

Teaching Children with Autism to Ask Questions

Katie E. Squires, Ph.D., CCC-SLP
Central Michigan University

Alyssa Bickel, B.A.A.
Graduate Student at Central Michigan University

Abstract

Children with autism have impairments in communication that make it difficult for them to acquire the ability to ask appropriate wh- questions. This is a very important skill, and one that clinicians often do not know how to target. Search terms were entered into several databases to locate studies published in peer-reviewed journals. The studies had to include a wh-question as the dependent variable. Thirteen studies were located and described. This article reviews the literature in regards to teaching children with autism to ask questions and provides opportunities for clinicians to obtain an evidence-base from which to build their practice.

Teaching Children with Autism to Ask Questions

Recent research suggests that as many as one in 88 children will be diagnosed with some form of Autism Spectrum Disorder (ASD; Baio, 2012). Children with ASD have impairments in social interactions and communication, and display restricted, repetitive, and stereotyped patterns of behavior (NINDS, 2009). Children with autism have many difficulties learning to produce and respond to language. One such challenge is in acquiring the skill of asking questions. Questions beginning with why, who, where, when, and what (also known as “wh” questions) are especially difficult for this population to ask. This skill is important because it enables children to develop appropriate conversational strategies and to request needed information; however, children with autism are typically not motivated by verbal information (Sundberg & Michael, 2001). Many researchers have attempted to teach children with autism this important language skill. However, because this area has not been extensively researched, practitioners have difficulty knowing what research exists and how to best apply it to their own clients. Therefore, people working with children with autism do not yet have a preferred method to teach question-asking behaviors. Thus, the purpose of this paper is to examine published studies that teach question-asking behaviors to children with autism and to identify features that seem most salient in a successful intervention.

Method

An electronic search of the databases *ERIC*, *CINAHL Plus with Full Text*, and *PsychInfo* was conducted using combinations of the following terms: “question, questions, question asking, requesting communication, requests for communication, imitations, verbal imitations, coping strategies, strategies, teaching, teaching materials, training, training methods, training materials, learning methods, teaching methods, Autistic Disorder, PDD, Developmentally Delayed, autism, and autism spectrum disorder (ASD)” and yielded results from multiple peer-reviewed journals. Upon inspection of the abstracts of the articles, 13 articles met the inclusion criteria. Articles

were not included if they focused on a population other than children with autism or pervasive development disorder and if the population was of high school age or older. Studies were also excluded from this review if they only measured the child's ability to mand (request) an object by saying, "I want ____." The dependent variable had to be a question that the child formulated on his/her own rather than following a specific script.

Typical Acquisition of Question-asking

In a qualitative research study conducted almost 50 years prior to this review, Brown (1968) observed the spontaneous speech of three typically developing preschool children to discover whether there was anything in their unprompted speech to suggest that they learned operations that governed their ability to ask questions much like children learn grammar. The author concluded that children do develop a structure for asking "wh" questions (who, what, where, when, why) much like the grammar structure they learn. The researcher noticed recurrent discourse patterns and proposed that these patterns may constitute the basis of a learning process. Furthermore, for typically-developing students, there is an order of acquisition of question asking skills. "What" is the first acquired wh- question word, followed by "where, who, why" and finally, "when" (Bloom, Merkin, & Wootten, 1982). Typically developing children acquire the ability to ask wh- questions through natural language development; however, that is not the case for children with ASD. Most of these children must learn this skill by way of specific interventions and strategies (Ostry & Wolfe, 2011). Indeed, many of the researchers in the following studies provided children with ASD a framework to guide them in their ability to ask questions and measured whether that newly learned skill generalized to other situations. However, the approaches to teaching children how to ask questions varied. These approaches will be examined in further detail.

Early Research on Question-asking in Children with Autism

Almost a decade after Brown's article appeared, Hung (1977) wanted to measure the ability of four children with autism to ask spontaneous questions. These children (one female and three males) ranged in age from 8 years, 1 month to 11 years, 9 months. In this seminal study, Hung taught the children question-asking using modeling, cueing, and reinforcement. The training occurred over a three-week period in which all the children were enrolled in a summer camp specifically for children with autism. There were four experimental conditions. The first experimental condition consisted of obtaining baseline measurement for the children's spontaneous question-asking and rewarding each unprompted question with a token. After obtaining baseline data for three days, each child received 45 minutes of direct instruction in question-asking five days a week. This direct instruction consisted of multiple steps in which the child was guided to ask questions about events from picture cards, objects, and actions, again being rewarded initially with token reinforcers, and later with praise. The third condition attempted to promote generalization of the question-asking skill to other conditions beyond the classroom and without using picture cards by providing opportunities to earn novelty items by spontaneously asking questions. In the fourth experimental condition, the token value was manipulated to assess whether it would affect spontaneous question-asking during non-training time. Hung's study attempted to examine the generalization of spontaneous question-asking responses from training to non-training situations, from question-asking to question-answering as

well as maintenance of question-asking and answering after the summer camp ended. Hung discovered that, although during the training sessions the children's use of spontaneous question-asking increased, the children did not spontaneously ask questions outside their training sessions. He hypothesized that the children may have learned to ask questions in order to receive the reinforcers, but did not generalize the question-asking behavior to other settings once the reinforcement was taken away.

Learning From Question-asking

Although question-asking is an important skill, it is not the end goal. Ultimately, students should be able to learn from asking questions. In 1995, Taylor and Harris sought to examine the extent to which children with autism could be taught to ask the question "What's that?" when pointing to an unknown picture, learn new information by asking the question, and generalize question-asking to a less structured context. Participants included two males and one female child who ranged in age from five years to nine years. The children had similar scores on a standardized measure of vocabulary, with age equivalency scores ranging from three years, two months to four years, two months. The researchers provided three teaching sessions in each child's classroom in which they presented 10 trials. Each trial consisted of four pictures – three known and one unknown – and verbal directions to the child to label the items pictured on the table. A time delay procedure was used along with modeling and cueing. In this first experiment, all of the children demonstrated rapid acquisition of the question-asking skill during teaching. Criterion was met when the children were able to spontaneously ask, "What's that?" within 10 seconds after being presented an unknown picture. They all met mastery criterion of 80 percent accuracy within four to seven sessions and maintained that level of criterion for 15 to 24 sessions.

Generalization probes were conducted to assess whether the question-asking behavior of "What's that?" extended to different settings, people, and three-dimensional objects as opposed to pictures. The children traveled to the school kitchen where they met new adults and were exposed to novel items. Prior to receiving direct instruction in question-asking, the children did not ask any questions during a generalization probe. After receiving training, the children's question-asking generalized to a different setting (kitchen), people (cooks and kitchen help), and objects (blenders, appliances) with 78% - 82% accuracy. As Hung had previously suggested, this ability to ask the question in different settings, with different people, and about different objects implies that children with autism can generalize question-asking behaviors and reinforcement does not have to be tangible.

A second experiment was conducted to assess whether the children could learn novel labels by asking the question "What's that?" A mix of unknown and known pictures was presented to the children. When a child asked, "What's that?" in reference to an unknown picture, he was immediately verbally reinforced and given the picture's name. Expressive and receptive posttest sessions were conducted to determine if each child acquired expressive and/or receptive labels. Receptive labeling tasks involved the child being able to point to a correct picture. Expressive tasks required the child to provide a correct label for the picture. The authors found all three children acquired receptive labels, and two of the three children acquired consistent expressive labels. The third child required discrete training to learn expressive labels. These findings

suggest that the children used the question “What’s that?” not just as a rote response, but also as a means for them to gain information.

In the third experiment, the children walked around the school building where they were introduced to new stimuli. After an instructional period in which training consisted of modeling asking the question “What’s that?” when being exposed to a novel stimuli and using a time-delay procedure, the children met baseline criteria of asking three questions unprompted within a 10 second time restriction. The children then went on a walk and their questions were tallied. All three children’s question-asking increased to criterion (80%) performance. The authors concluded that children with autism are able to learn to initiate a query to request information about novel stimuli, to ask a question in instructional contexts, and to learn new verbal labels from their questions when given instruction and provided with modeling.

In a study conducted by Esbenshade and Rosales-Ruiz (2001), researchers investigated whether a five-year old male with autism could be taught to ask, “What is that?” The procedure used the presence of an unknown object and measured whether the child was able to retain the knowledge he gained from asking the question. This study used natural reinforcement where the child was given the answer to the question in return for asking the question. Stimuli consisted of 114 items (either a 3-dimensional object or a flashcard), 51 of which the child already knew. The child was presented with a mixture of known and unknown items. If the child was able to independently ask, “What is that?” when presented with an unknown item, he was given a correct score. The intervention took place in the child’s home and consisted of six stages beginning with:

- 1.) finding which objects the child could and could not label,
- 2.) teaching the child the task,
- 3.) taking baseline measures,
- 4.) teaching the child to name known stimuli and ask “what’s that?” in the presence of unknown stimuli,
- 5.) giving generalization probes, and
- 6.) providing generalization training.

The training task took place in phase four (i.e. teaching the child to ask “What’s that?” in the presence on an unknown stimuli) and used a procedure that employed answers as the consequence to teach and maintain question-asking. The researchers found that the question-asking behaviors generalized to unknown items, but when the experimenter asked the child to do something with the unknown item (e.g. Put the ___ on the table), he was unable to perform the task. While the child did succeed in learning a new language behavior, he was limited to using it only under very specific stimulus conditions.

Koegel, Camarata, Valdez-Menchaca, and Koegel’s research (1998), also suggests a correlation between question-asking behaviors and vocabulary acquisition. Two males and one female participant, ranging in age from three to six years, were invited to participate in a study that combined the used of motivational procedures and the use of a targeted question, “What’s that?” Intervention took place in a therapy room, while generalization was assessed in each child’s home. The children were presented with an opaque bag holding an item of interest. Once the child asked “What’s that?” the researcher would take the item out, label it, and give it to the child

to play with. If the child did not ask the question right away, the researcher asked the child to imitate the question form. Once the child began spontaneously asking the question, “What’s that?” the preferred items were gradually changed to neutral items and generalization to other settings was assessed. After intervention ended, all three participants continued to ask questions in novel settings and were able to label items that were previously unfamiliar to them. This suggests that gains in these spontaneous language interactions could be correlated with an increase in expressive vocabulary labels.

In a similar study, Williams, Donley, and Keller (2000) proposed a treatment package consisting of modeling, prompting, and reinforcement to teach three types of questions to a couple of 4-year old girls with autism. Instead of teaching the children to ask just one question (i.e. “What’s that?”), the researchers worked with the girls in their homes to teach them to ask three types of questions about a hidden object (What’s that? Can I see it? Can I have it?) The training began with the examiner piquing interest in a box by playing with it in front of the girls. Once they began to show interest, the examiner modeled a question type to them. When the girls repeated the question for two consecutive opportunities, the experimenter faded the modeling to a prompt. The prompt was gradually reduced until the child asked the question independently. When the child asked a question, she was appropriately rewarded (being told the name of the object inside the box, being able to see the object, and being able to play with the object). After each session, the procedure was repeated in another room of the house with the girls’ mothers. The mothers followed the same protocol as the examiner. For both girls, the question-asking generalized to a different person and setting. Twenty days after the treatment phase ended for one girl, and 11 months after it ended for the other girl, the experimenter conducted a follow-up observation. Both girls responded the same way post-treatment as they did during treatment. The authors concluded that their training package demonstrated an effective procedure to establish and maintain high levels of different forms of question-asking.

Most researchers include preferred items, or items of interest to the child, when teaching question-asking behaviors. However, Endicott and Higbee (2007) investigated whether students with autism would inquire about the location of an item, even if the item was not of interest. Four males, between the ages of three and five years and enrolled in a university preschool participated in the study. During the baseline sessions, the children were given noncontingent access to a preferred item for no longer than 30 seconds. The child was then removed from the area for a brief interval while the item was moved to another location. Upon return to the area, the instructor told the child to retrieve the missing item. If the child asked where the item was, the instructor would verbally provide the location (e.g. in the backpack, on a shelf, in the toy box). If the child did not inquire about the item’s location within 30 seconds, the participant was given the item again. Five trials were conducted with a highly preferred item and five trials were conducted with a non-preferred item.

During the intervention sessions, the same basic procedures were followed. The child was given non-contingent access to an item, was removed from the location of the item, and was brought back to the location after the item was moved. This time, if the child did not ask, “Where?” within 30 seconds, he was verbally prompted to imitate the instructor in asking “Where?” Once the child imitated the modeled question, the instructor told the child the location of the item. Again, five trials were conducted with both the highly preferred and non-preferred items.

After intervention, two of the three children were able to ask “Where?” to find out the location of an item with 100% accuracy for three consecutive sessions in just four sessions. These two children were also able to ask “Where?” at home, thereby showing generalization to another environment. One child’s performance was much more variable, and it took 14 sessions before he met the mastery criterion.

The second experiment examined whether these same students could be taught to ask, “Who has it?” The procedures from the first experiment were followed with the addition of a second component. When the child asked, “Where?” the experimenter replied, “I gave it to somebody.” If the participant did not respond, the experimenter verbally prompted the child to say, “Who has it?” Ten trials were conducted (five with a preferred item and five with a non-preferred item). After intervention was complete, all three participants were able to ask “Who?” with 100% accuracy for three consecutive sessions within five sessions.

Interestingly enough, it made no difference for two of the participants whether high or low preference stimuli were used. They learned how to ask the questions regardless of the status of the items that were missing. This suggests that receiving information was sufficient motivation. What is unknown is whether the children were actually motivated to learn the information about the object’s location, or if the idea of playing a word game with the instructor was the motivating factor.

Researchers Koegel, Koegel, Green-Hopkins, & Barnes (2010) investigated if preschool children could be taught to ask the question “Where is it?” whether the question would generalize to novel situations and people, and whether improvement in other early emerging language structures would result. The study took place at a university clinic and included three males between the ages of three and five, diagnosed with ASD. Intervention focused on teaching the child to ask for a desired hidden item (e.g. toys, candy) by saying, “Where is it?” Initially, verbal prompts were provided and once the child asked the question, the interventionist modeled a response using a targeted language structure (prepositions or ordinal markers) and provided the child with the item. In subsequent trials, the prompts were faded. Two dependent measures were recorded: the number of times the child independently asked, “Where is it?” and the number of prepositions or ordinal markers the child produced.

Results revealed the intervention strategy was successful in eliciting the targeted response from the children. Additionally, all children exhibited an increase in expressive language, specifically in the targeted areas of preposition use or ordinal markers. Finally, all three children were able to generalize their newly acquired skills to their home environments. This suggests that instilling intrinsic motivational procedures may be helpful in promoting spontaneous question asking in natural environments.

Roy-Wsiaki, Marion, Martin, and Yu (2010) designed a study to examine if generalization could occur to a natural environment. These researchers taught a five-year old male with autism to ask the question “What?” while he participated in preferred activities in his home. A script was used to elicit the desired response from the child. For example, while he was playing with a preferred item, the experimenter hid an item. The experimenter announced what he did (e.g. “I hid

something”), and the child had to respond by asking the question “What?” Likewise, in another situation, the child started an activity but need more of a particular item. The experimenter said, “We need more of something” to which the child was verbally prompted to ask, “What?” Training was conducted in each of the activities, with the examiner modeling the question and asking the child to repeat it. Verbal prompts were faded over subsequent trials. The child was reinforced with tokens after each desired response and after the child accumulated 10 tokens he received a reinforcer of his choice. Once the child learned to respond to the scripts in the desired way, different scripts were used to assess generalization to different activities and settings.

Results revealed that the scripted training of the question “What?” generalized to untrained scripts and settings. The student significantly increased in his abilities to independently ask “What?” after receiving the training. These results were maintained at a four-week follow up assessment.

The following year, this study was extended by researchers Marion, Martin, Ye, and Buhler (2011). The training scripts and scenarios were similar to the previous study, but this time, three students between the ages of four and nine who attended an Applied Behavior Analysis program for children with autism were taught to ask, “What is it?” in response to the script. Using objects that the children in the study preferred, the researchers would randomly present four scripts across four trials within a session using a prompt fading technique. Natural reinforcement was used in that the child received the item for which he wanted and a hierarchy of prompts was used to ensure errorless learning. Upon mastery of the skill, all three children showed generalization to natural environments, novel activities, and scripts. Although the results of this study suggest that the training was effective because generalization and maintenance over time occurred, it is possible that the children learned to ask, “What is it?” solely for the purpose of receiving the item instead of asking to receive information.

The participants in this study consisted of two males and a female who attended a preschool for children with autism. In accordance with the design of the study, each child was assessed on how teaching procedures could promote generalization across novel settings and stimuli (Betz, Higbee, & Pollard, 2010). The children were between the ages of 3;5 and 5;0. During the baseline sessions, each child was allowed to play with a preferred item for up to 30 seconds. The child was then distracted while the item was removed from sight. After the item was hidden, the instructor said, “Let’s play. Get (item).” If the child did not respond, “Where + item?” the trial ended and a new trial began after 2 seconds. If the child responded appropriately, the child was told where to find the item.

The intervention sessions were conducted in the same manner with a few additions. If the child did not inquire about the item’s location, the instructor repeated, “Let’s play. Get (item). Where’s item?” Up to two verbal prompts were given per trial. If the child did not respond to the second prompt, the trial was terminated and a new one began. However, if the child did respond appropriately to the first or second verbal prompt, the instructor would give verbal praise and repeat the instruction. If the child asked, “Where + item?” the instructor provided the item’s location. Otherwise, the prompting hierarchy was repeated.

All three participants successfully learned how to inquire about an item's location after intervention. The researchers assessed generalization across stimuli and settings and discovered that as long as the procedures were similar to the ones used during training (i.e. verbal cues), the children were able to mand for information. However, if the children were not provided with verbal cues (i.e. "Get item"), they were not able to request the information. This finding suggests that these children may have been focusing on the verbal cues as the controlling stimulus for their response instead of the actual missing item.

Shillingsburg, Valentino, Bowen, Bradley, and Zavatkay implemented a study in 2011 to examine strategies that would aid in teaching children with autism to ask a variety of questions including "When?" "Who?," "Where?," and "Which?" in order to request information. In addition, the researchers also wanted to examine generalization and maintenance of this task and therefore compared teaching a specific topography (i.e. Where is my toy?) to teaching a general topography (i.e. Where is it?). Two males with autism, ages 7;9 and 11;11, participated in the study. The younger participant received intervention in an individual therapy room while the older participant received intervention in his classroom. During treatment, the therapist presented a paired verbal and nonverbal stimulus (i.e. telling the child to listen to the CD player but not providing headphones for him to do so) followed by verbal prompt (i.e. "Where are the headphones?") if the child did not react to the stimulus by asking the appropriate question. If the child gave a correct response, the therapist would give the child the preferred item. When the child could produce the target independently, he would receive further reinforcement. Upon mastery of the skill, generalization and maintenance were assessed over a period of five trials. The experimental design was successful in teaching the two participants to use the "wh" questions independently to request information. In addition, both students acquired both the specific and general topography questions.

Ostryn and Wolfe (2011) developed a procedure to teach children with autism to ask, "What's that?" using *The Picture Exchange Communication System (PECS)* (Frost & Bondy, 2002) initially and then learning to vocalize the words. The multiple baseline design across participants study took place in a public preschool for children with developmental disabilities in a self-contained classroom. The participants consisted of a three year-old male with pervasive developmental disorder (PDD) and two females of a similar age but with a diagnosis ASD. All three children already used pictures as their main form of communication, but were not using the pictures to request objects.

Before choosing stimuli, the researchers surveyed typically developing students to find a picture that most accurately depicted the question "what's that?" in the minds of children that age. The three children were first taught to ask, "What's that?" using a picture of a girl pointing at something unseen. The instructor presented the child with an opaque bag containing a toy that moved, made music, or lit up. If the child did not initiate a question, the instructor employed a hierarchy of physical and verbal prompts to engage the child in verbally inquiring about the item. When the participant would say "what's that?" the instructor would name the toy and give information about it. Results of the study showed that all participants transitioned from the current picture communication system to vocalizations or approximations of the question "what's that?" in fewer than two days. Additionally, the children demonstrated evidence of being able to generalize this skill to different stimuli, people, and settings. The data from the study may

suggest that most-to-least prompting may be an effective and efficient way to teach children with autism to request information. Furthermore, students who have used PECS to communicate can be taught to use PECS to mand and with training, be taught to vocalize mands.

Questions in Conversations

Most of the research in this area concentrates on educators or researchers teaching children with autism how to ask single basic question structures (e.g. “What’s that? Where is it?”) in response to researcher contrived situations. However, typically developing children use a variety of wh-questions to request social information in an ongoing reciprocal social interaction. The next study investigated whether a self-management intervention designed to elicit acquisition and discrimination of questions in the context of conversation could be effective with two elementary school-age children with autism.

Two females, ages 7;6 and 9;10, participated in Doggett, Krasno, Koegel, & Koegel’s study (2013) which took place in their classrooms after school with a familiar clinician. The clinician began by building rapport with each of the children. Explicit teaching for when it is appropriate to use the words “what,” “where,” and “who” followed this rapport building. The girls were taught that the word “what” is used when asking a question about a thing, “where” is used to ask about a place, and “who” is used to ask about a person. For example, the clinician might say, “I went somewhere fun this weekend. What would you ask?” Verbal and visual prompts were used to elicit the appropriate questions. To teach self-management, the clinician used a specific protocol that used a point system as reinforcement. The children were allowed to earn points by asking appropriate questions of the clinician during a reciprocal conversation. Probes were taken with other conversational partners to measure generalization and between 6 months and a year post-intervention to measure maintenance of skills.

For both participants, there was an increase in appropriate “what, where, and who” questions during conversations after intervention that was maintained across settings and time. The self-management intervention package resulted in increased levels of correct question-asking behaviors in both girls. The findings from this study suggest that reciprocal social conversation in children with autism can be improved and that self-management procedures can provide the motivation necessary to learn these verbal behaviors.

Conclusion

Clinicians working with children who have autism often set goals for their clients to be able to ask wh-questions because it is through asking questions that children obtain important, unknown information from their environment, increase social interactions with others, and facilitate language development. This paper looked at the research of individuals who successfully taught students with autism to ask questions.

Children participating in treatment programs consisting of modeling, prompting, time-delay procedures, and tangible reinforcers were able to learn to ask wh- questions, generalize those skills to other settings, and maintain the skills over time. Contrary to popular belief, some children learned to ask for a non-preferred item just as quickly as a preferred item. Additionally,

even though children may appear unmotivated to access verbal information, several students did acquire new vocabulary by asking questions and others asked questions solely to receive a verbal answer. While the majority of studies used very specific stimuli to obtain a very specific response, some results implied that students can learn general rules about when to ask certain types of questions and apply those rules to conversations, thereby expanding the opportunities of these students to participate in reciprocal communication.

Teaching children with autism to ask questions is an important area of research. This paper highlighted studies that were successful in facilitating this vital skill. Clinicians, therapists, and educators can use the information provided to drive their evidence-based practices so that their clients and students can obtain similar success.

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About the Authors

Katie E. Squires, Ph.D., CCC-SLP is an assistant professor in the Department of Communication Disorders at Central Michigan University. Her research interests are in the area of school-age language and literacy and curriculum development.

Alyssa Bickel, B.A.A. is a graduate student in Communication Disorders at Central Michigan University.