University of Maryland
Department of Special Education

Factors Affecting the Generalization of "Wh-" Question Answering by Children with Autism

Christine Hoffner Barthold, Andrew L. Egel, Natasha Bailey, Bonnie S. Dayhoff, Becky Gruetzmacher, Kateri Hull, Lisette LeCompte, Amponsah Nkansah, Amanda Sawma, Layne Whitney, Curtis Wojnar, and Jessica Zdatny

Answering "wh-"questions is considered to be a critical skill for reciprocal communication (Jahr, 2001). As part of a larger study Krantz and McClannahan taught students to answer several "wh-" questions to three children with autism. Larger concepts ("what," "why," "how") were broken into smaller subconcepts, and training increased the probability of generalization to untrained targets. Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001), asserts that novel communicative responses are a product of multiple exemplar training.

Secan, Egel, and Tilley attempted to increase generalization of "wh-" question answering by conducting booster sessions with pictures from a storybook and actions occurring in the natural context when magazine picture training alone was not effective for generalization. When training stimuli were varied, most students were able to answer questions in novel settings and with novel assistants.

Research Questions:

•Does varying training stimuli increase the probability of generalization to novel questions and stimuli?
•Does teaching relations via a matching-to-sample procedure increase generalization for students who do not generalize using varied training stimuli?

Participants

Three students, ages 7-0 to 7-5, assessed within the mild-moderate to severe range of autism symptoms or PDD-NOS participated in the study. All students were in a self-contained public school classroom in Suburban Washington, DC, and were identified as having difficulties with generalization of learned targets according to classroom and program staff.

- Joon, age 7-5
- Allen, age 7-1
- Dino, age 7-0

Stimuli

Each question generated for the study had one visual stimulus associated with it.

•a magazine picture

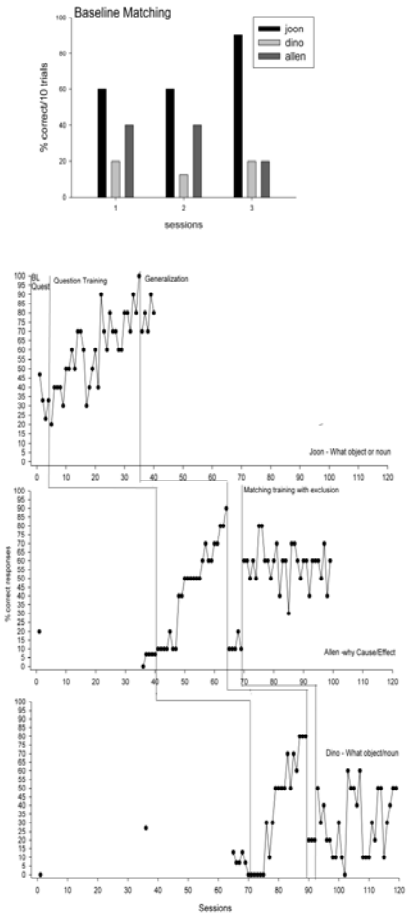
•a storybook picture

•a natural context question

Questions were broken down into subcomponents, and each child was assigned one subcomponent.

Subcomponents	Sample Questions
What	
1. As object or noun	1. What do you write with?
2. As "which"	2. What room do you eat lunch in?
Why	
1. Relevant to cause/effect	1. Why is he eating?
2. Relevant to affect	2. Why is he smiling?
3. Relevant to potential action	3. Why is he picking up a fork?
How	
1. Relating to actions	1. How do you start the CD player?
2. Relating to means	2. How do you get into school?
3. Relating to affect	3. How do you show you're sad?

Baseline and Training Graphs



Procedures

Operational Definitions of Correct:

- Matching: Placing comparison stimulus with related stimulus within 5 seconds of the prompt "put with same"
- Question answering: Any verbal response logically related to the stimulus item and contextually relevant (c.f., Krantz et al., 1981; Secan et al., 1989).

Baseline:

- Categorization baselines was assessed to determine whether students were able to categorize a stimulus into a relational frame.
  - Five of the ten baseline questions were chosen at random and an additional visual stimulus was assigned.
  - Baseline was conducted using a matching to sample procedure. Stimuli were presented in a field of two.
- Question answering baseline
  - 15 questions per subcomponent were selected
  - Questions were presented in random order
  - No feedback for correct or incorrect answers were given

Training:

- Ten of the questions from baseline were chosen from the students' incorrect answers
- Traditional discrete trial teaching procedures were used for instruction
- Criterion: 8/10 questions answered correctly over 3 consecutive sessions

Procedures Continued

Generalization probes:

- 10 novel questions and corresponding visual stimuli
- Presented in the same manner as baseline trials
- Criterion: 7/10 answers to novel questions over three consecutive sessions.

Matching Training with Exclusion:

If the child did not generalize to criterion, matching training with exclusion commenced.

- The visual stimuli associated with each of the questions was presented in random order and the student was presented with two additional visual stimuli, one that depicts a similar action in a different modality (e.g., a storybook character crying) and a non-example (e.g., a person typing at a computer).
- The student was then asked to "put with same.
- Exclusion instruction: added to increase the likelihood that relations would be learned.
  - Student was presented with identical visual stimuli and asked to "put with different".
  - Same and different were equally interspersed among the trials for a total of 10 trials per session.
- Modified prompt hierarchy used to prompt correct responding
  - Gesture
  - Model
  - Physical
- Criterion:c8/10 unprompted responses over 3 consecutive teaching sessions.

Results and Discussion

Matching baselines and question answering baseline. There was considerable variability across and within participants. Students consistently scored low during baseline sessions on question answering

Question training. Each student showed a gradual increase in correct responding until reaching criterion of 8/10 correct over three consecutive sessions. The steady increase of correct responding is consistent with the training results found in Secan, et al. (1989).

Generalization trials. Joon reached generalization criterion of 7/10 correct over three sessions in 4 sessions. The study was terminated for Joon at that time. Joon had the highest matching performance of the three students, suggesting that matching performance did indeed relate to generalize "wh-" question answering. These results, however, were not replicated in a related study.

Matching training. Neither Allen nor Dino reached criterion of 8/10 correct over three consecutive sessions for matching training. The study was terminated for both students at this point. Upon review of Allen and Dino's educational records and assessment data, none of the students were reported to have mastered the difference between "same" and "different." It is possible that the exclusion training did not, in fact, increase the discrimination between classes, but instead lead to more confusion. It seems that the students were not able to differentiate between "same" and "different" trials.

Using different types of visual stimuli for training was effective for increasing generalization of "wh-" questions for only one of four students. Therefore, questions remain regarding the correct selection of exemplars for training to increase generalization of "wh-" questions.

Suggestions for future Research:

•Controlling for extraneous stimuli
•Removing Exclusion Training
•Training multiple exemplars of each question