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Using Contingency Maps to Teach Requests for Information

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Using Contingency Maps to Teach Requests for Information

by

Roberto Andrade-Plaza

A thesis submitted in partial fulfillment of the requirements for the degree of Masters of Science Department of Child and Family Studies College of Behavioral and Community Science University of South Florida

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Keywords: observing response, multiple schedule of reinforcement, mixed schedule of reinforcement, contingency maps

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Abstract

Autism spectrum disorder is a developmental disorder characterized by social, behavioral, and communicative deficits. Although there is no known cure for autism, there are many research-based interventions that aid in strengthening such deficits, especially those associated with failures of stimulus control. One way to address such failures is to provide additional stimuli that enhance or override information provided by naturally occurring stimuli. Contingency maps are one such example. This study uses an observing response (i.e., hand-raising) to allow the subjects to request contingency maps. The purpose of this study is to identify if contingency maps function as reinforcers and if requests for information can be acquired using an observing-response paradigm. Major findings of the present study indicate that requests for information can be acquired and maintained by access to CMs.
Introduction

Autism Spectrum Disorders (ASD) is a developmental disability prevalent in one in every 45 children (CDC, 2016) that is characterized by communicative, social, and behavioral impairments (Centers for Disease Control and Prevention [CDC], 2016; DSM-V-TR; American Psychiatric Association, 2013). Irregular behavior often accompanying these deficits include repetition of words or phrases (i.e., echolalia), repetitious physical movements or sounds (e.g., stereotypy and echolalia), the lack of eye contact, the preference for playing alone and avoidance and resistance of physical contact. Related to social and academic deficits, individuals with ASD often show deficits in asking questions (Charlop & Milstein, 1989; Koegel, 1996).

Although there is no known cure for ASD, there are research-based interventions used to teach and strengthen the previously mentioned deficits along with decreasing problem behavior (CDC, 2016; Rosanoff, 2015). These interventions often include the use of visual supports. Visual supports allow the use of words, images, and tangible objects to represent both abstract and concrete concepts (Hayes, Hirano, Marcu, Monibi, Nguyen, & Yeganyan, 2010). According to Cohen and Sloan (2007), the use of visual supports could reduce problem behavior associated with cognitive, communicative, and social impairments for individuals diagnosed with ASD. That is, visual supports might aid individuals diagnosed with ASD in communicating with others, and in behaving in a socially appropriate manner (Kidder & Mcdonnell, 2015). Moreover, visual supports are flexible, cost-effective, easy to create, and can be easily replaced and modified (Gagie & Rao, 2006).

One example of an empirically-supported visual support is a contingency map (CM).
This type of visual support uses graphic representations to represent the antecedent-behavior-consequence relationships for both the occurrence of problem behavior and occurrence of alternative appropriate behavior (Brown & Mirenda, 2006). In this way, CMs typically illustrate two complementary antecedent-behavior-consequence relationships: One relationship illustrates emission of the target behavior resulting in reinforcement, and the other relationship illustrates the absence of the target behavior resulting in extinction (i.e., no reinforcement).

Brown and Mirenda (2006) evaluated the effects of implementing a CM in a general education classroom for one subject diagnosed with ASD. Following baseline, the experimenter stated the programmed contingency for the target response (i.e., standing up, bringing work to the teacher, and saying “finished” results in reinforcement), and the contingency for not engaging in the target behavior (i.e., not standing up, bringing work to the teacher, and not saying “finished” results in extinction). In the third phase, the contingency map was paired with the experimenter's verbal explanation of the contingencies. Following this phase, maintenance was assessed one and two weeks post intervention. The results indicated the verbal contingency had no effect in reducing the subject’s latency to comply with task demands, as compared to baseline when no treatment was implemented. Following the implementation of the contingency map, an immediate and sustained decrease in latency to comply was observed, as compared to baseline and the verbal contingency phases. This effect was observed during all three activities, and the decrease in latency to comply maintained in follow-up.

From a student’s perspective, the absence of effective discriminative stimuli might make the classroom environment similar to a mixed schedule. That is, classroom contingencies often change throughout the school day, and if the stimuli that signal these changes are ineffective, appropriate behavior is less likely to occur. This interpretation might explain why contingency
maps have been shown to be effective. If contingency maps work by making the contingencies more salient, then they effectively turn a mixed schedule into a multiple schedule, whereby stimuli present in each context set the occasion for appropriate behavior.

A related strategy for improving stimulus control in individuals with autism is to teach such students to make requests for information. For example, Sundberg, Loeb, Hale, and Eigenheer (2002) assessed a method to teach two children diagnosed with ASD how to mand for information using “who” and “where.” In this study, the establishing operation (EO) was arranged by removing and hiding the subject’s preferred item. Two experiments were conducted in this study in order to examine the relationship between the EO and asking “who” and “where” questions. Results showed the subjects acquired these mands when the EOs were manipulated, assumedly increasing the value of the information, and the information functioning as a conditioned reinforcer. Sundberg et al. hypothesized part of the reason why children with ASD have difficulty manding for information is due to verbal information not functioning as a reinforcer. Thus far, methods to teach requests for information largely make use of chain schedules, in which an initial response (a request) is necessary before individuals can earn access to the backup reinforcers, and such a procedure might bypass alleged deficits in the degree to which verbal information functions as a reinforcer.

The fact that requests are necessary to access the terminal link (and the terminal reinforcer) in such procedures erodes some of the face-validity of using them to teach requests for information. Indeed, authors who use chain-schedule procedures like the above often call them ‘contrived establishing operations’ because access to the terminal link depends on the occurrence of a request in the initial link. Thus, in these arrangements, so-called requests for information might ultimately be maintained by access to the tangible terminal link reinforcer.
Another approach perhaps more closely mirrors naturally occurring situations. It involves a concurrent schedule where target responses result in access to reinforcement on a mixed schedule while responses made toward an alternative (i.e., a request for information) produces a signal correlated with the current schedule. Such an arrangement is called the observing response procedure (Raiff & Dallery, 2006).

Research on the observing response procedure has shown discriminative stimuli in multiple schedules can serve as conditioned reinforcers and maintain behavior that produces it (i.e., the observing response). Evidence on the effectiveness of CMs suggests they can provide effective stimulus control. Therefore, including them as discriminative stimuli in an observing response procedure provides an opportunity to evaluate whether they might also function as conditioned reinforcers in a way that more closely mirrors requests for information made by typically developing individuals and without providing explicit and arbitrary reinforcers to establish those requests. However, unlike in many previous request-for-information studies, observing responses are not necessary in order to access the tangible reinforcer; they merely signal produce a signal associated with its availability. Therefore, the purpose of the proposed study was to identify if contingency maps function as reinforcers in an observing-response paradigm for the purpose of establishing and maintaining requests for information.
Method

Subjects and Setting

Subjects included three individuals, between the ages of 3 and 10, who have been diagnosed with Autism Spectrum Disorder, and have an individualized education plan (IEP). All subjects were recruited from behavior analysts in the Tampa Bay area and from the Florida Autism Center (FAC).

EP was a 7-year-old Latino male going into 2nd grade. He is currently enrolled in an ESE classroom as he is diagnosed with autism. EP was in level 1 of the VBMAPP with a low verbal repertoire as it is his lowest scoring operant in the VBMAPP. Aside from the vocal operant, all other operants were in the beginning milestones of level 2 and rapid progress has been observed. EP engaged in mild to low levels of aggression (presses his chin against the body part of another individual with force). EP did not engage in any aggression through the entirety of the study. While this study was being conducted, EP was received 10 hours of direct ABA therapy per week at FAC.

LA was a 9-year-old South Asian male going into the 4th grade. LA was enrolled in an ESE classroom due to his diagnosis of autism. LA was currently in level 2 of the VBMAPP, LA had enough of a verbal repertoire to communicate his wants and needs, and engaged in low frequency of invasion of personal space (is closer than 1ft to your face) and in low frequency of vocal protesting (says "no" after a demand is placed). In the VBMAPP, LA exceed in the listener response operant, as it is the only operant on level 3. LA did not engage in any problem behavior
through the entirety of the study. LA was receiving 10 hours of direct ABA therapy per week during the duration of this study.

Lastly, JJ was a high-functioning 9-year-old Caucasian male going into the 4th grade. JJ was in a mainstream gifted classroom where he was enrolled in 5th grade classes. JJ mastered out of the VBMAPP and was currently working on functional living skills and social skills. JJ engaged in severe to mild property destruction (throwing chairs, flipping tables, and throwing computers) and severe to mild aggression (punching, kicking, and throwing objects to another individual). However, JJ did not engage in any of the aforementioned problem behavior throughout the entirety of the study. JJ was only receiving 4.5 hours of direct ABA therapy per week during this study.

Sessions were conducted at FAC in a quiet session room with a table and three chairs (one for the subject and two for the experimenter). One-to-five sessions were conducted per day, one-to-five days per week, and lasted 5 min in length, which were divided into ten 30s intervals. Sessions occurred during their scheduled therapy sessions.

**Materials**

Two contingency maps (CMs) made out of laminated 8.5” x 11” white cardstock paper were used. Each of the contingency maps corresponded with one of the target responses described below. Contingency map A (CM-A) corresponded with the target response A, and contingency map B (CM-B) corresponded with target response B. Each contingency map illustrated antecedent-behavior-consequence relations for both the occurrence and nonoccurrence of the response (see Figure 1 and Figure 2 for examples). Additionally, target task materials included a red buzzer and blue buzzer.
Target Responses and Data Collection

The target responses were defined as hitting the blue buzzer with one open hand and hitting the orange buzzer with one open hand. These two topographies were designated as target response A and B, respectively. Data were collected on the frequency of correct responses, defined as independent emission of the response that was effective for the current component (e.g., response A during component A, and response B during component B). Additionally, hand-raising was included as the request-for-information response, hereon referred to as the observing response. Hand-raising was defined as lifting either the left or right arm such that the hand is at or above ear level, and open for more than 1 s and no longer than 5 s. One or two trained observers independently collected data on subjects’ behavior during all sessions. During the mixed and multiple schedule phases, data were also collected on the frequency of correct responses. Data were also collected on the frequency of hand-raising during the mixed schedule. All data were collected using paper and pencil. Lastly, data were collected on the rate of overall responses, which included the frequency of responses emitted for component A and B over 5 min and the rate of hand-raising over 5 min.

Interobserver Agreement. A second independent observer collected data during an average 32% (range, 31% to 34%) of sessions in each phase, and interobserver agreement (IOA) was calculated for those. Agreement percentages for correct and incorrect responses and hand raising were calculated by dividing the 5-min sessions into 10 intervals, and then calculating the percentage of exact agreement, that is dividing the number of agreements by the number of agreements plus disagreements, and multiplying 100 to yield a percentage across the session. EP’s average IOA was 92.8% (range, 88.4% to 100%) for correct and incorrect responses, and 97.4% (range, 92.3% to 100%) for hand-raising. LA average IOA was 93.6% (range, 88.2% to
100%) for correct and incorrect responses and 94.2% (range, 90.9% to 100%) for hand-raising. Lastly, JJ’s average IOA was 90.9% (range, 86.3% to 94.6%) for correct and incorrect responding and 97.2% (range, 91.7% to 100%) for hand-raising.

**Treatment Integrity.** Treatment integrity data were collected during at least 26% of the sessions on experimenters’ correct delivery of the preferred edible and correct presentation of the contingency maps within the parameters of the specific schedule. Treatment integrity data was calculated by dividing the number of occasions in which the experimenter correctly delivered the preferred edible and presented the contingency map, by the number of opportunities to deliver the preferred edible and present the contingency map and multiplying by 100 to yield a percentage.

EP obtained average treatment integrity of 90.6% (range, 83.3% to 100%) for correct delivery of the preferred edible and an average treatment integrity of 95% (range 80% to 100%) for correct presentation of the contingency maps. LA obtained average treatment integrity of 89.5% (81.8% to 100%) for correct delivery of the preferred edible and an average treatment integrity of 92.5% (range, 80% to 100%) for correct delivery of the contingency maps. Lastly, JJ obtained average treatment integrity of 88.5% (range, 76.9% to 100%) for correct delivery of preferred item and an average treatment integrity of 95% (range, 80% to 100%) correct delivery of the contingency maps. It is important to note that the error that was often seen across the all subjects was failing to deliver the preferred edible at the exact schedule of VI 30-s. At times the preferred edible was delivered more than 3 s after the response or not at all.
Preference Assessment.

A Multiple-Stimulus Without Replacement Preference Assessment (MSWO; DeLeon & Iwata, 1996) was conducted to identify each subject’s highest preferred edible item, which was used as a consequence for appropriate requests in subsequent phases. During the preference assessment, an array of seven edible items was placed in front of and within arm’s reach of the subject, and each stimulus was spaced equidistant from one another. The experimenter then instructed the subject to select one of the available items by saying, “pick one.” Once the subject selected an item, the other stimuli were removed from the array, and the selected item was not included in subsequent trials. If the subject reached for more than one item, the experimenter blocked access to both items, and repeated the directions “pick one.” Prior to the next selection, positions of the remaining items were rotated to reduce the effect of a position bias on any single item. This procedure continued until all items were selected or until the subject did not make a selection within 30 s of the prompt (i.e., “pick one”). If this happened the session ended and “not selected” was recorded rather than the stimulus selected in each trial. Results from this assessment were used to select the highest preferred edible item to be used as a consequence for target behavior in subsequent phases. Each assessment was conducted 5 times per subject.

Two independent observers collected data on the percentage of selection and rate of responding for at least 25% of sessions. Per DeLeon and Iwata (1992), agreements were defined as both observers having recorded the same selection, or non-selection, for each of the sessions. Interobserver agreement (IOA) will be calculated by dividing the number of agreements by number of agreements plus disagreements, and multiplying 100 to yield a percentage. All three subjects obtained an overall IOA score of 100%.
**General Procedure**

The study was divided into two phases: Pre-Experimental Training and Experiment Proper. Pre-Experimental Training included three sub-phases. Phase 1 consisted of multiple schedules training; Phase 2 and Phase 3 involved fading the multiple schedule to that necessary for Experiment Proper. During the Experiment Proper, an ABAB reversal experimental design was used to compare responding during two phases: Baseline (i.e., a multiple schedule) and Mixed-Schedule Training. Additionally, Hand-raising Training was implemented between the first Baseline and Mixed-Schedule Training phases in Experiment Proper.

**Pre-experimental Training**

**Phase 1 – Multiple Schedule Training.** During this phase the experimenter and the subject sat at a table across from each other. Materials for the two target responses (i.e., A and B) were presented in a concurrent-operant arrangement, and were made available throughout the entirety of the session. The experimenter provided pre-session exposure prior to the start of the session by prompting the subject to engage in both target responses in the presence of their corresponding CMs and delivering the corresponding consequences. Following pre-session exposure, the session began, and a two-component multiple schedule was implemented in which each component was signaled by the presence of one of the two CMs. The experimenter placed the relevant CM on the table to depict the current component. The CM presented at the start of the session was selected on a quasi-random basis, and alternated with the other CM on a fixed time (FT) 30-s schedule throughout the session. The alternation of the CMs were signaled by the experimenter removing the current CM (e.g., CM-A) and replacing it with the other CM (e.g.,
CM-B). Emission of target response A in the presence of CM-A resulted in one preferred edible on a fixed-ratio 1 (FR1) schedule of reinforcement. Similarly, emission of target response B while in the presence of CM-B resulted in one preferred edible on a FR1 schedule of reinforcement. Moreover, emission of incorrect responding, which included engagement in target response A in the presence of CM-B and engagement in target response B in the presence of CM-A, resulted in extinction (i.e., no reinforcement). If the subject engaged in another response other than the one depicted on the CM, the experimenter withheld reinforcement (e.g., preferred item and praise) and used most to least prompting (Batu, Ergenekon, Erbas, & Akmanoglu, 2004) in order to aid the subject engage in the correct response depicted by the contingency map.

More specifically, this procedure required the experimenter to initially provide a full-physical prompt for the subject to respond correctly, once the subject consistently engaged in the target response independently, a less intrusive prompt was implemented (i.e., model prompt). The prompt level (i.e., physical prompt, model prompt, verbal prompt, and gestural prompt) continued to decrease until the subject consistently and independently engaged in the target response. This phase continued until the subject emitted 90% correct responses (i.e., the response that is depicted by the CM) across 3 consecutive sessions, and then phase two was implemented.

**Phase 2.** The purpose of this phase was to enhance discriminative control of the CMs by removing the passage of time as a reliable predictor of the current component. This phase was identical to Phase 1, with the exception that the two components alternated on a variable-time 30-s (VT 30-s) schedule. Once the subject emitted 90% correct responses across 3 consecutive sessions, Phase 3 was implemented.

**Phase 3.** The purpose of this phase was to enhance discriminative control by the CMs by using an intermittent schedule of reinforcement that reduces the possibility for non-deliveries of
reinforcement following a target response to provide reliable discriminative control. This phase was identical to Phase 2, with the exception that the schedule of reinforcement for correct responses were changed to a variable-interval 30-s (VI 30-s) schedule. Once the subject emitted 90% correct responses across 3 consecutive sessions, the Hand-Raising Training phase was implemented.

**Hand-Raising Training.** Hand-raising training was implemented following Phase 3 and before the baseline of Experiment Proper was implemented. Procedures were identical to those described in Phase 3, with the addition of the observing response contingencies. That is, the CMs alternated on a VT 30-s schedule and reinforcement for correct responses were delivered on a VI 30-s schedule. The CMs were only presented contingent on the observing response (i.e., hand-raising) on a Fixed-Ratio (FR) 1 schedule. Contingent on the observing response, the CM was delivered for 30s and if the component switch within those 30s, the CM switched to the respective component. Hand-raising was taught to the subject using a time delay procedure (Neitzel & Wolery, 2009) described below.

**Time delay.** When hand-raising was first taught, a fixed 0-s delay was used to provide a full physical prompt to hand raise. That is, when the CMs alternated, there was no wait time between the absence of information (i.e., presence of the CM) and the controlling prompt (i.e., the full physical prompt). Immediately following the prompted hand-raise, the relevant CM was presented. This procedure took place until the subject raised their hand 3 consecutive times with the full physical prompt, unless the subject independently started engage in hand-raising prior to completing the 3 consecutive full physical prompts.

**Increasing the time delay.** In the absence of the CM, the subject initially had 1-s to engage in the observing response before the full physical prompt was implemented. If the subject
engaged in the observing response 3 consecutive times with the full physical prompt, the time
delay was gradually increased in 1-second increments up to 5-s as deemed necessary. If the
subject did not engage in any response during the interval, a full physical prompt was delivered.
Reinforcement (i.e., presentation of the relevant CM) was delivered immediately following each
prompted and unprompted response. Once the subject independently engaged (i.e., without
prompts) in the observing response during 90% of opportunities, across 3 consecutive sessions,
Experiment Proper was implemented.

**Experiment Proper**

**Baseline (A).** Baseline was identical to Phase 3 above. That is, a two-component multiple
schedule was implemented and components alternated according to a VT 30-s schedule, and one
preferred edible was delivered for correct responses on a VI 30-s schedule. Hand-raises had
programmed consequences.

**Mixed-Schedule Training (B).** This phase consisted of the same procedures in place at
the end of Hand-Raising Training. More specifically, a two component mixed schedule was
implemented with the CMs alternating on a VT 30-s schedule, and one preferred edible was
delivered for correct responses on a VI 30-s schedule of reinforcement. Additionally, engaging in
the observing response resulted in the presentation of the relevant CMs on an FR-1 schedule of
reinforcement.
Results

The results of the MSWO for all three subjects are illustrated in Figure 1. For EP, chocolate chips were the most preferred, for LA, pundin chips, and for JJ, oreo cookies were the most preferred. For each subject, the highest preferred edible was selected as a consequence for target responses.

Figure 2 depicts data for the rate of target responding (requests for preferred edibles) for all three subjects for Pre-Experiment and Experiment Proper. In Phase 1, two components and their CMs were alternated on a FT 30-s schedule throughout the session and reinforcement of target responding was delivered at an FR 1 schedule of reinforcement. In one component (Component A) target response A resulted in the preferred edible on an FR-1 schedule while target response B had no consequence. In the other component (Component B), target response B resulted in the preferred edible and target response A has no consequence. The “goal” of this phase was simply for the subjects to learn to emit the appropriate target response in the correct component. In Phase 1, all participants acquired the target response. In addition, all participants readily acquired the discrimination of engaging in the correct target response in the presence of the correct CM (Figure 3).

In Phase 2, the components and CMs alternated unpredictably (on a VT 30-s schedule) throughout the session and schedule of reinforcement of target responding was kept the same as the previous session (i.e., FR 1). For both EP and JJ, an increasing trend was observed during this phase. Conversely, rates of target responding were slightly disrupted for LA. However, participants’ target responses continued to be under stimulus control of the CMs (Figure 3).
Phase 3 was the final phase prior to hand-raising training. During this phase, CMs were alternated at the same schedule as the previous phase, but reinforcement was now being delivered at a VI 30-s schedule. During Phase 3, rate of target responding maintained in all three participants. Furthermore, they continued to emit the correct target response in the correct component (Figure 3).

After acquiring discrimination of the target responses by the CMs and fading the schedule of reinforcement to VI 30-s, we now removed the CMs and only provided them following a hand raise. Rate of target responding was variable for all subjects (Figure 2), but all of them readily acquired hand raising (Figure 4) and target responding still appeared to be under tight stimulus control of the CMs (Figure 3). At this point, we moved to the baseline phase of the experiment proper in which the CMs were provided on a FT 30-s schedule.

During baseline, the correct CMs were visible noncontingently. Target response was variable but maintained and occurred in the correct component for all subjects (Figures 2 and 3). Hand raising did not occur (Figure 4).

During the subsequent phase, hand raising was required to produce the CMs. Target responding continued to be variable but correct (Figure 2 and 3). Most importantly, hand raising increased for all subjects. (Figure 4). Moreover, these effects went away and returned during the replication of this and the previous phase.
Discussion

We successfully taught all three subjects two ways to request preferred edibles and they readily learned to do so in the presence of specific contingency maps. Further, we taught all three subjects to raise their hands to request the contingency maps when they were not available. Using a reversal design, we showed that those requests were maintained by access to the contingency maps.

It is important to note that preferred edibles were used in this study rather than preferred tangibles, as preferred edibles were easier to deliver. Also, preferred edibles were consumed with very minimal interruption of the session. Lastly, delivery of preferred edibles to increase the likelihood of a behavior occurring in the future is part of their programming.

Previous studies on teaching requests for information involved chain schedules in which the request was necessary before the terminal response would produce access to a reinforcer. In contrast, this is the first study to teach requests for information using an observing response procedure in which the request for information was not necessary. In either situation, the ‘information’ might be conceptualized as a conditioned reinforcer. Many real-life situations involve those in which the ‘correct’ response can be stumbled upon by accident. This approach might be useful for studying acquisition and maintenance of behavior reinforced by similar kinds of conditioned reinforcement.

This study contained two subjects who were low functioning and one who was high functioning. The differences in the functioning levels in the subjects show that the effects were not dependent on having either a high or low level of functioning.
In our study, it was not entirely clear whether subjects discriminated between components A and B based on the content of the CMs, the discriminative nature of the CMs, or a combination of both. Examination of Figure 2 suggests that all subjects showed ‘imperfect’ discriminations initially, with EP responding closest to chance in the first session. This suggests EP’s discriminative responding was at least under partial control of the CMs because of the relationship between them and the contingencies they signaled. Regardless, our subjects included both high and low functioning individuals suggest our procedures were at least sufficient at producing discriminative control irrespective of level of functioning.

The CMs used in this study depicted both the consequence for target behavior, and the consequence given the absence of target behavior. This is consistent with CMs used in previous research (Brown & Mirenda, 2006). However, the procedures used in this study could allow future studies to evaluate whether and to what degree both antecedent-behavior-consequence relationships are necessary for an individual to acquire discriminative control. Specifically, rates of hand raising might be expected to change according to the ‘value’ of the information.

This study presented a method for teaching and evaluating requests for information in children with autism. The availability of such methods is important for both remediating the social deficits associated with the disorder, and as a paradigm for studying the nature of those deficits.
References


Appendices
Figure 1. Percentage of selection for all subjects during the MSWO preference assessment.
Figure 2. Rate of correct target responses for component A and B across the pre-experiment and the experiment proper for all subjects.
Figure 3. Percent of correct responses for Component A and B across the pre-experiment and the Experiment Proper for all subjects.
Figure 4. Percent of independent hand-raising across the pre-experiment and the experiment proper for all subjects.
Figure 5. Rate of hand-raising (requesting for information) across the pre-experiment and the experiment proper for all subjects.
Appendix B: JJ’s Contingency map
Appendix C: EP's CM

- Buzzers are presented
- Press the blue buzzer
- Cookie

- Buzzers are presented
- Don't press the blue buzzers
- No Cookie

- Buzzers are presented
- Press the orange buzzer
- Cookie

- Buzzers are presented
- Don't press the orange buzzer
- No Cookie
Appendix D: LA’s CM

Buzzers are presented → Press the blue buzzer → Chips

Buzzers are presented → Don’t press the blue buzzers → No Chips

Buzzers are presented → Press the orange buzzer → Chips

Buzzers are presented → Don’t press the orange buzzer → No Chips
Appendix E: Data Sheet

Phase 1 Multiple Schedule Training
Components Alternate FT 30s | Reinforcement Schedule FR 1

Observer: | Participant: | Date:

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<th>Session</th>
<th>Component</th>
<th>Response (+/-)</th>
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Component A
Rate ( / 5 ) =
% Correct ( / ) =

Component B
Rate ( / 5 ) =
% Correct ( / ) =

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Component A
Rate ( / 5 ) =
% Correct ( / ) =

Component B
Rate ( / 5 ) =
% Correct ( / ) =
Appendix F: Treatment Integrity Data Sheet

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<th>Presentation of CM</th>
<th>Fidelity %</th>
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Appendix G: USF IRB Approval

October 16, 2017

Roberto Andrade-Plaza
ABA-Applied Behavior Analysis
Tampa, FL 33612

RE: Expedited Approval for Initial Review
IRB#: Pro00031521
Title: Using Contingency Maps to Teach Requests for Information

Study Approval Period: 10/16/2017 to 10/16/2018

Dear Mr. Andrade-Plaza:

On 10/16/2017, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
Protocol Version 1.10.5.17.docx

Consent/Assent Document(s)*:
Parental Permission V #1.10.5.17.docx.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110. The research proposed in this study is categorized under the following expedited review category:
(6) Collection of data from voice, video, digital, or image recordings made for research purposes.

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Study involves children and falls under 45 CFR 46.404: Research not involving more than minimal risk.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

[Signature]

John Schinka, Ph.D., Chairperson
USF Institutional Review Board
Appendix H: USF IRB Informed Consent

Parental Permission for Children to Participate in Research Involving Minimal Risk and Authorization to Collect, Use and Share His/Her Health Information

Information for parents to consider before allowing your child to take part in this research study

Pro #00031521

The following information is being presented to help you and your child decide whether or not he/she wishes to be a part of a research study. Please read this information carefully. If you have any questions or if you do not understand the information, we encourage you to ask the researcher.

We are asking you to allow your child to take part in a research study called:
Using Contingency Maps to Teach Requests for Information

The person who is in charge of this research study is Roberto Andrade-Plaza. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. Roberto is being guided in this research by Dr. Andrew Samaha.

The research will be conducted at the Florida Autism Center.

Purpose of study:

The purpose of this study is to identify if contingency maps function as conditioned reinforcer for the purpose of establishing requests for information.

Why is your child being asked to take part?

We are asking your child to take part in this research study to see if a contingency map can be conditioned as a reinforcer, which in turn will allow your child to engage in appropriate responding (i.e., raise their hand) to obtain a reward.

Study Procedures:

If your child takes part in this study, s/he will be asked to:

Complete a preference assessment in order get an understanding of what the child is motivated to work for (e.g., pretzels, chips, cookies, or m&ms). Contingency maps, a visual strategy, will be placed in the child’s sight so that they are aware of the appropriate behavior they should engage in. This map will provide the child with the antecedent, the appropriate and problem behavior and their consequences. The map will indicate for the child to either press a green or a red button and contingent on their response they will get a piece of the item that they chose in the preference assessment. Later, hand-
raising will also be taught, in order for your child to gain access to the contingency map once it is not available.

There are a total of 5 phases, as the availability of reinforcement will change in each phase. However, the child will be responding in the same manner (i.e., raising hand and the selecting the colors of the button).

A study visit is one your child will have with the person in charge of the study or study staff. Most study visits will take about 5 min per session. Study visits will occur 1-5 times a week for the duration of up to 6 months. Each session will be videotaped. Data will be collected individually for your child at approximately the same time of day each day. The only person with access to these tapes will be the research team. After five years, the tapes will be destroyed.

**Total Number of Participants**

About 30 individuals will take part in this study at their respective homes or at the Florida Autism Center.

**Alternatives / Voluntary Participation / Withdrawal**

If you decide not to let your child take part in this study, that is okay. Instead of being in this research study your child can choose not to participate. You should only let your child take part in this study if both of you want to. You or child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

**If you decide not to let your child take part:**

- Your child will not be in trouble or lose any rights he/she would normally have.
- You child will still get the same services or health care benefits he/she would normally have.
- Your child can still get their regular treatments from his/her regular doctor.

You can decide after signing this informed consent form that you no longer want your child to take part in this study. We will keep you informed of any new developments which might affect your willingness to allow your child to continue to participate in the study. However, you can decide you want your child to stop taking part in the study for any reason at any time. If you decide you want your child to stop taking part in the study, tell the study staff as soon as you can.

**Benefits**

The potential benefits to your child include:

- The potential to reduce problem behaviors and teach alternative behaviors or new skills for your child.

**Risks or Discomfort**

The following risks may occur:

- Your child may be uncomfortable when routines are changed in order to help decrease problem behaviors and increase alternative behaviors. We will take every precaution to make sure that your child is safe, and that others around your child are safe.
- Your child may experience some loss of privacy during observations and videotaping by data collectors.
If you have any of questions or concerns, call Roberto Andrade-Plaza at 813.391.7862

Costs

It will not cost you anything to let your child take part in the study.

Privacy and Confidentiality

We will keep your child’s study records private and confidential. Certain people may need to see your child’s study records. Anyone who looks at your child’s records must keep them confidential. These individuals include:

- The research team, including the Principal Investigator, study coordinator, and all other research staff.
- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
- Any agency of the federal, state, or local government that regulates this research. This includes the Department of Health and Human Services (DHHS) and the Office of Human Research Protection (OHRP).
- The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.

We may publish what we learn from this study. If we do, we will not include your child’s name. We will not publish anything that would let people know who your child is.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Roberto Andrade-Plaza at 813.391.7862

If you have questions about your child’s rights, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.

Authorization to Use and Disclose Protected Health Information (HIPAA Language)

The federal privacy regulations of the Health Insurance Portability & Accountability Act (HIPAA) protect your child’s identifiable health information. By signing this form, you are permitting the University of South Florida to use your child’s health information for research purposes. You are also allowing us to share your child’s health information with individuals or organizations other than USF who are also involved in the research and listed below.

The following groups of people may also be able to see your child’s health information and may use that information to conduct this research:

- The medical staff that takes care of your child and those who are part of this research study;
- Each research site for this study including the Florida Autism Center
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance and the USF Health Office of Clinical Research.
• Data Safety Monitoring Boards or others who monitor the data and safety of the study.

Anyone listed above may use consultants in this research study, and may share your child’s information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your child’s health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your child’s information with others without your permission. They can only do so if permitted by law. If your information is shared, it may no longer be protected by the HIPAA Privacy Rule.

By signing this form, you are giving your permission to use and/or share your child’s health information as described in this document. As part of this research, USF may collect, use, and share the following information:
• Your child’s research record
• All of your child’s past, current or future medical and other health records held by USF, other health care providers or any other site affiliated with this study as they relate to this research project. This includes, but is not limited to records related to HIV/AIDS, mental health, substance abuse, and/or genetic information.

You can refuse to sign this form. If you do not sign this form your child will not be able to take part in this research study. However, your child’s care outside of this study and benefits will not change. Your authorization to use your child’s health information will not expire unless you revoke (withdraw) it in writing. You can revoke this form at any time by sending a letter clearly stating that you wish to withdraw your authorization to use your child’s health information in the research. If you revoke your permission:
• Your child will no longer be a participant in this research study;
• We will stop collecting new information about your child;
• We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with others, or we may need it to complete and protect the validity of the research; and
• Staff may need to follow-up with your child if there is a medical reason to do so.

To revoke this form, please write to:
Roberto Andrade-Plaza
12806 E. Wheeler Rd.
Dover, FL 33527
For IRB Study #00031521
RAndrade@mail.usf.edu

While we are conducting the research study, we cannot let you see or copy the research information we have about your child. After the research is completed, you have a right to see the information about your child, as allowed by USF policies. You will receive a signed copy of this form.

Consent for My Child to Participate in this Research Study & Authorization to Collect, Use & Share His/Her Health Information for Research

I freely give my consent to let my child take part in this study and authorize that his/her health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to let my child take part in research. I have received a copy of this form to take with me.
Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their child’s participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.