April 2021

Case Study: Using a Contingency-Based Delay Procedure to Decrease Tantrums During Periods of Delayed Reinforcement

Lindsey Snyder
University of South Florida

Follow this and additional works at: https://scholarcommons.usf.edu/etd

Part of the Behavioral Disciplines and Activities Commons

Scholar Commons Citation
Snyder, Lindsey, "Case Study: Using a Contingency-Based Delay Procedure to Decrease Tantrums During Periods of Delayed Reinforcement" (2021). Graduate Theses and Dissertations. https://scholarcommons.usf.edu/etd/8869

This Thesis is brought to you for free and open access by the Graduate School at Scholar Commons. It has been accepted for inclusion in Graduate Theses and Dissertations by an authorized administrator of Scholar Commons. For more information, please contact scholarcommons@usf.edu.
Case Study: Using a Contingency-Based Delay Procedure to Decrease Tantrums During Periods of Delayed Reinforcement

by

Lindsey Snyder

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
Department of Applied Behavior Analysis
College of Behavioral and Community Sciences
University of South Florida

Major Professor: Catia Cividini-Motta, Ph.D., BCBA-D
Raymond Miltenberger, Ph.D., BCBA-D
Kimberly Crosland, Ph.D., BCBA-D

Date of Approval:
March 30, 2021

Keywords: autism, functional communication training, delay tolerance, problem behavior

Copyright © 2021, Lindsey Snyder
ACKNOWLEDGEMENTS

Due to the COVID-19 pandemic the thesis requirements for students graduating from the USF ABA program in 2021 has been modified and may include fewer participants, case studies or literature review.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Figures</td>
<td>ii</td>
</tr>
<tr>
<td>Abstract</td>
<td>iii</td>
</tr>
<tr>
<td>Chapter One: Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Chapter Two: Method</td>
<td>4</td>
</tr>
<tr>
<td> Participants, Settings, and Materials</td>
<td>4</td>
</tr>
<tr>
<td> Dependent Measures and Design</td>
<td>5</td>
</tr>
<tr>
<td>Chapter 3: Procedure</td>
<td>6</td>
</tr>
<tr>
<td> Baseline</td>
<td>6</td>
</tr>
<tr>
<td> Intervention</td>
<td>6</td>
</tr>
<tr>
<td>Chapter Four: Results</td>
<td>10</td>
</tr>
<tr>
<td>Chapter Five: Discussion</td>
<td>12</td>
</tr>
<tr>
<td>References</td>
<td>14</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 1: Results of Tangible Preference Assessments .......................................................... 7
Figure 2: Results of Social Preference Assessment ............................................................... 8
Figure 3: Contingency-Based Delay Evaluation .................................................................... 11
ABSTRACT

Functional Communication Training (FCT) involves reinforcing a functional communicative response (FCR) while placing problem behaviors on extinction (Carr & Durrand, 1985). When reinforcement for the FCR is delayed or unavailable, the individual’s problem behavior may return to previous levels (i.e., resurgence of previously reinforced problem behavior; Briggs et al., 2018) or the participant may exhibit emotional responding consistent with an extinction burst (Lerman & Iwata, 1996). A contingency-based delay procedure was introduced which increased the participant’s percentage of trials without tantrums and decreased the overall duration of tantrums.

- Successful FCT may lead to an increased number of independent mands that cannot be reinforced, as a continuous schedule of reinforcement is unlikely.
- Delayed or denied reinforcement can simulate extinction conditions, possibly leading to an increased rate of problem behaviors.
- A contingency-based delay procedure may reduce problem behavior during periods of delayed reinforcement and promote acceptance of alternative activities during the delay.
- When FCR cannot be immediately reinforced, redirection to a similar alternate item or activity may partially satisfy motivation for the temporarily unavailable reinforcer.
CHAPTER ONE:
INTRODUCTION

Functional communication training (FCT; Carr & Durand, 1985; Day et al., 1994; Fisher et al., 1993), is a form of differential reinforcement during which the individual can gain reinforcement for appropriate alternate behaviors (i.e., the functional communicative response; FCR). This procedure has proven to be an effective intervention for problem behavior, particularly for individuals diagnosed with an autism spectrum disorder (ASD; Carr & Durand, 1985; Day et al., 1994; Fisher et al., 1993). The schedule of reinforcement for the FCR can be critical to the effectiveness of FCT procedures (Fisher et al., 2000; Greer et al., 2016). In previous studies on methods to thin or delay reinforcement for the FCR, problem behavior increased when the response resulted in long delays to reinforcement (e.g., Fisher et al., 2000). These findings reflect literature on extinction-induced resurgence, which is the resurgence of previously reinforced behavior when another functionally equivalent behavior is placed on extinction (Greer et al., 2016).

Furthermore, these extinction-like periods produced by delay in reinforcement may lead to novel and emotional responding from the individual. Briggs et al. (2018), which re-analyzed data published by Greer et al. (2016), investigated the prevalence of resurgence and topographies of destructive behavior during reinforcement schedule thinning within the context of FCT. During FCT with continuous reinforcement, participants emitted high and stable rates of FCRs and had low and stable rates of problem behavior. However, Briggs et al. (2018) observed
resurgence of destructive behaviors during schedule thinning for 19 of the 25 applications from the Greer et al. (2016) study. These results suggest that when the schedule of reinforcement for the FCR is progressively thinned, resurgence of problem behavior is a common behavioral phenomenon. Nevertheless, schedule thinning is an important component of FCT as it increases the practicality of the implementation of this treatment by caregivers.

One method used in literature to combat resurgence of problem behavior is to require the individual to complete a specified task prior to granting access to the requested item or activity (Ghaemmaghami et al., 2016). More specifically, Ghaemmaghami et al. compared a contingency-based progressive delay (CBPD) procedure, during which the participants were required to engage in an alternative activity and refrain from engaging in problem behavior prior to reinforcement being delivered, to a time-based progressive delay (TBPD) procedure, during which participants were required to refrain from engaging in problem behavior for a specified period of time prior to reinforcement being delivered. During the CBPD procedure, experimenters reinforced mands that were emitted only after the participant continuously interacted with an alternative toy for a specified period of time or completed a specified demand, while refraining from engaging in problem behavior. Ghaemmaghami et al. found that the CBPD procedure was more effective than the TBPD procedure in increasing participants’ tolerance for delays in reinforcement (i.e., reducing problem behaviors and increasing appropriate behaviors). In addition, engagement with alternative activities or compliance with work tasks increased while low levels of problem behavior persisted during the CBPD condition. These results may be because an alternate activity (e.g., jungle gym) may partially abolish the establishing operation (EO) for the delayed reinforcer (e.g., swings).
This study’s participant often engaged in high rates of disruptive and destructive behaviors during periods when it was not possible to immediately reinforce his mands. As a result, the purpose of this study was to use a contingency-based delay procedure to promote engagement with alternate leisure activities during delays to reinforcement, and to reduce the individual’s rate of problem behavior during these periods.
CHAPTER TWO:

METHOD

Participants, Setting, and Materials

Jackson, a 5-year-old male with an ASD, participated in the current study. Jackson communicated using vocal speech and his clinical goal at the time of his participation in this study consisted of manding using two words (i.e., open juice, ride bike, etc). Jackson’s problem behaviors included aggression, self-injury, screaming, crying, elopement, and flopping. Aggression was defined as any attempt or instance of striking another person with an open hand, closed fist, or one or both feet with a recoil of at least five inches. Self-injury was defined as any attempt at or forceful contact of Jackson’s head with the wall, floor, or furniture with at least a two-inch recoil. Screaming consisted of any non-contextual loud vocalization that could be heard from at least five feet away and crying was defined as any instance of sobbing, with or without tears. Elopement was defined as any instance or attempt at moving three or more feet away from the therapist or desired direction without permission. Flopping consisted of any instance in which Jackson released his body weight resulting in displacement of his body from a standing or sitting position to the ground. A descriptive assessment showed that Jackson’s problem behaviors typically resulted in access to adult attention and/or tangible items. Materials consisted of the toys identified by a preference assessment and data sheets. The study was conducted in a therapy room which contained a table, chairs, and toys.
**Dependent Measurements and Design**

Researchers measured the percentage of trials per 5-trial session (i.e., five consecutive demands that were not immediately reinforced) in which Jackson complied with the alternate activity without engaging in problem behavior. Compliance with the alternate activity was defined as Jackson manipulating the presented item for 30 continuous seconds without problem behavior. For example, if Jackson requested to ride the bike, he was told “not right now” by his therapist, followed by “let’s jump on the trampoline instead”. If Jackson jumped on the trampoline for 30 s without engaging in problem behaviors, his next request for the bike was reinforced if possible. Percentage of trials was calculated by dividing the instances during which Jackson complied with the alternate activity without engaging in a tantrum by the total instances in which therapists delayed access to a requested item or activity, multiplied by 100. Researchers also measured duration of tantrums. A tantrum consisted of the occurrence of two or more of the previously defined problem behaviors within no more than 3 s of each other. A tantrum ended when at least 10 s elapsed without any problem behavior. Tantrum duration was reported as the total minutes per session.

Interobserver agreement (IOA) was not collected for this study. IOA scores for the occurrence of tantrums would have been calculated by comparing data independently recorded by two observers during each session, dividing the number of trials with agreement by the total number of trials in the session, and then multiplying by 100. IOA scores for duration of tantrums would have been calculated using the total duration method by aggregating all tantrum durations recorded per session, then dividing the smaller duration by the larger duration and multiplying by 100.
CHAPTER THREE:
PROCEDURE

Baseline

During baseline, therapists recorded instances during which they could not reinforce Jackson’s mand (e.g., if a peer was already using the item specified by his mand). Therapists recorded occurrence and non-occurrence of tantrums, as well as duration if they occurred. During baseline, in cases when mands could not be reinforced, Jackson was not required to engage with an alternate activity prior to reinforcement. Therapists provided immediate access to the requested item or activity whenever possible, while blocking and ignoring tantrums as necessary. Jackson’s self-injury and aggression did not happen with enough intensity to warrant restraint or other intrusive procedures, but therapists physically blocked these behaviors while minimizing attention as much as possible to maintain his and their safety.

Intervention

Intervention consisted of systematically introducing a contingency-based delay procedure. Researchers first conducted paired-stimulus preference assessments (Fisher et al., 1992) to identify low, moderate, and high preferred toys and social interactions (see Figures 1 and 2). During intervention, therapists contrived situations (e.g., playing with a toy without Jackson or reinforcing several mands for a social interaction before denying one) to increase the probability of mands, then purposefully did not reinforce them and instead stated a variation of no (i.e., “not right now,” “one minute,” etc.). During each intervention phase, some mands for
targeted items were immediately reinforced to prevent an overall decrease in mands for targeted items. In cases when mands were not immediately reinforced, the specified stimulus remained in eyesight but out of reach of the participant.

Figure 1. Tangible preference assessment for Jackson.

If Jackson did not engage in any problem behavior and engaged with an alternate item or activity independently for 30 consecutive seconds, therapists provided behavior-specific praise and reinforced his next independent mand for the denied item. If Jackson continued to mand for the denied item or activity but did not engage in problem behavior, therapists provided vocal prompts to redirect Jackson to an alternate item or activity (i.e., “we can’t ride the bike, but we can play with Mr. Potato Head”). If Jackson did not engage with an alternate activity following a vocal prompt, the therapist began engaging with the alternate activity and provided more specific vocal prompts (i.e., “find his nose”). If Jackson engaged in a tantrum, therapists blocked aggression and self-injury as needed while providing minimum attention. Once the tantrum stopped, therapists redirected Jackson back to the alternate activity. Once Jackson engaged with
an alternate activity or item for at least 30 s without occurrence of problem behavior, the next independent mand for the denied item or activity was reinforced.

**Figure 2.** Social interaction preference assessment for Jackson.

In the first phase of intervention, the contingency-based delay procedure was applied only to items and activities identified by the preference assessment as low preferred items. Low preferred items and activities were those selected on fewer than 50% of opportunities. Mastery criteria for each phase was three consecutive sessions during which Jackson complied with the alternate activity in the absence of problem behavior. When Jackson met mastery criteria for low preferred stimuli, the second phase began, which applied to items and activities identified by the preference assessment as moderate preferred. Moderate preferred items and activities were those selected on 50-59% of opportunities. Finally, when Jackson met mastery criteria for moderate
preferred items and activities, the contingency was applied to high preferred items and activities, which were those selected on 60% of opportunities or more. Therapists were provided with a list of stimuli and social interactions for each preference level (i.e., low, moderate, and high) and were instructed to contrive scenarios that would increase the probability that Jackson mands for those items or activities. If Jackson manded for an item not included in the current intervention phase (i.e., manding for a high preferred item during the low preferred level), therapists followed baseline procedures (i.e., reinforcing mands whenever possible) and Jackson was not prompted to engage with an alternate activity if problem behavior occurred.
CHAPTER FOUR:

RESULTS

Figure 3 depicts Jackson’s percentage of trials without tantrums and tantrum duration throughout baseline and intervention. Mastery criteria was met in five sessions for low preferred items and activities, 12 sessions for moderate preferred items and activities, and has not yet been met for high preferred items and activities. In addition, the percentage of trials without tantrum increased. During baseline, Jackson’s percentage of trials without tantrums averaged 30% (range, 20% to 40%). During the low preferred phase, Jackson’s percentage of trials without tantrums averaged 95% (range, 80% to 100%). During the moderate preferred phase, Jackson’s percentage of trials without tantrums initially decreased to 0% but then increased to 100%, averaging 77% (range, 0% to 100%). Finally, during the high preferred phase, Jackson’s percentage of trials without tantrums averaged 89% (range, 60-100%) and has not yet met mastery criteria.
Jackson’s duration of tantrums also decreased throughout intervention. During baseline, Jackson’s duration of tantrums fluctuated between 6 and 21 minutes with an increasing trend. During the low preferred phase, Jackson’s duration of tantrums decreased to 1.18 minutes per session. During the moderate preferred phase, Jackson’s duration of tantrums initially increased to 19 minutes, similar to baseline rates, before decreasing. During the high preferred phase, Jackson’s duration of tantrums remained low despite the initial decrease in percentage of trials without tantrums. That is, Jackson’s tantrums occurred during more trials but were short in duration.
CHAPTER FIVE:  
DISCUSSION

During the contingency-based delay phase, Jackson’s percentage of trials without tantrums increased while duration of tantrums decreased. The current study replicated procedures used by Ghaemmaghami et al. (2016) during the CBPD condition in their comparative analysis of tolerance training. Although specific procedures in the Ghaemmaghami et al. study differed between individuals, our procedures most closely replicated those used for Nico. In their study, Nico was required to say “okay” and play with low-preferred items without problem behavior following the instructor’s verbal delay signal (i.e., “not yet”). In the current study, Jackson was not required to emit a vocal response to the instructor’s verbal delay signal as it was not deemed important by his clinical team. Furthermore, in the Ghaemmaghami et al. study, experimenters reset the delay interval if Nico engaged in problem behavior during the interval. In the current study, Jackson’s delay contingency stipulated that he must engage with the alternative activity for 30 continuous seconds without problem behavior or his delay interval would reset as well. However, Ghaemmaghami et al. used a progressive delay procedure while the current study did not include a progressive delay.

This study does have limitations. Although therapists were instructed to minimize the attention provided for tantrums occurring during intervals of delayed access to specified items, therapists still needed to maintain Jackson’s safety and their own. In some instances, Jackson’s behaviors may have been inadvertently reinforced when therapists blocked aggression, self-injury, or other dangerous behaviors (i.e., climbing on furniture). Furthermore, when Jackson
eloped, therapists maintained a slow pace while following him and avoided eye contact while returning him to the prior location. However, the physical contact necessary to guide Jackson back to his previous location may have reinforced his elopement as a prior descriptive analysis suggested that Jackson’s problem behaviors were sensitive to therapist attention.

Additionally, it is important to consider the fluctuation in motivation that may have occurred throughout the study. Although preference assessments were conducted prior to the intervention phase, literature on preference assessments indicates that an individual’s preference may change over time due to fluctuations in establishing and abolishing operations (Higbee et al., 2000). Future studies should conduct preference assessments more often and adjust stimuli included in each phase to reflect changes in the participant’s preferences.

Future research should also explore presenting a discriminative stimulus during delayed reinforcement to signify that reinforcement will be provided following the delay. This technique may help the individual to discriminate between delay and extinction conditions. For example, if the individual mands to jump on the trampoline, the therapist could hand the individual a picture of the trampoline to hold until the trampoline becomes available. The addition of a discriminative stimuli, such as a timer or picture, may negate the extinction-like condition that occurs when reinforcement is not immediately provided. For example, Greer et al., (2016) used discriminative stimuli (i.e., colored cards, wrist bands, or the location of a hat or lei) to signal the availability or unavailability of reinforcement for the FCR.

In summary, this case study showed a promising decrease in occurrence and duration tantrums during periods of delayed reinforcement for one participant. Future research should replicate procedures across participants, settings, or behaviors, while adjusting for fluctuation in motivation.
REFERENCES


