TRAINING BEHAVIOR TECHNICIANS TO IMPLEMENT NATURALISTIC OBJECT IMITATION USING BEHAVIORAL SKILLS TRAINING

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A THESIS

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

Applied Behavior Analysis-Master of Arts

ABSTRACT

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The purpose of this study was to evaluate the effects of Behavioral Skills Training (BST) on teaching behavior technicians to implement imitation training, in the form of naturalistic behavioral interventions, to a confederate adult. Using a concurrent multiple baseline across participants design, participants were exposed to baseline conditions and given the instruction to teach the adult confederate how to imitate. Then, participants were exposed to a single BST session. Following BST, participant behavior was monitored further in the presence of the confederate. Results suggest BST resulted in an improvement in imitation training for all three participants. Limitations and future directions are discussed.

Keywords: training, imitation, behavioral skills training, behavior technicians, naturalistic developmental behavioral intervention

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KEY TO ABBREVIATIONS

- ASD Autism Spectrum Disorder
- NDBI Naturalistic Developmental Behavioral Intervention(s)
- ABA Applied Behavior Analysis
- DTT Discrete Trial Training
- SPA Stimulus Preference Assessment(s)
- BST Behavioral Skills Training
- IOA Interobserver Agreement

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by impairments in social communication and restricted, repetitive patterns of behavior, interests, or activities. (American Psychological Association, 2013). These deficits may result in underdeveloped skill repertoires children require for social interactions and language development. One way to address ASD deficits is through behavioral interventions. Behavioral interventions have been shown to be effective to increase skill repertoires in individuals with ASD (MacDonald et al., 2014).

One type of behavioral intervention is naturalistic developmental behavioral interventions (NDBIs) (see Schreibman et al., 2015). NDBIs capitalize on naturally occurring learning opportunities within the child's natural environment, and as a result help to promote skill generalization (Jimenez-Gomez et al., 2019). Therefore, it is important to incorporate NDBIs as a teaching strategy with children.

A requisite skill for NDBIs is imitation (Ingersoll, Lewis, & Kroman, 2007). Imitation skills are important for social-communication skill development, and imitation skills are often observed early in development for young children (Warreyn, Van Der Paelt, & Roeyers, 2014). Without a strong imitation repertoire, the child's developmental growth can be restricted (Ingersoll, 2010). Therefore, it is important to train providers (e.g., behavior technicians) on behavioral interventions to accurately implement imitation training strategies in order improve social and communication outcomes in children with ASD.

Given the importance of imitation training, it is critical to train behavior technicians to implement imitation training procedures accurately. Fortunately, there is an emerging body of

work that has evaluated the effects of training on teaching people to implement behavioral interventions. For example, researchers have evaluated strategies to teach instructors to conduct discrete trial training (DTT) and preference assessments correctly (Gerencser et al., 2018; Marano et al., 2020; Sump et al., 2018). For example, Gerencser and colleagues (2018) evaluated an asynchronous training strategy to be used when teaching paraprofessionals to implement DTT. Marano and colleagues (2020) assessed the effects of trainees observing and rating the accuracy of others implementing a paired-stimulus preference assessment (SPAs) on their own implementation of a paired-stimulus preference assessment. Sump and colleagues (2018) extended previous research on teaching DTT procedures using Behavioral Skills Training (BST) in-person and via telehealth. Each of these studies resulted in increase in fidelity of implementation by participants.

Behavioral Skills Training and Naturalistic Developmental Behavioral Interventions

BST is an evidence-based treatment package consisting of four primary components: instruction, modeling, rehearsal, and feedback (Miltenberger, 1997). BST has been argued to be the most effective intervention of the beforementioned procedures in producing instructor behavior change (Slane & Liberman-Betz, 2021). BST has been shown to improve behavior in multiple different practice-related domains. For example, teaching to behavior technicians graphing skills (e.g., Kranak et al., 2018), to conducting preference assessments (e.g., Lavie & Sturmey, 2008), and implementing functional analyses (e.g., Iwata et al., 2000). However, one of the most studied applications of BST on interventionists of people with ASD and developmental disabilities is in the application of DTT (e.g., Ahearne & Beaulieu, 2018; Dart et al., 2017; Nosik et al., 2013; Sarokoff & Sturmey, 2004). Therefore, BST is likely well suited to address matters related to instruction of implementation of behavioral interventions.

In one notable example, Jimenez-Gomez and colleagues (2019) evaluated the effects of BST on teaching instructors to implement NDBIs. During intervention, instructor behaviors were scored as either positive (skills to develop) or negative (behaviors to decrease). Results showed higher rates of positive behaviors after the implementation of BST. Additionally, instructors demonstrated generalization to clients whom they had never worked with following intervention.

One limitation of Jimenez-Gomez et al. (2019) is that a steady state of baseline performance by participants was not established prior to the implementation of BST (Sidman, 1960). Therefore, it is unclear to what extent participants improvements were a result of BST or were subject to influence from history or maturation (see Ledford & Gast, 2018). Another limitation is that Jimenez-Gomez et al. taught participants to implement NDBIs, broadly defined. However, no specific type of focused intervention (e.g., imitation training) was evaluated. Therefore, it is important to evaluate the effects of BST in teaching a specific type of NDBI, such as imitation training. Further, Jimenez-Gomez et al. did not report procedural fidelity and therefore the extent to which BST and procedural components were implemented as intended are unknown. Finally, additional booster sessions were required of participants in order to reach stated mastery criteria; it is unclear if this was a result of the focus of broadly teaching NDBI implementation, or perhaps a limitation of BST itself in supporting NDBI implementation.

Given the importance of imitation and teaching it in an NDBI framework, and the limitations noted in Jimenez-Gomez et al. (2019), the purpose of this study is to replicate and extend Jimenez-Gomez et al. and evaluate the effects of BST on instructor implementation of imitation training. Specifically, we asked: *What are the effects of BST on increasing correct implementation of an object imitation task in behavior technician*?

Method

Participants

Three participants working as behavior technicians were recruited for this study. All participants had one year or less experience working in an agency providing behavioral services to individuals with ASD. Participant work experience was identified based on self-reported job history and length of time since hired at their current agency. Participants were also asked if they had prior experience implementing NDBIs by giving each participant the definition of NDBIs and asking if they had conducted NDBIs in the past. Additionally, all participants received an instructional training on implementing NDBIs when they were hired at the current agency.

Participant 1 was a 26-year-old white female. Participant 1 was hired at the current agency one year prior to the start of the study and indicated no prior experience as a behavior technician. Participant 1 indicated prior experience implementing NDBIs with students and had received instructional (i.e., didactic) training on NDBIs.

Participant 2 was a 25-year-old black male. Participant 2 was hired at the current agency one year prior to the start of the study and indicated no prior experience as a behavior technician. Participant 2 indicated no prior experience implementing NDBIs with students, though they had received instructional (i.e., didactic) training on NDBIs.

Participant 3 was a 19-year-old middle eastern and white female. Participant 3 was hired at the current agency one month prior to the start of the study and indicated no prior experience as a behavior technician. Participant 2 indicated no prior experience implementing NDBIs with students, though they had received instructional (i.e., didactic) training on NDBIs. Additionally, the lead researcher served as a child confederate during all experimental conditions. The confederate followed a script depicting a sequence of specific behaviors for each trial to mimic

the behavior of a child (described in more detail below).

Settings and Materials

The current study took place at a classroom in an early intervention behavioral agency in mid-Michigan. The classroom was a square room, approximately 10ft by 10ft in size. Inside the room was one circle table with 3 chairs, built in desk, and two filing cabinets.

Two identical sets of five non-identical toys were used during experimental sessions. Toys included a car, action figure, ball, Little People figurine, and dinosaur. Non-identical toys were chosen due to availability of materials. Each participant was given a printed data sheet and a pen at the beginning of each session. The confederate also had a script denoting the responses that were to be made during the session. All sessions were recorded via video recorder.

Dependent Variable

The dependent variable was correct implementation of imitation training. Correct implementation of imitation training was defined as any instance in which the participant engaged in the appropriate step in a pre-defined task analysis (see Table 1) within 5 s of the previous step, or the initial opportunity to engage in the first step. If the participant engaged in a response that corresponded with the appropriate step in the task analysis within 5 s, it was scored as correct. If the participant did not engage in a response within 5 s or engaged in a response that did not correspond with the appropriate step in the task analysis, it was scored as incorrect. Following completion of each research session the percentage of correctly implemented steps was calculated by dividing the number of correct steps by the total number of steps and multiplying the product by 100 to yield a percentage (Cooper, Heron, & Heward, 2019

Steps

1. Choose an item based on confederate's motivation.

2. Gain attention by saying the confederate's name.

2a. If the confederate does not look the first time their name is said, wait 3 s, repeat their name.

3. Instruct confederate to do 1-step action and do that action with object.

4a. If the confederate does the action correctly, give enthusiastic praise.

4b. If the confederate does the action incorrectly, give a model prompt.

5a. After the model prompt, if the confederate responds correctly, give neutral praise.

5b. After the model prompt, if the confederate responds incorrectly, end the trial without feedback.

6. Collect data after each trial.

Table 1 Task Analysis for Participant Behavior

Experimental Design

A concurrent multiple baseline across participants design was used to evaluate the effects of BST on implementation of imitation programs (Coon & Rapp, 2017; Slocum et al., 2022). BST was implemented for each participant at different points in time, following baseline once

visual analysis suggested stable responding for each participant in baseline was achieved.

Procedure

General Procedures

During both baseline and post-training sessions, the confederate was provided with a script that dictated how to respond in the presence of participant (i.e., behavior technician) responding. Scripts were randomly chosen for each session by numbering each script and using a random number generator ("Random number generator", n.d.). Ten different scripts consisting of six unique response sequences were used during baseline and post-training and were designed to mimic the behavior of a child learning to engage in object imitation. The sequence of responses

in each script were randomly generated across scripts, by numbering each sequence and again using a random number generator ("Random number generator", n.d.) to place the sequences in a random order to create a unique script. No two scripts were alike, except scripts contained the same number of opportunities to demonstrate error correction in each session: two correct responses, two prompted responses, and two errors. Once each participant was exposed to all 10 scripts, all 10 scripts were available to be chosen again. Additionally, session length was approximately 5 min, with about 3 s between trial implementation opportunities during each session. The researcher observed each participant after sessions were completed via recoded video and scored their behavior based on the dependent measure described above.

Confederate Behavior

A flow chart depicting the confederate's behavior is shown in Figure 1. We recommend the reader follow along with Figure 1 as we describe the confederate-participant interaction in detail. The confederate began each session by interacting with an object for more than 5 s without stopping (hereafter referred to as the showing motivation or the motivation opportunity) in order to serve as the condition under which the participant should introduce an imitation training trial. If the participant missed the motivation opportunity, the confederate waited 30 s before showing motivation for another object. From this point on, the confederate's behaviors varied based on the participant's behaviors and what was indicated on the predetermined script for that specific session. Each session, the confederate was instructed to show motivation for an object 6 times with 3 s between each initiation. Motivation opportunities were held constant across sessions.

Participant recognition of confederate motivation was defined as any instance in which the participant said the confederates name within 5 s of the confederate showing motivation of a

item. If the participant said the confederate's name, the confederate either looked at the participant or keep looking down at the object (depending on the script). If the confederate kept looking down at the object, the participant was to say the confederate's name again, and if this occurred, the confederate would then look at the participant. If the participant gained the attention of the confederate by saying their name, the participant was then to engage in a behavior with an object for the confederate to imitate. If the confederate imitated correctly, the participant then had an opportunity to provide praise, to which the confederate would then smile and the trial would end. If the participant did not provide praise, the trial ended.

If the confederate imitated the participant's model incorrectly, the participant then had an opportunity to model the behavior again. If the participant modeled the behavior again, the confederate imitated the modeled action either correctly or incorrectly. If the participant did not model the behavior again, the trial was ended. If the confederate modeled the action correctly, following the confederate's incorrect response and the participant's second model, the participant had an opportunity to provide neutral praise, to which the confederate would smile and the trial would end. If the participant did not provide neutral praise, the trial ended. If the confederate modeled an incorrect action, the participant then had an opportunity to end the trial. If the participant did not initiate ending the trial after 5 s, the trial was ended by the confederate.



Figure 1 Confederate Behavior Flow Chart

Instructor Training

This section describes how the lead researcher taught a Board Certified Behavior Analyst (here after referred to as the trainer) to implement all four components of BST (i.e., instruction, model, rehearsal, feedback). This instructional session occurred to ensure the trainer could engage in high levels of procedural fidelity of BST implementation prior to the start of the experiment.

First, the lead researcher demonstrated the instruction component of BST by reading each PowerPoint slide fully and in the correct order, then playing a video model. Then, the lead researcher asked if the trainer had any questions and proceeded to answer any that arose. Next, the trainer rehearsed the instruction component as if the lead researcher was the participant (behavior technician). If any errors were made by the trainer, the lead researcher gave feedback immediately and instructed the trainer to continue. Then, the lead researcher explained the modeling component of BST to the trainer. After explanation, any questions posed by the trainer were answered and the lead researcher and trainer then practiced that component. If the trainer made any errors, the lead researcher corrected those errors using descriptive feedback and additional modeling (if necessary). Finally, the rehearsal and feedback components were explained by the lead researcher then rehearsed with the trainer. Once the trainer demonstrated 100% implementation of each step of BST, the trainer was considered ready to conduct BST independently.

Baseline

The purpose of baseline was to evaluate participant responding prior to the introduction of BST. The experimenter gave the instruction, "Teach me how to imitate". During baseline, no feedback or comments were made on participant behaviors. Each imitation trial was counted as one opportunity, and one response sequence was presented during each 5-minute session. If the participant was in the middle of completing a trial at the end of 5 min, the trial was considered complete, and the session was then terminated.

Behavioral Skills Training

The purpose of BST condition was to teach the participants to accurately implement NDBI object imitation trials. BST was conducted between baseline and post-training conditions for all three participants.

First, the trainer explained each step in the task analysis used to measure the dependent variable, including examples and non-examples for each step. After instruction was given, modeling of the task analysis was completed. Modeling was delivered via two modalities. First, a

video model was used. Then, each participant was shown the correct way to implement each step in the task analysis and the correct order by the lead researcher and trainer. The trainer acted as the participant (behavior technician) and the lead researcher acted as the confederate. Participants were then instructed to rehearse the steps with the lead researcher, the third step in the BST procedure. The fourth step, feedback, was implemented directly after rehearsing each step. During this step, the trainer watched as each participant rehearsed with the confederate and feedback immediately based on the task analysis. The participants did not have to score 100% in rehearsal, but they did have to show correct responding with each step at least once. For example, if the participant responded incorrectly when giving neutral praise the first opportunity, then implemented the feedback and responded correctly, this was considered mastered for that particular step.

Post-Training

Post-training was identical to baseline, except the participant had been exposed to one session of BST. The experimenter gave the instruction, "Teach me how to imitate". Each training session consisted of observing the participant running imitation training with the confederate. Their ability to run an imitation trial was evaluated based on the task analysis previously mentioned.

Procedural Fidelity

Procedural fidelity measures were collected to evaluate the extent to which the confederate's behavior matched that of the prescribed script across baseline, BST, and post-training conditions. The confederate's behavior was evaluated for 60% of baseline and post-training sessions across participants. Baseline and post-training sessions were randomly selected for evaluation. The confederate's behavior during each pafticipant's model and rehearsal

component of BST was evaluated. Fidelity of BST implementation was also evaluated for each participant.

For each session in which procedural fidelity was measured, an independent observer used a checklist to evaluate the confederate's behavior based on the corresponding script for that session. The observer recorded if the confederate engaged in the correct step based on the script or the incorrect step based on the script. Procedural fidelity of confederate behavior was calculated by dividing correct steps implemented by total number of steps and multiplied by 100 (Ledford & Gast, 2014). Proceural fidelity across all conditions was 98.2% for participant 1 (range 88% to 100%), 100.0% for participant 2, and 99.5% for participant 3 (range: 96% to 100%). During modeling for participant 1, the confederate looked the first time her name was called when she should have looked the second time on two occasions and looked the second time her name was called when she should have looked the first time on one occasion. During one post-training session for participant 3, the confederate looked the first time her name was called when she should have looked the second time on one occasion.

To evaluate correct implementation of BST, each participant's training session was reviewed and scored by an independent observer. A task analysis of BST was used to evaluate procedural fidelity (Table 2). The independent observer watched each training session and evaluated each step of BST as either correct (the step occurred and was done in the right order) or incorrect (the step did not occur or was done out of order). Procedural fidelity of BST was calculated by number of steps implemented correctly divided by total number of steps and multiplied by 100 (Ledford & Gast, 2014). BST procedural fidelity for participant 1 was 93%. During feedback, the lead researcher prompted the BST instructor to give feedback for the first

BST Component	BST Step
Instruction	Read slide 1
	Read slide 2
	Read slide 3
	Read slide 4
	Read slide 5
	Read slide 6
	Read slide 7
	Read slide 8
Model	Play entire video
	Ask for questions
	Model with confederate
Rehearsal/Feedback	Begin rehearsal with confederate
	Trainer gives feedback in trial 1
	Trainer gives feedback in trial 2
	Trainer gives feedback in trial 3
	Trainer gives feedback in trial 4
	Trainer gives feedback in trial 5
	Trainer gives feedback in trial 6

trial. This was scored as incorrect. The participant still received feedback on the trial that was incorrect. BST procedural fidelity for participants 2 and 3 was 100%.

Table 2 BST Procedural Fidelity

Interobserver Agreement

Interobserver agreement (IOA) was taken for at least 33% of sessions within each condition across all participants. An independent observer took data during select sessions using the task analysis previously used to evaluate each participant's behavior. Data between the lead researcher and independent observer were compared at the end of each session. An agreement was defined as both observers recording the same datum (either yes or no) for each step. A disagreement was defined as an instance in which datum differed between each observer for a specific step. IOA was calculated by agreements divided by agreements plus disagreements and multiplied by 100 (Cooper, Heron, & Heward, 2019). Mean IOA was 99.3%, ranging from 98.7-100%. IOA for participants 1, 2, and 3 were 100%, 99.3%, and 98.7%, respectively.

Results

Below, we provide the results for Participants 1, 2, and 3 for baseline and post-training conditions. We also provide participant performance data obtained during BST.

Participant 1

During baseline, participant 1 averaged 47.75% correct implementation across three baseline sessions. BST was then implemented. During the rehearsal component of BST, participant 1 showed 94.5% correct implementation. During post-training participant 1 averaged 98.38% correct implementation.

Participant 2

During baseline, participant 2 averaged 40.54% correct implementation across five baseline sessions. BST was then implemented. During the rehearsal component of BST, participant 2 showed 100% correct implementation. During post-training participant 2 averaged 95.68% correct implementation.

Participant 3

During baseline, participant 3 averaged 42.1% correct implementation across seven baseline sessions. BST was then implemented. During the rehearsal component of BST, participant 3 showed 97.3% correct implementation. During post-training participant 3 averaged 95.6% correct implementation.



Figure 2 Results of Participant Responding

Discussion

Jimenez-Gomez and colleagues (2019) evaluated the effects of BST to train participants to implement NDBIs. In their study, baseline data were taken for either one or two sessions before the implementation of BST. The current study evaluated at least three baseline sessions to assess skills fully before implementation of BST training. Therefore, contributing to the literature by assessing participant behavior adequately to determine need for intervention.

Additionally, Jimenez-Gomez et al. (2019) implemented supplemental trainings in addition to the initial BST training. As a result, they were unable to isolate the effects of BST on participant responding. The current study evaluated the effectiveness of one BST training without additional training. Here, we demonstrated that BST may be effective when teaching NDBI object imitation with just one stand-alone training. However, future research is needed to evaluate the maintenance of implementation over time, as well as generalization to student participant (e.g., a child with ASD).

Jimenez-Gomez et al. (2019) evaluated training participants to conduct NDBI sessions, but did not target a singular type of NDBI. As a result, it was unclear if their treatment package could be used to teach implementation of imitation training, specifically. Therefore, the current study advanced the research literature by demonstrating that BST can be used to teach participants to implement imitation training in an NDBI context.

Due to the COVID-19 pandemic there was restricted access to children as research participants, therefore a confederate was used throughout the duration of the study. However, the incorporation of a confederate created methodological control throughout the study by ensuring all skills presented in the task analysis were similarly assessed within and across participants. By using a confederate, we were able to evaluate participant responding in the presence of all

potential responses a student may engage in. Our holistic evaluation of participant responding suggests participants reliably learned the skills taught through BST and did not rely on memorization of the confederate's behavior. Though confederate behavior was designed to mimic the behavior of a child, the extent to which the confederate's behaviors accurately depicted those of a child is unknown. We cannot accurately say a child would have responded in the same way the confederate did. Due to this limitation, future research may investigate the effects of the current study with a child instead of a confederate.

It is important to note that the used of confederates in research is not uncommon. Its purpose is to evaluate an intervention in a controlled manner. The use of a confederate during staff training studies has been effective in teaching participants a variety of skills (Arnal et al., 2007). Additionally, previous studies have used confederates during intervention and generalized these effects to students (Pollard et al., 2014). Although the use of confederates was effective in the current study, the extent to which participant behavior generalizes to a student remains unknown. Therefore, a limitation to the current study is lack of a generalization assessment. Future research should examine generalization from a confederate to a student to ensure using a confederate for training is an effective method.

The current study contributes to the already strong body of BST literature by presenting a potentially wider range of interventions able to be taught through BST. Previously literature has effectively used BST to teach structured programs, specifically DTT programs and preference assessments (Gerencser et al., 2018; Marano et al., 2020; Sarokoff & Sturmey 2004; Sump et al., 2018). Due to the less structured nature of NDBI programs, the current study adds to the literature by presenting a potentially wider range of interventions able to be taught. While object imitation was specifically targeted during this study, other types of NDBI interventions—such as

joint attention, listener responding, tacting, social skills, and play skills—could be evaluated in the future to further evaluate the effectiveness and versatility of BST.

In the current study, only one BST training session was implemented for each participant, lasting approximately 15 min (ranging from 13.5-16 min). By isolating the effects of a singular training, the results of the current study suggest one BST training can be used to teach NDBI object imitation to individuals. This adds to the BST literature by further evaluating the effects of BST training without the addition of supplemental trainings. Due to the effectiveness of a single BST session, behavior analytic agencies may consider using BST to teach behavior technicians NDBI object imitation.

The current study also incorporated a video model in conjunction with an in vivo model during BST. It is not clear whether the addition of video modeling aided in the acquisition of participant responding and may at least be partially responsible for how our study results may differ from those reported by Jimenez-Gomez et al. (2019). It is necessary to evaluate the effects of video modeling and in vivo models to find the most effective teaching method. Future research may compare the effect of BST with video and in vivo models.

Additional limitations not previously noted include maintenance of participant skills across time. Due to the importance of imitation skills, it is necessary for participants to continue implementing NDBIs correctly. Future research should incorporate maintenance probes to ensur skill acquisition over time. Additionally, previous experience of technicians in the current study consisted of 1 month and 1 year of experience. It is not clear whether BST would be effective with those who have no experience implementing imitation training. Future research may systematically evaluate the effectiveness of BST with fully novice technicians. While the current study resulted in effective acquisition of skills, it is not clear if BST is the most effective way to

teach the skills needed to implement NDBI programs. Future research is needed to evaluate for other, potentially more effective, ways of teaching.

APPENDICES

Appendix A: Confederate Script 1

Trial 1	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 2	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 3	Shows motivation
	Looks 2 nd time
	Correct action
	Smile
Trial 4	Shows motivation
	Looks 1 st time
	Correct action
	Smile
Trial 5	Shows motivation
	Looks 2 nd time
	Incorrect action
	Correct after model prompt
	Smile
Trial 6	Shows motivation
	Looks 1 st time
	Incorrect action
	Correct after model prompt
	Smile

Table A1 Confederate Script 1

Appendix B: Confederate Script 2

cript 2
'cript 2

Trial 1	Shows motivation
	Looks 2 nd time
	Correct action
	Smile
Trial 2	Shows motivation
	Looks 1 st time
	Incorrect action
	Correct after model prompt
	Smile
Trial 3	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 4	Shows motivation
	Looks 1 st time
	Correct action
	Smile
Trial 5	Shows motivation
	Looks 1 st time
	Incorrect action
	Incorrect after model
Trial 6	Shows motivation
	Looks 2 nd time
	Incorrect action
	Correct after model prompt
	Smile

Appendix C: Confederate Script 3

Trial 1	Shows motivation
	Looks 1 st time
	Correct action
	Smile
Trial 2	Shows motivation
	Looks 1 st time
	Incorrect action
	Incorrect after model
Trial 3	Shows motivation
	Looks 2 nd time
	Correct action
	Smile
Trial 4	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 5	Shows motivation
	Looks 1 st time
	Incorrect action
	Correct after model prompt
	Smile
Trial 6	Shows motivation
	Looks 2 nd time
	Incorrect action
	Correct after model prompt
	Smile

Table A3 Confederate Script 3

Appendix D: Confederate Script 4

Trial 1	Shows motivation
	Looks 2 nd time
	Incorrect action
	Correct after model prompt
	Smile
Trial 2	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 3	Shows motivation
	Looks 1 st time
	Incorrect action
	Correct after model prompt
	Smile
Trial 4	Shows motivation
	Looks 1 st time
	Incorrect action
	Incorrect after model
Trial 5	Shows motivation
	Looks 2 nd time
	Correct action
	Smile
Trial 6	Shows motivation
	Looks 1 st time
	Correct action
	Smile

Table A4 Confederate Script 4

Appendix E: Confederate Script 5

Trial 1	Shows motivation
	Looks 2 nd time
	Incorrect action
	Correct after model prompt
	Smile
Trial 2	Shows motivation
	Looks 1 st time
	Correct action
	Smile
Trial 3	Shows motivation
	Looks 1 st time
	Incorrect action
	Correct after model prompt
	Smile
Trial 4	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 5	Shows motivation
	Looks 2 nd time
	Correct action
	Smile
Trial 6	Shows motivation
	Looks 1 st time
	LOOKS I tille
	Incorrect action

Table A5 Confederate Script 5

Appendix F: Confederate Script 6

Table A6 Confederate Script 6	
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Trial 1	Shows motivation		
	Looks 2 nd time		
	Incorrect action		
	Incorrect after model		
Trial 2	Shows motivation		
	Looks 1 st time		
	Correct action		
	Smile		
Trial 3	Shows motivation		
	Looks 1 st time		
	Incorrect action		
	Correct after model prompt		
	Smile		
Trial 4	Shows motivation		
	Looks 2 nd time		
	Incorrect action		
	Correct after model prompt		
	Smile		
Trial 5	Shows motivation		
	Looks 1 st time		
	Incorrect action		
	Incorrect after model		
Trial 6	Shows motivation		
	Looks 2 nd time		
	Correct action		
	Smile		

Appendix G: Confederate Script 7

Trial 1	Shows motivation		
	Looks 1 st time		
	Incorrect action		
	Incorrect after model		
Trial 2	Shows motivation		
	Looks 2 nd time		
	Incorrect action		
	Correct after model prompt		
	Smile		
Trial 3	Shows motivation		
	Looks 1 st time		
	Incorrect action		
	Correct after model prompt		
	Smile		
Trial 4	Shows motivation		
	Looks 2 nd time		
	Incorrect action		
	Incorrect after model		
Trial 5	Shows motivation		
	Looks 2 nd time		
	Correct action		
	Smile		
Trial 6	Shows motivation		
	Looks 1 st time		
	Correct action		
	Smile		

Table A7 Confederate Script 7

Appendix H: Confederate Script 8

Table A8 Confederate Script 8

Trial 1	Shows motivation			
	Looks 1 st time			
	Correct action			
	Smile			
Trial 2	Shows motivation			
	Looks 2 nd time			
	Incorrect action			
	Correct after model prompt			
	Smile			
Trial 3	Shows motivation			
	Looks 1 st time			
	Incorrect action			
	Correct after model prompt			
	Smile			
Trial 4	Shows motivation			
	Looks 2 nd time			
	Correct action			
	a .1			
	Smile			
Trial 5	Smile Shows motivation			
Trial 5	Smile Shows motivation Looks 2 nd time			
Trial 5	Smile Shows motivation Looks 2 nd time Incorrect action			
Trial 5	SmileShows motivationLooks 2nd timeIncorrect actionIncorrect after model			
Trial 5 Trial 6	SmileShows motivationLooks 2nd timeIncorrect actionIncorrect after modelShows motivation			
Trial 5 Trial 6	SmileShows motivationLooks 2nd timeIncorrect actionIncorrect after modelShows motivationLooks 1st time			
Trial 5 Trial 6	SmileShows motivationLooks 2nd timeIncorrect actionIncorrect after modelShows motivationLooks 1st timeIncorrect action			

Appendix I: Confederate Script 9

Table A9 Confederate Script 9

Trial 1	Shows motivation		
	Looks 2 nd time		
	Incorrect action		
	Correct after model prompt		
	Smile		
Trial 2	Shows motivation		
	Looks 1 st time		
	Correct action		
	Smile		
Trial 3	Shows motivation		
	Looks 1 st time		
	Incorrect action		
	Incorrect after model		
Trial 4	Shows motivation		
	Looks 2 nd time		
	Incorrect action		
	Incorrect after model		
Trial 5	Shows motivation		
	Looks 1 st time		
	Incorrect action		
	Correct after model prompt		
	Smile		
Trial 6	Shows motivation		
	Looks 2 nd time		
	Correct action		
	Smile		

Appendix J: Confederate Script 10

Trial 1	Shows motivation
	Looks 1 st time
	Correct action
	Smile
Trial 2	Shows motivation
	Looks 1 st time
	Incorrect action
	Incorrect after model
Trial 3	Shows motivation
	Looks 2 nd time
	Incorrect action
	Incorrect after model
Trial 4	Shows motivation
	Looks 1 st time
	Incorrect action
	Correct after model prompt
	Smile
Trial 5	Shows motivation
	Looks 2 nd time
	Correct action
	Smile
Trial 6	Shows motivation
	Looks 2 nd time
	Incorrect action
	Correct after model prompt
	Smile

Table A10 Confederate Script 10

Appendix K: Participant Data Sheet

Participant Data Sheet

Name: Date:

Make X in the appropriate box for each trial

Trial Number:	Correct?	Prompt?	Error?
1			
2			
3			
4			
5			
6			

Appendix L: Participant Behavior Data Sheet

Participant Behavior Data Sheet

Participant: Date: Script number: Data recorder:

Participant Behavior	Trial Number		Circle one	per trial		
1. Chooses target based	1	Y	N	N/A		
on confederate actions	2	Y	N	N/A		
and motivation.	3	Y	N	N/A		
	4	Y	Ν	N/A		
	5	Y	N	N/A		
	6	Y	N	N/A		
2. Gained attention by	1	Y	N	N/A		
saying confederate's	2	Y	N	N/A		
name	3	Y	N	N/A		
(If confederate does not	4	Y	Ν	N/A		
look 1 st time, says name	5	Y	Ν	N/A		
2 nd time).	6	Y	Ν	N/A		
IF CONFEDERATE DOESN'T LOOK THE FIRST TIME AND LOOKS THE SECOND						
	L (II confederate	looks first tim	ie, circle N/	A)	NT/A	
3. Waited 3's before	<u>l</u>		Y	N	N/A	
saying confederate's	2		Y	N	N/A	
name second time.	3		Y	N	N/A	
	4		Y	N	N/A	
	5		Y	N	N/A	
	6		Y	N	N/A	
	1	37	N.			
4. Instruct confederate to	1	Y	<u>N</u>	N/A		
do action and does action	2	Y	<u>N</u>	N/A		
with object.	3	Y	<u>N</u>	N/A		
	4	Y	<u>N</u>	<u>N/A</u>		
	5	Y	<u>N</u>	<u>N/A</u>		
	6	Y	N	N/A		
IF CONFEDERATE RESPONDS CORRECTLY						
(if confederate responded incorrectly, circle N/A)						

Main Data/IOA Data

5. Gives enthusiastic	1	Y	Ν	N/A
praise (skip to step 8).	2	Y	Ν	N/A
	3	Y	Ν	N/A
	4	Y	Ν	N/A
	5	Y	Ν	N/A
	6	Y	Ν	N/A
IF CONFEDERATE F	RESPONDS IN	CORRECTLY A	ND CORRE	CTLY TO THE
	Pl	ROMPT		
(if confederate responded	d correctly OR i	incorrectly and ir	ncorrectly to	the prompt, circle
		N/A)		
6. Model prompt given	1	Y	Ν	N/A
immediately after error.	2	Y	Ν	N/A
	3	Y	Ν	N/A
	4	Y	Ν	N/A
	5	Y	Ν	N/A
	6	Y	Ν	N/A
6. Neutral praise given	1	Y	Ν	N/A
(skip to step 8).	2	Y	Ν	N/A
	3	Y	Ν	N/A
	4	Y	Ν	N/A
	5	Y	Ν	N/A
	6	Y	Ν	N/A
IF CONFEDERATE	RESPONDS IN	NCORRECTLY A	AND INCO	RRECTLY TO
	P	ROMPT		
(if confederate responded	correctly or inc	orrectly and corr	ectly to the	prompt, circle N/A)
7. Model prompt given	1	Y	Ν	N/A
immediately after error.	2	Y	Ν	N/A
	3	Y	Ν	N/A
	4	Y	Ν	N/A
	5	Y	Ν	N/A
	6	Y	Ν	N/A
		·		
7. Trial ends without	1	Y	Ν	N/A
feedback.	2	Y	N	N/A
	3	Y	Ν	N/A
	4	Y	Ν	N/A
	5	Y	Ν	N/A
	6	Y	Ν	N/A

8. Data collected correctly	1	Y	Ν	N/A
(independent, prompt,	2	Y	Ν	N/A
error).	3	Y	Ν	N/A
	4	Y	Ν	N/A
	5	Y	Ν	N/A
	6	Y	Ν	N/A
		Total Correct:		

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