

*PARENT-IMPLEMENTED SCRIPT FADING TO PROMOTE PLAY-BASED  
VERBAL INITIATIONS IN CHILDREN WITH AUTISM*

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We trained 3 mothers of children with autism to create, implement, and systematically fade scripts to promote vocal initiations during play. All 3 children's scripted and unscripted initiations increased after the introduction and fading of scripts, and unscripted initiations were maintained at the 2-week follow-up. The results indicate that parents of children with autism can successfully implement script-fading procedures in their homes and that these procedures are effective methods to increase vocal initiations during play.

DESCRIPTORS: autism, initiations, parent training, play, script fading

Children with autism may continue to have limited verbal initiations during play, even after successful participation in intensive language-intervention programs (E. G. Carr & Kologinsky, 1983; McClannahan & Krantz, 2005). Script-fading procedures have proven effective for prompting children with autism to initiate and respond to interactions with others (Krantz & McClannahan, 1993, 1998; Petursdottir, McComas, McMaster, & Horner, 2007; Sarokoff, Taylor, & Poulson, 2001; Stevenson, Krantz, & McClannahan, 2000). Scripts can be composed of words, phrases, or sentences and can be printed or audiotaped for individuals who have not yet developed fluent reading skills (Krantz & McClannahan; Sarokoff et al.; Stevenson et al.). Overall, the script-fading literature suggests that professionals can use scripts to teach initiations, question asking, and commenting and that scripts can be faded and eliminated while scripted responses remain intact (see McClannahan & Krantz for a review).

Although professionals have successfully implemented script-fading procedures in educational and treatment settings, script fading has not been tested experimentally with parents as

the primary implementers in their home environments. This study examined the effectiveness of script fading in home settings with parents as implementers. Parents were taught to develop, implement, and systematically fade audio scripts to promote initiations in their young children with autism during play. Generalization across play materials was also assessed.

## METHOD

### *Participants*

Three children who had been diagnosed with autism spectrum disorders (ASD) participated with their mothers (married college graduates who did not work outside the home). Each child had been served or was being served at a behavioral university-based ASD preschool program. Each child had a generalized verbal imitation repertoire and used speech as a primary means of communication, but had limited conversational initiations and exchanges during screening (i.e., three 5-min play observations with the parent). Julia participated with Collin (6 years 10 months old, first grade) whose Expressive Vocabulary Test (EVT, Williams, 1997) standard score was 84 (14th percentile, 5 years 5 months age equivalent). Cami participated with Brandon (3 years 11 months old, EVT score of 109; 73rd percentile, 4 years 6 months age equivalent). Andrea

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participated with Jake (2 years 11 months old, EVT score of 116, 86th percentile, 3 years 11 months age equivalent).

### *Setting and Materials*

Mothers conducted experimental sessions in open living areas of their homes. Toys were placed on the floor, and the space was cleared of other distracting items. Each mother used a Canon Optura 60 digital video camcorder to record sessions. They used the top three toy sets identified in individual brief multiple-stimulus without replacement preference assessments (J. E. Carr, Nicolson, & Higbee, 2000). One toy set (i.e., target toy set) was randomly selected for the script-fading intervention, and the other two sets were used in generalization sessions. Collin's toy sets included a wooden train set (target), books (Generalization Set 1; GS1), and blocks (Generalization Set 2; GS2). Brandon's toy sets were Rescue Heroes action figures (target), a train set (GS1), and Disney Toy Story figures (GS2). Jake played with Fisher-Price Little People Ramps Around Garage (target), a wooden train set (GS1), and a Fisher-Price fire station (GS2). These toys were unavailable outside the experimental sessions. Parents recorded three separate scripts for the target play set on three Mini-Me button-activated voice recorders (4.5 cm by 4.5 cm) and placed the three recorders near or on the target toy set at the beginning of the session.

### *Design and Measurement*

The study used a multiple baseline design across participants, and all sessions were 5 min in duration. Parents served as primary data collectors and recorded the frequency of unscripted and scripted verbal initiations in real time. Unscripted verbal initiations were contextually appropriate (e.g., "Let's race" for cars but not books) statements or questions that differed from the scripts by more than a name or minor grammatical feature (e.g., articles, prepositions, plurality, tense). Scripted initiations (i.e., the entire script) were scored during

the script-fading phase to determine when to progress with fading. Direct answers to parent questions or directions, parent-identified echolalic responses, single words, noncontextual statements, and immediate repetitions of a statement were not scored as initiations.

Trained researchers independently scored initiations and parent behavior live or from video to evaluate interobserver agreement and procedural fidelity. Each initiation scored by either observer was compared to the scoring of the other, and agreements (i.e., both recorded an initiation) were divided by agreements plus disagreements (only one scored an initiation) and converted to a percentage. Interobserver agreement data were obtained for 38% of all sessions for Collin ( $M = 93\%$ , range, 50% to 100%), 45% of all sessions for Brandon ( $M = 88\%$ , range, 58% to 100%), and 57% of all sessions for Jake ( $M = 94\%$ , range, 50% to 100%). A checklist was used to evaluate procedural fidelity for (a) placing the appropriate session toys on the floor in front of the child and removing other toys or materials from the immediate area, (b) recording the script on the voice recorder at the appropriate fading level as specified on the data sheet, (c) prompting the child to use the voice recorders when 30 s elapsed without the child using a script (only scored during sessions in which scripts were present), (d) providing verbal responses only in response to child initiations, and (e) having the correct session duration (5 min) and intersession interval (2 to 3 min). Fidelity was evaluated for 17% of sessions for Julia (Collin;  $M = 93\%$ , range, 50% to 100%), 60% of sessions for Cami (Brandon;  $M = 83\%$ , range, 50% to 100%), and 96% of sessions for Andrea (Jake;  $M = 91\%$ , range, 64% to 100%). Brief corrective feedback was provided following a low procedural fidelity score.

### *Procedure*

*General procedure.* Mothers conducted one session with each toy set per day with 2 to 3 min separating each of the three sessions. In

each session, the toy sets were presented in a randomized sequence predetermined by the experimenters. Prior to each session, the mother removed distractions, arranged the materials on the table or floor, and said, "Let's play." She sat next to her child and oriented toward him throughout the session.

*Baseline.* Mothers were asked to play with their children and to respond if the child spoke but not to initiate conversation. No recorders (i.e., no scripts) were present during baseline.

*Parent training.* Parents were trained on the use of voice recorders, script development and preteaching procedures, and script-fading intervention procedures using instructions, modeling, prompts, and feedback. Training continued until the parent could perform each component without errors during a role-play with the researcher. During training in script development, the researcher provided a sample script and sample parent responses for a toy set that was not used in the investigation. Mothers then created the three scripts for the target toy set (e.g., "Mom, let's go play cars," "Look, the car is going!" and "Beep! Beep! Here I come!" for the car set) and listed potential responses to their children's initiations ("The car needs gas!" "It's dirty. Let's wash it." "Oh no! It crashed!"). Each mother successfully performed each behavior within two attempts and completed all training within 2 hr (additional information is available from the second author).

*Preteaching recorder activation.* Prior to script fading, the mother arranged toys that were not used in any other sessions (e.g., puzzle, coloring book) on the table or floor along with the recorders that had relevant scripts recorded (e.g., "puzzles are fun," "I like to color"). She taught her child to use the button-activated recorder using manual guidance and praise for imitation. If the child did not repeat the script after being manually guided to push the button, the mother prompted, "say" and guided the child to push the button again. If the child still did not respond, the mother provided a complete verbal

model of the script before repeating manual guidance. She repeated this sequence until the child repeated the scripted response. The scripts were faded by eliminating the last word from the previous script. Preteaching continued until the child successfully used the recorders three consecutive times after fading was complete (i.e., no recorded script). Colin required nine trials to meet this criterion, Brandon required 10 trials, and Jake required 12 trials.

*Script fading and follow-up.* Script fading was implemented using three scripts created for the target toy set. Scripts were never developed or used with GS1 and GS2 toys. If more than 15 s elapsed before the first button press or between presses, the parent manually guided the child to press the button. After the child said all three scripts correctly in two consecutive sessions, the last word of each script was faded by re-recording the scripts with the last word omitted (e.g., "Mom, let's play cars," to "Mom, let's play," to "Mom, let's," to "Mom") until there were no words remaining on the recorder. The three scripts were faded simultaneously rather than separately to simplify the procedure. If the child failed to initiate using a script during fading, the mother returned to the prior script-fading step for the next session. An exception was made with Brandon, who stopped initiating and said, "it's broken" each time the recorder produced no audio cue after the script was completely faded. Because he was consistently emitting unscripted verbal initiations across toy sets, the recorders were removed completely from subsequent sessions rather than reintroducing and fading recorded scripts. Follow-up occurred 2 weeks after script fading was completed under conditions identical to baseline (i.e., no scripts present). New toys (e.g., novel blocks, books, figurines) were added to Collin's toy sets.

## RESULTS AND DISCUSSION

All 3 children readily acquired the three scripted initiations for their target toy set.

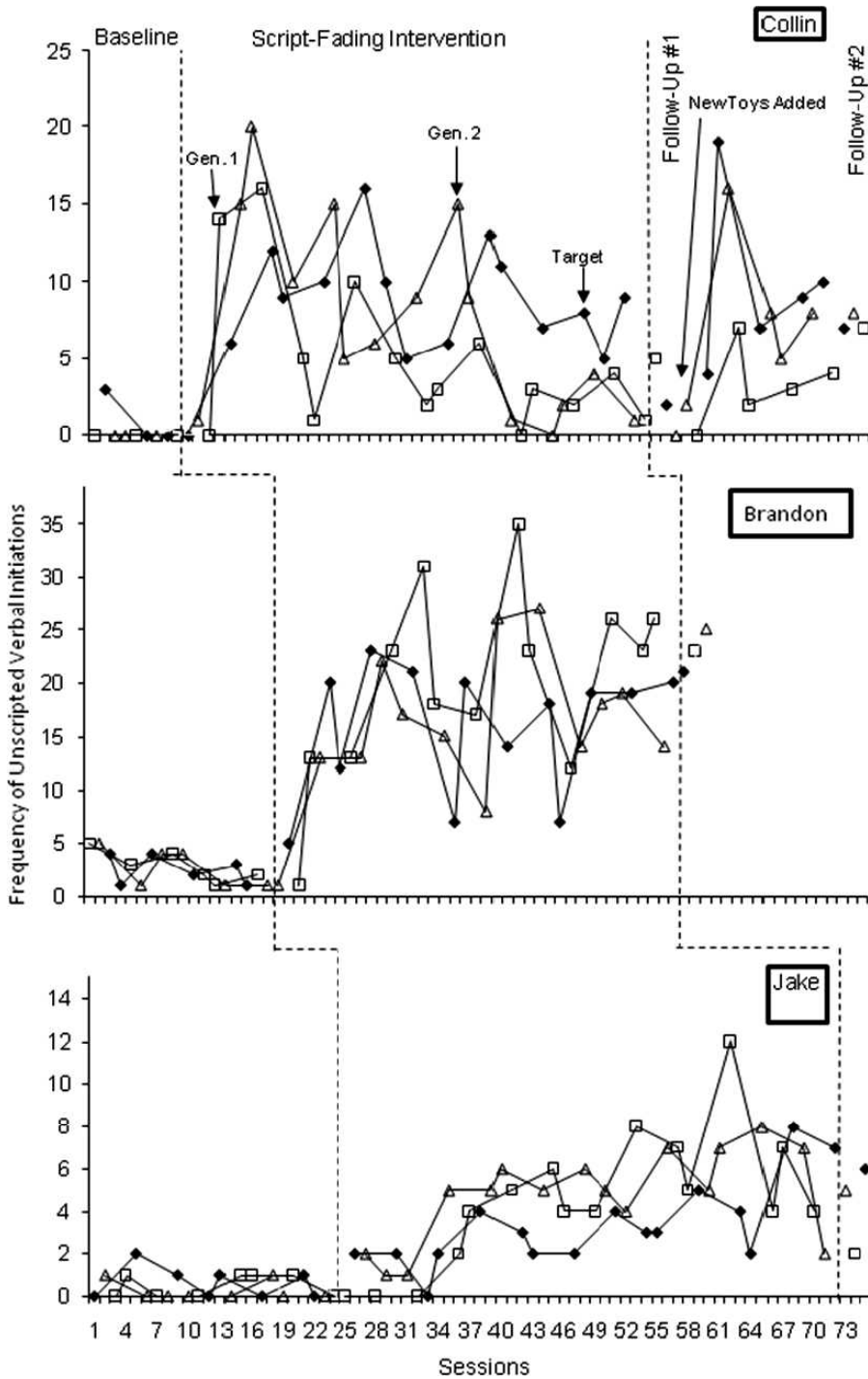


Figure 1. Frequency of unscripted verbal initiations during 5-min sessions for Collin (top), Brandon (middle), and Jake (bottom). Sessions with the target toy set are shown as filled diamonds. GS1 sessions are shown as open squares, and GS2 sessions are shown as open triangles.

Scripts were completely faded after 13 sessions for Collin, nine sessions for Brandon, and 14 sessions for Jake. More important, the number of unscripted initiations (Figure 1) also increased for all 3 boys. Collin's unscripted initiations for the target toy set varied greatly but increased substantially from baseline ( $M = 1$ ) to intervention ( $M = 9$ ). Unscripted initiations also increased for the generalization toy sets from no responding during baseline to a mean of five (GS1) and eight (GS2) responses per session. Unscripted initiations with the generalization toy sets declined throughout intervention and follow-up, perhaps due to satiation, but increased with the addition of new books and blocks. Brandon's initiations were variable but increased substantially from baseline ( $M = 3$  per session for all sets) to intervention ( $M = 16$ , target;  $M = 20$ , GS1;  $M = 16$ , GS2) and were maintained during follow-up sessions. Jake's unscripted initiations were near zero for all toy sets during baseline and increased gradually in the treatment phase with a mean of three (target), five (GS1), and five (GS2) responses per session. Initiations were maintained at moderate levels during follow-up.

These results extend the research on script fading and parent training and add to growing research on language interventions that are suitable for parents to implement with children with autism (Charlop-Christy & LeBlanc, 2000). The results support the findings from previous script-fading research that children with autism can be taught to use scripts to increase the frequency of spontaneous interactions (e.g., Krantz & McClannahan, 1993). All 3 boys learned to initiate play with their parents as a result of script fading and began to initiate play with toys for which no scripts had been provided. The results also provide the first demonstration that parents of children with autism can successfully implement script-fading procedures in their own homes after brief training.

Although the results of this investigation are encouraging, several procedural limitations exist. First, the recorder buttons were present during target-toy sessions except for follow-up for 2 of the 3 participants. These recorder buttons may have been discriminative stimuli for interactions, as evidenced by the fact that all 3 participants continued to press the recorder button when it no longer contained the script. Second, although maintenance was assessed during a brief follow-up phase, the durability of these results is limited to the 2-week follow-up probe data, and some decrease in response rate was observed for 2 of 3 participants. Third, although we anecdotally observed positive changes in parent-child play interactions following intervention, parental responses to child initiations and the specific topographies of play responses were not examined. Future researchers may explore ways to address these concerns.

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