

# Look Who's Talking

## Intermodal Speech Perception in ASD

by Jonathan Weiss

*“It matters not through which sense I realize that in the dark I have blundered into a pigsty.”*

- von Hornbostel

Our senses allow us to see, hear, taste, touch and smell, and all at potentially the same moment in time. We do it every day—effortlessly, automatically, and efficiently—even though we are not aware that we are doing it. Have you ever been watching TV and noticed that the facial movements of the person speaking are slightly out of synch with what they are saying? How do you know that something is off? Intermodal perception. What is it, and why is it important in the study of autism spectrum disorder (ASD)?

### What is it?

Intermodal perception is the ability to coordinate information from different senses so that we have a coordinated and integrated understanding of an event. For example, when people speak to us, we receive auditory information by hearing their voices and visual information by watching their mouths and facial movements. In typical intermodal perception, which develops within the first year of life, we are able to combine this information easily so

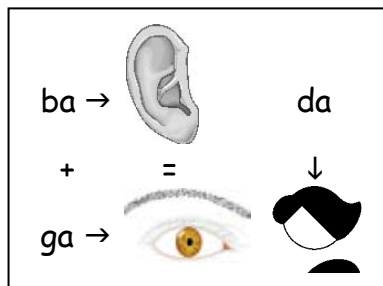


Figure 1



speech perception, often imploring, “Look at me while I’m talking to you!”

It is a researcher’s job to test his or her ideas in experiments. In the 1970s, Harry McGurk and John MacDonald studied how infants perceive speech during different periods of development. They created a videotape with the audio syllable “ba” dubbed onto a person pronouncing “ga.” When they played the tape, the people heard an entirely different syllable, “da,” an incredible audiovisual illusion (now known as the McGurk effect, see Figure 1). A variety of research since then has demonstrated that intermodal speech perception is important in how we typically develop language in infancy and childhood. By manipulating the different modalities in which we can communicate speech, we are also able to improve language in individuals with sensory impairments. For example, Helen Keller, who could not see or hear, first learned words through vibrations spoken into her hand.

### Why is it important in the study of ASD?

What if we were not able to easily unite inputs from multiple modalities? How would we cope with potentially confusing and overwhelming sources of information entering our consciousness at the same time? These are important questions, which to date have no concrete answers. But there is reason to believe that some individuals with ASD have difficulty with intermodal perception.

Anecdotally, some high-functioning individuals with ASD report oversensitivity to sensory input or a blending of sights and sounds (e.g., that certain colours of light “buzz”). Researchers have also reported that individuals with ASD might have difficulty matching what they see and hear in certain events. Recent evidence from our lab at York University, headed by Dr. James Bebko, suggests that children with

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ASD may have more difficulty in intermodal perception than typically developing children or those with intellectual disabilities without ASD, especially when language is involved. We are just beginning to understand the extent of these difficulties and for the most part, they are still largely unknown.

My own dissertation research focuses on determining if children with ASD have difficulty in their intermodal speech perception. In one study, children with ASD watch video clips recreating the McGurk effect audiovisual illusion, and simply report what they hear. Do they automatically combine what they see and hear in speech, and report the illusion? Or do they only rely on what they hear to perceive speech, and react differently than their peers without ASD? In a second study, children watch two video displays of the same face speaking different vowel sounds, and hear a speech tone that matches one of the sounds (see picture 1). While we know that typically developing children can match the sounds they hear to the appropriate images, we do not yet know about children with ASD.

Autism Society Ontario's Stimulus Development Grant, supported by the *Toonies for Autism Day* campaign, has helped me address



Picture 1

these questions by supporting the creation of the necessary materials. The earlier we can identify a child at risk for ASD, the greater our chances of successful intervention and outcome. I hope that a greater understanding of intermodal perception in young children with ASD may lead to early screening techniques using audiovisual stimuli and video analysis, and improve programming and therapeutic services. Of course, without the continued involvement of individuals with ASD and their families in research, achievements such as these would not be possible. Thank you again for your support.

*I was afraid  
that by  
observing  
objects with  
my eyes and  
trying to  
comprehend  
them with  
each of my  
other senses  
I might blind  
my soul  
altogether.*  
—Socrates