

## **Blindness and Selective Mutism: One Student's Response to Voice-Output Devices**

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This case study was designed to measure the response of one student with blindness and selective mutism to the intervention of voice-output devices across two years and two different teachers in two instructional settings. Before the introduction of the voice output devices, the student did not choose to communicate using spoken language or gestures while at school. As a result of this intervention, the student consistently communicated her choice of a preferred activity, responded independently to social greetings, and more consistently expressed her wants and needs. She responded "yes" and "no" to questions and made significant gains in pre-reading skills.

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-V, 2013), the diagnostic criteria for selective mutism are a consistent failure to speak in specific situations that interferes with achievement or with social communication that has a duration of at least one month and is not due to either a lack of knowledge of the language being spoken or to a specific communication disorder such as stuttering. Common characteristics of persons with selective mutism include social withdrawal, high social anxiety, extreme shyness, and mild oppositional behaviors (DSM-V, 2013). Persons with selective mutism frequently have a second diagnosis of anxiety disorder, specifically social anxiety disorder, separation anxiety disorder, and/or specific phobia (DSM-V, 2013). Selective mutism usually manifests during childhood, and it is a low incidence

disability that affects less than one percent of the population (DSM-V, 2013).

Persons with selective mutism often share characteristics with excessively shy or behaviorally inhibited children (DSM-V, 2013). Even as infants or toddlers, these individuals may demonstrate difficulty handling transitions, changes, or new stimuli. This finding suggests that there may be a link between selective mutism and basic temperament. Elizur & Perednik (2003) also suggest that acquiring a second language may be a stress factor for bilingual immigrant children and that it may contribute to the development of selective mutism. Furthermore, selective mutism often persists and becomes more resistant to treatment over time (Auster, Feeney-Kettler, & Kratochwill, 2006; Stone & Kratochwill, 2002).

In a review of 23 studies by Cohan, Chavira, and Stein (2006), sixty percent of

children with selective mutism in the reviewed studies had received a mental health evaluation and/or mental health treatment. However, medical interventions are not always available to children and special education teachers are not qualified to provide medical interventions. Therefore, teachers need to explore non-medical interventions. Another model of intervention for children with anxiety disorders such as selective mutism is conjoint behavioral consultation (Auster et al, 2006). With this intervention, parents and teachers work together to address the academic, social, and behavioral needs of the child. Research has shown that this systematic method is effective in improving communication, interactions, comprehension and the skills of all parties involved (Auster et al, 2006).

There is limited research on behavioral interventions that encourage a language-based response. In a seminal work, Mace and West (1986) described a prompt, ignore, and praise (PIP) procedure as an intervention for students with selective mutism or reluctant speech. This intervention was used to encourage speech in a four-year-old student, Glen. The PIP procedure was explained as follows: If Glen did not answer a question within 3 seconds, a prompt was provided. The prompts would vary and would include repeating the question using the imperative "Tell me" or providing the beginning sound of the response. If Glen did not respond to the prompt within 3 seconds, the experimenter told him that the question would be repeated soon and went to another question. If he did respond, he was praised enthusiastically. If he did not respond, a new question was presented, and the original question was restated after two trials. Thus, the PIP procedure did not allow Glen to escape from the demand for a vocal response. Mace and West found that under PIP Procedure conditions Glen consistently produced higher levels of speech than under other

conditions that allowed for escape from the demand.

Additionally, extremely little research has focused on individuals with visual impairment with a diagnosis of selective mutism. Kass, Gillman, Mattis, Klugman, and Jacobson (1967) completed a case study regarding the treatment of selective mutism in a six-and-one-half year old girl who was congenitally blind. They explained that a program of psychotherapy was begun in collaboration with teachers and clinic personnel. The girl soon began to talk in her therapy sessions, but the authors do not explain what specific interventions were provided to encourage her to speak. In addition, a study of selective mutism in a child with low vision was conducted by Brown and Doll in 1988. Brown and Doll describe two interventions designed to induce peer directed speech and audible speech in a six-year-old girl with low vision. In order to encourage peer directed speech, the student and her classmates were all allowed to choose a prize from a box whenever the child spoke to another student (Brown & Doll, 1988). In order to encourage the student to speak in a volume above a whisper, the student was asked to speak in a loud voice, given praise and tangible rewards for doing so, and asked to speak loudly enough to cause a voice light to activate in response to the sound of her voice (Brown & Doll, 1988). Brown and Doll (1988) report that over a period of three years the student made progress. However, they do not explain how the student was encouraged to speak at the beginning of the intervention.

Selective mutism and related anxiety disorders sometimes persist into adulthood (Auster et al, 2006). If an individual remains unwilling to use speech, different approaches must be explored in order to empower the individual to communicate meaningfully with others (Browder & Spooner, 2006). In addition to nonsymbolic gestural communication or a

picture-exchange system, voice-output devices give users access to language-based communication. In this way, they are often motivating to individuals and can help them to seem more 'typical' in settings where the communication of others is primarily verbal (Browder, Anderson, & Meek, 1986, p. 336). Further, providing the student with an alternative system of communication gives him/her "multiple ways to communicate...and enhances the quality of life" (Browder, Anderson, & Meek, 1986, p. 338). Voice-output devices do not necessarily discourage speech. Sigafoos, Didden, and O'Reilly (2003) found that the use of a voice-output device did not reduce a student's vocalizations and that, in some cases, interventions involving voice-output devices actually encouraged a student to speak. Having and using communication devices as well as other assistive technology also aids academic and social success (Newton et al., 2006; Safhi, Zhou, Smith & Kelley, 2009; Stoner, Angell & Bailey, 2010).

Though the research that specifically focuses on students with both visual impairments and selective mutism is sparse, there is a strong theoretical basis for the provision of voice-output devices as an intervention. Hatlen (1996) described the expanded core curriculum, including communication modes, for students with visual impairments. Children who are visually impaired may communicate through a variety of means, including recorded materials (Hatlen, 1996). He further states that students with visual impairments should receive instruction from teachers with professional preparation in compensatory and functional skills. Lowenfeld (1973) discusses special methods for educating students with visual impairments, including the importance of learning by doing. He states that teachers should "encourage blind children to learn to do things themselves with as little assistance as possible" (p. 45). According to Mastropieri and Scruggs (1987) there are three levels of

independence in learning. Level one is identification and production; this refers to behaviors such as pointing, selecting, or matching. Level two is acquisition and fluency. Acquisition involves achieving a higher level of accuracy, and fluency refers to maintaining the same level of accuracy at a faster rate of completion. The third level of learning involves application and generalization. Application refers to being able to exhibit an accurate, fluent behavior in a relevant instructional context. Generalization expands on application, and refers to exhibiting learned behaviors outside of the special education setting. Even at level one, students must be expected to produce relevant responses. Thus, there is a theoretical basis for teaching communication modes to a blind student with selective mutism by giving her an opportunity to learn to communicate at the initial instructional level of selecting a communication response, while moving towards expecting a more accurate level of communication expressed in a wider variety of settings.

The purpose of this study was to investigate three research questions. Will targeted instruction lead to an increase in the use of a voice-output device by a blind student with selective mutism to express her basic wants and needs? Additionally, will targeted instruction lead to an increase in the use of a voice-output device to respond appropriately to social greetings? Will the introduction of a second voice-output device have a positive impact upon the student's ability to answer listening comprehension questions?

## **Method**

### **Participant**

Sally was a twelve-year-old Hispanic-American female at the beginning of the study. She may or may not have light perception as a result of retinopathy of prematurity (ROP). With this eye condition, there is a progression

of destructive changes to the retina that may occur when life-saving oxygen is administered to premature infants (Cassin & Rubin, 2012). In Sally's case, the ROP progressed to a detachment of the retina in both eyes that has resulted in a severe decrease in vision. In addition, she has been diagnosed with voluntary aphasia, otherwise known as selective mutism, by her pediatrician. According to her mother, Sally was verbal in Spanish until the age of three, but she stopped speaking across environments upon entering the preschool setting. She has not verbalized or spoken at school since beginning preschool. Sally's mother reported that she has heard Sally sing in her bedroom, but that Sally immediately stopped singing when she became aware that someone else was in the room.

During the school year prior to implementing the voice-output devices intervention, the primary classroom teacher, the teacher of students with visual impairment (TSVI), and Sally's mother agreed to implement the behavioral intervention of teaching commonly used communication gestures (Schum, n.d.). The gestures taught were nodding the head yes, shaking the head no, and waving hello and goodbye. However, Sally demonstrated very limited and inconsistent responses to this intervention. The classroom teacher and the TSVI hypothesized that it was difficult for Sally to understand the purpose of silent gestural communication since she was blind and this type of communication by others did not convey information or meaning to her.

During the study, Sally was served in a self-contained classroom and received 30 minutes of instruction from a TSVI daily. Although Sally did not speak at school, having been selectively mute for the last ten years, she had excellent receptive language skills in both English and Spanish. She consistently followed one and two step directions such as "Please stand up and push

your chair in." She also demonstrated the ability to follow instructions that allowed her to express choices nonverbally, for instance, "If you would like another turn on the swing, just stay seated, but if you would like to go sighted guide to the slide, please stand up." Further, Sally demonstrated understanding of humorous language. As an example, one time the TSVI stumbled while serving as Sally's sighted guide. After explaining, "I'm sorry Sally. I tripped over a tree root," the TSVI added, "Sometimes you just can't get a good sighted guide!" At this last remark, Sally smiled and giggled. Laughter and giggling are the only sounds that she produced at school before and during the intervention.

### **Procedures**

Sally received 30 minutes of daily one-on-one instruction with a TSVI as part of this intervention. Instruction during the first year was provided by the first author, who is a certified TSVI, as part of a university course. Instruction during the second year was provided by the second author, who is also a certified TSVI, as part of another university course since Sally had transitioned from an elementary school to a middle school. In her new environment, she encountered new teachers and paraeducators in a much larger school.

After consulting with and obtaining permission from Sally's mother, the first TSVI and Sally's primary classroom teacher created a year-long plan for increasing opportunities for Sally to communicate by providing her with access to two voice-output communication devices. The first device was introduced in October and the second device was introduced in January. Voice-output devices were initially selected because this communication method would provide auditory information to Sally about her communication attempt, without requiring spoken words. Each of the voice-output devices was presented to Sally during one-on-

one instruction time with the first author. The devices were placed on a table in front of Sally, and the TSVI told Sally, "I would like to show you something interesting." She then guided Sally to explore the devices with hand-under-hand assistance.

After the initial device had been introduced, most lessons throughout the two-year intervention followed the same sequence of tasks in order to create a more predictable environment. Each lesson began with a greeting. Initially, Sally was provided the level of prompting necessary to activate the "Hello" response on her communicator. Both TSVIs used a system of least-to-most prompting, beginning at the independent level in which Sally was given an opportunity to independently press a response to answer a greeting or a question. If Sally did not respond, four increasing prompt levels were provided. At prompt level 1, the TSVI repeated the question beginning with the words, "Sally, tell me...". At prompt level 2, the TSVI guided Sally's fingertips over the Braille letters on the voice-output device while reading the possible responses aloud, and then returned Sally's hand to a neutral position to allow Sally to select a response independently. At prompt level 3, the TSVI placed Sally's hand over the correct response and gave Sally the opportunity to press the response independently. At prompt level 4, the TSVI helped Sally to press the response using hand-under-hand assistance. By the middle of the second year, Sally did not require prompting in order to respond to hello. Next, she was asked if she would like to dance, a highly preferred activity, before beginning the lesson. During the first year and every other session during the second year, a story was read aloud to her while she used her hands to feel the Braille letters. Then she was asked listening comprehension questions. During the second year, the other lessons were dedicated to teaching pre-

Braille skills, including writing on the Braillewriter. Afterwards, she was given an opportunity to select a highly preferred activity using one of her voice output devices. Finally, Sally was provided with the level of prompting necessary to activate the "Goodbye" response on her communicator. By the middle of the second year, she did not require prompting in order to respond to good-bye.

Sally's progress was measured using a researcher-developed checklist regarding the level of prompting required to achieve the target behavior, which was defined as activating a button on one of the voice-output devices at an appropriate time in a conversation. The level of prompting needed was coded by the modified PIP Procedure:

1. Ask the question.
2. Wait about 3 seconds.
3. Repeat the question, beginning with the words, "Sally, tell me..."
4. Wait about 3 seconds.
5. Repeat the question. Then, guide Sally's hand to the correct response, while making the beginning sound of the correct response. Then, repeat the direction, "Sally, tell me..."
6. Wait about 3 seconds.
7. Repeat step #5, this time helping Sally to press the correct response with hand-over-hand assistance.
8. Praise Sally for making a response.
9. Consider offering a brief, highly preferred activity.

During the second week of intervention, M&Ms were introduced as a reinforcer for independently pressing a response to a listening comprehension question. The TSVI began by reading a story aloud while encouraging Sally to explore the Braille letters and raised, tactile illustrations with her fingertips. After listening to the story, Sally was asked yes/no listening comprehension questions, such as "Does the person in this story eat the gumdrops right away?" or "Did

Bumpy stay at home with his friend during this whole story?" If Sally independently pushed either a "yes" or a "no" response, she received an M&M reinforcer for willingly answering the question. If she answered the question incorrectly, the TSVI reread the relevant sentences in the story, asked Sally if she would like to try again, and repeated the question. Again, Sally received an M&M reinforcer for either a "yes" or "no" answer because the TSVI wanted to continue to encourage Sally's willingness to respond. During the second year, she independently answered questions without a reinforcer. Further, reinforcers were not used throughout the intervention for questions related to wants and needs because being able to express and receive what one wants and needs is inherently reinforcing. Also, reinforcers were also not used for the "hello" and "goodbye" responses because it was hoped that over time being able to exchange social greetings with others would become inherently reinforcing.

## Results

Before the introduction of the voice output devices and the two-year intervention, Sally did not choose to communicate using spoken language while at school. She consistently refused to speak any word, even to obtain a higher preferred item such as chocolate ice cream. She had very limited behavioral ways of expressing her basic wants and needs and no method of expressing a response to listening comprehension questions. After the initial introduction of the first voice-output device but before the second device was introduced, Sally pressed yes on the device independently two or three times a month in order to obtain something that she really wanted. When she was first presented with a second voice-output device, it was described to her as "the big button communicator." She pushed the device away

from her and refused to use it. On the second presentation, she placed her arm across all four buttons, rather than use the device appropriately to communicate a choice.

Initial data were gathered during January and February of the first year of intervention. Sally answered "yes" in response to a yes/no question about a preferred activity on ten out of eleven opportunities. She answered independently four of the eleven times. On six of the eleven opportunities, she required prompt level 2 after independently placing her hand on the communicator and then hesitating. Her hands were guided with hand-under-wrist assistance across the Braille words as the choices were read aloud. Sally then pushed the "yes" button. On one of the eleven opportunities, Sally did not press either "yes" or "no" after receiving prompt level 2 assistance.

Sally responded appropriately with "hello" on two occasions and with "goodbye" on one occasion after receiving prompt level 2 assistance. On the other 19 opportunities, Sally required prompt level 4 assistance to respond to a social greeting. The TSVI interviewed a paraeducator as well as Sally's mother regarding Sally's use of her communicator. Both reported that Sally sometimes used her communicator to respond to "hello" or "goodbye" or to answer yes/no questions related to practical wants and needs, such as "Do you have to go to the bathroom?" She also sometimes pressed "Hello" in the hallway in response to a social greeting.

Given an opportunity to use her device to express a choice between three highly preferred activities, Sally responded independently on 7 out of 7 opportunities, demonstrating by her behavior that she had selected her preferred activity on 6 of the 7 opportunities. When the opportunity to respond to listening comprehension questions

given two choices was introduced in combination with the M&M reinforcer, Sally answered independently on 24 out of 24 opportunities, answering correctly on 14 out of the 24 opportunities.

During the second year, Sally was greeted with, "Hello!" when she entered the classroom. Sally responded with "Hello!" using her device independently 104 times out of 130 (80%) in the course of the school year. When she did not initially respond, Sally was prompted with a question such as "What do we say when someone says hello?" Sally responded to this level of prompting 15 out of 26 times (57.7%). If she still did not respond, Sally was guided with hand-under-wrist assistance.

After the greetings were exchanged, Sally was then asked if she wanted to dance. Sally responded to this question independently 119 times out of 130 (91.5%) in the course of the school year. When she did not respond to the question, Sally was prompted to answer and she responded. There was no need for hand over hand assistance because this is a highly preferred activity. Of the 130 times Sally was asked if she wanted to dance, she answered 'yes' 121 times and only answered 'no' nine times.

At the end of each session with Sally, she was told, "Goodbye!" Sally responded to this parting independently 93 out of 130 times (71.5%) in the course of the school year. When Sally did not respond back with, "Goodbye!" she was prompted with a question such as, "What do we say when we are leaving someone?" Sally responded to this level of prompting 26 out of 37 times (70.3%). When neither of these methods worked to get a response from Sally, she was then guided with hand-under-wrist assistance.

After Sally completed her preferred activity, she listened to a story while tactually tracking the Braille lines with the fingertips of both hands. Afterwards, she

was asked a series of comprehension questions. At the beginning of the school year, she was given two answer choices for each of the questions. From August 27, 2012 to February 8, 2013 Sally responded correctly to 91 out of 121 (75.2%) questions. Starting on February 12, 2013 Sally was offered three answer choices for each question. From then until May 21, 2013 she correctly answered 37 out of the 60 (61.7%) questions.

### **Discussion**

As a result of this intervention, Sally demonstrated an increased willingness to communicate. After being introduced to the second device, she consistently communicated her preferred activity at the end of each lesson. She is responding independently to social greetings, and she is more consistently expressing her wants and needs. She now responds "yes" and "no" to questions such as "Do you need to use the bathroom?" and "Do you want milk?" Thus, the use of voice-output devices has positively impacted Sally's quality of life.

Additionally, the use of voice-output devices has allowed Sally to move from level one learning to level three learning as defined by Mastropieri and Scruggs (1994). She is now able to use her learned communication behaviors outside of the educational setting. Sally uses her devices at home and in the community. For example, at the end of the first year of the intervention, when a restaurant cashier stated that sausage, bacon, egg, and cheese were available in any combination on a biscuit, the TSVI asked her if she would like a sausage biscuit since she knew that Sally likes sausage. However, Sally independently pushed the "no" button. This was an unexpected response, so the TSVI replied, "Thank you so much for telling me! Would you prefer to have an egg biscuit?" Sally independently pushed the "yes" button. When asked, "Would you like to add cheese?" and

“Would you like to add bacon?” Sally independently pushed the “yes” button both times. When Sally was served the bacon, egg, and cheese biscuit that she had ordered, she ate every bite of it, demonstrating by her behavior that this was very much the breakfast biscuit she wanted.

Sally’s newly acquired communication skills had positive academic implications. Now that Sally has a language-based way to communicate her understanding, she participates more meaningfully in academic instruction. For instance, in January of the second year the TSVI introduced rhyming words to Sally. The TSVI read books with rhyming words to Sally and discussed what a rhyming word was by giving multiple examples. At the end of each mini-lesson, the TSVI asked Sally questions such as “What rhymes with mat?” and provided 2 choices on the voice-output device. As her understanding of rhymes developed, her choices were increased to three. Sally answered the rhyming questions with 54.79% accuracy for the months of January, February and March. For the months of April and May, her accuracy increased to 76.09%. Her voice-output device has not only allowed Sally the opportunity to communicate more readily, but has also expanded her ability to learn.

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