

Strategies to Promote Language in Young Children with Autism

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ASSERT Program Aims

1. **Education:** Provide effective educational and behavioral early intervention using research-based best practices
2. **Research:** Conduct research to improve educational and behavioral interventions for children with autism
3. **Training:** Serve as a model training classroom for USU preservice special education teachers and other educational professionals throughout the state of Utah who are interested in learning to work effectively with children diagnosed with autism spectrum disorders



Home Component

- Home visits a minimum of 2x per month
 - Language
 - Daily living skills
 - Community outings
- Monthly progress reports
- Parents do school visits 1x per month
- School collaboration

Autism: What is it?

- Autism is a severe developmental disability, marked by impairments of communication, social, emotional functioning
- Autism is defined in by the Individuals with Disabilities Education Act (IDEA) as:
 - A developmental disability affecting verbal and nonverbal communication and social interaction, generally evident before age three, that affects a child performance .
 - Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to an article change or changing daily routines, and unusual responses to sensory experiences .
 - The term does not apply if the child's educational performance is adversely affect it primarily because the child has a serious emotional disturbance

Autism: Education and Treatment

- While researchers have thus far been unsuccessful in identifying the cause of autism, they have developed effective methods for treating the disorder
- Research has shown that while children with autism do not learn readily from typical educational environments, they can learn a great deal when the environment is appropriately constructed
- Research has consistently demonstrated that successful treatments for children with autism are those based on principles of Applied Behavior Analysis (ABA)
- Research has also shown that behavioral interventions are most effective when they are intense (30-40 hours per week) and started at a young age (3-5 years of age)
- The following information is examples of research we have conducted based on the principles of ABA

Contriving Motivating Operations to Evoke Mand for Information in Young Children with Autism

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Introduction

- Children with autism often are able to respond to questions and discriminative stimuli
- Many acquire strong tact repertoires, receptive discrimination skills, and mand repertoires to access tangibles or activities
- However, many do not acquire manding repertoires involving accessing information

The Mand

- Mands are defined by Skinner (1957) as “a verbal operant in which the response is reinforced by a characteristic consequence and is therefore under the functional control of relevant conditions of deprivation or aversive stimulation.” (p.35).
- More specifically, Skinner states that “a question is a mand which specifies verbal action” (p.39).

- Why is it difficult for children with autism to acquire this specific manding repertoire?
- Why is there so little empirically based research in this area?
- What is it about mands for information (Where is my wallet, when are we leaving, why did you miss your flight, how is your mom doing?) that makes the information to these questions more or less valuable?
- One reason may be that the verbal information is not effective as conditioned reinforcement
- Behavior may occur, but not under the control of EO (maintained by other reinforcement variables or discriminative stimuli)

What is the motive variable for mands for information?

- When we mand for information, the information provided by the speaker is valuable
- EO has two effects: evocative (increase verbal or nonverbal behavior which has been associated with certain consequence in past) and reinforcer altering (changes value of consequence...in this case, the information)
- For children with autism, one strategy to teach mands for information is to contrive establishing operations to increase the value of the verbal information

Previous Research

- Hall & Sundberg (1987)
 - 2 Deaf teens
 - Contrived situation where item was missing in chain of behavior
 - Results indicated manding for missing items was successfully trained in a structured procedure
- Williams, Donley, and Keller (2000)
 - 2 children with autism
 - Placed items in box
 - Taught children to ask “What’s that?,” “Can I see it?,” and “Can I have it?”

Previous Research

- Sundberg, Loeb, Hale, & Eigenheer (2002)
 - contrived motivating operations by providing access to preferred item in a box, bag, or can
 - 2 children with autism, ages 5 & 6
 - Experiment 1: Participant was allowed to remove item from container and play with toy
 - Container was then given back to participant, but item was missing
 - Participant was prompted to vocalize “Where (toy)?”
 - Instructor then provided information regarding location of item
 - Results indicate participants were able to successfully mand for information using “where + item”
 - One participant demonstrated lower rates of manding behavior when the item was deemed to have less reinforcing value by experimenters

Previous Research, cont.

- Sundberg et al. conducted a second experiment
- Participants
 - Same child that participated in Experiment 1, 1 year later
 - second participant with well-established “where” manding repertoire
- Same procedure as Experiment 1, but when participants manded “Where (item)” experimenter said, “I gave it to a teacher”
- Demonstrated success in contriving motivating operations and evoking mands “Who has it?”

Purpose

- Systematic replication of Sundberg et al. (2002)
- Participants were of preschool age
- For Experiment 1 instead of item being placed in one of three containers, item was placed in one of three locations throughout classroom for one participant
- For other two participants, item was placed in unlimited locations
- Addition of stimulus preference assessment (Carr, Nicolson, & Higbee, 2000) to determine items used in both experiments

Methods

Experiment 1

- *Participants*
 - Three males
 - Stewart, age 4
 - Braden, age 3
 - Gavin, age 3
 - All have received a diagnosis of Autistic Spectrum Disorder
 - Stewart had been attending for 22 months, Braden and Gavin for 5 months
 - Stewart and Braden had vocabularies of hundreds of words, speak in sentences
 - Gavin had a vocabulary of approximately 100 words, and would frequently emit phrases (intelligible and unintelligible)

• *Participants, cont.*

- Stewart and Braden
 - Well-established mand repertoires
 - Both manded for activities involving social interaction (pirates, Star Wars, etc.)
- Gavin
 - Able to mand for variety of tangible items

Methods, cont.

- *Setting*
 - Study took place in university preschool.
 - Some instruction occurred in individual cubicles (measure 5 x 6 feet)
 - Some instruction occurred in general classroom area
 - Generalization probe data was collected in Stewart and Braden’s home environments

Methods, cont.

- *Materials*
 - Variety of tangible items for stimulus preference assessment
 - Backpack, toy box in cubicle, shelf in general classroom area
 - Items changed from day to day, with some overlap
- *Dependent Variable*
 - Percent correct using “where” plus the name of the item out of 10 trials
- *Independent Variables*
 - Access then removal of item/MO manipulation
 - Prompt procedure
 - Information regarding location of item

Methods, Cont.

- *Experimental Design*
 - Within-subject design with between subject replication
 - Within subjects comparisons occurred via a multiple baseline design
 - Multi-element compared different levels of motivation within each subject (highly preferred versus low preferred items.)

Item Selection: Stimulus Preference Assessment

- Brief multiple stimulus without replacement (MSWO)
- 5 items selected according to history of participant (could tact each item as well)
- Participant allowed to interact with each item; if not, prompted to interact
- All items present.
 - Participant was told “Choose the one you want.” Participant was then allowed access to item for 30 sec., then it was removed from array. Procedure was repeated three more times. First item selected was called highly preferred (HP) and last item chosen was low preferred (LP)
- Assessment took approximately 5 minutes

Response Definition & Interobserver Agreement

- Responses were recorded as correct only if the participant manded “Where” plus the name of the item.
- IOA: collected by trained observer for 67% of Stewart’s sessions, 78% of Braden’s sessions, and 91% of Gavin’s sessions
- Agreement was 100% for Stewart and Braden, 100% for all sessions for Gavin except one, which was 90%

Baseline

- Ten trials conducted, 5 HP and 5 LP
- Participant was given access to item for 30 seconds in instructional cubicle
- Participant was distracted briefly, item was removed
- Instructor then said, “Get (item).”
- Any vocalizations were recorded.
- All participants engaged in searching behavior
- Stewart & Braden infrequently used “where” but when they did it was not directed at an adult
- More frequently said “Get it for me”
- Gavin echoed “Get (item)” or engaged in non-contextual statements

Intervention

- Sessions conducted like baseline; stimulus preference assessment provided HP and LP items
- Five trials conducted with each item
- Student allowed access to item, distracted, told to “Get item”
- After 30 seconds, instructor provided prompt: “Say where (item)?”
- After participant echoed phrase, location of item was revealed.

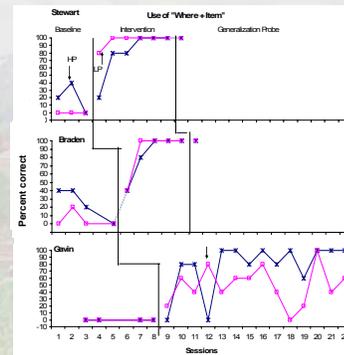
Pre-Teaching/Modifications

- Pre-teaching was required for Gavin
- Taught to go to the backpack, shelf, toy box
- Initially, locations for hidden items were restricted to the three locations for Stewart and Braden. However, when they would return to the instructional cubicle and notice the item was missing, they would immediately check the three locations.
- For this reason, the possible locations increased to anywhere in the classroom.
- Both had well established receptive repertoires and were familiar with the locations throughout the classroom

Generalization

- Once Stewart and Braden emitted “where + item” 100% of trials 3 sessions in a row, generalization probes were conducted
- *Generalization probes*
 - For Stewart and Braden, probes were conducted in the home environment
 - Both mothers were trained in the procedure
 - Items were hidden in any area of the living room
 - IOA: 100%
 - Both participants manded for the missing items 10 out of 10 trials
- *Spontaneous responses*
 - Stewart manded where spontaneously 5 times and even prompted his mother
 - Braden manded where spontaneously 12 times

Results: Experiment 1



Results

- Successfully replicated the Sundberg study; a similar effect was observed
- All three participants demonstrated increases in mands for information
- Stewart and Braden manded “Where is the (item)?” before the instructor could provide the instruction to get the item. (They noticed the item was missing upon entry to the cubicle.)
- For Stewart and Braden, there was no difference in percent correct for HP compared to LP item
- Gavin often had to be prompted to interact with the LP item
- Gavin also manded for items that were not the target item (the HP or LP item he had accessed) Example: When told “Get Nemo” he would say, “Where sharks?”
- Demonstrates EO can be momentary, and manipulated as an independent variable

Discussion

- Data support this procedure in order to teach mands for information regarding location of item
- Further analyses are required to account for differences in performance of participants regarding HP item and LP item (investigate the temporary or transitory effects of EO)
- Gavin demonstrated lower rates of mands involving the LP item
- One possibility could be Stewart and Braden chose activity based reinforcers involving adult attention, whereas Gavin chose concrete items
- For Stewart and Braden, the whole procedure could have acquired reinforcing properties, while Gavin’s behavior could have been affected by momentary effect of the EO
- Anecdotally, all participants generalized mands for information regarding location of item in classroom

Experiment 2

- *Participants*
 - 3 males
 - Stewart and Braden (from previous study)
 - Dillon
 - 4 years old, diagnosis of Autistic Spectrum Disorder
 - Attended university preschool for approx. 4 months
 - Extensive vocabulary
 - Complex manding repertoire, including where
 - *Setting and materials*
 - Same as Experiment 1 (stimuli selected through SPA)
 - Variety of instructors served as people to hold designated items

Methods, cont.

- *Dependent Variable*
 - Percent correct mands “Who has it?” out of ten trials (5 HP, 5 LP)
- *Independent Variable*
 - Access then removal of item/MO manipulation
 - Prompt procedure
 - Information as to who had the item
- *Experimental Design*
 - Same as Experiment 1

Response Definition & IOA

- Responses were recorded as correct only if the participant manded "Who has it?" or any socially appropriate variation (ex. Who has got it, Who holding it, etc.)
- IOA: collected by trained observer for 67% of Stewart's sessions, 77% of Braden's sessions, and 80% of Dillon's sessions
- Agreement was 91% for Stewart, 95% for Braden, 100% for Dillon
- Procedural Fidelity data was over 90% for all experimenters
- Procedural Fidelity assessed following parameters: access to item, correct item used (HP vs. LP), correct S^d, whether prompt was needed or not, correct prompt, correct information provided regarding location of item

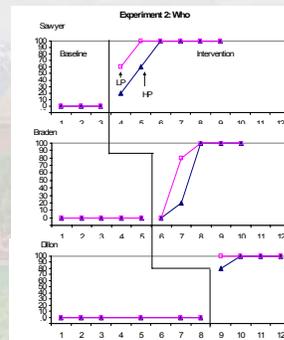
Initial Probe & Baseline

- An informal probe was conducted to see if all participants could expressively identify all instructors at the preschool by name
- No preteaching was required
- Baseline procedures same as Experiment 1 (SPA, access to item, distraction, S^d "Get item.")
- When participant manded "Where item?" instructor responded "I gave it to somebody." All responses were recorded.
- None of the 3 participants manded using "who." All would search and mand using "where," but after the instructor's response they would cease the interaction.

Intervention

- Similar to Experiment 1
- Sessions started as in Baseline
- While participant was distracted, instructor handed item to another adult in room
- After participant manded using "where" and instructor said "I gave it to somebody" instructor would wait 30 sec. and provide a vocal prompt "Say 'Who has it?'"
- After participant repeated phrase, instructor would provide name of person who had item
- Participant would then locate person and mand for item

Results: Experiment 2



Results

- Again, successfully replicated Sundberg study
- All 3 participants met criteria within 4 or 5 sessions
- When told who had the item, Dillon would often mand "Where is (adult)?" adding in a spontaneous mand for information
- For all 3, no difference between HP item and LP item

Discussion

- Data demonstrate effective way to teach children with autism how to mand for information
- Further analyses required to examine lack of difference between HP and LP items
- Anecdotally, participants have been observed using mands for information (Who is there, who is it)

Limitations and Future Research Directions

- Limited amount of participants
- Generalization probe in only one environment
- Need for analysis to investigate typical language development
- Investigate methods to build on mands for information (“Who can play with me, who can I choose, who is it ?” etc.)
- Investigate methods to manipulate MO to teach mands involving when, which, why, how

Training Parents to Use Scripts and Script Fading Procedures

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Scripts

- “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).”

Script Fading

- After children reliably use 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).

Previous Literature

- 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)

Script-fading Procedures

- 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)

Previous Literature

- Parent training research that has focused on increasing language of children with autism has included:
 - Incidental teaching (Charlop-Christy & Carpenter 2000)
 - Time delay procedures (Charlop & Trasowech, 1991)
 - Natural language paradigm (Laski, Charlop & Schreibman, 1988)
- To date there has been no previous parent training research using script fading procedures

Purpose

- The purpose of the present study is 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 2 – 8) and one parent of each participants
- 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 the child's home

Participants

- The first parent-child dyad included
 - Julia – 38 years old, married, 3 children, B.S., and is a stay at home mother
 - Collin – 6 years 10 months, autism and previously enrolled at ASSERT and currently attends 1st grade in a local public elementary school
- The second parent-child dyad included
 - Cami – 28 years old, married, 3 children, B.A. and is a stay at home mother
 - Brandon – 3 years 11 months, autism, and attends a university based preschool for children with autism 20 hours a week in addition to a special needs public preschool 10 hours a week

Participants Continued

- The third parent-child dyad included
 - Andrea – 26 years old, married, 2 children, B.A., and is a stay at home mother
 - Jake – 2 years 11 months, autism and received consultation services from a community clinic one time per week

Procedures

- Assessments
- The Behavioral Language Assessment Form (BLAF)
 - (Sundberg & Partington, 1998)
- Expressive Vocabulary Test (EVT)
 - (Williams, 1997)

Assessment Results

- Collin
 - BLAF average score was 4.5 (range 2-5)
 - EVT – Standard score was 84, 14th percentile, test-age equivalent of 5-5
- Brandon
 - BLAF average score was 4.5 (range 3-5)
 - EVT – Standard score was 109, 73rd percentile, test-age equivalent of 4-6
- Jake
 - BLAF average score was 4 (range 2-5)
 - EVT – Standard score was 116, 86th percentile, test-age equivalent of 3-11

Procedures

- Parent interview
- Parent survey
- Play observation

Procedures

- Stimulus Preference Assessment (SPA) – A brief multiple stimulus without replacement preference assessment was conducted with the child prior to intervention to identify appropriate activities (Carr, Nicolson, & Higbee, 2000).

Procedures

- *Response Definition and Measurement*
Number of interactions were measured using a continuous event-recording system, during which observers recorded the frequency of interactions that occurred during the activity session.
- Sessions were 5 minutes in duration.

Response Definitions

- Child Interactions
- Unscripted Interactions
- Scripted Responses
- Non-interaction

Design

- Parent's use of scripts and script fading procedures and children's use of scripts and unscripted responses were examined using a non-concurrent multiple-baseline design across participants.

Baseline

- During baseline, the parent was instructed to sit next to the child and orient their face towards the child. The parent was instructed not to initiate conversation to the child but to respond only if the child spoke.

Parent Training

- Didactic
- Script development
- Role play

Pre-teaching

- Non related audio scripts, manual guidance and verbal prompts were used to teach the child how to use the voice recorded 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

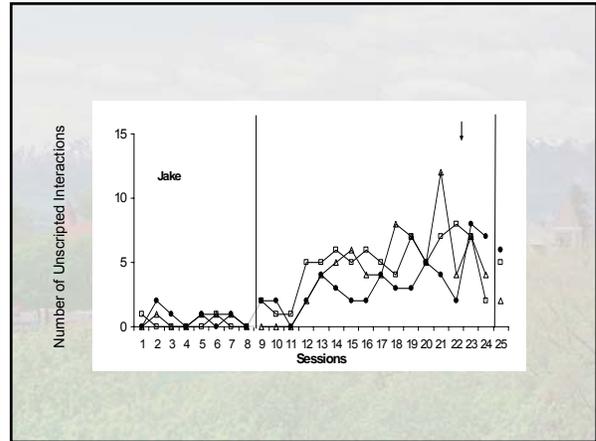
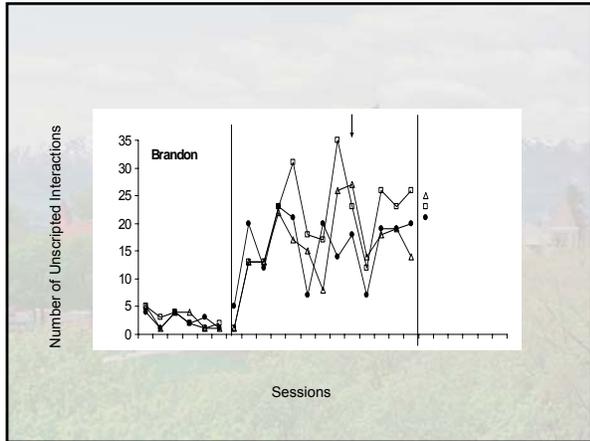
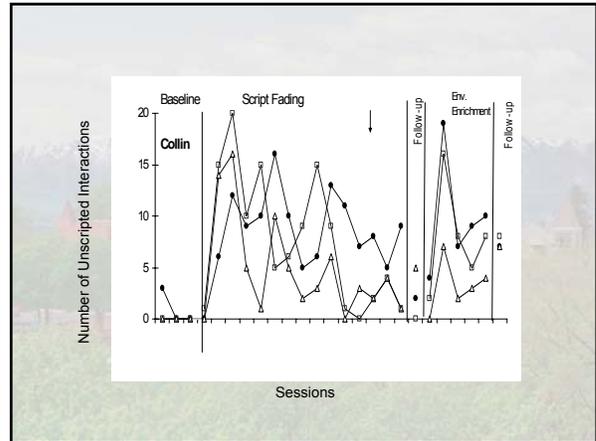
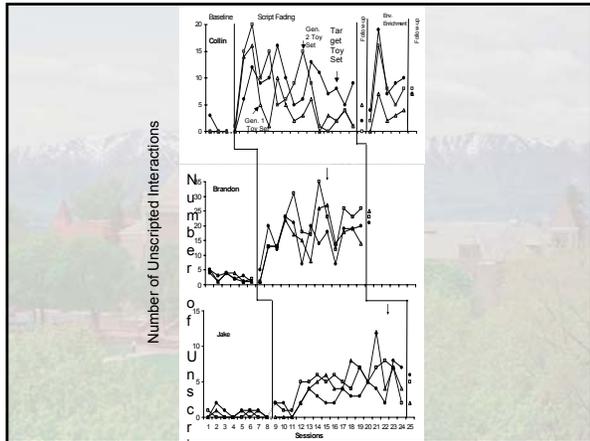
- Sessions were conducted once a day, in which the parents told the child "Let's play." The parents arranged the stimuli on the table or floor and minimized distractions.
- Parents collected data on scripted and unscripted responses.
- Sessions were run for 5 minutes with a 2-3 minute break in between 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 to sit next to the child and orient their face towards the child. The parent was instructed not to initiate conversation to the child but to respond only if the child spoke.
- If the child initiated interaction, the parent was to respond with a statement or question that was contextually related.
- Parents were instructed to respond naturally to child interactions using words the child understands, while making the mean length of their response similar to the child's verbal imitation abilities, using appropriate volume and intonation, and to use gestures and play actions when appropriate.

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.



- ## Results
- Collin
 - Baseline: Mean = .33, Range (0 - 3)
 - Intervention: Mean = 6.9, Range (0 - 20)
 - Trains: Mean = 8.4
 - Blocks: Mean = 4.8
 - Books: Mean = 7.5
 - Follow-up
 - Trains: 2 Blocks: 5 Books: 0
 - Intervention with environmental enrichment: Mean = 6.9, Range (0 - 19)
 - Trains: Mean = 9.8
 - Blocks: Mean = 3.2
 - Books: Mean = 7.8
 - Follow-up
 - Trains: 7 Blocks: 7 Books: 8

- ## Results Continued
- Brandon
 - Baseline: Mean = 2.9, Range (1-5)
 - Intervention: Mean = 16.1, Range (1-35)
 - Rescue Heroes: Mean = 14.7
 - Toy Story: Mean = 14.9
 - Trains: Mean = 18.9
 - Follow-up
 - Rescue Heroes: 21
 - Toy Story: 25
 - Trains: 23

Results Continued

- Jake
 - Baseline: Mean = 0.45, Range (0-2)
 - Intervention: Mean = 4, Range (0-12)
 - Garage: Mean = 6
 - Unscripted Mean = 3.3
 - Scripted Mean = 2.85
 - Fire Station: Mean = 4.5
 - Trains: Mean = 4.75
 - Follow-up
 - Garage: 6
 - Fire Station: 2
 - Trains: 5

Results Continued

- IOA
 - Collin - A second trained observer scored 33% of all sessions mean 98% (range 91%-100%)
 - Brandon - A second trained observer scored 25% of all sessions = 97%
 - Jake - A second trained observer scored 64% of all sessions mean 88% (range 66% - 100%)
- Procedural Fidelity
 - Julia - A second trained observer scored 33% of all sessions mean 98% (range 92% - 100%)
 - Cami - A second trained observer scored 25% of all sessions = 87%
 - Andrea - A second trained observer scored 36% of all sessions mean = 96% (range 83% - 100%)

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.

Limitations

- Presence of voice recorded buttons except during follow-up
- Parental responses to interactions were not evaluated
- For one of the participants environmental enrichment was necessary to maintain interactions

Future Research

- More data is required to clarify the effects of parents use of scripts and script fading procedures on children with autisms' interactions during play
- How to systematically fade the presence of the voice recorded button
- Evaluate the effects parental responses may have on unscripted interactions

Conclusions

- Contriving motivation is an additional way to evoke language in young children with autism
- Scripts and script fading procedures can help facilitate spontaneous language in young children with autism
- Parents can easily be trained to implement both procedures in the home

Contact information

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