

Contriving Deprivation Condition to Teach a Child with Autism to Request Missing Items Needed to Complete Tasks

Angela Carbonell, Ann Maddox, Ashley Bennett, & Hyesuk LeePark

Sam Houston State University

The purpose of this study was to test the effects of contriving motivational condition in a form of deprivation of an item on emergence of vocal request for the item. The participant of the study was a first grade boy with autism and language delays who attended to a public elementary school in a metropolitan area. A deprivation as a motivational condition was contrived by placing an item which was needed to complete a given activity within a sight but out of reach of the child. One activity was used to teach to request and three novel activities were used to test if the learned language skill was generalized within the novel activities. A prompt procedure was used. During the prompting, the investigator presented a vocal model of the name of the missing items when the participant reached to a step of the activity in which the missing item was needed. The prompt procedure was faded systematically. The participant learned to request the missing item with sessions and the skills was generalized across all three novel activities without additional instruction on the vocal requesting.

Keywords: autism, motivational condition, vocal request, generalization

Typically developing two to three year-olds begin to show preference or desire for specific items in their environment by requesting those items to adults and caretakers using vocal words. Using vocal words in order to request needed or desired items or events is the behavior which most of typically developing children acquire as the first functional vocal language skill (Simic & Bucher, 1980). Mand is one of the first functional language skills that children learn within their environments (Simic & Bucher, 1980). Mands occur when a child is under a condition of deprivation of an item, ask for it, and then receive it. Mands are identified to be controlled by environmental variables such as deprivation and specific reinforcement (Greer & Ross, 2008). In other words, children mand or request desired items and they are reinforced by receiving the specific requested items through the mediation of the listener. For example, if a child is hungry (deprivation of food) and says “I want a cookie”, receiving the cookie from a caregiver who listens to the request acts as a reinforcer for that manding behavior, “I want a cookie.” This behavior is both socially meaningful and serves the function of giving the child

Angela Carbonell, Ann Maddox, Ashley Bennett-Sigmund, and Hyesuk LeePark, Department of Language, Literacy, and Special Populations, Sam Houston State University, Texas. Correspondence concerning this article should be addressed to Ann Maddox BCBA, Behavior Specialist, Spring Independent School District, Houston, TX 77090. Contact: amaddox@springisd.org

increased control over their environment. Children with autism have difficulties in establishing this functional language behavior or lack of spontaneous use of the language skills (Kodak & Clements, 2009; McGill, 1999; Secan, Egel, & Tilley, 1989; Williams, Donley, & Keller, 2000) and require intervention on the area.

Identification of environmental variables which control the functional uses of language is one of the critical elements in intervention of children with language delays (Brown, Wacker, Derby, Peck, Richman, Sasso, Knutson, & Harding, 2000). A study by Lechago, Carr, Grow, Love, and Almason (2010) noted that verbal mands such as “what’s that?”, “Can I see it?”, and “Can I have it?” all serve different functions. One is to gain information about an object, one is to see it and the other is to obtain it. Determining the function of the behavior helps to determine how to contrive motivating operation to create instructional opportunities for teaching mands. Cooper Heron and Heward (2007) identified environmental variables that altered the reinforcing value of objects or events. These variables were defined as motivating operations and can determine what an individual wants at any particular moment. An motivating operation increases the value of an item as reinforcer: An abolishing operation decreases the value of an item as a reinforcer. An item becomes more reinforcing when someone has been deprived of it for a period of time. Many behaviors are reinforced by social attention, therefore, creating deprivation of attention for inappropriate behaviors may increase the likelihood that appropriate behavior will occur in order to receive social attention. Similarly, providing free access to one object decreases the motivating operation for it and may increase the likelihood that they will ask for another object. For example, to increase a child’s toy play repertoire, allowing free access to their favorite toy may increase the likelihood that they would choose a new toy because they become satiated with the toy they had free access to. Creating a deprivation for a preferred item may increase the likelihood that the child will say the name of the item in order to receive it.

Children with autism typically have difficulties asking others for items or information they need (Lechago, Carr, Grow, Love, & Almason, 2010; Sundberg, Loeb, Hale, & Eigenher, 2002). Research has found that the lack of communicative behavior often results in problem behaviors such as withdrawal, tantrums, self-injurious behavior, or other violent outburst (Carr & Durand 1985). Teaching children with autism to ask for specific items that they want or need can allow them to express their needs and desires specifically. In the natural environment opportunities to ask for missing or needed items can be limited, so creating instructional opportunities can increase the number of teachable moments (Gutierrez, Vollmer, Dozier, Borrero, Rapp, Bourret, & Gadaire, 2007). Increasing spontaneous vocal requests may be generalized in natural context (i.e., at home or in the community) and allow the child to have more access to things they may need or want on a daily basis.

Various approaches have been reported to be effective in teaching children with language delay to use spontaneous mands. For example, a study by Kodack and Clements (2009) found that when instruction on echoic, manding as vocal requesting, or naming items were paired with preceded trainings vocal requesting, higher levels of unprompted requesting were observed. In this study data were taken on prompted and unprompted vocal responses. The investigator held out a preferred object and waited for a correct vocalization (i.e. naming the object or requesting for the object). Data on prompted and unprompted vocal responses of target mands were collected. This study alternated the use of training on tact training or oral labeling, mand training

or learning to request items, echoic/mand training, and echoic/tact training or initial vocal imitation to request or label items. The investigator would present a preferred object and if there was no response they would say “what is it?” or “what do you want?” depending on the desired response (request or labeling). If the participant did not respond within 5 seconds the investigator said “say (name of desired object)”. If they gave the correct vocal response they would give the object to the child. Results of the study showed that the use of echoics in which vocal models of the names of the items were presented by the investigator facilitated acquisition of spontaneous requesting of the child.

Even though the aforementioned procedure in which echoics as prompts were provided was effective in teaching mands as vocal requesting, a major environmental variable which controls manding is being under motivating condition such as being under deprivation or being under aversive situation. Contriving motivational condition has been reported as a major strategy for teaching manding. In the relevant literature, motivating operation was used to teach mands within various contexts. Gutierrez, Vollmer, Dozier, Borrero, Rapp, Bourret, and Gadaire (2007) evaluated the effectiveness of manipulation of an motivating operation on teaching children to use mands as vocal requests. They conducted a training procedure designed to teach two separate mands for two separate preferred items. Using picture cards the participants were taught to mand. Following the training, the manipulation of the motivating operation was used to establish discrimination in items they were manding. They decreased motivation for one object which in turn increased motivation for the other item. The manipulation of deprivation and satiation were obtained by providing free access to one item and by restricting access to the other creating deprivation of it and thus decreased motivation for that object. They were presented with pictures of two preferred objects. When presented with pictures of two preferred objects they were trained to choose the one that was under deprivation. Three out of four participants were able to discriminate between the item they had free access to and the one that they should have motivation for because they did not have access to it.

Motivating operation was used during instruction on appropriate form of a mand as a replacement behavior for problem behavior which function as a mand. A study by Brown, Wacker, Derby, Peck, Richman, Sasso, Knutson, and Harding (2000) tested the effects of manipulating motivational condition during functional communication training in order to decrease problem behavior. They manipulated the motivating operation and prompted them to respond with the appropriate mands instead of the problem behavior which functioned as mands for a break from aversive tasks or mands for attention or desired items. They presented two conditions to the participants, one condition where the motivating operation related to the function as the inappropriate behavior (i.e. attentions, escape, tangible objects) and the other condition where the motivational operation did not relate to the function of the inappropriate behavior. Their results supported the hypothesis that a higher rate of appropriate manding occurs when a motivating operation was present that relates to the same function of the inappropriate behavior.

Considering the effectiveness of utilizing motivating operation in teaching children to mand desired items, identifying ways to establish motivating condition can be a critical component in planning and implementing mand instruction. Cooper Howard & Heward (2006) identify major ways to create a motivating operation; brief deprivation, and interrupted chaining.

Deprivation increases the reinforcement values of an item and increases the likelihood that someone will ask for mand for it. For example, receiving a glass of cold water will be highly reinforcing after a child comes back from the soccer game on a hot day and thus the child will be highly likely request water in the situation. However, the same event will not be reinforcing after the child has a bowl of cereal with milk and the probability of occurrence of manding will be low.

Another way to create motivating operation is an interrupted chaining procedure in which a preferred activity is interrupted. In this procedure, an opportunity to perform a skill is provided but the behavior chain is interrupted at a predetermined step, thus creating a situation of deprivation for the next step. Having an motivational condition in place can induce a mand for that item to continue in the behavior chain. A study by Sundberg, Loeb, Hale, and Eigenheer (2002) used an interrupted chain procedure and a contrived establishing operation of deprivation to see if the rate of spontaneous mands would increase in a child with autism. The data from this study showed that manipulating the motivational operation by removing the item increased the number of mands for the item by the participants. The research showed that by contriving establishing operations using the interrupted chain procedure was effective on teaching children spontaneous uses of mands.

Similarly, in a study by Lechago, Carr, Grow, Love and Almason (2010) implemented an interrupted chain procedure by withholding one item needed to complete an activity and placing it out of sight of the participant. The participant was required to ask where the item was. In the current study a similar tactic is used but the item was placed within the participant's sight. One item needed to complete the activity was withheld and then presented contingent on the mand for the item emitted by the participant. The investigators of the aforementioned studies were able to teach the participant to mand the missing items effectively using the interrupted chain procedure, however, generalization of this skill was not looked at in the research.

The purpose of this study is to use the interrupted chain procedure and a contrived establishing operation of deprivation to see if the rate of spontaneous mands for a needed object to complete a task will increase for a child with autism. The interrupted chain involves removing items the student needs in order to complete an activity. Generalizations of the spontaneous mands across novel activity were then tested within the study on three novel activity sets.

Methods

Participants

The participant was a first grade male with a diagnosis of autism. He attended a self-contained special education classroom in a public school. The participant had moderately delayed communicative and adaptive skills and displayed some stereotypic behavior (ie. repetitive vocalizations and movements). He was able to sustain joint attention, pretend play and engage in play with his older sisters. He showed affection in the form of hugs and empathy by asking peers if they were ok when he observed them crying or angry. He mands (requests with vocal words) for highly reinforcing items in preferred settings but the frequency of spontaneous mands in non-preferred settings was very low. He was selected as the participant due to the lack of spontaneous mands in natural settings. The results of evaluation on his language skills

administered with the Psychoeducational Profile-Third Edition, (PEP-3) showed that he was in 38% rank in preverbal domain, 26% rank in expressive language skills, and 31% rank in receptive language skills. The PEP-3 is an instrument designed to assist educators in planning educational programming and diagnosing autism or other pervasive developmental disorders. The summary of the information of the participant is displayed in Table 1.

Setting

This study was conducted in a classroom of a public elementary school. The classroom consisted of 6 children diagnosed with autism, two paraprofessionals and one teacher. Sessions were conducted while the participant was seated at a 2-½ foot wide rectangular classroom table with the teacher who sat directly across the table. The only materials on the table during each session were the instructional materials that were presented. One paraprofessional and three peers were in the classroom when the study was conducted. The classroom contained items with reinforcing value, such as the computer, small toys (i.e., cars, trains, and puzzles), and books.

Materials

Four sets of materials for four different activities were used during the experiment. All the activities required the participant emitted a chain of behaviors using the provided materials in order to complete the activities. The experimenter provided all the materials needed to complete the behavior chain except one item. The item was withheld from the participant but placed within their visual field in order to create a deprivation of the item. The items used to contrive the deprivation conditions were marbles, shapes, toy cars, and cups. The materials including the target items are listed in Table 2.

Dependent Variable and Data Collection

The dependent variable for the study was spontaneous vocal requests for missing items. The items were placed within the participants sight but out of their reach. A response was considered correct if the child requested the item they needed by stating the name orally within 15 seconds using full sentences. For example in Activity 1, the participant was presented with a bag, shaving cream, but no shapes. The shapes were in the participants sight but out of reach. The direction was given to “put the shape in the bag”. The child needed to request or ask for the shapes to put them in the bag. The number of vocal requests was counted and recorded using paper and a pen. If the child requested the missing item which was needed to complete the activity by saying the name using full sentences (i.e., “Can I have ____?”) within 15 seconds, then a “+” was noted in a data sheet by the investigator. If the child did not respond within the 15 seconds or emitted an approximation of the target response, a “-” was noted. Each session consisted of 5 trials across all experimental conditions.

Independent Variable

The independent variable consisted of (a) manipulation of the establishing operation (deprivation) through interrupted chaining procedures (b) echo-to-mand procedures, and (c) prompt fading. Interrupted chaining procedure was implemented by placing one of the items

needed for completion of the given activity out of reach but within the sight of the participant. In the echo-to-mand procedure the experimenter provided prompts by saying the name of the target item and delivered the item immediately after the participants echoed the vocal form presented by the experimenter. The echoic prompt was faded gradually.

Design

A multiple baseline design across behaviors was used to assess the effects of interrupted chain procedure and prompting on the increase of spontaneous mands. Baseline data were collected within all four activities. Intervention started with Activity 1. Once the participant reached the pre-set criterion, generalization probes with Activity 2, Activity 3, and Activity 4 were conducted.

Procedure

Four activities were used throughout the study. Activity 1 was making a shaving cream bag using a paper bag, foam shapes, and shaving cream; Activity 2 was producing a painting using marbles which were rolled on paints and coloring paper; Activity 3 was car painting using a piece of paper, toy cars, and points; Activity 4 was making bubble towers using cups, straws, and bubbles liquid. Activity 1 was used during the intervention phase and Activity 2, Activity 3, and Activity 4 were used during the generalization probe sessions. A brief description of activities and a list of materials are shown at Table 2.

Pre-experimental instruction on vocal naming of the materials. A pre-experimental probe was conducted to determine the participant's ability to name each item used in the study. The items that the participant failed to label the presented item during the probe were taught using echoic prompts. The investigator presented an item, stated the name, and waited three seconds for the child to echo the presented vocal model. The echoic prompts were faded gradually and the participant was required to label the items orally and independently when the investigator presented the items in front of the participant. Verbal praise was delivered for correct echoic responses and independent responses. The criterion of the pre-experimental instruction was labeling the presented items with 100% accuracy for one training session.

Baseline. During the baseline 5 opportunities for requesting the missing items were provided during each session. In each session the participants were presented with one of the four activities which contained multiple steps. In each activity, one item needed in order to perform the activity was missing and placed out of the reach but within the sight of the participant. For example the participant was given paint, a bin, coloring sheet, but no marble. The instructions were to roll the marble in the paint before he placed the marbles on the coloring sheet. The marble was out of the reach of the participant but within the visual field. Data on the number of vocal requests of the missing items was collected. If no response was given within 15 seconds the activity was taken away and a new activity was presented.

Intervention. Five trials were provided during each session of intervention and the intervention phase was started with Activity 1. The activity was presented with one key item (a

Ziploc bag) missing and the instructions (i.e. “Make a shaving cream bag.”) for five trials. For example, the participant was instructed to create a shape bag, given shaving cream and shapes, but a bag for the activity was not provided. The bag was placed on a table behind the investigator out of the reach of the participant but within sight. By removing the needed item the investigators created a deprivation of the item to increase the likelihood that the participant would ask for it. A prompt was delivered immediately after the participants reached the step in which the missing items were needed (e.g. the investigator said “I need a bag, please” when the participant reached to the step of activity in which the Ziploc plastic bag was needed). The prompt was faded by delaying prompts systematically: the time between the moment when the participant needed the item and a prompt were delayed starting from zero seconds, to 1 second, to 2 seconds and then the prompt was faded out. The criterion for mastery during intervention with Activity 1 was showing independent vocal requests with 100% accuracy for 3 consecutive sessions. After the participant reached the criterion with Activity 1, generalization probes were conducted with the other three activities.

Generalization probes. After criterion was reached with Activity 1, generalization probes were conducted with the three untrained activities; Activity 2, Activity 3, and Activity 4. Five trials were presented during each probe session. The procedure during the generalization probe was the same as that of baseline.

Interobserver Agreement

IOA was obtained with a paraprofessional who collected the data independently and simultaneously when the study was conducted. IOA was conducted in 30% of the sessions. A total agreement method was used to calculate IOA. Total agreement is calculated by taking the smaller number divided by the larger number times 100%. The mean of IOA during the baseline, during intervention, and during the generalization probe was 100%.

Results

The participant independently emitted mands for missing items to complete tasks and generalize this skill to novel activities. Results are depicted in Figure 1. During baseline the student emitted zero corrected responses across all four activity sets. The intervention began with Activity 1. During the first two sessions the shaving cream and the bag were presented to the participant, but responding remained at zero for independent mands for the shapes. The participant began to show correct independent responses starting from the fifth session. The participant was able to mand for the shapes 2 times independently during the fifth and the sixth session. The participant reached to the criterion within 10 sessions. The generalization probes were presented starting with Activity 2, Activity 3, and Activity 4. The participant was able to independently mand for the marble 5 times out of 5 opportunities with Activity , manded the car 5 time out of 5 opportunities, manded the cup 5 times out of 5 opportunities. The participant was able to achieve criteria with all the generalization activity sets containing novel items.

Discussion

The results of the study support the findings of previous studies (Sungberg, Loeb, Hale,

& Eigenheer 2002) that using interrupted chain procedure was effective in increasing spontaneous mands. The study conducted by Lechago, Carr, Grow, Love, and Almason (2010) used the same procedure but placed the object out of sight of the participant. While Lechago's study focused on "Wh" questions, this study focused on pure mands therefore the object remained in view of the participant. The results show that having the target items within the sight effectively contrive the motivational operation. The findings have several implications. The results of the present study showed that the use of an interrupted chaining procedure in combination of echoic-to-mand procedure was effective in inducing a requesting missing items with a child with autism. Both clinicians and educators can benefit from the information produced by research in this area. A potential expansion of that tactic could be adding descriptive words such as adjective (i.e. words for coloring, shapes, and sizes), targeting to expand the length and specificity of mands. For example, a child with language delay can learn to use mands with descriptive words (e.g., big or small) when the children are delivered the desired big car only when they specifically describe the feature of the desired item by saying "I need the big car, please."

With highly structured and intensive instruction, children with autism and language delays can be taught to use functional language skills such as requesting orally (mands) in the instructional setting. However, generalization of the learned language skills in novel environments has been challenging issue among the children with autism. The previous research on inducing spontaneous requesting didn't necessarily focus on abilities to generalize that skill to novel items or events. In the current research, generalization of the spontaneous mands within novel activities was measured after the participants reached the criterion with one activity. The findings from the present study show that after using interrupted chaining procedures to elicit mands the skill can be successfully generalized to novel activities in which mands for the missing item was not taught. The limitation of the current study is that data was collected with very limited number of participant. However, this extends the findings from other research and also presents to opportunity to extend the research further to look for generalized in the natural setting. Looking within the context of the participants' day or various activities in the natural setting can provide another option for generalization. The design of the current study incorporated generalization component, which enabled the investigators to obtain the information about eh generalization. Future research could look at the intensity or duration of intervention that would occur before a child with autism or developmental disabilities generalizes the skill in the natural environment.

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Table 1

Description of the Participant's Language Skills

Standardized test score (developmental age and % rank) on PEP-3			Level of Verbal Behavior
Cognitive Verbal/			-mands for highly reinforcing items
Preverbal	47 months	38%	-lack of spontaneous mands
Expressive Language	25 months	26%	-exhibits echolalia
Receptive Language	23 months	31%	-echoes some words spoken by teacher
			-exhibits some stereotypic and repetitive communication

Table 2

Description of Activities, Materials Used, and Target Items to be Requested

Activity	Materials	Task Presentation
Activity 1	Shaving Cream	Make a Colorful Shaving Cream Bag with a Ziplo
Shaving Cream Bags	Ziploc Bags Various Foam Shapes	Bags, Shaving Cream, and Foam Shapes of Different Colors.
Activity 2	Several Colors of Paint	Paint a Picture with Marbles Which Have Been
Marble Art	Bin/Tub Marbles Coloring sheet Chair	Rolled Over on Paints: The Participant Rolled the Marbles with Paints on a Sheet of Coloring Paper to Produce an Abstract Painting
Activity 3	Several Colors of Faint	Painting an Abstract Picture by Rolling a Car
Car Painting	Toy cars, Paper, Paper plates (to put paint on)	Which Had Been Rolled on Paints Several Times on A Sheet of Paper
Bubble Towers	Small Dixie Cups, Straws, and Bubble Liquid	Making a Bubble Tower by Blowing Bubbles in a Cup with Straws

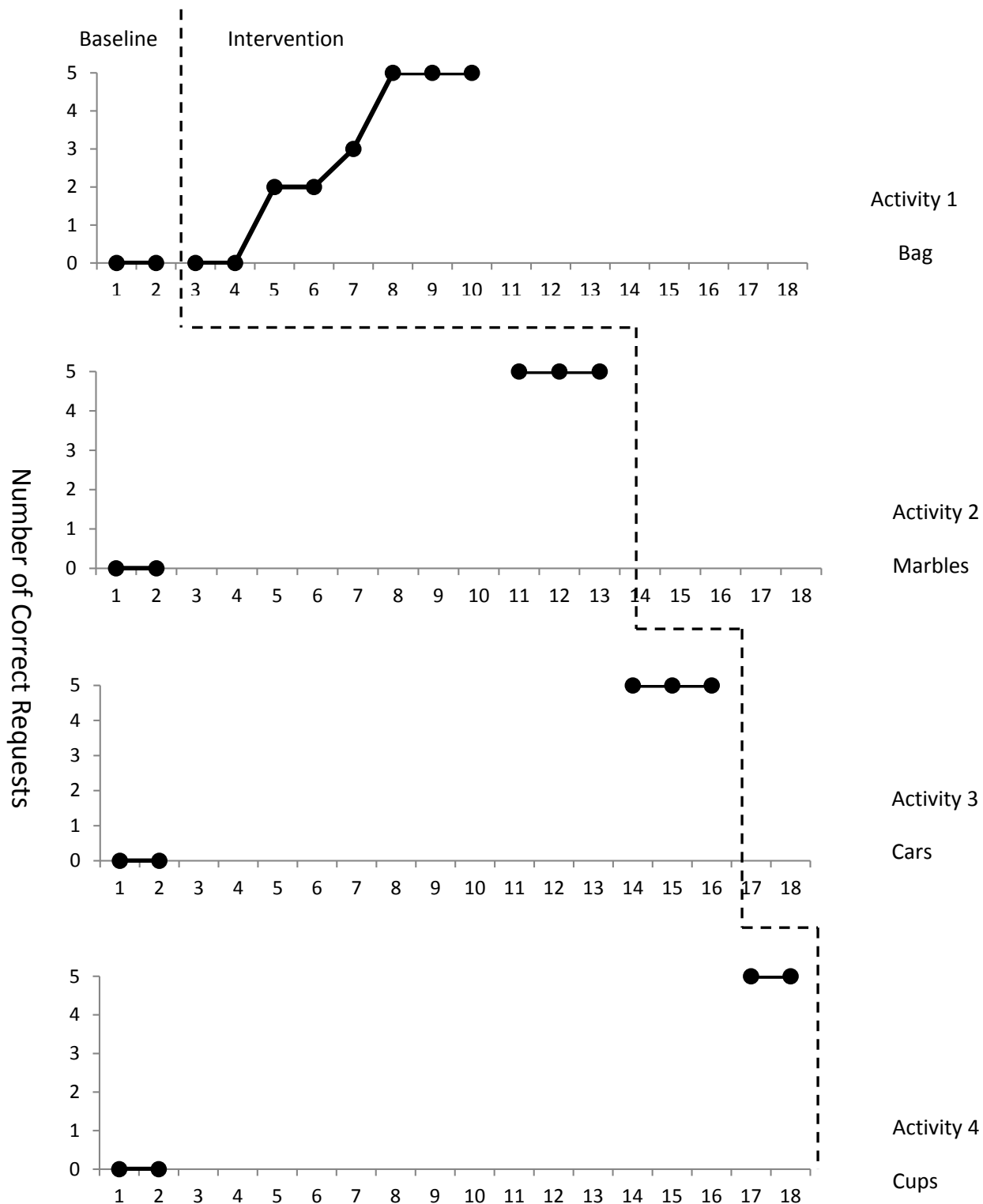


Figure 1. During the baseline, the participant didn't show requesting the missing items within all of the activities. The participant required 8 sessions to reach to the criterion with Activity 1 during intervention phase. The participant showed generalization of the requesting missing item across the untrained activities.