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A comparison of edible, social, and no contrived reinforcement on the acquisition of a behavior chain

Kimberly Flint
Northeastern University

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**A Comparison of Edible, Social, and No Contrived Reinforcement on the
Acquisition of a Behavior Chain**

A Thesis Presented

by

Kimberly Flint

Department of Counseling and Applied Educational Psychology

In partial fulfillment of the requirements

for the degree of

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Bouve College of Health and Sciences Graduate School

Thesis Title: A Comparison of Edible, Social, and No Contrived Reinforcement on the Acquisition of a Behavior Chain

Author: Kimberly Mariah Flint

Department: Counseling and Applied Educational Psychology

Approved Thesis Requirements of Masters of Sciences Degree

Julie S. Weiss

Date

Paula Braga-Kenyon

Date

William H. Ahearn

Date

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Kimberly Flint

B.L.A., University of Massachusetts Lowell

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Abstract

Reinforcement is used by applied behavior analysts to increase the future frequency of responding. Finding effective reinforcers is important to increase the frequency of behavior. Not all people learn with the same type of reinforcers. Some people can be taught skills using conditioned reinforcers such as grades or parental praise after a report card is sent home. For people with learning disabilities, learning with direct and immediate reinforcers are often necessary. When developing schedules of reinforcement as part of a skill acquisition program, consideration should be given to the type of reinforcers that are comparatively more effective, whether it be social or edible reinforcers. The unanswered question is: can the learner master the task without programmed reinforcement and does past learning history have an effect on skill acquisition? The purpose of the current study was to determine the comparative effects of edible, social, and no programmed reinforcement on the acquisition of behavior chains. Three Lego[®] constructs were compared in an alternating treatments design. Each construct was associated with either with an edible reinforcer, a social reinforcer, or no contrived reinforcer delivery contingent upon completion of the training steps of a behavior chain. An alternating treatments design was implemented to compare the three constructs which were taught to two participants. The results do not indicate any one type of reinforcer as a more effective reinforcer to use with the acquisition of a behavior chain. All two participants, however, did learn each construct. Practitioners should choose reinforcers carefully using reinforcer assessments, and evaluate the most appropriate reinforcer for the task being taught.

A Comparison of Edible, Social, and No Contrived Reinforcement on the
Acquisition of a Behavior Chain

Reinforcement is a procedure used by applied behavior analysis practitioners to increase the future frequency of responding (Cooper, Heron & Heward, 1987). The procedure entails that following a response, a stimulus is presented or removed, and the effects on the frequency of responding are observed. Before a stimulus can be used for skill acquisition, however, a reinforcer assessment should be conducted to determine if a stimulus is a reinforcer (Mace, Ivancic, Edwards, Iwata, & Page (1985).

Reinforcer assessments are conducted to determine whether or not a stimulus is a reinforcer. The results may be used to compare stimuli in terms of a hierarchy of effective reinforcers. Effective reinforcers found in the experimental setting may then be used in the applied setting, such as in the classroom, to promote skill acquisition.

Reinforcers can be classified by origin as either unconditioned or conditioned (Cooper, 2007, p. 269). A reinforcer is unconditioned when the learner has no learning history with the stimulus, or it has not become conditioned through the process of conditioning reinforcers. The reason the stimulus is an unconditioned reinforcer is because of the evolution of our species (Malott, Tillema, & Glenn, 1978). For example, food is an unconditioned reinforcer. A previously neutral stimulus, however, may become a conditioned reinforcer through “stimulus-stimulus” pairing. For instance, if a token is a neutral stimulus, it can become a reinforcer through multiple pairings with an edible that is a reinforcer.

Another way to classify a reinforcer is by its effect on behavior by using it as either a positive or negative reinforcer. A positive reinforcer is a stimulus that is presented contingent upon a response, as opposed to a negative reinforcer which is a stimulus that is removed contingent upon a response (Cooper et al., 2007, p. 36), and the consequence for both is an increase in the frequency of the response.

Lancioni (1982) used direct edibles as positive reinforcers to increase social responses of three mentally retarded children, one male and two female, when taught the social responses by their typically developing peers, called “tutors”. During Phase 1, the edibles were paired with verbal praise on a continuous schedule of reinforcement (CRF). In addition, the tutors modeled the behavior and reinforcement to each other (called vicarious reinforcement). Then, in Phase 2, the vicarious reinforcement was eliminated systematically as appropriate social responses occurred, and the verbal praise paired with edible reinforcement continued to be delivered on a CRF schedule. Tokens were then exchanged for the edibles, first on a CRF schedule and then systematically faded to one token per session, with trade-ins being available only after four sessions. The edibles were then phased out from being directly given contingent upon responding, and tokens were replaced as the direct reinforcement, which could then be traded in for edibles.

Social reinforcers could possibly be unconditioned, such as the human touch (Cooper et al., 2007, p. 273). Many social reinforcers are conditioned, and can be delivered immediately following a correct response. Examples include physical contact (e.g., head rubs, tickles), attention (e.g., eye contact, head nod), and praise (e.g., saying, “nice job” or “wow, good work”).

Although social enthusiasm is very common, its reinforcer value should not be overestimated. The effects of teacher enthusiasm were evaluated in a study with 12 students diagnosed with an ASD (Natof, & Romanczyk, 2008). The students were evaluated during two conditions. One condition, high attention, was designed to maximize teacher attention, while the low attention condition was designed to minimize teacher attention. Inspection of the data revealed that only one student showed better performance under the high attention condition, while only one student displayed better performance under the low attention condition. Interestingly, when teachers were asked about how they thought the students performance, they said they believed that all students displayed better performance in the high attention condition. Assuming a social stimulus is a reinforcer is cautioned. Reinforcer assessments should always be conducted when a stimulus is being considered for a reinforcer in a program.

Deci (1971) published an article in the *Journal of Personality and Social Psychology*. He discussed reinforcement in terms of extrinsic and intrinsic reinforcement. According to the author, an intrinsic reinforcer is one that is related to the response in a natural way. For example, a teenager washes his car each week without any apparent reinforcement in the environment other than doing the activity itself. Therefore the task of washing the car is intrinsically reinforcing. An extrinsic reinforcer is arbitrarily related to the response that produces it. Using the same example, if the teenager was paid for washing the car, he may wash it more often to get more money. Being paid the money is the extrinsic reinforcement, and the task is now extrinsically motivated.

Behavior analysts also talk about intrinsic motivation, but we use terms such as automatically reinforcing, or the behavior being maintained by the natural consequences of the response. Fading the extrinsic reinforcers is something practitioners try to do.

Finding effective reinforcers is important to teach skills. Not all individuals learn with the same type of reinforcers. In addition, time and again students work through extinction conditions during reinforcer assessments, or demonstrate compliance on tasks with no planned reinforcer delivery. This raises the question of what effect does external or planned reinforcers have on skill acquisition. Can a learner master a task without planned reinforcers?

The purpose of the current study was to determine the comparative effects of edible, social, and no programmed reinforcers on the acquisition of behavior chains. The three conditions were assessed with two participants using Lego[®] constructs. Results were used in a discussion of the effects of the different types of reinforcers.

Method

Participants

Two individuals with a diagnosis of an ASD participated in the study. Greg was an 8-year-old boy and had a history of learning tasks with behavior chaining. He was a vocal student and could follow multi-step directions. Nathan was an 11-year-old boy. He also had a history of learning multi-step tasks using behavior chaining. He used vocal approximations and a communication device to express his needs.

Both participants attended a day school program specializing in teaching children with ASD. They both could complete pre-requisite skills including fine motor skills necessary for attaching Lego[®] blocks together.

Settings and Materials

Sessions were conducted at the participants' school at their regular desks. The area contained a table and chairs at which the participants were seated. Other materials included data sheets, pen, a video camera, two timers, a small plastic container, edibles, and Lego[®] blocks.

Independent and Dependent Variables

The independent variables were prompting using three types of reinforcers contingent upon completion of the training step: Edible reinforcers, social reinforcers, and no planned reinforcers. The dependent variables were the number of sessions completed to mastery, the number of trials to mastery, and the number of errors per condition.

Interobserver Agreement, Response Measurement and Procedural Integrity

Data were collected during sessions by the experimenter. Interobserver agreement and procedural integrity data were collected during at least 33% of sessions during the reinforcer assessments and 34% of the experimental conditions. A second trained observer collected data on correct trials of agreement by watching video tapes of the sessions. The total number of trials were divided by the total number of trials with agreement and multiplied by 100 to get the trial-by-trial IOA percentage.

IOA for both participants were 100% and 100% for both the edible and the social reinforcer assessments. IOA for was 97% for Greg and 98% for Nathan.

Procedural integrity was collected for 34% of the experimental conditions. Procedural integrity was collected on correct reinforcement deliveries, correct prompting delivered, error correction, and correct implementation of prompts and steps prescribed

by the experimenter. Procedural integrity was 100% for experimenter working with Greg and 100% for the experimenter working with Nathan.

Procedure

Three edibles and three social stimuli were chosen for each participant following completion of a reinforcer assessment for individuals with severe disabilities (RAISD) that was completed by each participant's caregivers (Fisher, Piazza, Bowman, & Almari, 1996). Based on Smaby, MacDonald, Ahearn, and Dube (2007), the stimuli were then assessed to determine if they were reinforcers.

Edible Reinforcer Assessment. Three conditions were compared to assess which edible stimuli functioned as reinforcers. The three edibles that were assessed for Greg were carrots, apple, and cucumber. The three edibles assessed for Nathan were Oreos, chips, and ice cream. The target response was touching a green target. Sessions were conducted in an ABCBDB design, and each session was replicated once. Contingent on touching the target, the experimenter delivered the specified edible stimulus. During the extinction condition, no programmed reinforcement were delivered contingent on touching the target.

Social Reinforcer Assessment. The social reinforcer assessment was similar to the edible reinforcer assessment. The only difference was that social stimuli chosen from the RAISD were used instead of edible stimuli during the stimulus contingent sessions. The social stimuli were verbal praise, high fives and thumbs up for Greg, and high fives, tickles, and verbal praise for Nathan.

Baseline. A baseline was conducted for each participant prior to the beginning of training for each Lego[®] construct. Each Lego[®] construct was presented to the participant one at a time. The experimenter stated, “Let’s build Legos[®].” Each baseline session ended with the first error or after 15 seconds of no responding. If the participant built the construct independently, a new participant would have been found.

Training Sessions. The behavior chain was taught using a forward chaining method with most-to-least prompting with a 2 second delay (Libby, Weiss, Bancroft, & Ahearn, 2008). Sessions were conducted two to three times per day, four to five days per week, using an alternating treatments design.

Each session consisted of one probe trial and ten training trials. During the probe trials, there were no prompts and no programmed reinforcement. The participant was presented with all the materials for the specific Lego[®] construct. The experimenter stated, “Let’s build Legos[®].” The probe continued until the first error or 15 seconds of no responding. If the construct was mastered in the probe trial, a second probe trial was conducted to determine mastery. Training began if the participant did not complete the Lego[®] construct in the probe trial. Each trial was initiated at a specific training step which was determined by the last trial of the previous sessions. At the end of each trial, the experimenter removed all the materials. The remaining steps in the chain after the training step were not completed.

The criterion to use less restrictive prompting was two correct responses at the prescribed step. The criterion to increase to more restrictive prompting was two incorrect responses at the prescribed prompt. If two consecutive incorrect responses occurred on a previously mastered step, training was re-started at the previously mastered step with full

manual guidance. To train the next advanced step, two consecutive independent responses must have been made at the prescribed step.

Contingent Edible Reinforcement Condition. During training, the experimenter stated, “Let’s build Lego’s®.” Contingent upon correct responding on the training step, edible reinforcement was delivered. The remainder of the steps in the chain were not completed.

Contingent Social Reinforcement Condition. During training sessions, the experimenter stated, “Let’s build Lego’s®.” Contingent upon correct responding on the training step, social praise was delivered. The remainder of the steps in the chain were not completed.

No Contrived Reinforcement Condition. During training sessions, the experimenter stated, “Let’s build Lego’s®.” Contingent upon correct responding on the training step, no contrived reinforcement was delivered to either participant. Instead, the experimenter paused with hands blocking any more responses on the Lego® construct for two seconds to indicate the end of the trial. The rest of the steps in the chain were not completed.

Generalization. After mastery of a Lego® construct (16/16 independent responses for two consecutive sessions) generalization was assessed. A novel experimenter in a novel setting tested the participant for mastery of the Lego® construct. The novel experimenter stated, “Let’s build Lego’s®.” The criteria for meeting generalization was independent and accurate responses on all 16 steps of the Lego® construct with the novel experimenter in the novel setting.

Results

Figure 1 depicts the edible reinforcer assessment for Greg. There was no responding (touching the target) during the last minute of the extinction sessions. The number of responses during the first set of presentations were 18 responses in the carrots condition, 19 responses in the apples condition, and 19 responses in the cucumbers condition. There were 29, 21, and 23 responses for the second set of presentations, respectively. The item with the most average responses was carrots with 23.5 responses, and was therefore chosen for the study.

Figure 2 depicts the social reinforcer assessment for Greg. There was no responding (touching the target) during the last minute of each extinction condition. The average number of responses across conditions for verbal praise, high fives, and thumbs up were 30, 23, and 8, respectively. Since the verbal praise condition had the most average responses, it was chosen for the study.

Figure 3 depicts the edible reinforcer assessment for Nathan. There was no responding (touching the target) during the last minute of each extinction condition. The items chosen from the RAISD that were assessed in the reinforcer assessment were Oreos, chips, and ice cream. The item with the most average responding between the two conditions was chips with 18, followed by Oreos and ice cream with an average of 15 and 8 responses, respectively. Chips were therefore chosen for the study.

Figure 4 depicts the social reinforcer assessment for Nathan. There was no responding (touching the target) during the last minute of each extinction condition. The item with the most average responding across conditions was tickles with an average of 15 responses. Next was high fives with an average of 13.5 responses across conditions,

followed by verbal praise with an average of 6 responses across conditions. Ticks were therefore chosen for the study.

Figure 5 depicts the sessions to mastery for the edible reinforcement, social reinforcement, and no contrived reinforcement conditions for Greg. Greg mastered the Lego[®] construct associated with social reinforcement in fewer sessions than the other conditions with 33 sessions to mastery. He mastered the Lego[®] construct associated with no contrived reinforcement in 40 sessions, and mastered the Lego[®] construct associated with edible reinforcement in 41 sessions.

At session 78 there was a significant drop in independent steps with the no contrived reinforcement condition. There was a minor confound with the Lego[®] construct that was discovered when this occurred. There were two steps, step 11 and 12, in the no contrived reinforcement condition that were similar in color to steps 12 and 13 of the social reinforcement condition. Although Greg was mastering the task associated with no contrived reinforcement condition faster, when he mastered the steps 12 and 13 of the social reinforcement condition, he began making errors on the two constructs. The constructs were adjusted and training continued.

Figure 6 depicts the sessions to mastery for the edible reinforcement, social reinforcement, and no contrived reinforcement conditions for Nathan. Nathan mastered the Lego[®] construct associated with the edible reinforcement in 21 sessions. Nathan mastered the Lego[®] construct associated with social reinforcement in 22 sessions, followed by the Lego[®] construct associated with no contrived reinforcement in 24 sessions.

Figure 7 depicts the trials to mastery for all three conditions for Greg. The number of trials to mastery were 332 trial for the social reinforcer condition, 392 trials for the no contrived reinforcement condition, and 399 trials for the edible reinforcement condition.

Figure 8 depicts the trials to mastery for all three conditions for Nathan. The number of trials to mastery for the edible reinforcement condition was 197 trials, followed by social reinforcement with 212 trials, and no contrived reinforcement with 236 trials.

Table 1 depicts the errors for all three conditions for both participants. Greg made a total of 117 errors in the social reinforcement condition, 143 errors in the no contrived reinforcement condition, and 176 errors in the edible reinforcement condition. The average errors per session were 2.84 for the social reinforcement condition, 2.27 in the no contrived reinforcement condition, and 2.74 in the edible reinforcement condition. Nathan made a total of 74 errors in the edible reinforcement condition, 97 errors in the social reinforcement condition, and 100 errors in the no contrived reinforcement condition. The average errors per session were 2.67 for the edible reinforcement condition, 2.18 in the social reinforcement condition, and 2.36 in the no contrived reinforcement condition.

Discussion

Reinforcement is essential to increase behavior. Practitioners choose carefully the type of reinforcement that is to be used, making sure to do reinforcer assessments to find appropriate reinforcers. Using contrived reinforcers is often essential in the learning

environment, especially for children with learning disabilities (Cooper et al., 2007, p. 274).

Both participants in the current study mastered all three Lego[®] constructs. Greg acquired the Lego[®] construct associated with social reinforcer first, followed by the no contrived reinforcer, and finally the edible reinforcer. Nathan acquired the Lego[®] construct associated with the edible reinforcer first, followed by the social reinforcer, and lastly the no contrived reinforcer.

Past research has shown that edible reinforcers are effective to increase behavior and acquire new skills (Lancioni, 1982). Edible reinforcers are an effective form of reinforcer for many individuals. They are often preferable when there is an immediate intent to increase the frequency of a behavior. Edibles are often a desired reinforcer when teaching a new skill. As shown in the current study, edible reinforcers were effective in aiding acquisition of the Lego[®] constructs. However, they can be socially stigmatizing, as in the classroom setting not every child receives an edible for each correct response. Effort should be made to fade out the edible reinforcers by pairing them with social reinforcers, and eventually fading out contrived reinforcement so the behavior comes into contact with the natural reinforcers in the environment.

When possible, social reinforcers should be used because it comes closest to the natural reinforcers in the environment. Using social reinforcers may assist with generalization, making the need for contrived reinforcers to be faded out altogether, and an easy transition to the natural consequences of the environment. Past research has shown, however, that the use of social reinforcers should be cautioned (Natof & Romanczyk, 2008) and reinforcer assessments should be conducted to confirm the

reinforcing value of a stimulus. As shown in the current study, all stimuli used were first evaluated in reinforcer assessments, and then used for the reinforcers during the task acquisition.

For the current study, a basic reinforcer assessment was conducted based on Smaby et al. (2007). For Greg, carrots, apples, and cucumbers were compared in an edible reinforcer assessment while verbal praise, high five, and thumbs up were compared in a social reinforcer assessment. The most powerful reinforcers found were carrots and cucumbers. Interesting to note is that across conditions the condition with carrots as a reinforcer there was an average of 18 responses, while in the condition with verbal praise there was an average 30 responses. Both assessments were conducted the same way except for the stimulus that was presented contingent upon a response. The social reinforcer used in the current study was more effective during the initial reinforcer assessments than the edible reinforcer. When compared with the results of the training with the Lego[®] constructs, it may not be surprising that Greg mastered the construct associated with verbal praise before the construct associated with the carrots. Future research could use the initial reinforcer assessments to attempt to find an edible and a social stimulus that are as equally reinforcing and then assess them during the training. This may make comparing the results on the acquisition of the Lego[®] construct behavior chains more equally balanced. The implication of these results is that when comparing the effectiveness of reinforcers for a particular task acquisition, attention should be paid to the responses per condition across all conditions. Since one reinforcer may be more effective than another, it could be used for a skill that is more difficult, and other reinforcers could be used for easier tasks.

Nathan's initial reinforcer assessment results indicated that chips and tickles were most reinforcing for the edible and social reinforcer assessments, respectively. With an average of 18 responses for the chips and an average of 15 responses for the tickles, there was not a big difference between the number of responses for each stimulus.

During the training, Nathan refused the chips and asked for the Oreos. After the first request, a choice was offered between the two items before each session, and Nathan chose to earn Oreos for the remainder of the Lego[®] training. Satiation may have occurred during one session. Nathan refused all edible reinforcers after six trials, and continued to refuse edibles for the remainder of the session. This did not happen for the remainder of the study. Practitioners should consider the effects of satiation and possibly offer choices from a reinforcer list they have acquired for a student or learner.

Nathan mastered the Lego[®] construct associated with edible reinforcers the quickest, followed closely by social reinforcer followed by no contrived reinforcers. During the beginning of training, he was mastering the steps in all three constructs at a slow and steady pace. A clear split in terms of the rates of mastering steps for each construct occurred around session 24, where Nathan began to master more steps of the edible reinforcers condition. Around session 42, there was a decrease in mastered steps, and this could be due to a weeklong vacation prior to these sessions where no sessions were conducted.

Both participants mastered constructs associated with different types of reinforcers first: social reinforcer for Greg and edible reinforcer for Nathan. However, those constructs were the same color construct, green. In addition, the construct both participants mastered next, no contrived reinforcer for Greg and social reinforcer for

Nathan, was the yellow Lego[®] construct. The Lego[®] construct both participants mastered last was the red construct.

The results of these data do not distinctively show that any type of reinforcers is more effective than another. However, a number of factors could have produced these results. The results could be because of the type of reinforcers used for each condition, individual differences, the difficulty of the Lego[®] constructs, or possibly because of unknown environmental factors. In the future, researchers should use more participants to be clear if the results were because of the difficulty level of the Lego[®] construct or because of the type of reinforcers used for the behavior acquisition.

Automatic reinforcers associated with past learning histories could explain the results that both participants mastered the Lego[®] construct associated with the no contrived reinforcement condition. The history of learning tasks using behavior chaining and the long history of having programmed social and edible reinforcers in the learning environment may have played a role in aiding the acquisition without contrived reinforcement.

Another possible explanation for the participant's mastering the Lego[®] construct associated with the no contrived reinforcers condition is carryover effects. Because of the rapid alteration of the training conditions, one condition having an effect on another condition is a possibility. A way to test to assure effectiveness of a reinforcement contingency would be to use the reinforcement contingency to be found most effective with another Lego[®] construct and measure number of trial to acquisition.

A limitation to this study should be considered when discussing the results of the Lego[®] tasks for Greg. He was mastering the steps of the Lego[®] construct associated with

no contrived reinforcers at a steady pace and he had mastered more steps of this construct than the others when a confound occurred. Around step 12, the Lego[®] constructs associated with no contrived reinforcers and social reinforcers had two very similar steps in terms of color. Greg made multiple errors with the Lego[®] construct associated with no contrived reinforcers on these steps until the confound was corrected. However, during this time Greg mastered the Lego[®] construct associated with social reinforcers. Therefore, although it is clear Greg mastered the Lego[®] construct associated with edible reinforcers last, it is not clear if he would have mastered the construct associated with social reinforcement or no contrived reinforcers first. The confound was fixed for Nathan.

Reinforcement is pivotal for increasing behavior. Every behavior has a consequence, and sometime the natural consequences in the environment are not enough to sustain behavior, especially when learning new tasks in the learning environment.

Children diagnosed with an ASD may especially need contrived reinforcers such as social praise because often their social repertoire is underdeveloped. Using social reinforcers can aid in establishing appropriate social interactions not only in a discrete trial setting, but also in the incidental teaching setting. These reinforcers can be generalized into all environments, not just the classroom environment. The ultimate goal for using contrived reinforcers is to fade it so behaviors come into contact with the natural consequences in the environment.

References

- Cooper, J.O., Heron, T.E., & Heward, W.L. (2007, 1987). *Applied Behavior Analysis Second Edition*. Upper Saddle River, NJ: Pearson Education, Inc.
- Deci, E. L. (1971). Intrinsic motivation, extrinsic motivation, and inequity. *Journal of Personality and Social Psychology*, 22, 113-120.
- Fisher, W. W., Piazza, C. C., Bowman, L. G., & Almari, A. (1996). Integrating caregiver report with a systematic choice assessment to enhance reinforcer identification. *American Journal on Mental Retardation*, 101, 15-25.
- Libby, M. E., Weiss, J. S., Bancroft, S., & Ahearn, W. H., (2008). A comparison of most-to-least and least-to-most prompting on the acquisition of solitary play skills. *Behavior Analysis in Practice*, 1, 37-43.
- Lalli, J. S., Vollmer, T. R., Progar, P. R., Wright, C., Borrero, J., Daniel, D., Barthold, C. H., Tocco, K., & May, W. (1999). Competition between positive and negative reinforcement in the treatment of escape behavior. *Journal of Applied Behavior Analysis*, 32, 285-296.
- Lancioni, G. E. (1982). Normal children as tutors to teach social responses to withdrawn mentally retarded schoolmates: training, maintenance, and generalization. *Journal of Applied Behavior Analysis*, 15, 17-40.
- Mace, G. M., Ivancic, M. T., Edwards, G. L., Iwata, B. A., Page, T. J. (1985). Assessment of stimulus preference and reinforcer value with profoundly retarded individuals. *Journal of Applied Behavior Analysis*, 18, 249-255.
- Malott, R. W., Tillema, M., & Glenn, S. (1978). *Behavior Analysis and behavior modification: An introduction*, MI: Behaviordelia.

Natof, T. H. & Romanczyk, R. G. (2008). Teaching students with ASD: Does teacher enthusiasm make a difference? *Behavioral Interventions*, 24, 55-72.

Smaby, K., MacDonald, R. P. F., Ahearn, W. H., & Dube, W. V. (2007). Assessment protocol for identifying preferred social consequences. *Behavioral Interventions*, 22, 311-318.

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	Edible Reinforcement			Social Reinforcement			No Contrived Reinforcement		
	Total Sessions	Total Errors	Avg. Errors Per Session	Total Sessions	Total Errors	Avg. Errors Per Session	Total Sessions	Total Errors	Avg. Errors Per Session
Greg	399	176	2.27	332	117	2.84	392	143	2.74
Nathan	197	74	2.67	212	97	2.19	236	100	2.36

Table 1. Errors for the edible reinforcement, social reinforcement, and no contrived reinforcement conditions for Greg and Nathan.

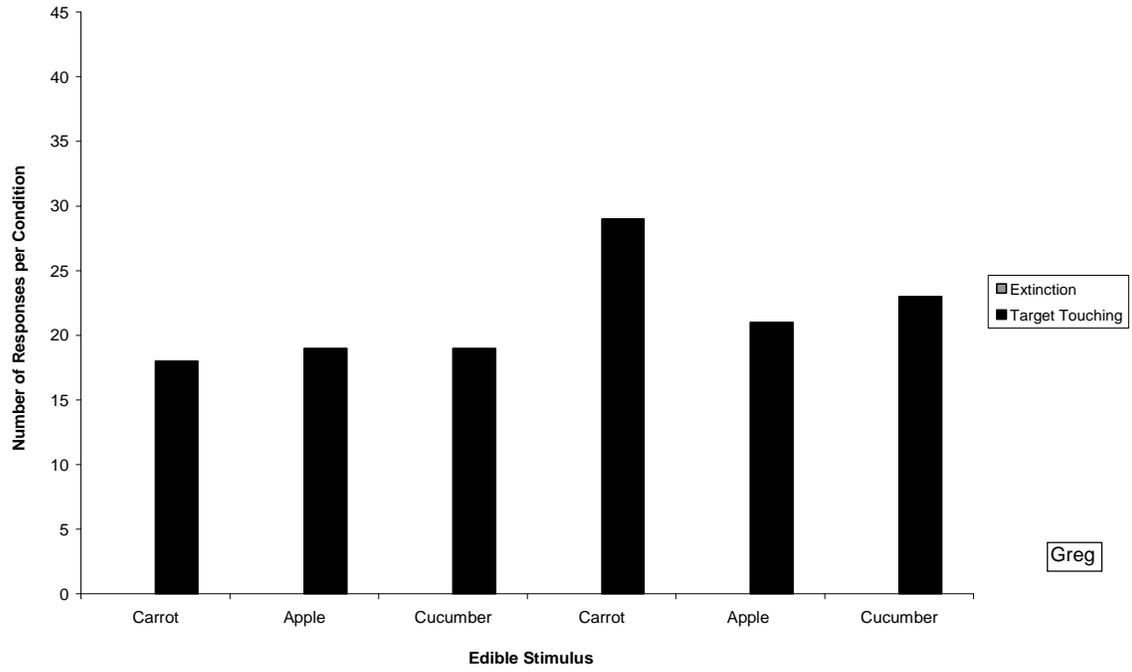


Figure 1. Edible reinforcer assessment for Greg.

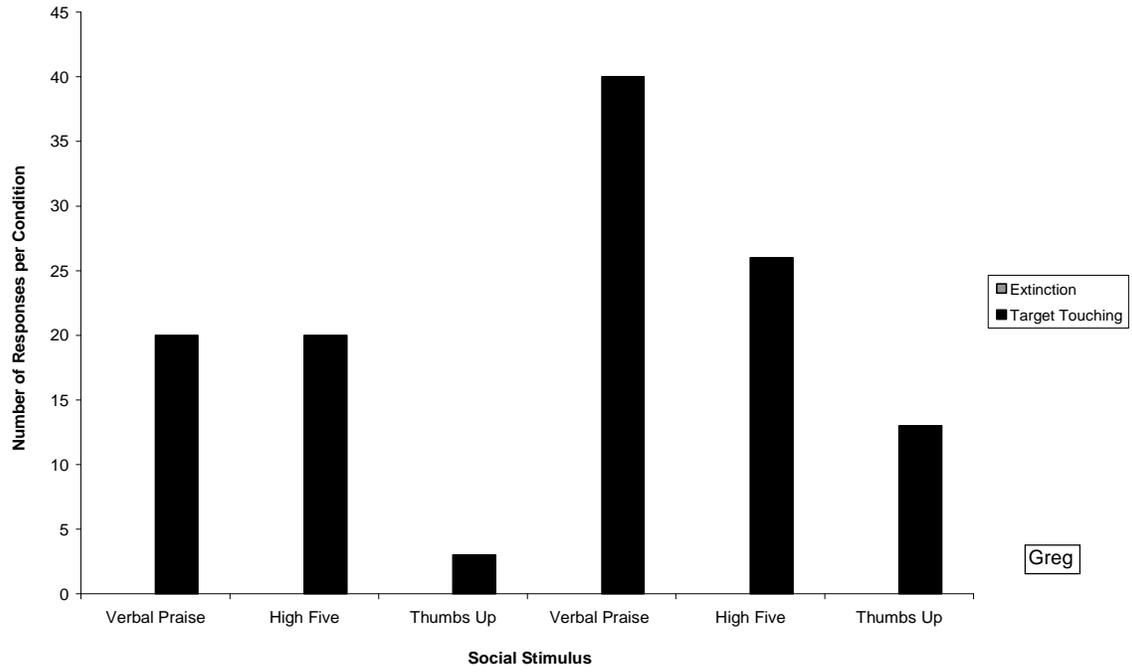


Figure 2. Social reinforcer assessment for Greg.

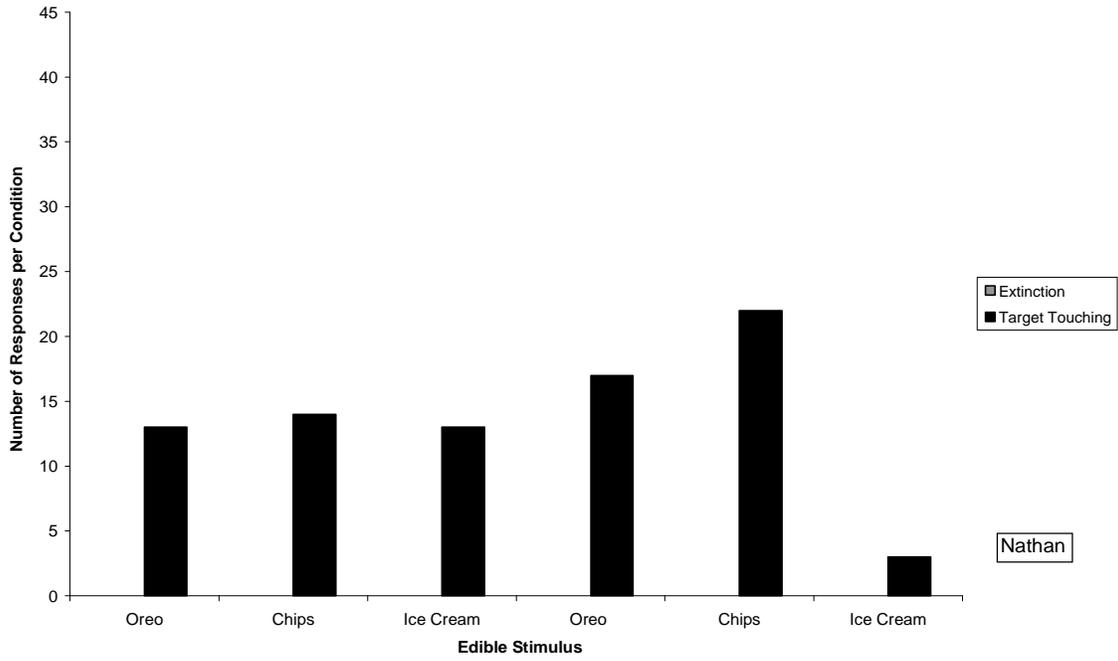


Figure 3. Edible reinforcer assessment for Nathan.

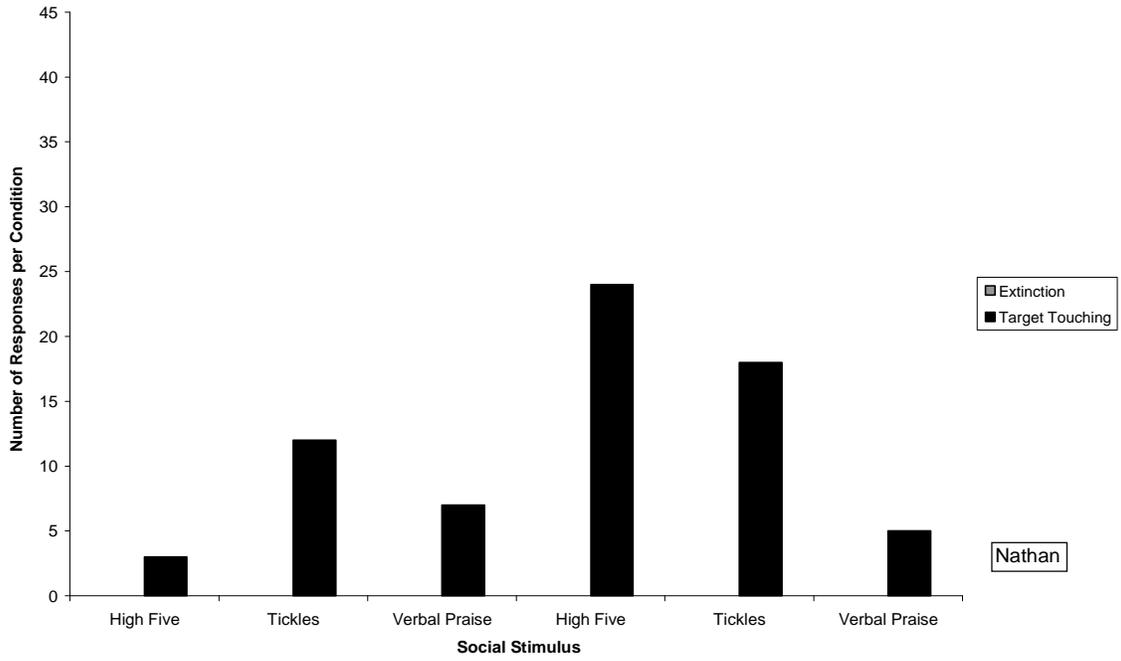


Figure 4. Social reinforcer assessment for Nathan.

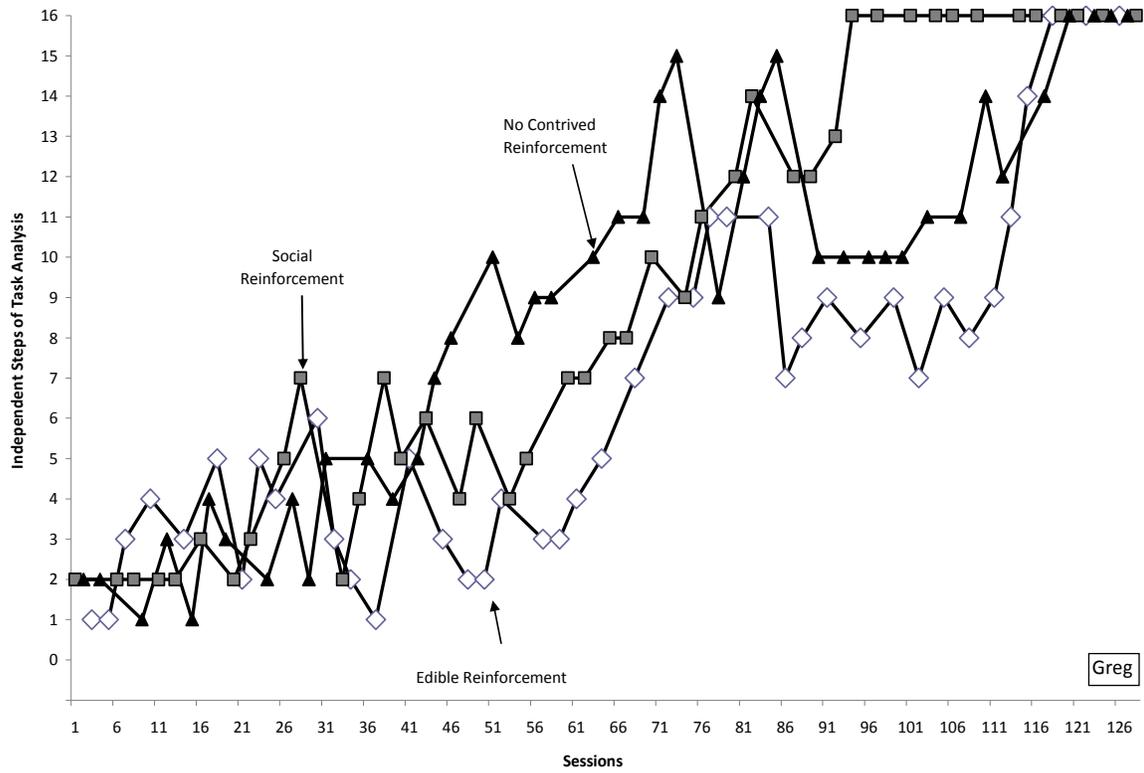


Figure 5. Sessions to mastery for the edible reinforcement, social reinforcement, and no contrived reinforcement conditions for Greg.

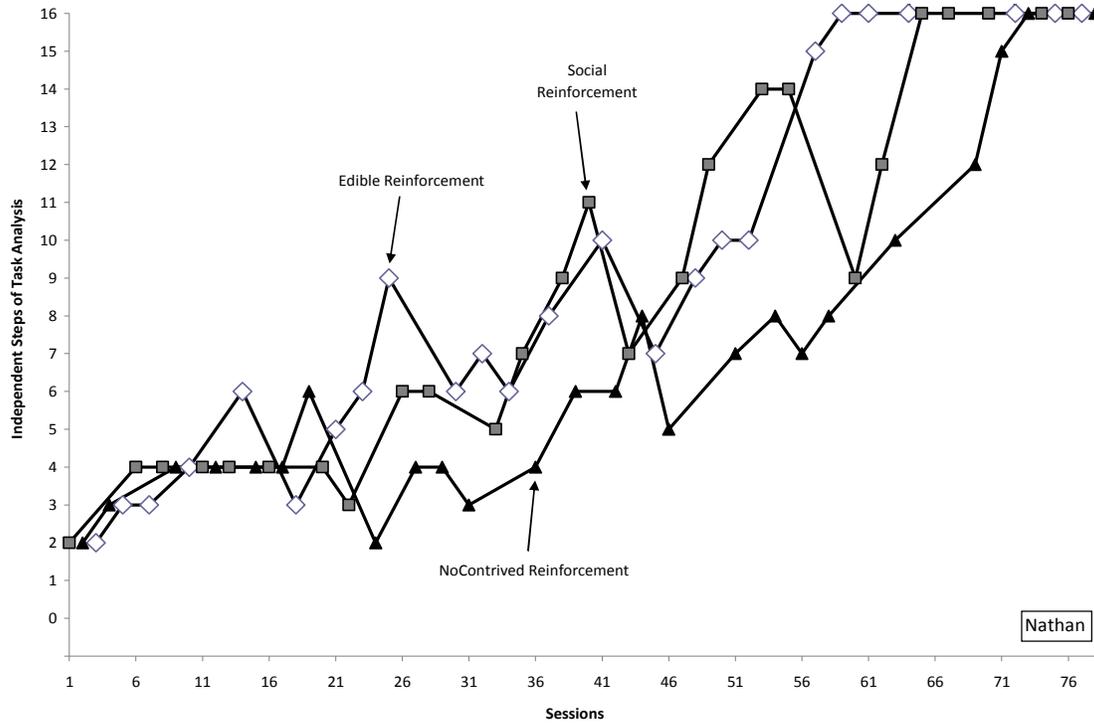


Figure 6. Sessions to mastery for the edible reinforcement, social reinforcement, and no contrived reinforcement conditions for Nathan.

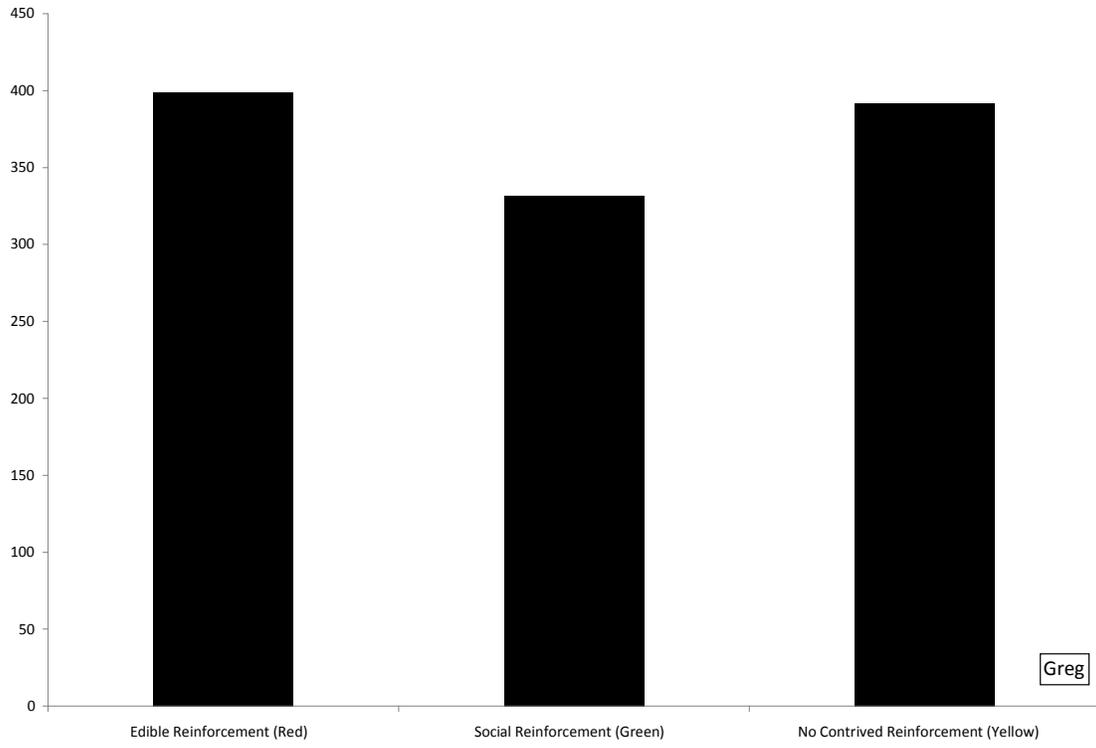


Figure 7. Trials to mastery for Greg.

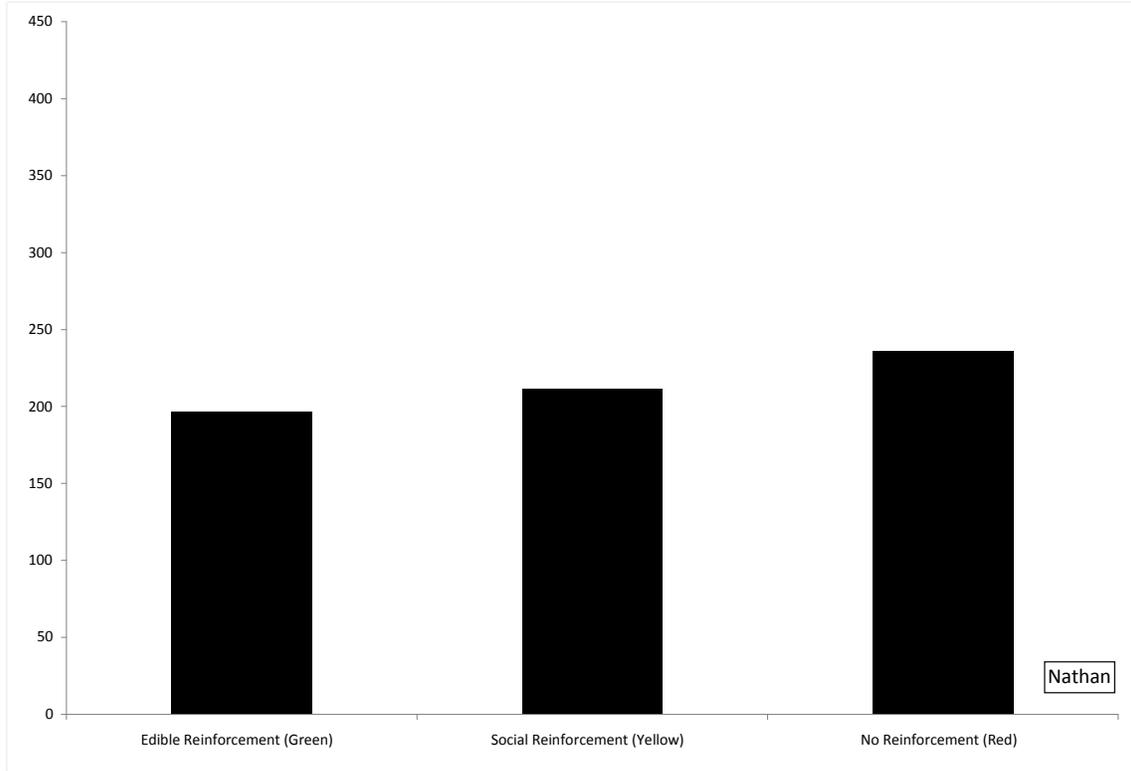


Figure 8. Trials to mastery for Nathan.