Current Research on Promoting Spontaneous Language and Social Behavior in Children with Autism Using Script Training and Fading

Thomas S. Higbee, Ph.D., BCBA-D
Professor, Dept. of Special Ed. & Rehab.
Director, ASSERT Autism Program
Utah State University
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The Innovators at PCDI

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My Students

Kara Reagon  Alison Betz  Joy Pollard

Matt Brodhead  Jessica Akers  Nina Gerencser
Impairments in Social Interaction, Communication, & Independence

- Deficits in spontaneous language and social behavior are defining characteristics of students with ASD.

- Even students who acquire extensive verbal skills through behavioral intervention often do not exhibit spontaneous social interactions or initiations without extensive training.

- They also make fewer social initiations compared to typical peers and spend more time playing alone.

- Social scripting/script fading is a strategy that has been shown to be effective in addressing these deficits.
Scripts and Script Fading

Social scripting is one set of techniques designed to promote social interactions in individuals with ASD.

“A script is an audiotaped or written word, phrase, or sentence that enables young people with autism to start or continue conversation (McClannahan & Krantz, 2005).”
After children reliably follow the scripts, the scripts are then systematically faded back to front.

After scripts are introduced and then faded, children often continue to use the learned scripts when they are not present, combine parts of scripts or language used by their conversation partner thus producing spontaneous unscripted language (McClannahan & Krantz, 2005).
Examples of Social Interactions

- To request attention
  - “Watch me”

- For joint attention/sharing with toys or objects
  - Bubbles, ball, sing songs

- To initiate play
  - “Let’s play ball”

- To discuss favorite topics
  - Movies, restaurants
Examples of Interactions About Activities

- At the beginning of an activity or at the completion of an activity
  - “May I look at a book?”
  - “Look what I did!”
  - “I’m hungry.”
  - “Bathroom.”
Script Formats

- **Text-based**: written script that the participant reads and repeats
- **Auditory**: script is recorded on an electronic device that the participant listens to and repeats
Script-Fading

1. “I like to eat chips.”
2. “I like to eat____.”
3. “I like to ______.”
4. “I like________.”
5. “I__________.”
6. _______________
Research on Script Fading

- Scripts and script fading procedures have been effective strategies to teach children and adolescents with autism conversational language.
- Audio taped scripts (Stevenson, Krantz, & McClannhan, 2000)
- Textual scripts (Krantz & McClannahan, 1993; Krantz & McClannahan, 1998; and Sarokoff, Taylor & Poulson, 2001)
Research on Script-fading

Conversational topics using script-fading procedures have included:

- initiations to peers and or adults about recently completed activities, current activities or upcoming activities (Krantz & McClannahan, 1993)
- approaching and initiating to an adult about an upcoming event or completed activity (Krantz & McClannahan, 1998)
- commenting about objects within their environment, such as a snack or video game (Sarokoff, Taylor & Poulson, 2001)
- appropriate conversational skills during shopping trips (Brown, 2003)
Recent Research at Utah State University on Script Fading

- Parent-implemented script fading to promote play-based verbal initiations in children with autism
- The use of script fading to promote bids for joint attention in children with autism
- The effects of script fading and extinction procedures on the variability of mand frames used by children with autism
- The effects of script training, lag schedules, and a discrimination training procedure on mand variability
Parent-implemented script fading to promote play-based verbal initiations in children with autism

Kara A. Reagon & Thomas S. Higbee
Utah State University
The purpose of this study was to extend the use of script and script fading procedures to a home setting by training parents to help create, implement and systematically fade scripts to promote appropriate social interactions in young children with autism about play activities.
Participants and Setting

- 3 students with Autism Spectrum Disorders (ASD) (ages ranging from 3 – 6) and one parent of each participant

- Child participants were included in the study if they had verbal speech but did not initiate conversation or had minimal conversational exchanges (≤5) that were contextually appropriate during play with their parent and if the parent was willing to learn how to use scripts and script fading procedures

- The study was conducted in each child’s home
General Instructions to Parents

ги Sit next to your child and orient your face towards him
ги Model interactions and elaborations
ги Pause to see if the child initiates
ги Respond naturally to your child’s interactions using
  ги words he understands
  ги while making the mean length of your response similar to your child’s verbal imitation abilities
  ги use appropriate volume and intonation
  ги use gestures and play actions when appropriate
Baseline

During baseline, the parent was instructed to sit next to the child and orient their face towards the child.

The parent was instructed to model interactions and elaborations, pause to see if the child initiated, and not to specifically initiate conversation to the child but to respond if the child spoke.
Pre-teaching

- Non related audio scripts, manual guidance and verbal prompts were used to teach the child how to use the voice recorder buttons.
- The participant did not start intervention until he had successfully used the voice activated buttons 3 consecutive times with fading of the last word.
Intervention

- Sessions were conducted once a day, in which the parents told the child “Let’s play.”
- The parents arranged the stimuli on the table or floor and minimized distractions.
- Parents collected data on scripted and unscripted responses.
- Sessions were run for 5 minutes with a 2-3 minute break in between activities/toys.
- The 3 activities were presented quasi randomly, not in the same sequence more than 2 times in a row.
Intervention

- The parent was instructed not to provide praise or other additional reinforcement for child interactions.
- If the child used unintelligible speech or used low volume the parent was instructed to respond with a clarifying statement (e.g., “I didn’t hear you.”, “Say that again.”)
Results Continued

- **Social Validity**

- Parents reported that they were satisfied with the parent training and their child’s use of scripts.

- Parents reported that they believed the quality of their child’s interactions improved and the number of interactions increased during the play sessions.
Conclusions

- The results indicate that parents of children with autism can successfully implement scripts and script fading procedures in the home.
- Scripts and script fading procedures are effective methods to increase interactions during play.
- Only 3 scripted interactions were taught to each participant.
- The current study extends the body of research on scripts and script fading procedures and parent training.
- A major difference between the current study and previous research is that the procedures did not include the use of an activity schedule to facilitate the use of scripts.
A Script-Fading Procedure to Promote Unscripted Bids for Joint Attention in Children with Autism

Joy S. Pollard, Alison M. Betz & Thomas S. Higbee
Utah State University
Purpose

- To evaluate variables that increase unscripted bids for joint attention
- Adult statements
- Multiple exemplar script training
Method

Participants, setting and materials
- (N=3) autism
- 4-7 years old
- University-based preschool & public school district
- Thirty 2- and 3-dimensional stimuli
- Text script “Look, it’s a ___”
Method

- General Procedures
  - Script attached to 10 stimuli
  - 2-3 sessions/day
  - 2-3 min
  - Setting: hallway
Method

- Baseline-No prompts
- Teaching-Participants manually guided to:
  - Orient to object
  - Point to script
  - Repeat script
  - Orient back to adult
- Adult response: “Yeah, that’s right”
- Adult statements
  - Adult varied response among 3 programmed statements about object
  - 1 of 3 statements about object
Method

- Multiple Exemplar Training (MET)
  - Adult response: “Yeah, that’s right”
  - Scripts pertaining to objects randomly placed on stimuli
  - Unscripted probes conducted

- Generalization
  - Peer, adult, stimuli, setting
Discussion

- Extended research by MacDuff et al. (2007)
  - Variables promote unscripted language
  - Generalization natural environment

- Limitations
  - Additional training in natural environment
  - Variable results
The Effects of Script Fading and Extinction on the Variability of Mand Frames Used by Children with Autism

Alison Betz, Thomas Higbee, Kristen Kelley, Tyra Sellers, & Joy Pollard

Utah State University
Response Variability

- Children with ASD often engage in stereotypic repetitive behavior and rigid sequences of behavior.

- When compared to typically developing children, children with ASD often respond less variably (Frith, 1972).

- This lack of variability in responding both verbally and nonverbally may limit access to reinforcement when one response form is extinguished.
Reasons for a Lack of Variable Responding in Children with ASD

- Lack of multiple response forms in verbal repertoire
- Stimulus control over responding is too tight and linked to only one response form
- Environmental contingencies may only support one response form
Rationale

The purpose of this preliminary study was to begin a basic investigation to determine the effects of extinction and script training as strategies to produce variability in more complex verbal behavior.

- Extinction alone
- Scripts and script fading procedures
METHODS

- Participants (Setting)
  - Jillian (home)
    - 4 year old female
    - Public preschool
  - Drew (ABA preschool)
    - 4 year old male
    - ABA preschool
  - Travis (ABA preschool)
    - 5 year old male
    - ABA preschool
METHODS

- **Materials**
  - 10 preferred snack items
  - Auditory scripts

- **Pretraining**
  - Auditory scripts
METHODS

Dependent Variables

- Novel Mand frames (within session)- different from a scripted mand frame by more than articles, plurals, or adding adjectives describing the item being requested

- Cumulative novel mand frames (across session)- had to be different from any mand frame used during all previous sessions and conditions
METHODS

General Procedures
- Brief preference assessment (Carr, Nicolson & Higbee, 2000)
- “It’s time for snack”
- Manual prompts (scripts) or verbal prompt to “pick one” (baseline and extinction)
- 5 minute sessions
METHODS

- **Baseline**
  - All mand frames were reinforced
  - All other mands were ignored

- **Extinction**
  - Each mand frame was reinforced the first time it was used WITHIN EACH SESSION
SCRIPT TRAINING

Purpose:
- Teach 3 mand frames successively to determine if:
  - Preteaching a variety of mand frames will increase response variability
  - The number of mand frames taught affects the amount of variability demonstrated
SCRIPT TRAINING

- Teach scripts
  - Three different scripts taught
  - One at a time
  - Icon (small colored sticker) placed on voice-recorder button
  - Voice-recorder button placed on placemat
  - All mand frames reinforced (scripted and unscripted)
SCRIPT TRAINING

- Manual prompts to attend to the script if:
  - No mand for 30 s
  - Mand frame other than the target frame for two consecutive requests

- Verbal prompts used if:
  - No response to manual prompt within 5 s
SCRIPT TRAINING

- Script fading procedures
  - Backward fading word by word
  - Faded once participant follows script 90% for one session
I would like

May I please have

NOVEL MAND FRAMES - JILLIAN
Results – Novel Mand Frames within Session

- Jillian and Travis
  - 0-1 mand frames during baseline
  - Extinction prior to training did not increase variability
  - Little increases in variability during script training (i.e. when script was present)
  - With an exception of script 3 with Travis
  - Larger and more stable increases in extinction following script 3
  - Behaviors maintained at follow up and generalization
Results – Novel Mand Frames within Session

- Drew
  - Overall, more variability in mand frames during script training conditions
  - Specifically toward the end of conditions
  - Little to no variability during extinction
  - Alternative treatment maintained variability at 3-5 responses
  - Generalization and follow up probes showed stable levels of variability
RESULTS – Cumulative Novel Mand Frames

- All participants emitted more novel frames than were taught
  - Jillian = 13 new frames
  - Travis = 13 new frames
  - Drew = 10 new frames

- All participants continued to emit novel frames during generalization and maintenance sessions
CONCLUSIONS

 Extinction prior to teaching did not increase variability

 During script training, participants primarily used target script

 Increases in variability were seen following all script training conditions for 2 participants
   Increased levels of variability generalized and maintained at 1 and 2 wk follow up
Teaching multiple exemplars may have influenced variability.

- Teaching multiple responses simultaneously may increase variability further.
The Use of a Discrimination Training Procedure to Teach Mand Variability to Children with Autism

Matthew T. Brodhead, Thomas S. Higbee, Jessica Akers, & Nina Gerencser
Introduction

Although Skinner’s (1957) analysis of VB has been successfully applied to teaching individuals with ASD to engage in VB, effective strategies for developing varied VB in individuals with ASD are not well understood.

Betz, Higbee, Kelley, Sellers, and Pollard (2011), Sellers (2011), and Kelley (2013) used script training procedures to establish mand variability in preschoolers with autism, but only 4 of 9 participants engaged in independent mand variability at the end of the study.
Introduction

- The remaining participants engaged in varied manding, but only when supplemental visual stimuli were present (e.g., colored dots or the first letter of each script).

- It is possible that stimulus control of varied manding failed to transfer from the scripts to the natural environment because reinforcement for variability was only provided in the presence of the scripts.

- When the scripts were removed, mand variability stopped, possibly because the discriminative stimuli ($S^D$) for variability (i.e., the scripts) were no longer present.
Brief Rational

- A study that establishes an artificial stimulus as an $S^D$ for mand variability may allow for continued response variability when the scripts are removed.

- A discrimination training procedure for mand variability would help to mitigate failures of transfer of stimulus control because reinforcement for mand variability would be provided in the presence of a programmed visual stimulus (in this case, a placemat). This visual stimulus would serve as a “bridge stimulus” to the natural environment, and as a result, variability may continue to occur when the scripts are removed.

- Demonstrating discriminative control of operant variability of verbal behavior might also be interesting in its own right.
Goals

 To establish discriminated mand variability when visual scripts are present.

 To maintain discriminated variability when visual scripts are absent

 To demonstrate antecedent control in the presence of “vary” and “no vary” stimuli

 To demonstrate generalization of discriminated manding to a natural snack environment

 To demonstrate maintenance of discriminated mand variability
Design

- Non-concurrent multiple baseline design
- 4 participants with autism, ages 3-5
- 5-min sessions that resemble snack environment
- Measured number of different mand frames per session
Conditions

- Baseline (white placemat)
  - All mand frames are reinforced

- Baseline Vary Probe (green placemat)
  - All mand frames are reinforced

- Baseline No Vary Probe (red placemat)
  - All mand frames are reinforced

- Baseline Generalization Probe (regular placemat)
  - All mand frames are reinforced

- Extinction of Repetition (white placemat)
  - Only the first occurrence of each mand frame is reinforced
Conditions

- Script Training and Discrimination Training (VARY)
- Four scripts were printed on a green placemat. A Lag 2 schedule of reinforcement was in place. If no responding occurred for 15-s, or if a response did not meet Lag 2 schedule requirements, we implemented an error correction procedure and prompt three varied responses from a pre-determined prompt sequence.
Conditions

- Script Training and Discrimination Training (NO VARY)
- Four scripts (same as VARY) were printed on a red placemat and only “I want _” produced reinforcement. If no responding occurred for 15-s, or any response other than “I want _” occurred, we implemented an error correction procedure and prompted three responses of “I want _”.

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Conditions

- **Test Condition (VARY)**
  - A blank (i.e., no scripts) green placemat was present. Responses were reinforced if they meet Lag 2 schedule requirements.

- **Test Condition (NO VARY)**
  - A blank red placemat was present. Only “I want _” was reinforced.

- **Return to Baseline (VARY)**
  - A blank green placemat was present. All mand frames were reinforced.

- **Return to Baseline (NO VARY)**
  - A blank red placemat was present. All mand frames were reinforced.
Conditions

 Generalization (VARY)
 A blank green placemat was present and the participant was his/her normal snack group. All mand frames were reinforced.

 Generalization (NO VARY)
 A blank red placemat was present and the participant was at his/her normal snack group. All mand frames were reinforced.

 Maintenance (VARY and NO VARY)
 Same as generalization VARY and NO VARY phases, except conducted two weeks after study has concluded.
Number of Different Mand Frames

Session

Ext of repetition

ST + Lag 3

Lag 3

Return to BL

Gen

Kade

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Number of Different Mand Frames

Sessions

Baseline

ST + Lag 2

Vary

No Vary

Cont. Ex

P

APM

ST + Lag 2

Lag 2

Gus
Scripts can be used to teach a variety of verbal skills from the simple to the complex

They can be implemented by both parents and professionals

Scripts are an effective tool for promoting social interaction and spontaneous language in children with ASD

There are more scripting research questions to be answered
Thank you!!!

For further information contact:

Dr. Tom Higbee

Email: tom.higbee@usu.edu

Web: http://sped.usu.edu/ASSERT