

Comparing the Effects of Single and Multiple Target Trials in Teaching Skills to Children Diagnosed with Autism

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Introduction

Children with autism generally have difficulty communicating with others (Sundberg & Partington, 1998). Therapists working with these children must decide how to most effectively and efficiently teach new skills such as verbal behavior. Various procedures are used to teach new skills to children with autism, but no studies currently assess how many targets should be taught during one session. The purpose of the current study was to investigate two different procedures to teach new skills to children diagnosed with autism. One procedure involved teaching one target (for a skill) until mastery before beginning to teach a second target. The other procedure involved teaching multiple targets at the same time until all targets were mastered. The two procedures were evaluated using a multi-element single-subject design (Barlow & Hayes, 1979).

Method

Participants

Four participants with diagnoses of autism were used in the study. Marie was a 4-year-old girl who received approximately 27 hours of in-home intensive applied behavior analysis (ABA) therapy each week. James was a 6-year-old boy who received approximately 6 hours of in-home ABA therapy per week and also attended kindergarten. Naomi was a 4-year-old girl who received ABA therapy from a university autism clinic approximately 5 hours per week. She also received 4.5 hours of in-home ABA therapy each week. Walter was a 2-year-old boy who received approximately 4 hours of ABA therapy each week from a university autism clinic.

Setting

Sessions for Walter and Naomi were conducted in a therapy room on-campus with cameras and one-way mirrors. Marie and James were taught at their homes in a room equipped with a camera. All rooms contained a table and two chairs.

Materials

Commercially produced pictures and preferred items and edibles were used in this study. For Marie, the targets that were directly taught were pictures of a teacher, doctor, mailman, pilot, janitor, and firefighter. To test for generalization, a similar but different picture of the same community helper was probed. Walter saw pictures of ongoing actions such as crying, eating, digging, writing, blowing, and sleeping. Generalization targets consisted of a picture of a different person performing the same action. Naomi identified class cards that consisted of 6 different pictures from a particular class (animals, numbers, colors, drinks, clothes, and instruments). Generalization targets were the same classes, but different pictures within each class. For James, academic questions were used, so no materials were needed. Generalization targets were the reversal of the form of the question. For example, the target "Who was the first president?" had the generalization target of "Who was George Washington?"

Procedure

Targets were taught using a 5-second constant prompt delay procedure (Snell & Gast, 1981). During the first session that a target was taught, all 5 trials were immediately prompted. All subsequent sessions had a 5-second prompt delay. The teacher presented the instruction and if the child erred or did not respond within 5 seconds, the prompt was given. If the child responded correctly, the child was given praise and access to a preferred edible or item for 15 seconds. The first session that each target was taught was not included in the analysis of total trials or sessions until mastery because the child did not have an opportunity to respond correctly.

Single Target Condition (STC) – In the single target condition, three targets were taught in succession. Five trials of a single target were presented during each session until mastery. After Target 1 was mastered, Target 2 was introduced and taught to mastery, followed by Target 3.

Mixed Target Condition (MTC) – In the mixed target condition, three targets were taught simultaneously. Five trials of each target were presented in a random order each session until a target reached mastery. Once a target reached mastery, it was no longer taught and moved to the maintenance condition. To maintain the integrity of the Mixed Target Condition, the mastered target was replaced with a target that was not part of the mastery criteria so that there were always three targets taught per session.

Mastery Criteria

A target was mastered if the child responded correctly on 100% of the trials for one session. In both conditions, a target was no longer taught once it was mastered.

Author Note

The authors of this research would like to thank the Office of Research and Sponsored Programs at the University of Wisconsin-Eau Claire. The authors would also like to thank Renee Norman, Cierra Micke, and Cassie Drees for their support and suggestions.

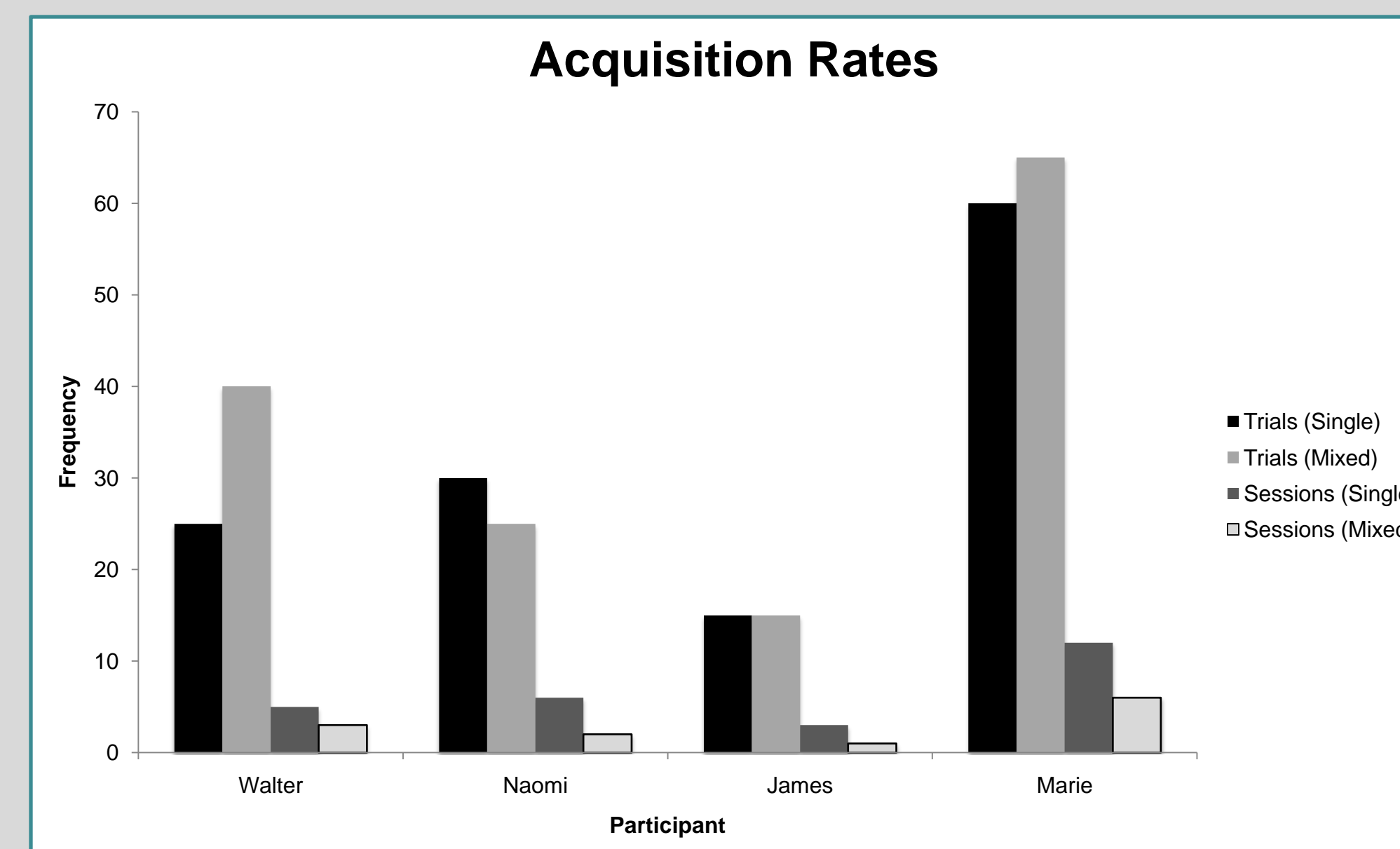


Figure 1. The acquisition rates for all four participants separated into the number of sessions and the number of trials before mastery.

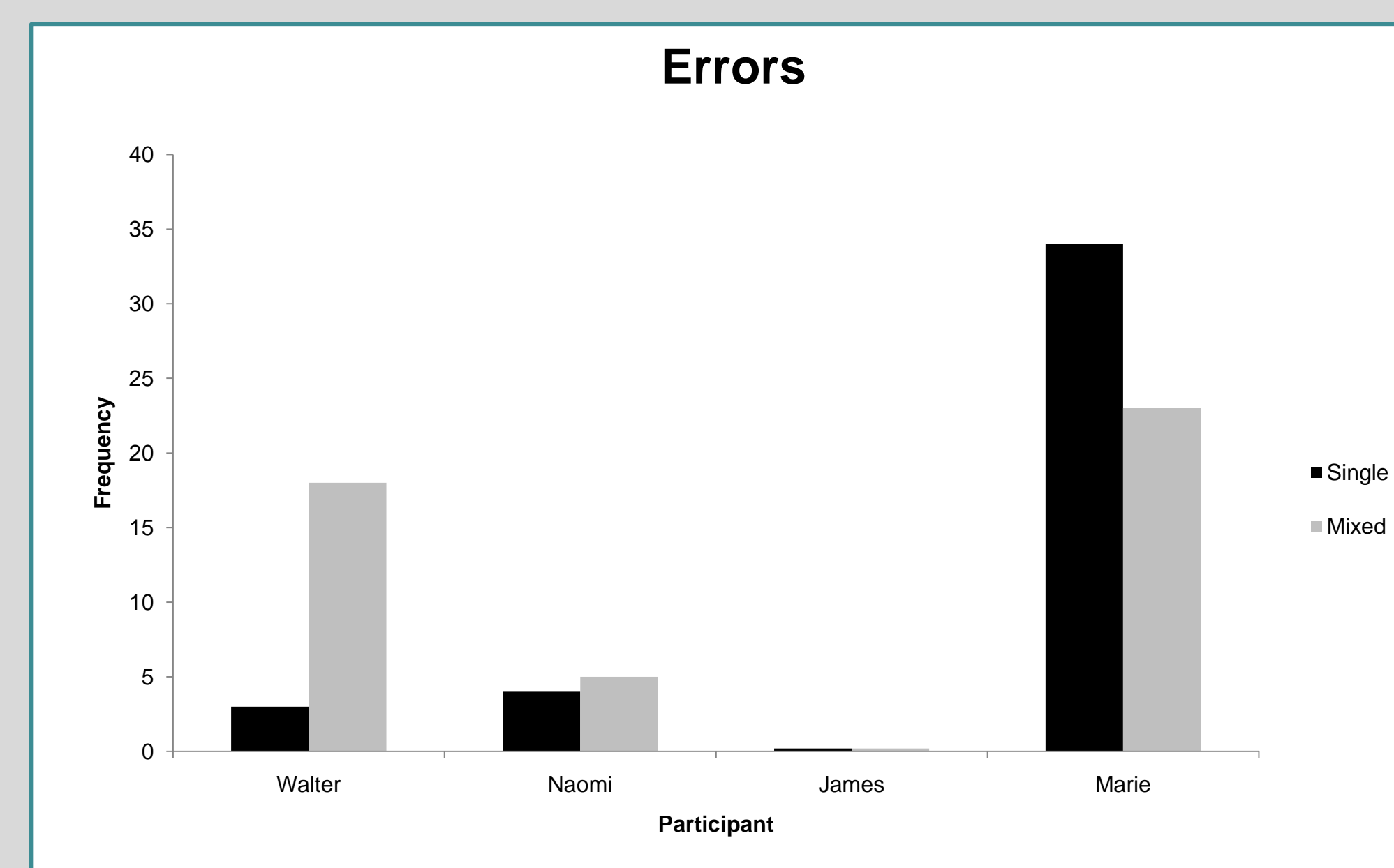


Figure 2. The number of errors before mastery for all four participants across the single target and mixed target conditions.

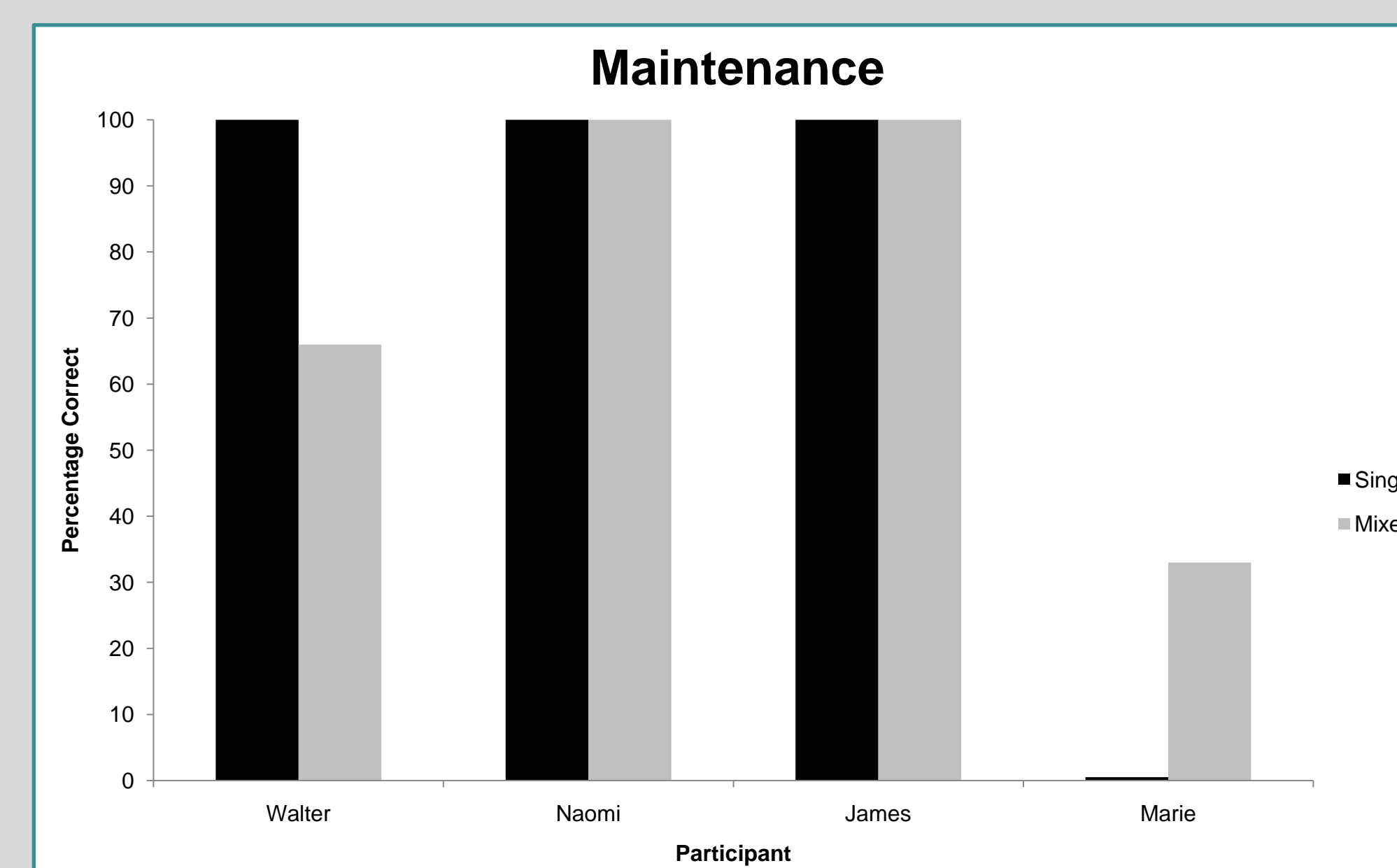


Figure 3. The percentage of targets that maintained successfully for all four participants across the single target and mixed target conditions.

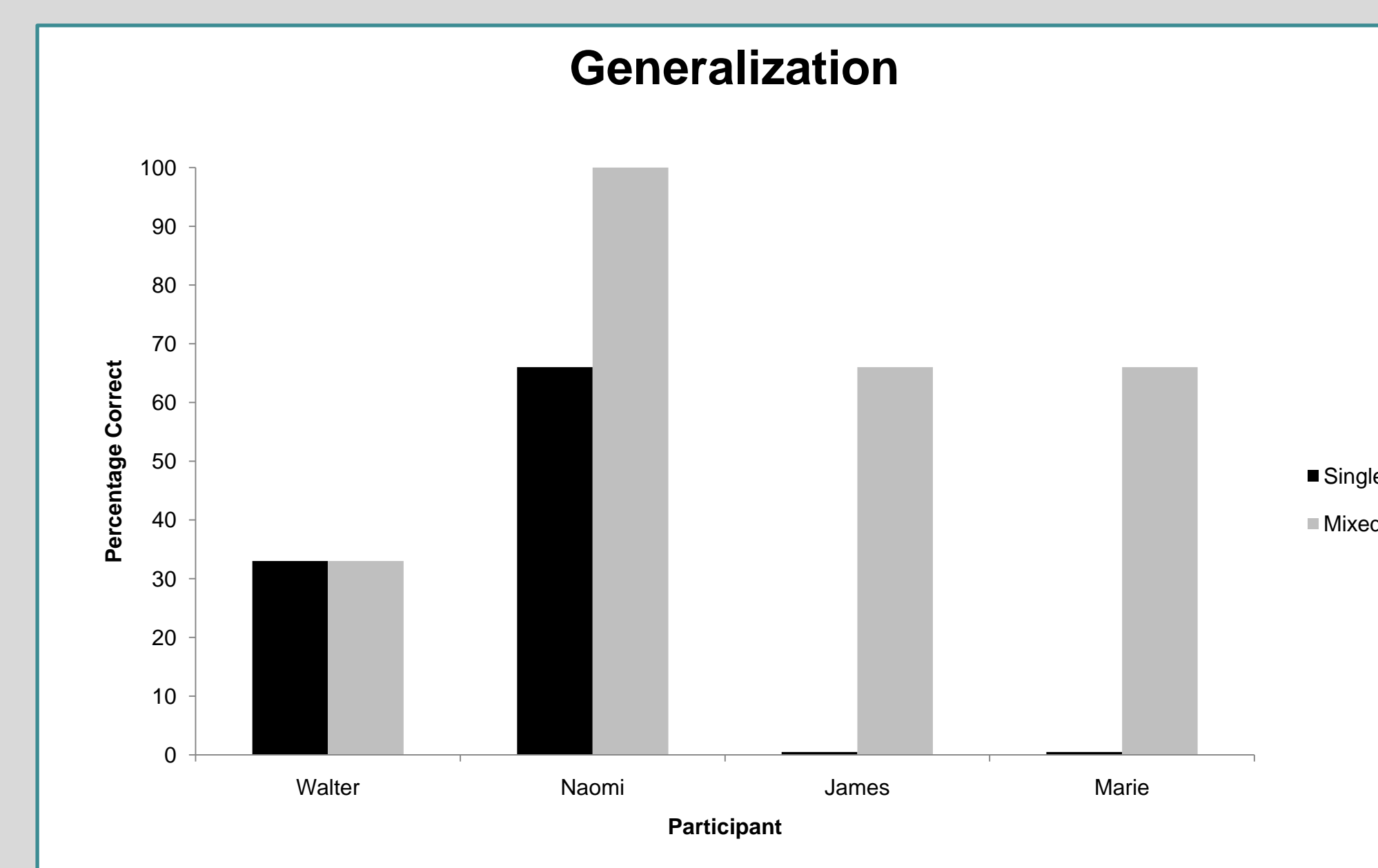


Figure 4. The percentage of targets that generalized successfully for all four participants across the single target and mixed target conditions.

Method (cont)

Generalization and Maintenance Probes

One trial of a generalization probe was conducted the session following mastery of a target. A maintenance probe was conducted 2-4 weeks after the target was mastered.

Inter-Observer Agreement (IOA) and Treatment Integrity (TI)

IOA was collected on 100% of the sessions for Walter and Naomi. The mean agreement for Walter was 100% and for Naomi was 99%. IOA was collected on 67% of sessions for Marie and the mean agreement was 100%. For James, IOA was collected on 55% of the sessions and the mean agreement was 99%. TI data for Walter and Naomi were collected on 92% of the sessions and both averaged 99%. TI data were collected on 55% of sessions for James and was 100%. For Marie, TI data were collected on 67% of the sessions and was 100%.

Results

Acquisition Rate - Figure 1 displays the acquisition data for all four participants. All participants mastered the targets in the MTC in fewer sessions than the targets in the STC. The number of trials until mastery varied across participants. Walter mastered all targets in the MTC in 3 sessions (40 trials) and those in the STC in 5 sessions (25 trials). Naomi mastered all targets in the MTC in 2 sessions (25 trials) and mastered the STC targets in 6 sessions (30 trials). James mastered the MTC within 1 session and the STC within 3 sessions. Both conditions took 15 trials to reach mastery. Marie mastered the MTC in 6 sessions (65 trials) and the STC in 12 sessions (60 trials).

Errors - Figure 2 displays the total number of errors made by each participant before the targets were mastered. Walter made 18 errors in the MTC and 3 errors in the STC. Naomi made 5 errors in the MTC and 4 errors in the STC. Marie made 34 errors in the STC and 23 errors in the MTC. James made no errors in either condition.

Maintenance - Figure 3 displays the percentage of targets that maintained after reaching mastery. Naomi and James maintained 100% of the targets in both conditions. Walter maintained more targets in the STC (100%) than in the MTC (66%), whereas Marie maintained no targets in the STC and only 33% in the MTC.

Generalization - Figure 4 displays the percentage of targets that generalized to novel stimuli. James and Marie generalized 66% of the targets in the MTC and none in the STC. Naomi generalized 100% of the targets in the MTC and 66% in the STC. Walter generalized 33% in both conditions.

Discussion

The results from this study suggest that teaching targets using a mixed target format results in faster acquisition in regards to the number of sessions needed to reach mastery. Also, more behavior generalized to novel but similar stimuli in the mixed target condition for three of the four participants. The faster acquisition rate suggests that more targets for a particular skill may be taught in fewer sessions when using the mixed target condition over the single target condition.

No clear conclusions were drawn from data on maintenance or number of errors before acquisition. Maintenance data varied across participants. Two of the participants showed no difference between conditions and maintained all targets. Walter maintained more in the single target condition and none in the single target condition. The number of errors varied across participants as well. Walter and Naomi made more errors in the mixed target condition, whereas Marie made more errors in the single target condition. James made no errors in either condition.

There were some limitations to this study that future research should address. First, a multi-element single subject design was used in which both conditions were run during the same session. Even though the two conditions were separated by 10 minutes, both conditions were still taught during one session. Future research should address this limitation by using a multiple treatment reversal design and controlling for the total number of targets taught in the child's therapy sessions. Another limitation to this study was the limited number of programs. Three participants were taught labeling programs and one participant was taught a conversational program. Future research should assess the two teaching procedures while using multiple programs.

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