather than to isolate the relative importance of each component of this treatment package.

During implementation of RIRD, the sequence was altered to include a formal redirection (e.g., “quiet hands”) and then the three high-probability behaviors. “Quiet hands” was a deviation from previous research using RIRD to reduce stereotypy. This change was implemented to gain compliance before the implementation of the 3-high probability behaviors. Anecdotally, it was observed that an RIRD sequence was shorter in duration if a “quiet hands” was required first. Future research could examine if a formal redirection is necessary.

Preliminary analysis of the raw data suggested that stereotypy occurred more often in the beginning of a 5-min session, occurred least in the middle of the session, and toward the end of the session gradual increases were observed. When using DRO and RIRD, it would be interesting to know if interventions could be faded out within and across sessions based on within session trends of stereotypy.

When implementing the RIRD procedure, it may be important to select the motor responses used in the redirection component based on the automatic reinforcers associated with the stereotypic movements. In the initial research on RIRD, appropriate and functional vocal responses were chosen and it was reported that appropriate vocalization increased (Ahearn et al., 2007). It is possible that less noticeable forms of stereotypy could be increased through the RIRD procedure. Future research could look at requiring motor responses during the RIRD procedure that might aid in the replacement
of more obvious forms of stereotypy.

RIRD can create emotional responding and compliance concerns. In this study, it was found that, at a minimum, social praise was necessary to maintain compliance with the RIRD requests. It would be important to evaluate the role that tangible and social reinforcers play in the compliance of RIRD requests and the overall effectiveness of RIRD on reductions in stereotypy.

Sessions were conducted three to five times per week for approximately an hour at a time. However, sessions did not occur every day for the entirety of Jack’s time at KAC. This treatment package was labor intensive and was hard to implement in a one-on-one teaching scenario. During the experiments, there were often two to three individuals helping with the implementation of the treatment package. Considering both the difficulty of implementation and the emotional responding that was occasionally evoked by the treatment package, it seems important to evaluate the side effects of continually implementing RIRD across the day and week.

Also, from a practitioner’s perspective, these procedures are difficult to conduct; and it may not be reasonable to expect a novice to implement them correctly. There were subtle day-specific changes that were implemented to get the best results. For example, the experimenter had a previously established rapport with the Jack. So, she was sometimes able to produce better results than the research assistants by altering the pace of instruction, making subtle changes to the intervention (i.e., providing an extra “quiet hands” at the end of the RIRD procedure on “rough” days) and changing the tone of her voice (i.e., softer on “rough” days). Additionally, she was sometimes more successful at
getting compliance with the RIRD procedure than the research assistants.

In addition, after two years with this intervention, informal observation showed that high percentages of stereotypy still persisted outside the experimental sessions. Also with the iPad® and the initial academic-work task the DRO schedules were not successfully increased to above 15s for academic work and 1 min 30 s for playing with iPad®. As a result it is suggested a habit reversal treatment package including awareness training and competing response training might be implemented. While there are multiple components to habit reversal (Azrin & Nunn, 1973; Woods, Miltenberger, & Lumley, 1996), awareness training and competing response training seem the most appropriate for Jack’s current repertoire. These changes would require Jack to engage in tacting his own behavior as it is occurring or possibly before it is about to occur and to engage in a competing response contingent on stereotypy. In the current research, Jack was not given any rules regarding the contingencies, as it seemed unlikely that such rules would control his behavior, without considerable training in rule governance. Therefore any changes in stereotypy were solely the result of direct-acting contingencies.

In conclusion, while there is still much work to be done to reduce Jack’s stereotypy, this intervention did produce positive results. It was observed that the treatment package produced the most favorable results with the leisure tasks as compared to the work tasks. If Jack’s stereotypy is serving an escape function, at least in part, then having a higher rate of DRO reinforcement during harder tasks might help keep stereotypy at a lower rate. It was also noted that within the LEGOS® experiment, the DRO alone produced similar results to the entire treatment package. So, when the
reinforcing value of the activity at hand is high, DRO is more effective on its own then when the activity is less preferred. Whereas with the academic-work tasks, the entire treatment-package phases were more effective then phases with DRO alone. Additionally, it was found that sessions containing only 1 to 2 reinforcers were not sufficient in maintaining low percentages of stereotypy and possibly, produced gradual increases. Lastly, the treatment package did not appear to interfere with the acquisition of academic targets. More research is needed on this treatment package but these experiments produced many future directions and provided helpful information to the team working with Jack.
REFERENCES


Appendix A

Functional Analysis Results
Functional Analysis Results

A functional analysis was conducted for Jack. Each condition in the analysis lasted 5 min and was repeated until stereotypy was stable. Three of the four conditions were designed to assess the functions of escape, attention, and automatic reinforcement. The fourth condition was a control condition. In the escape function, Jack was allowed to escape instructional-task requirements for 15-s when he engaged in stereotypy. During the attention condition he was provided with free access to preferred toys and when stereotypy occurred, the undergraduate research assistant said something like, “Jack, don’t do that.” During the alone condition, which assessed automatic reinforcement, no toys were available, no attention was provided, or removal from instructional demands followed stereotypy. During the final condition, play condition or control condition, no demands were placed, attention was provided at a high rate, and toys were always available. Once stereotypy was stable (i.e., 3-5 data points in the absence of an ascending or descending trend), the data were evaluated to determine the function of the stereotypy.

Jack engaged in moderate percentages of stereotypy across all assessment conditions with no condition reliably producing more stereotypy than the alone condition (see Figure A1). These levels of stereotypy were characteristic of his behavior during most portions of the day. The results of the functional analysis suggest that his stereotypy was primarily maintained by automatic reinforcement, as opposed to consequences provided by another person.
Figure A1: Results of the functional analysis on stereotypy across four conditions: alone, escape, attention, and play.
Appendix B

Stereotypy Data Sheet
### Stereotypy Data Sheet

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# intervals with Stereotypy/30= %
Appendix C

Treatment Integrity Data Sheet
## Treatment Integrity Data Sheet

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Appendix D

Stereotypic Behaviors That Meet Response Definition
Stereotypic Behaviors That Meet Response Definition

- Fingers (with or without food):
  - Fingers pressed together and slightly bent back in front of his mouth, body, on desk, or in lap with or without food.
  - Back of hands pressed together with fingers wiggling (with or without spitting)
  - All fingers or one finger wiggling
  - Flicking fingers up or together
  - Fingers in ears, nose, mouth, or tongue
  - Hand flapping
  - Thumb sucking with or without his hand in his shirt
  - Rubbing face: more than five seconds
  - Licking and smelling items
  - Pinching or pulling the skin of the hand beyond its normal position or so that the wrist pivots
  - Balancing objects on back of hands
  - Hands or fingers inside of pants or other articles of clothing
  - Fingers spread and covering face or cheek
  - Touching items with no purpose

- Biting:
  - Biting wrist or shirt

- Body:
  - If responses occur more than 2 s apart from each other count as a new response
    - Leaning back in chair with chair coming off floor
    - Bouncing in seat: more than 2 x
    - Rocking body or head side to side: more than 2x
    - Leaning to side or front for more than 2 seconds
    - Shrugging shoulder to ear or side of head
    - Legs or body on desk

- Vocals/Mouth:
  - det det
  - eee eee or peee (high pitched)
  - humming
  - low pitched grunt
  - ahh
  - blowing air out of mouth
  - Spitting
  - Raising/lowering top/bottom lip revealing teeth
  - Tongue protruding from the mouth or visibly covering the teeth for at least 3 s
  - Grinding teeth together

* Must occur without an apparent appropriate function to be considered Stereotypy
  - Nonexamples of stereotypy: itching face, wiping nose, etc.
Appendix E

Thesis Data on Response Interruption and Time-out
Thesis Data on Response Interruption and Time-out

**Procedure**

Initially, watching movies or playing on the iPad® was not observed to be an effective reinforcer for Jack (i.e., was not observed to engage with the iPad® or attend to movies when they were available). For the loss of a movie or iPad® to be effective in decreasing stereotypic responding, it was necessary to first establish movies and/or iPad® as reinforcers. The design of the intervention was twofold. Preferred edibles were provided to reinforce hands in the “quiet” position and to establish movies and/or iPad® as a reinforcer.

**Baseline.** During baseline, Jack was seated at his table with a movie playing. Each session consisted of a 2-min component where he wore the wristbands and a 2-min component where he did not. These two components were separated by a 1-2 s delay during which the research assistant removed or placed the wristband on him. The order of the two components (i.e., presence and absence of wristbands) was randomly determined by a coin toss. There were no programmed consequences for stereotypy during baseline. If he attempted to leave the work area, he was asked to return with the addition of minimal physical prompts if necessary.

**Intervention.** In all phases, during the non-wristband component, Jack was free to engage in stereotypy while he watched a video for 2 min.

**Phase 1: 2-s differential reinforcement with response interruption.** During Phase 1, when wristbands were on, he received an edible reinforcer selected
through a forced-choice-preference assessment along with social praise (e.g., “good job, Jack”) every 2 s that he kept his hands in the “quiet” position and continuously watched the movie (i.e. eyes directed at the screen). If he engaged in stereotypy or looked away from the movie, the timer was reset, the reinforcer was not provided, and he was vocally prompted (i.e., “quiet”) to engage in quiet hands. If he continued to engage in stereotypy, the research assistant physically prompted his hands into the correct position. If he removed the wristbands, the session time was stopped until the wristbands were back on. Throughout this phase, the movie continued to play regardless of stereotypy.

**Phase 2: 5-s differential reinforcement with response interruption.** Once data were stable, though still containing significant variability, the intervals increased to 5-s. During Phase 2, the edible reinforcer was switched to a lollipop, which was not available any other time at KAC. The behaviors required for reinforcement remained constant (i.e., quiet hands/mouth and continuously watching DVD) and the movie continued to play regardless of stereotypy.

**Phase 3: 5-s differential reinforcement without response interruption.** To assess the effectiveness of reinforcement alone, the physical prompts were removed during Phase 3. When wristbands were on, Jack received an edible reinforcer every 5-s he kept his hands in the “quiet” position and continuously watched the DVD player. If he engaged in stereotypy, the timer was reset and the reinforcer was not provided.
Phase 4: 2-s differential reinforcement without response interruption. In an effort to increase the opportunities to reinforce the “quiet hands” in the absence of prompts, the time requirement was decreased to 2 s. When wristbands were on, Jack received an edible reinforcer every 2 s he kept his hands in the “quiet” position and continuously watched the movie. If he engaged in stereotypy or looked away from the DVD, the timer was reset, and the reinforcer was not provided.

Return to baseline. After Phase 3, a return to the baseline was implemented. Once again across both components, there were no programmed consequences for stereotypy. Due to informal observations of Jack attending to an audio and illustrated Wiggles book on the iPad®, for brief periods of time, the DVD player was replaced with the iPad®.

Time-out contingency. After a stable baseline was reached, a time-out contingency was implemented. Each component lasted approximately 2 min plus the total amount of time taken by the 10-s removal of the iPad®. To begin this component, the wristbands were placed on both of Jack’s wrists, which was the intended S° for the component. A story iPad® application of Wiggles was chosen for the preferred stimulus to be removed during the time-out contingency.

When stereotypy occurred, the iPad® was paused and turned over for 10-s. If he did not immediately place his hands in the “quiet hands” position, he was verbally and physically prompted to do so. The iPad® remained off for 10-s or until he was in the “quiet” position for at least 1 s after the initial /10-s had lapsed. Differential reinforcement was no longer implemented for this phase.
Results and Discussion

Prior to the start of this intervention, neither the DVD player nor the iPad® was a reinforcer for Jack. He did not choose DVDs or the iPad® from a choice of preferred items or interact with them spontaneously. Additionally the DVD player and iPad® had not been used as a consequence to increase correct responding. In the first two phases of the intervention, the goal was to establish the DVD as a reinforcer through a pairing procedure while simultaneously working on establishing the wristband as a stimulus correlated with response interruption (i.e., brief physical prompt). After approximately eight sessions, of the 5-s differential reinforcement, the DVD was observed to become a reinforcer, evidenced by requests to watch shows (i.e., Wiggles) and it was also observed that the DVD and iPad® were being used as a consequence to increase skills on acquisition during regular academic sessions outside of the intervention sessions.

During the initial baseline, there was a high rate of variability in the stereotypy though minimal difference in percentages from when the wristbands were on (79% mean) and when they were off (75% mean) (see Table 2).

Over 32 sessions in Phase 1 (2-s differential reinforcement with response interruption), stereotypy ranged from 8 to 100% with a mean of 60% when Jack was wearing the wristbands and ranged from 8 to 100% with a mean of 83% when he was not wearing the wristbands.

Though there may have been a slight reduction in stereotypy during Phase 1, a 5-s differential reinforcement was implemented in Phase 2. Stereotypy maintained
at a mean of 57% when Jack was wearing the wristbands and slightly increased to a mean of 91% when he was not wearing the wristbands. It is interesting to note as the rate of stereotypy decreased when the wristbands were on in Phase 2, the rate increased when the wristband was off.

Table 2

Mean Percentages of Stereotypy for Jack

<table>
<thead>
<tr>
<th>Phase</th>
<th>Length of Session</th>
<th># of Sessions</th>
<th>Mean</th>
<th>Wristband</th>
<th>No Wristband</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>2 min</td>
<td>19</td>
<td>79%</td>
<td>(Range: 25%-100%)</td>
<td>75%</td>
</tr>
<tr>
<td>2 sec differential reinforcement w/ prompts</td>
<td>2 min</td>
<td>32</td>
<td>60%</td>
<td>(Range: 8%-100%)</td>
<td>83%</td>
</tr>
<tr>
<td>5 sec differential reinforcement w/ prompts</td>
<td>2 min</td>
<td>32</td>
<td>57%</td>
<td>(Range: 0%-92%)</td>
<td>91%</td>
</tr>
<tr>
<td>5 sec differential reinforcement w/out prompts</td>
<td>2 min</td>
<td>2</td>
<td>100%</td>
<td>(Range: 100%)</td>
<td>100%</td>
</tr>
<tr>
<td>2 sec differential reinforcement w/out prompts</td>
<td>2 min</td>
<td>8</td>
<td>94%</td>
<td>(Range: 67%-100%)</td>
<td>100%</td>
</tr>
<tr>
<td>Baseline</td>
<td>2 min</td>
<td>8</td>
<td>95%</td>
<td>(Range: 67%-100%)</td>
<td>100%</td>
</tr>
<tr>
<td>Time out</td>
<td>2 min</td>
<td>8</td>
<td>59%</td>
<td>(Range: 50%-67%)</td>
<td>92%</td>
</tr>
</tbody>
</table>

Note: This table summarizes the results of the intervention with Jack. Each phase of the intervention is labeled in the first column, the component lengths in the second column, and the number of sessions in each phase in the third column. The final column lists the mean percentage and range of stereotypy for each phase for both the wristband on as well as off.

The physical prompts were removed in Phases 3 and 4, to determine the effects of the prompts on the slight decrease in stereotypy from baseline to Phases 1 and 2. When the prompts were removed, percentages of stereotypy increased immediately, and there were minimal opportunities to reinforce “quiet hands” with no stereotypy in both Phase 3 with 2 s differential reinforcement and Phase 4 with 5-s differential reinforcement (see Figure 9 (wristband), Figure 10 (no wristband).
and Figure 11 (combined results). During the 5-s differential reinforcement without prompts, he made requests for the lollipop but only placed his hands on the table long enough to meet criteria on two occasions. In other words, with a brief physical prompt for “quiet hands”, he would maintain his hands in the quiet hands position without other stereotypy beyond the minimal 2-s or 5-s that resulted in the

![Graph](image)

*Figure 9:* Discriminated differential reinforcement and response interruption *(wristbands on)*. Black solid lines represent trend.
Figure 10: Discriminated differential reinforcement and response interruption (wristbands off). Black solid lines represent trend.
Figure 11: Discriminated differential reinforcement and response interruption (wristband on and wristband off). The closed circles show the results when the wristbands were on and the open squares for when they were off.

reinforcer; but without the brief physical prompt, that would rarely happen.

Nonetheless, Jack did continue to watch the iPad® or movie.

Because the DVD player and the iPad® were now reinforcers, a time-out contingency could be implemented. Baseline measures were again acquired. Over eight sessions, baseline stereotypy ranged from 67 to 100% with a mean of 95% when Jack was wearing the wristbands and occurred in 100% of intervals when he was not wearing the wristbands. There were only minimal differences in percentages from when the wristbands were on and when they were off his wrists.
The time-out contingency was introduced in the wristband component only. Over eight sessions of a 10-s time-out contingency, stereotypy ranged from 50 to 67% with a mean of 59% when Jack was wearing the wristbands and ranged from 75 to 100% with a mean of 92% when he was not wearing the wristbands (see Figure 12).

Figure 12: Discriminated time-out contingency (wristband on and wristband off). The closed circles show the results of the time-out contingency when the wristbands were on and the open squares represent when the wristbands were off.

The short latency to the first stereotypy in each component suggests that the reduced percentages of stereotypy result from the penalty contingency acting as an S^0 and not the wristbands (see Figure 13).
Time-out and differential reinforcement were not completely successful. Though there was a clear reduction from baseline to intervention, the stereotypy was still occurring 59% of the time, but the goal was to reduce stereotypy to below 30%.

*Figure 13:* Latency data during time-out contingency (*wristband and no wristband components*). The number of intervals until the first stereotypy were counted to assess the stimulus properties of the wristband. The closed circles represent the wristband component and the open squares represent the no wristband component.
Appendix F

Interobserver Agreement (IOA) Charts
### Interobserver Agreement (IOA) scores for Experiment 1: Academic Work Task

<table>
<thead>
<tr>
<th>Baseline DTT</th>
<th>Overall</th>
<th>Occurrence</th>
<th>Nonoccurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td>93%-100%</td>
<td>90%-100%</td>
<td>75%-100%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>96.6%</td>
<td>95.2%</td>
<td>87%</td>
</tr>
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**Phase 1**

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<tr>
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<th>Nonoccurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td>60%-100%</td>
<td>35%-100%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>88.8%</td>
<td>80.1%</td>
</tr>
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**Phase 2**

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<th>Occurrence</th>
<th>Nonoccurrence</th>
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<tbody>
<tr>
<td><strong>Range</strong></td>
<td>57%-100%</td>
<td>41%-100%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>82%</td>
<td>65.1%</td>
</tr>
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**Phase 3**

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<th>Nonoccurrence</th>
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<tbody>
<tr>
<td><strong>Range</strong></td>
<td>86.6%-100%</td>
<td>33%-100%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>90%</td>
<td>63%</td>
</tr>
</tbody>
</table>

**Phase 4**

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<tr>
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<th>Occurrence</th>
<th>Nonoccurrence</th>
</tr>
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<tr>
<td><strong>Range</strong></td>
<td>73.3%-93.3%</td>
<td>33.3%-72.7%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>86.3%</td>
<td>59.8%</td>
</tr>
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**Phase 5**

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<th>Nonoccurrence</th>
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<tr>
<td><strong>Range</strong></td>
<td>70%-96.7%</td>
<td>16.7%-90.9%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>86.2%</td>
<td>63.9%</td>
</tr>
</tbody>
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**Phase 6**

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<td>100%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>100%</td>
<td>100%</td>
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**Phase 7**

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<th>Nonoccurrence</th>
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<tr>
<td><strong>Range</strong></td>
<td>90%-93.3%</td>
<td>40%-66.7%</td>
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<td><strong>Average</strong></td>
<td>92.2%</td>
<td>55.6%</td>
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**Phase 8**

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<th>Nonoccurrence</th>
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<tr>
<td><strong>Range</strong></td>
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<td>55.56%-66.67%</td>
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<td><strong>Average</strong></td>
<td>90%</td>
<td>61.1%</td>
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**Phase 9**

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<th>Nonoccurrence</th>
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<td><strong>Range</strong></td>
<td>86.67%</td>
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<td><strong>Average</strong></td>
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<td>76.47%</td>
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**Phase 10**

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<th>Nonoccurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td>90%-96.66%</td>
<td>84.62%-87.5%</td>
</tr>
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<td><strong>Average</strong></td>
<td>94.16%</td>
<td>85.88%</td>
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**Phase 11**

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<th>Nonoccurrence</th>
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<td><strong>Average</strong></td>
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**Phase 12**

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<th>Nonoccurrence</th>
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<tbody>
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<td>100%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
**Interobserver Agreement (IOA) scores for Experiment 2: Leisure Time Activity (iPad®)**

<table>
<thead>
<tr>
<th>Interobserver Agreement</th>
<th>Baseline</th>
<th>Vocal RIRD, TO, DRO 2 s</th>
<th>Motor RIRD, TO, DRO 2 s</th>
<th>Motor RIRD, TO, DRO 5 s</th>
<th>Motor RIRD, TO, DRO 10 s</th>
<th>Motor RIRD, TO, DRO 15 s</th>
<th>Motor RIRD, TO, DRO 20 s</th>
<th>Motor RIRD, TO, DRO 30 s</th>
<th>Motor RIRD, TO, DRO 45 s</th>
<th>Motor RIRD, TO, DRO 1 min 15 s</th>
<th>Motor RIRD, TO, DRO 1 min 30 s</th>
<th>Motor RIRD, TO, DRO 2 min</th>
<th>Motor RIRD, TO, DRO 2 min 30 s</th>
<th>Motor RIRD, TO, DRO 3 min</th>
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<tbody>
<tr>
<td>Range</td>
<td>87%-97%</td>
<td>57%-97%</td>
<td>86%-100%</td>
<td>67%-100%</td>
<td>80%-100%</td>
<td>80%-100%</td>
<td>90%-100%</td>
<td>93%-100%</td>
<td>83%-100%</td>
<td>90%-100%</td>
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<tr>
<td>Average</td>
<td>92%</td>
<td>75.2%</td>
<td>89.8%</td>
<td>88.7%</td>
<td>89.7%</td>
<td>89.7%</td>
<td>95%</td>
<td>93.25%</td>
<td>83%</td>
<td>93%</td>
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<td>Overall</td>
<td>65%</td>
<td>46.2%</td>
<td>66.8%</td>
<td>57.1%</td>
<td>57.3%</td>
<td>75%</td>
<td>73.5%</td>
<td>75%</td>
<td>20%</td>
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<td>66%</td>
<td>80%</td>
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<tr>
<td>Occurrence</td>
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<td>19%-83%</td>
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<td>23%-100%</td>
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<td>40%-100%</td>
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<tr>
<td>Nonoccurrence</td>
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<td>80%-100%</td>
<td>66%-96%</td>
<td>77%-100%</td>
<td>77%-100%</td>
<td>90%-100%</td>
<td>92%-100%</td>
<td>82%-100%</td>
<td>87%-100%</td>
<td>89%-96%</td>
<td>89%-96%</td>
<td>80%-100%</td>
<td>85%-100%</td>
</tr>
</tbody>
</table>

Range: Range of scores; Average: Average scores; Overall: Overall scores; Occurrence: Occurrence scores; Nonoccurrence: Nonoccurrence scores.
<table>
<thead>
<tr>
<th>Range</th>
<th>97%</th>
<th>90%-94%</th>
<th>93%-95%</th>
</tr>
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<tbody>
<tr>
<td>Average</td>
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<td>92.5%</td>
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<table>
<thead>
<tr>
<th>Motor RIRD, TO, DRO 30 s</th>
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<th>Nonoccurrence</th>
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<tr>
<td>Range</td>
<td>93%-100%</td>
<td>78%-100%</td>
<td>91%-100%</td>
</tr>
<tr>
<td>Average</td>
<td>96.5%</td>
<td>89%</td>
<td>95%</td>
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<table>
<thead>
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<th>Motor RIRD, TO, DRO 11 R+</th>
<th>Overall</th>
<th>Occurrence</th>
<th>Nonoccurrence</th>
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<td>67%</td>
<td>96%</td>
</tr>
<tr>
<td>Average</td>
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<td>67%</td>
<td>96%</td>
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</table>
### Interobserver Agreement (IOA) scores for Experiment 3: Work Task 2 (Naming)

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<tr>
<th></th>
<th>Overall</th>
<th>Occurrence</th>
<th>Nonoccurrence</th>
</tr>
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<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>93.33%-100%</td>
<td>91.67%-100%</td>
<td>75%-100%</td>
</tr>
<tr>
<td>Average</td>
<td>97.34%</td>
<td>96.72%</td>
<td>87.5%</td>
</tr>
<tr>
<td><strong>DRO 5 s</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>83.3%-100%</td>
<td>76.6%-100%</td>
<td>0%-100%</td>
</tr>
<tr>
<td>Average</td>
<td>93.3%</td>
<td>87.59%</td>
<td>66.35%</td>
</tr>
<tr>
<td><strong>RIRD, TO, DRO 5 s</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
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<td>41.66%-100%</td>
<td>60%-100%</td>
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<tr>
<td>Average</td>
<td>88.6%</td>
<td>76%</td>
<td>82.97%</td>
</tr>
<tr>
<td><strong>DRO 5 s</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>100%</td>
<td>100%</td>
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<td>100%</td>
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<tr>
<td><strong>RIRD, TO, DRO 5 s</strong></td>
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</tr>
<tr>
<td>Range</td>
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<td>80%</td>
<td>96.15%</td>
</tr>
<tr>
<td>Average</td>
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<td>80%</td>
<td>96.15%</td>
</tr>
<tr>
<td><strong>DRO 5 s</strong></td>
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<td></td>
</tr>
<tr>
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<tr>
<td>Average</td>
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<td>81.65%</td>
<td>93%</td>
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### Interobserver Agreement (IOA) scores for Experiment 4: Leisure Time (LEGOS®)

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<th></th>
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<tbody>
<tr>
<td><strong>Baseline</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>60%-93%</td>
<td>54%-92%</td>
<td>31%-67%</td>
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<td>Average</td>
<td>82.6%</td>
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<td><strong>DRO 5 s</strong></td>
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<tr>
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<td>37%-100%</td>
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<td>26%-100%</td>
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<td>Average</td>
<td>86%</td>
<td>78%</td>
<td>75.5%</td>
</tr>
<tr>
<td><strong>RIRD, TO, DRO 5 s</strong></td>
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Appendix G

HSIRB Approval
Date: October 22, 2012

To: Richard Malott, Principal Investigator
    Jessica Korneder, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 12-09-04

This letter will serve as confirmation that your research project titled “Response Interruption and Redirection on the Reduction of Vocal and Motor Stereotypy” has been approved under the full category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may only be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., you must request a post approval change to enroll subjects beyond the number stated in your application under “Number of subjects you want to complete the study.”) Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: September 19, 2013