Welcome to the NCSC Communication Tool Kit. This is Module 2, Considering Sensory and Motor Factors.

In this module, we will consider the impact of sensory and motor factors on the development of communication.

Identify Potential Motor and Sensory Factors

Motor | Hearing | Vision | Dual Sensory Impairment | Sensory Processing Disorder

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Students with significant disabilities often have challenges in more than one area. The most prominent of these include problems with motor skills, hearing loss, vision impairment, dual sensory impairment and sensory processing disorder. Difficulties in any or all of these areas may have an impact on the students communication development.

Which of the following factors may impact the development of communication skills?
A) Vision
B) Motor
C) Dual Sensory Impairment
D) Sensory Processing Disorder
E) Hearing
F) All of the above

In this module, we will discuss the specific impact that the various factors we just mentioned may have on a student's ability to understand and/or use communication effectively. After identifying the impact of each factor on a student's communication, we will discuss the "next steps" that will be helpful in addressing these additional challenges to communication programming.

Motor difficulties may impair the ability to communicate and participate in academics.

Teacher: Tell us if you are at school today

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The first factor is motor impairments, which can take many forms. These include such characteristics as restricted movement or excessive movement resulting in limited motor control, difficulty initiating movement, and difficulty with coordination of body movements. As the complexity of motor demands increases, students may have motor planning and sequencing challenges resulting in slow and difficult movement.

Watch this little girl who is entering her classroom in the morning. She wants to greet her teachers and let them know she has arrived. She knows what she wants to do, but due to her motor challenges it takes a long time for her to complete her communication.
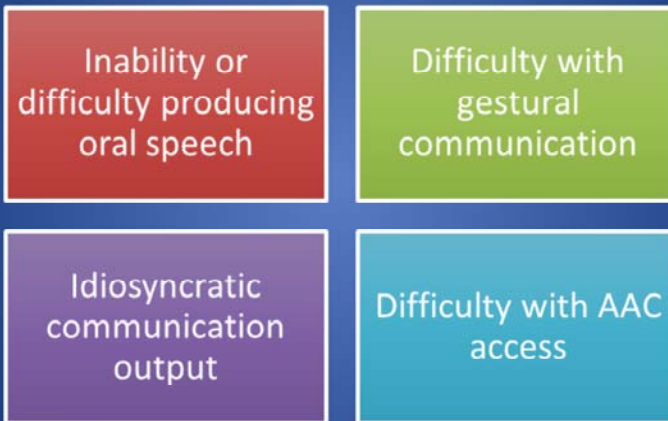
Teacher: Tell us if you are at school today
Student: (Activates switch) "Hello I'm at school today"
Teacher: Yay! Hello

Impact of Motor Factors

Since both oral speech and non-oral communication require body movement and control, motor impairments may have a significant impact on a student's communication skills. Motor impairments can result in inability or difficulty in producing oral speech and difficulty with gestural communication. Despite these difficulties, most students want to communicate and use whatever movements or sounds their bodies allow, often resulting in idiosyncratic communication output that is difficult to interpret. Motor impairments may also make it difficult for students to access AAC, impacting the type of communication system they are able to use. In light of these issues, it is important to consider both what a student can and cannot do motorically when working to develop a reliable communication system.

So what are the next steps to consider when a student has significant motor challenges impacting communication?

First, it will be necessary to contact a professional with specialized knowledge and skills to help students improve or compensate for motor challenges. These specialists include Physical Therapists, who assist students with mobility, seating, positioning, and adaptive equipment; Occupational Therapists, who have expertise in fine motor skills, self-help skills, adaptive equipment, positioning of materials for efficient access and sensory issues and Assistive Technology Specialists, who work with other team members to determine what equipment or devices, often electronic devices, will aid the student to more fully participate in academic, social and communication activities.

After identifying which specialists are needed, a request for assessment and adaptions appropriate for the specific student should be made. Such assessment can only be completed, however, with the input of the teacher and SLP who work with the student, so that recommendations will be immediately useful and transferable to the classroom setting and will support the development of effective communication skills.

It is important to remember that recommendations alone are not enough. The recommendations must be implemented by the classroom team, which should be expanded to include the motor specialists. Ongoing interactions between team members must be maintained over time in order to provide successful communication programming.
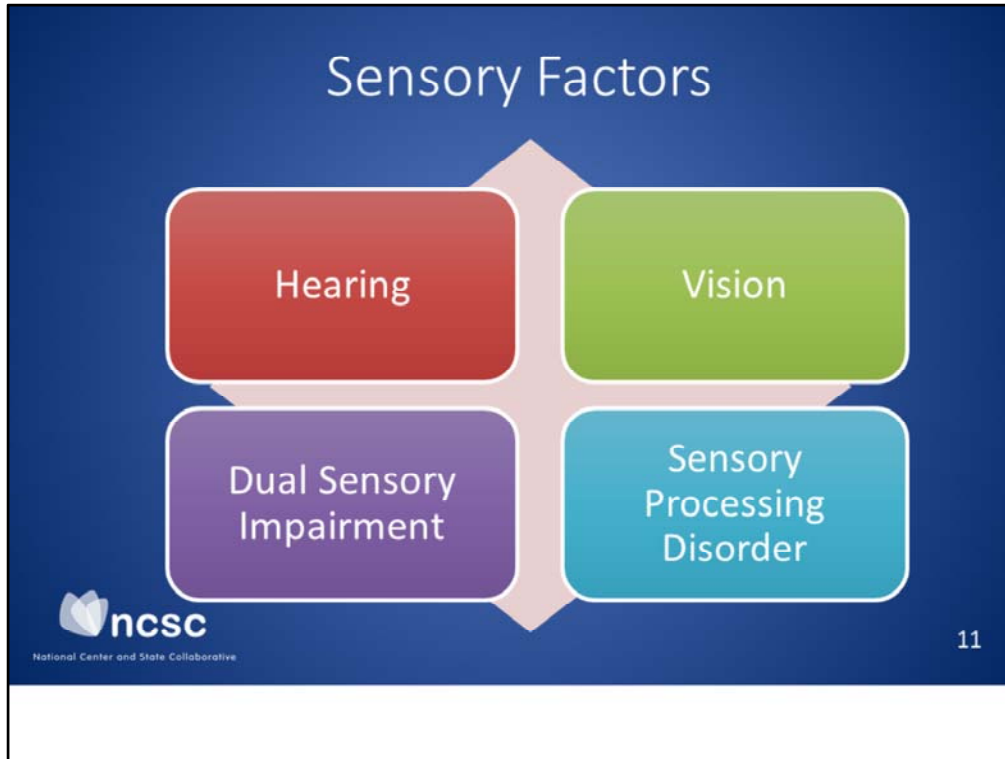
Which of the items below describes a possible negative impact of motor impairments?
A) Inability to produce oral speech
B) Difficulty with gestural communication
C) Idiosyncratic communication output
D) Difficulty with AAC access
E) All of the above

The next set of factors which may impact the development and use of communication are those related to the sensory systems. The four major factors in this area are: hearing, vision, dual sensory impairment indicating a student has both a hearing and a vision impairment, and, finally, sensory processing disorders. Let's discuss each of these factors and how they may impact a student's communication.
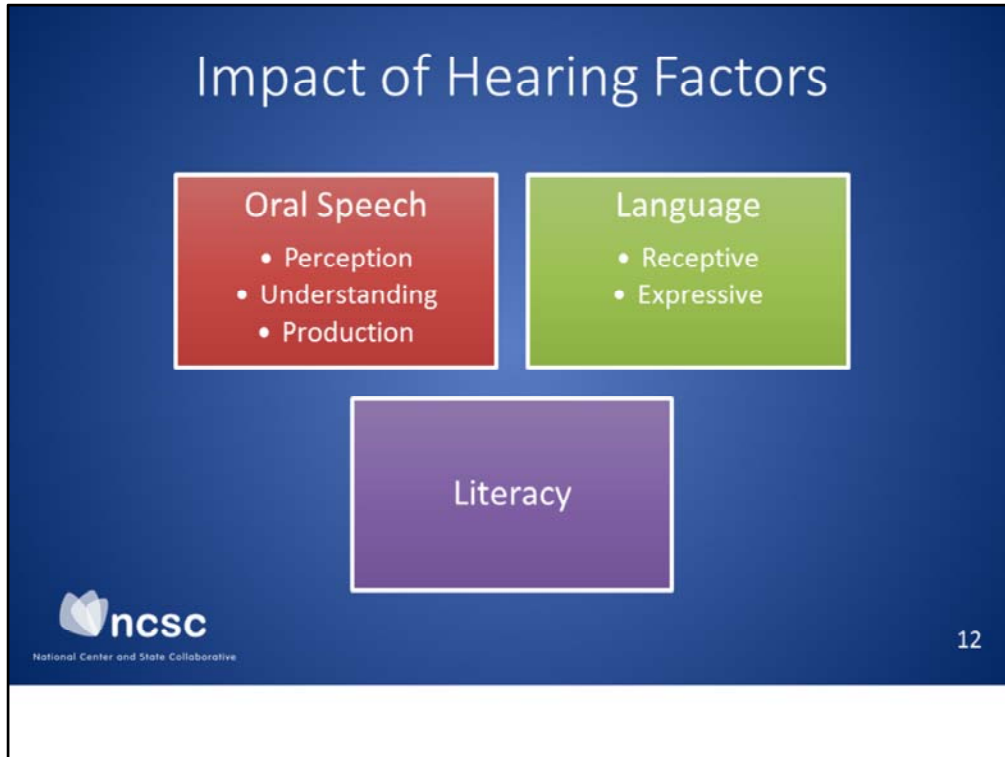
The impact of hearing on communication is well known. Hearing loss or deafness will impede the perception, understanding, and production of oral speech. If an individual cannot hear speech or only perceives certain sound levels or ranges, learning speech sounds will be very difficult. Likewise, hearing loss or deafness will impact the development of both receptive and expressive language. Without hearing, it will be difficult to develop vocabulary and language concepts and to comply with receptive tasks such as following directions. Literacy development will also be impacted by hearing loss. Among the primary elements needed for reading are phonemic awareness, auditory discrimination and perception. In addition, "sounding out words" and spelling will be affected since a more severe hearing loss will interfere with the acquisition of these skills. Clearly then, hearing plays an immense role in the ability to communicate verbally. When hearing loss and deafness occur in conjunction with other disabilities, communication becomes especially challenging.

It is critical that the instructional team be aware of each student's hearing status. This is a complex area, however, and will require additional specialists to become part of the team in order to provide an accurate picture of a student's hearing levels and needs for amplification and adaptations. In this case, our "next steps" will include:

Contacting hearing specialists, including an audiologist, who assesses hearing and determines the need and type of amplification for the student's hearing loss and a teacher of the hearing impaired, who has special knowledge regarding adaptations for hearing loss and use of sign language if appropriate. In addition, some students may require the assistance of a sign language interpreter in a large classroom setting. Some forms of deafness are familial; when this is the case, an interpreter may also be needed during meetings with a student's family.

After identifying which specialists are needed, a request for assessment and adaptions appropriate for the specific student should be made. Such assessment can only be completed, however, in conjunction with the classroom teacher and SLP who work with the student, so that the recommendations will be immediately useful and transferable to the classroom setting and will support the development of effective communication skills. Specialists in hearing impairment can offer many suggestions about preferential seating in the classroom so the student can take

advantage of visual as well as auditory information. Specialists will also teach classroom personnel how to check the student's amplification or hearing aid to be sure it is working well, or explain the complexity of a cochlear implant if the student has had that procedure.

It is important to remember that recommendations alone are not enough. The recommendations must be implemented by the classroom team, which should be expanded to include the hearing specialists. Ongoing interactions between team members must be maintained over time in order to provide successful communication programming.
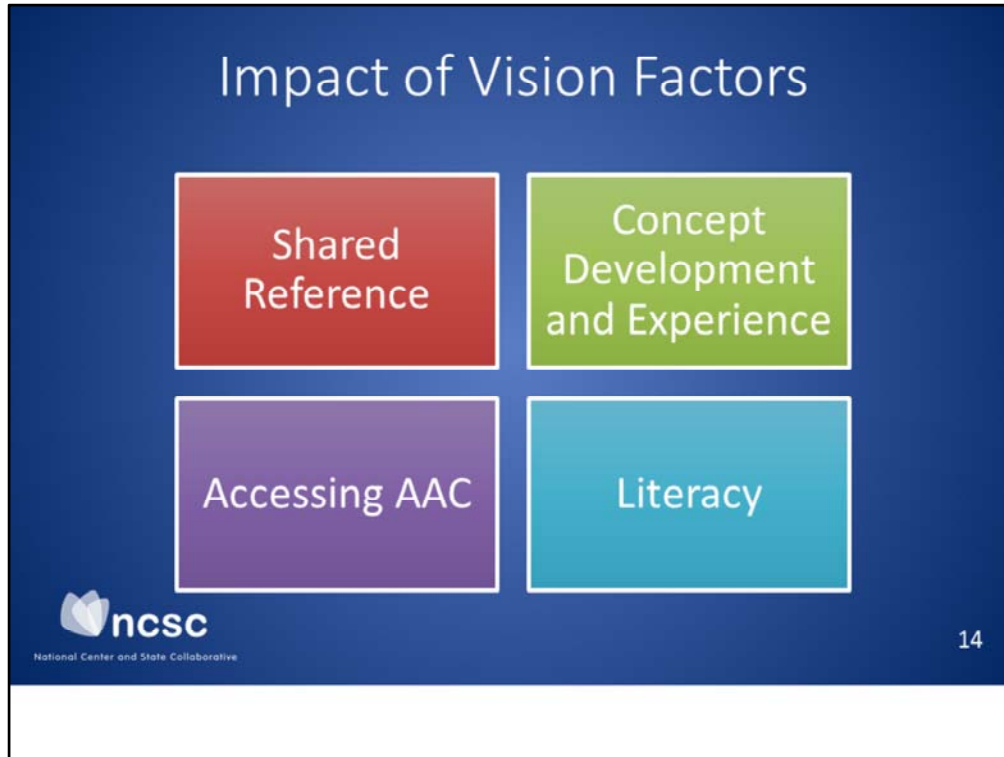
Next let's look at the impact of vision factors on communication development. There are many variations in type and severity of vision impairments. As a result, the impact of these impairments on communication will vary. Vision loss or impairment can impede *shared reference* which is vital first step to communication initiations and responses and learned at a very early age, since the sense of vision is a primary way students learn to recognize others and know that others are present and accessible. Shared reference also influences vocabulary development and direction following, since we frequently use a point or other gesture to gain a listener's attention or focus on a specific object. Vison also plays an important role in concept development and experience with new objects or places and their characteristics. Think about how we teach language concepts for a minute. First, we focus the student's attention on an object or activity (shared reference) and then we describe what the student experiences and sees in order to help build the concept. When vision is lacking or impaired the student must rely on other senses to learn language and develop concept knowledge.

Another important impact of vision impairment is on the ability to access AAC . Vision abilities play an important role in the selection of representations used in the AAC system, the placement of those representations, and the requirements for scanning and locating a desired message on any form of AAC, regardless of its complexity.

Finally the development of literacy will be affected by vision impairment. When teaching reading to a student who has vision impairment, many factors must be considered. Examples include whether to use an adapted form of text or Braille, what font size and

location is best for the student's particular vision impairment, and whether or not there is technology available, like a screen reader on a computer so that the student can listen to the text, rather than reading it.

Undoubtedly, vision impairment may have a significant impact on communication, language and literacy development. Can you think of other areas that have been impacted with your students who have some form of vision loss or impairment?

Since vision impairment affects a student's ability to access a symbol display on an AAC system, we need to find alternate means to present the student with symbol choices. Let's watch Noah, a student with both visual and motor impairments, as he uses his AAC system with auditory scanning capabilities to describe the way a taco shell feels. How does this system adapt to his visual difficulties?

Teacher 1: Noah is going to tell us how that taco felt

Teacher 1: Noah is going to tell us how that taco felt

Teacher 1: Alright Noah, can you get up there and tell us how that taco felt?

Teacher 1: Did it feel crunchy, mushy, or wet?

Teacher 1: Get your head up there and tell us.

Noah: Wet

Teacher 1: There's wet

Teacher 1: Get your head up there. I don't think it felt wet.

Teacher 1: You better keep looking.

Noah: Crunchy

Noah: Mushy

Teacher 1: Mushy?

Teacher 2: Mushy?

Teacher 1: How did that taco feel?

Teacher 1: Get your hand up there

Teacher 1: How did that taco feel?

Noah: Mushy

Teacher 1: Mushy?

Teacher 1: Hmmm. We better feel that taco again

It will be important for the educational team to understand each student's visual abilities. Visual impairments may range from low vision (with reduced visual acuity or visual field) to functional blindness or blindness (with the ability to receive light, at best, and no functional use of any residual vision) to cortical vision impairment (with difficulty interpreting visual information). Because of this complexity, we need the expertise of specialists in visual impairment to determine the student's visual abilities and to recommend adaptations to instructional strategies and instructional materials to work most effectively with the student. The next steps for these students will include:

First, contacting a Teacher of the Visually Impaired who has specialized knowledge of adapted instructional strategies and materials which can provide academic support to students who are blind or have low vision . The adaptations for a student with visual impairment may include specialized technology such as screen reading or screen magnification programs, electronic book players, optical character recognition systems, Braille technology (including translators, readers, and printers), large print items, and AAC systems that include visual scanning. This leads to our second step, consulting with an Assistive Technology Specialist who will have expertise in these educationally based technological applications.

After identifying which specialists are needed, a request for assessment and

adaptions which are appropriate for the specific student should be made. Such assessment can only be completed, however, in conjunction with the classroom teacher and SLP who work with the student, so that recommendations will be immediately useful and transferable to the classroom setting and will support the development of effective communication skills.

Again, it is important to remember that recommendations alone are not enough. The recommendations must be implemented by the classroom team, which should be expanded to include the vision and assistive technology specialists. Ongoing interactions between team members must be maintained over time in order to provide successful communication programming.

The Assistive Technology Specialist will have expertise in educationally based technological applications.
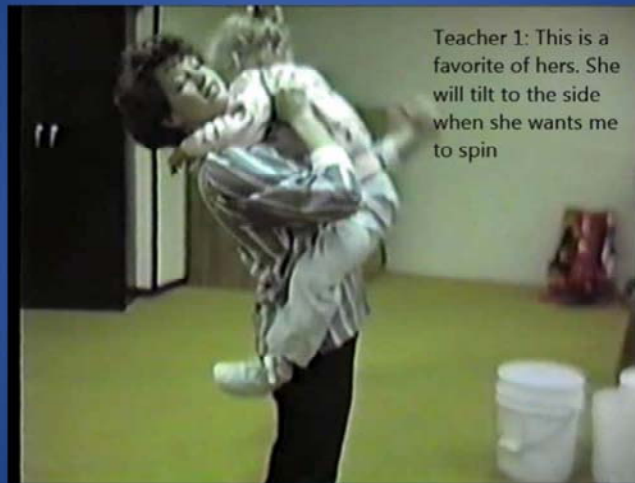
A) True

B) False

Let's look next at students with dual sensory impairments (hearing and vision) and the impact of those impairments on communication development. Students with dual sensory impairments feel the effects of both hearing and vision impairments, so we may expect to see impacts in the same areas we saw for hearing or vision impairments: the ability to establish *shared reference*, the development of *social interactions* , the *development of language concepts*, the ability to *access AAC*, the development of *oral speech* skills , the development of both receptive and expressive language, and, finally, the development of *literacy*.

To begin communicating with students with dual sensory impairments we need to take advantage of other, more intact, sensory modalities, including reactions to touch, smell, taste, and proprioception or vestibular stimulation. Let's watch a young students with dual sensory impairments use an intentional behavior to communicate a request for a sensory experience.
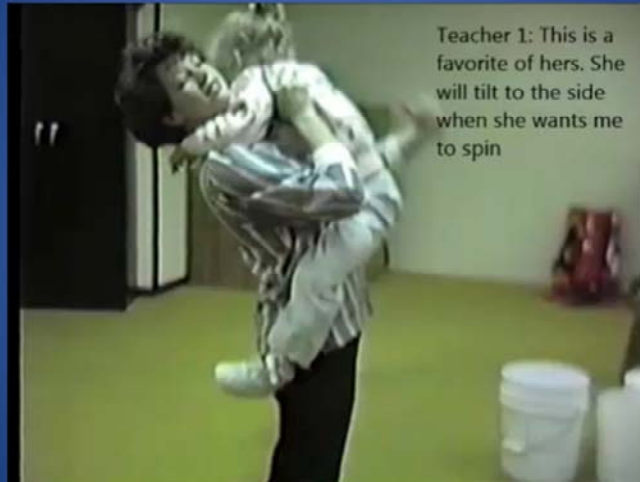
Teacher 1: This is a favorite of hers. She will tilt to the side when she wants me to spin.

Teacher 1: That means I want you to spin

Teacher 2: She has all kinds of communication with you. It's wonderful.

Teacher 1: See she'll hang

Teacher 2: Okay.

Teacher 1 And that means "I want you to do it some more"

Teacher 2: Okay. Can you see her smiling? That's wonderful. Oh you love it!

Let's take a look at a student with dual sensory impairment. In this clip you will see the student use tactile symbols to request a snack and then use touch to choose between available choices.

Teacher 1: What is that?

Student: Bathroom

Teacher 1: Bathroom

Teacher 1: What's next? What is that?

Student 1: Snack

Teacher 1: Snack, that's right!

Teacher 1: So let's get out snacks, we have strawberry banana yogurt, we have goldfish or we have trix cereal?

Teacher 1: You want your goldfish first?

For students with dual sensory impairment, it will be important for the educational team to understand the student's visual and hearing abilities. As a result, we need the expertise of several specialists already described for students with hearing impairment and visual impairment. Those specialists include, an Audiologist, a Teacher of the Visually Impaired, and an Assistive Technology Specialist. In addition, a student with dual sensory impairment may also require the expertise of an Intervener to orient the student to the task stimulus and to provide necessary tactile input.

After identifying which specialists are needed, a request for assessment and adaptions appropriate for the specific student should be made. Such assessment can only be completed, however, in conjunction with the classroom teacher and SLP who work with the student, so that recommendations will be immediately useful and transferable to the classroom setting and will support the development of effective communication skills.

Once again, it is important to remember that recommendations alone are not enough. The recommendations must be implemented by the classroom team, which should be expanded to include the dual sensory impairment and assistive technology specialists. Ongoing interactions between team members must be maintained over time in order to provide successful communication programming.
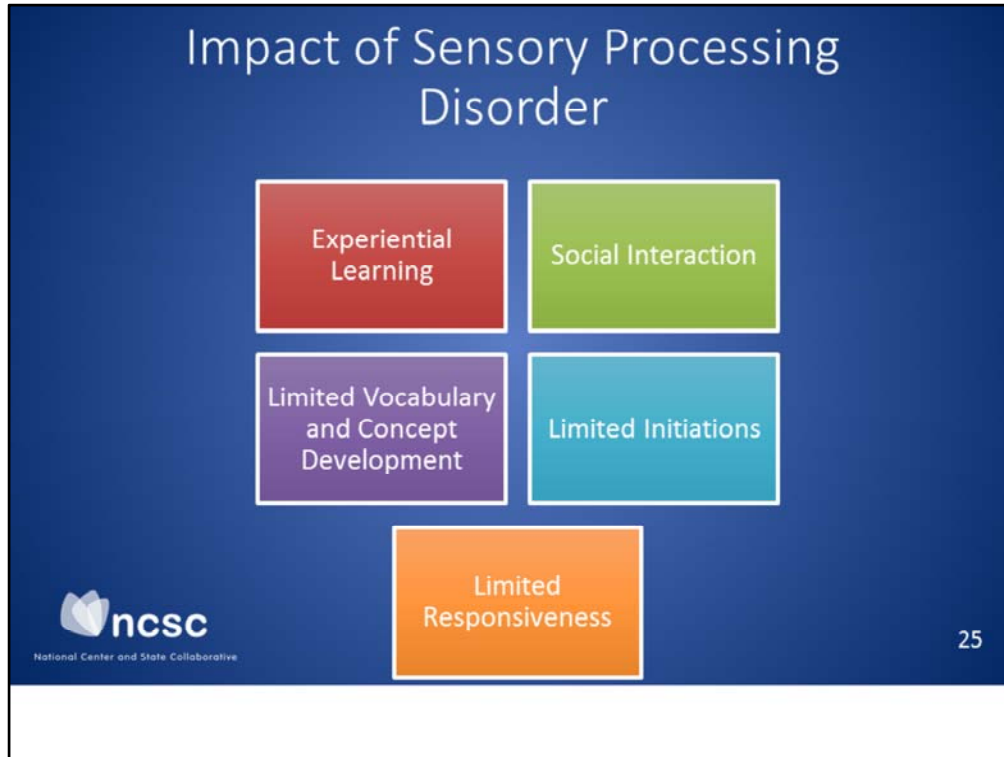
Let's look next at students who have sensory processing disorder and the impact of sensory processing issues on communication development. These students have difficulty receiving and responding to information available through the senses. They may either over-respond or under-respond to sensory stimulation. They may exhibit sensory avoidance or sensory craving and may also exhibit sensory motor and discrimination problems related to sensory issues. These characteristics make it more challenging for them to participate in and acquire knowledge through *experiential learning*.
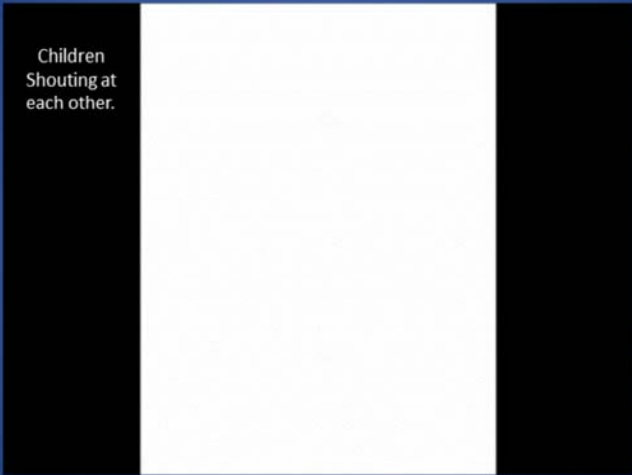
Typical children are able to use their experiences with their environment and the people in it to develop social and language skills. Students with sensory processing disorder, however, are less able to take advantage of this route to learning. Consequently, they may not have learned appropriate *social interactions* or may not be able to recognize the signals calling for a particular social response. Additionally, problems with sensory motor skills may also limit their social interaction. Similarly, their impaired ability to participate in and make sense of learning opportunities will also negatively impact their language, as evidenced by *limited vocabulary and concept development*. Finally, as a result of their sensory issues, coupled with limited language and social interaction skills, these students may exhibit *limited initiations* and *limited responsiveness*.
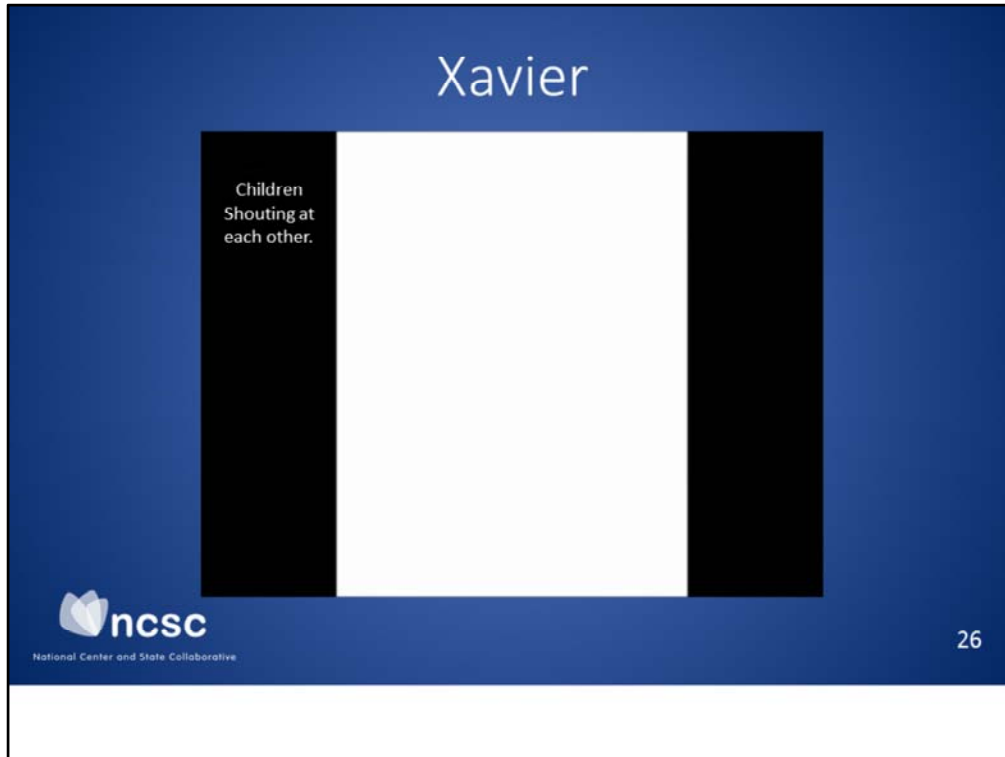
Let's take a look at a brief video of a student, Xavier. who has been diagnosed with sensory processing disorder. In the video you will see him push a classmate away as she tries to engage him in play/conversation. Xavier struggles with appropriate social interaction and how to communicate what he wants or doesn't want. As a result, he pushes his classmate away instead of using language to tell her he does not wish to interact with her.

Children shouting at each other

Social interactions are an area of strength for students with Sensory Processing Disorder.
A) True
B) False

For students with sensory processing disorder, it is important that the educational team understand the specific ways they are affected by the disorders and how to facilitate their ability to learn and participate in the classroom. This will require input from additional specialists who can assess the student's functioning and help plan and implement the best educational strategies. Our "next steps" with these students will include:

Contacting an *Occupational Therapist (OT)*, who can recommend educational adaptations to minimize the effects of the disorder and can also provide specific intervention intended to help the student learn to better integrate incoming sensory information. Because these difficulties put students at risk for social isolation, low self esteem and other social and emotional issues, another professional who should be consulted is a *Psychologist.*

After identifying which specialists are needed, a request for assessment and adaptions which are appropriate for the specific student should be made. Such assessment can only be completed, however, in conjunction with the classroom teacher and SLP who work with the student, so that recommendations will be immediately useful and transferable to the classroom setting and will support the development of effective communication skills.

With these students as well, it is important to remember that recommendations alone are not enough. The recommendations must be implemented by the classroom team, which should be expanded to include the appropriate specialists. Ongoing interactions between team members must be maintained over time in order to provide successful communication programming.

Which of the factors discussed in this module is not considered a sensory impairment?
A) Vision Factors
B) Hearing Factors
C) Motor Factors
D) Sensory Processing Disorder
E) None of the Above

In this module we have identified potential motor and sensory factors and looked at the impact of each factor on communication. For each of the identified factors, we have presented information on the next steps to take to help design and implement an effective plan for developing communication skills necessary for classroom participation.

References

Thank You. This competes Module 2, Considering Sensory and Motor Factors. The next module in this series will address selecting targets.