Practical Research

Teaching a Child with Autism to Respond to the Question, “What Else?”

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In this study, a child with autism was taught to respond to the question, “What else?” The purpose of this study was to examine an effective procedure to acquire appropriate responses when asked for additional information. The participant was first asked what he associated with an animal before being asked for additional information. To teach correct responses, a prompt fading procedure was used. The results revealed the procedure was effective. Furthermore, the behavioral variability of the participant increased at the completion of the procedure. The results revealed that children with autism can acquire appropriate responses, and the acquisition of these responses affects the degree of behavioral variability.

Key Words: autism, response to a question, behavioral variability

Introduction

Previous studies have identified repetitive behaviors as characteristic behavior of people with autism (Cunningham & Schreibman, 2008). They experience many difficulties such as a hindrance to learning (Lang, O’Reilly, Sigafoos, Lancioni, Machalicek, Rispoli, White, & Zarcone, 2009) and a hesitation to go outside because of these repetitive behaviors (Cunningham & Schreibman, 2008).

Furthermore, a lag schedule has been employed in previous studies to decrease repetitive behaviors and increase appropriate behaviors (Contreras & Betz, 2016; Napolitano, Smith, Zarcone, Goodkin, & McAdam, 2010; Susa & Schlinger Jr, 2012). A lag schedule is a reinforcement schedule in which timing is stipulated so as to present a reinforcer. When a lag schedule is introduced, a response is reinforced only if it differs from a specified number of previous responses (Contreras & Betz, 2016). Consider a child who is building a model with blocks. If a lag 1 schedule is introduced, a building response will be reinforced only if the model built differs from the previous model. If a lag 2 schedule is introduced, a building response will be reinforced only if the model built differs from the previous two models.

Many studies have supported the effectiveness of a lag schedule to increase behavioral variability. However, there are exceptions. Napolitano et al. (2010) used a lag 1 schedule to teach children with autism to select a novel colored block and while playing with the block, to shape a new form. In addition, they also provided the verbal instruction: “Build differently.” However, a lag 1 schedule did not increase participants’ behavioral variability. Consequently, they introduced teaching trials that the experimenter had modeled by building something different and verbally prompted the participants to imitate her model. The results revealed that this procedure increased behavioral variability. However, there is a possibility that the lag 1 schedule employed by Napolitano et al. (2010) did not increase behavioral variability because the participants could not respond appropriately to the verbal instruction, “Build differently.” Contreras and Betz (2016) conducted a pre-assessment to measure the number of verbal repertoires in a certain stimulus class before a lag 1 schedule was introduced. During the pre-assessment, the trainer asked the children with autism what they could find in a kitchen.

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In order to obtain other responses, they were asked what else they could find once they answered the first question. The participants were able to respond appropriately to the second question. This assessment is very useful in research on the lag schedule. However, if the children with autism were unable to respond appropriately, the pre-assessment would not have been established.

Regardless of the instruction or question (Contreras & Betz, 2016; Napolitano et al., 2010), the required responses differed from the preceding response. In order to promote increasing behavioral variability using a lag 1 schedule, it is sufficient to reinforce the response that differs from the first. However, many children with autism had never given varied responses or even repeated the same responses before the research was conducted (Contreras & Betz, 2016; Lee & Sturmey, 2006; Napolitano et al., 2010). Because children with autism who repeat the same response are never reinforced under a lag schedule, their behavioral variability is not necessarily increased. Therefore, a combination of a lag schedule and a verbal instruction so as to obtain responses that differ from the preceding response is possibly effective in increasing behavioral variability in children with autism who tend to repeat the same responses. However, as noted previously, cases where children with autism have not responded to this verbal instruction appropriately have been reported. To overcome this problem, Napolitano et al. (2010) and Lee and Sturmey (2006) used modeling to promote novel responses. Although this procedure has been effective, developing better procedures to teach children with autism to vary their responses may extend to an area of study on the repetitive behaviors and behavioral variability of children with autism as well as a lag schedule.

In this study, the effectiveness of the intervention promoting the acquisition of the response to the verbal instruction, “What else?” was examined. Most-to-least prompting was employed to teach this response. Most-to-least prompting is an instructional strategy that progressively reduces a trainer’s assistance from the greatest degree of help needed to ensure correct responses of the participant’s independent performance of the target behavior (Wolery, Ault, & Doyle, 1992). Because this strategy involves a procedure in which the participant can avoid an error (Libby, Weiss, Bancroft, & Ahearn, 2008), it was considered effective for a participant presented with the stimulus, “What else?” for the first time. Furthermore, the influence of this intervention on behavioral variability was examined.

Method

Participant and Setting

The participant was a 15-year-old boy with autism. The participant had been receiving applied behavior analysis in an educational institution attached to a university from the age of six years. The Kyoto Scale of Psychological Development (Ikuzawa, 2000) revealed the participant’s overall DQ score was 23, cognitive-adaptive DQ score was 29, and language-social DQ was 19. The participant could use two mand (the verbal behavior to request) sentences and one tact (the verbal behavior to describe) sentence. For example, he said “Hello, Mr. Please give me a ball” as a mand, and said “It’s a trampoline” as a tact. He could repeat the complete statements of others. He also could perform intraverbal instructions taught from training. For example, the participant answered “Curry” when the trainer asked, “What do you associate with food?” However, when the trainer asked, “What else?” afterwards, the participant immediately repeated the preceding response (“curry”) with a louder voice. At this time, the participant frowned and looked angry. To solve this problem, the authors and his parents discussed his future education. Accordingly, it was decided the participant should receive this intervention.

Because the participant did not respond to “What else?” a pre-assessment could not be conducted to identify repertoires in each stimulus class. However, it was inferred that as a result of previous training such as the discrimination of categories, the participant had at least 10 or more repertoires in each stimulus class.

The study was conducted across a period of approximately three months. Three sessions were conducted on one day a week. A session, which lasted 5–10 minutes, consisted of ten trials. A room (5 m × 8 m), which comprised a table and two chairs, located in an educational institution attached to a university was used. The participant sat opposite the trainer.

Two photographic sheets (148 mm × 210 mm) were used. There were four photographs of animals on
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Response Measurement and Data Collection

The dependent variable was a response followed the verbal instruction, “What else?” from the trainer. Measurement began after the participant answered a question from the trainer that was required in a certain stimulus class. For example, measurement began when the participant answered “Elephant” to the question, “What do you associate with the word, animal?”

However, if the trainer asked, “What else?” the participant could not give the example of an elephant again, but had to name another animal such as a giraffe. Such responses were recorded as correct responses, whether they were a single word or two words or more. An incorrect response constituted giving the same response as the preceding response or giving an answer from a different stimulus class as to that asked by the trainer. For example, if the participant had stated that it was an apple instead of an animal, it would have been regarded as incorrect. In addition, if the participant did not respond within five seconds after the trainer had asked for additional information, it would have been recorded as incorrect.

To examine the influence of the procedure in this study on behavioral variability, the percentage of trials with a varied response and the number of novel responses were measured in the pretests and posttests. A varied response was recorded when the participant gave a different response to the preceding response to first question from the trainer. For example, a varied response was recorded if the participant answered, “Monkey” to the question “What do you associate with an animal?” in a trial, and in the next trial answered, “Rabbit” to the same question. A novel response was regarded as the first response given spontaneously in a session. If the participant gave dog, monkey, cat, and giraffe in a session, there were four novel responses. However, if the participant gave dog, monkey, dog, and giraffe, there were three novel responses. A varied response and a novel response could be recorded as a single word such as dog or as two words or more, for example, it is dog.

All the sessions were recorded by a video camera. The trainer used the recorded sessions to measure the participant’s responses. In addition, an undergraduate student who did not participate in the study also recorded the participant’s responses to collect inter-observer agreement data. Inter-observer agreement data were collected by the second recorder who recorded the target behaviors independently for 50% of all the sessions. Reliability was calculated by dividing the total number of agreements by the number of agreements plus disagreements and multiplying the answer by 100%. The result showed that the inter-observer agreement was 100%.

Design and Procedure

A pretest-training-posttest design was employed to examine the effectiveness of the procedure. Training was divided into six phases. When the percentage of trials with a correct response was 100% for two sessions in a phase, the next phase began. However, data in pretests 1, 2, and 3, and post-tests 1, 2, and 3 were recorded for three sessions.

Pretest 1. The trainer first asked the participant, “What do you associate with an animal?” After the participant had responded, the trainer asked, “What else?” In pretest 1, the trainer did not provide feedback and prompts regardless of the participant’s response. In order to confirm the participant’s stable responses, three sessions were held.

Pretest 2. The same procedure followed in pretest 1 was adhered to in pretest 2. However, instead of the trainer asking the participant what he associated with an animal, he asked him what he associated with food.

Pretest 3. The same procedure was followed in pretest 3. However, the trainer asked the participant what he associated with a vehicle instead of an animal.

Training—Phase 1. The trainer provided the participant with a photographic sheet on which four pictures of animals were drawn. Thereafter, the trainer drew a diagonal line with a pencil through two of the pictures while naming these animals. For example, as the trainer drew a diagonal line through the picture of the panda, he said, “Panda.” Subsequently, the trainer asked the participant, “What else?” and gave him a pencil. However, the trainer held onto the pencil until the participant had named the two animals on which a diagonal line had not been drawn. When the participant did this correctly, the trainer gave the pencil to the participant. If he was able to draw a diagonal line through the remaining two animals, the
trainer praised him; this ended the trial. Two photographic sheets were alternated.

**Training—Phase 2.** The same procedure followed in phase 1 was adhered to in phase 2. However, the trainer did not hold onto the pencil. Rather, if the participant tried to draw a diagonal line without saying the names of two animals, the trainer grabbed the pencil to block the picture and prompted the participant verbally.

**Training—Phase 3.** The same procedure followed in phase 2 was followed in phase 3. However, the trainer did not give the participant a pencil when he asked him what else there was. In essence, the participant was praised for naming the animals. If the participant wanted a pencil, the trainer asked, “What else?” Furthermore, if the participant did not name the animals, the trainer prompted him verbally.

**Training—Phase 4.** The same procedure in phase 3 was followed. However, in phase 4, the trainer never drew a diagonal line through two of the pictures of the animals.

**Training—Phase 5.** Once again, the same procedure was followed. However, after the trainer asked the participant what he associated with an animal at the beginning of a trial and he had named two animals, the trainer asked, “What else?”

**Training—Phase 6.** In this phase, the same procedure followed in phase 4 was employed, but the two photographic sheets were not used.

**Post-test 1.** The same procedure used in pretest 1 was used. To confirm the state of stable responses of the participant, there were three sessions. However, if the sequence of the participant’s responses in the second and third sessions were the same as those of previous sessions, the session was recorded as “a repeated responses session.” This was done to determine whether responses to “What else?” were controlled appropriately by the stimulus control or if the participant had repeated a sequence of responses triggered at the beginning of the session as a discriminative stimulus. If a session was recorded as a repeated responses session, it was decided that the responses in the session were not an appropriate response for additional information, but simply a repetition of a certain sequence of responses.

**Post-test 2 (generalization to food).** The same procedure employed in post-test 1 was followed. However, the trainer asked the participant what he associated with food instead of an animal.

**Post-test 3 (generalization to vehicle).** Once again, the same procedure was followed. However, the trainer asked the participant what he associated with a vehicle instead of an animal.

**Informed Consent**

Before the study commenced, the purpose, procedure, and expected results were explained to the participant and his parents verbally and in writing. Furthermore, they were told they could refuse to participate if the participant experienced any dissatisfaction. Both the participant and his parents agreed to participate in the study and signed an informed consent form.

**Results**

The ratio of correct response in each session is illustrated in Fig. 1.

The participant never gave any correct responses in the pretests. Although he knew a dog was associated with an animal, he repeated the same response when asked, “What else?” When phase 1 was introduced, the ratio of correct response immediately increased to 100%. In phase 2, the ratio of correct response decreased in the 12th and 13th sessions. In these sessions, the participant drew a diagonal line through all the pictures of animals and said, “Done.” Subsequently, the ratio of correct responses increased in the 14th session. The participant never responded incorrectly from phase 3 to 6. The mean ratio of correct responses in post-tests 1, 2, and 3 was 96%. Furthermore, the participant never repeated responses.

The percentage of trials with a varied response and the number of novel responses is presented in Fig. 2. In the pretests, the participant repeated the same responses in all the trials. Thus, the percentage of trials with a varied response was 0% and the number of novel responses was 1. The mean percentage of trials with a varied response in post-test 1 was 62%, and the number of novel responses 4. The mean percentage of trials with a varied response in post-test 2 was 100%. The number of novel responses was 10 because the participant gave different names of foods in all the trials. The mean percentage of trials with a varied response in post-test 3 was 88% and the mean number of novel responses was 6.

Although anecdotal, the participant’s parents
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reported that he responded to “What else?” at home after the study had been completed. When his parents asked him what he had played at an excursion, he answered a swing. However, when his parents asked what else he had played, he said he had eaten a box lunch and a bike. However, the content of the participant’s responses was consistent with the excursion’s program. Furthermore, this was the first time that the participant had been able to talk for more than three turns.

**Discussion**

In this study, the participant was taught the appropriate response to the question, “What else?” In addition, the ratio of correct response was 100% in all the sessions of all the phases with the exception of phase 2. This revealed that the most-to-least prompting procedure employed in this study was appropriate for acquiring appropriate responses to a question requiring additional information. Furthermore, because the participant did not repeat responses in post-tests 1, 2, and 3, it is evident that he had acquired an appropriate response and not a sequence of single and mechanical responses to the question, “What else?” Although no previous study has taught this behavior, this study revealed that this behavior could be acquired by means of an appropriate intervention plan.

In post-tests 2 and 3, the participant was able to make generalizations of stimuli not used in the training. This shows that the participant was able to give varying responses rather than a learned response. Using two photographic sheets in training might be a factor in successful generalization. It is possible that using two photographic sheets served as “train suf-
icient exemplars” (Stokes & Baer, 1977), which are effective for generalization. In teaching a response for additional information, which is a versatile behavior, it is important to use procedures that promote generalization.

Although anecdotal, the participant could respond appropriately when asked for additional information in daily life. This result showed a generalization across settings and persons, and revealed that his responses were accurate. The procedure in this study may be effective for generalizations in daily life.

In addition, the number of conversation turns also increased. It is possible that the conversation between the participant and his parents continued for a relatively long time because asking “What else?” functioned as a discriminative stimulus to promote the next statement. Furthermore, although this study did not examine if children with autism are more inclined to talk after more opportunities, they may be able to construct more steady interpersonal relationships. Consequently, teaching children with autism responses for additional information may also be effective in constructing steady conversations and interpersonal relationships. It is recommended that future studies examine the effectiveness of teaching children with autism to respond appropriately to a request for more information in more widespread interpersonal interactions.

The behavioral variability increased in the post-tests. However, a lag schedule (Lee & Sturmey, 2006) and percentile schedule (Machado, 1989; Miller & Neuringer, 2000), which are effective in increasing behavioral variability, were not used in this study. Nevertheless, to increase behavioral variability, by alternating two photographic sheets, the participant was able to give different responses when asked with what he associated an animal. Increasing behavioral variability appeared to be the result of reinforcement for different responses for each trial during the training. It is possible that if only one photographic sheet had been used in the training, behavioral variability might not have changed. Furthermore, if three photographic sheets had been used, there may have been more evidence of behavioral variability; this hypothesis is beyond the parameters of this study. It is recommended that future studies examine the influence of the number of photographic sheets on behavioral variability.

The mean number of novel responses in post-test 1 that required the participant to list animals was four. However, the mean number of novel responses in post-tests 2 (food) and 3 (vehicles) was 10 and six, respectively. The discrepancies in those results might be the result of the participant’s verbal repertoires; he may have had more verbal repertoires for food than vehicles and animals. Alternatively, it is possible the participant’s interests had an influence on the discrepancies. The participant enjoyed food such as pizza and sweets, and often wanted to go out for lunch and dinner on holidays. Future studies should conduct a pre-assessment to assess the interests and verbal repertoires of the participant as Contreras and Betz (2016) did. Furthermore, the relationship between the results of the pre-assessment and the number of novel responses should be examined.

This study had several limitations. First, there was only one participant. Future studies with more than one participant should examine whether the results of this study can be reproduced. If the results of this study are not reproduced, future study should examine what factors resulted in any difference between the results. Second, generalizations to similar situations were not measured. Although the participant’s parents reported that he responded to “What else?” appropriately at home, this was an anecdotal episode. It is recommended future studies employ a measurement method to confirm any generalizations. Third, the pretests alone comprised nine sessions so as to identify a steady state of responses. However, if this intervention is used at an educational setting such as a school and a counseling facility, it may be too time-consuming. In this study, the numbers of correct responses given by the participant were all 0% in all pretest sessions; thus, taking twice as long. Although it is important to use a rigorous research design, future studies should consider a more cost-effective intervention for ease of use at an educational setting.

This study examined the effectiveness of the procedure on the acquisition of appropriate responses to the question, “What else?” Acquiring an appropriate response for additional information is important for children with autism, not only when employing a lag schedule, but in daily conversations with friends. Studies that teach children with autism useful verbal behavior such as a request for additional information are required.
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