

# Make sound visual to help treat 'r' speech errors in children, researcher says

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If you've heard rabbit sound like wabbit, and your name is Robert, not Wobeht, it's possible that you're on the receiving end of one of the most challenging and treatment-resistant speech sound disorders, misarticulation of /r/. Research by the National Institute on Deafness and Other Communication Disorders has shown that approximately 10 percent of preschool and elementary school-aged children are affected by speech sound disorders.

According to NYU Steinhardt Professor, Tara McAllister Byun, the use of acoustic and ultrasound [biofeedback](#) can significantly increase the accuracy of /r/ pronunciation in children and [adolescents](#), although few [clinicians](#) currently use the method as a means of [speech sound](#) intervention.

"Visual biofeedback enhances the sensory experience of producing a sound like /r/," said McAllister Byun, a certified speech-language pathologist. "In addition to hearing the sound of speech, the child sees a visual display of her own speech and a model representing the correct pronunciation of the sound. The model creates a target. Using the visual display, the child can adjust her speech to achieve a better match with the target."

McAllister Byun attributes the success of the treatment model to the unconventional approach it brings to the task of learning speech.

"In traditional methods, the clinician typically asks the child to imitate

the /r/ sound that she hears," McAllister Byun explained. "However, many children who are unable to produce a good /r/ sound also have trouble hearing the difference between correct and incorrect /r/. We think that biofeedback is successful because it bypasses that auditory channel. Even if the child can't hear the difference between good and bad /r/, they can see whether they're hitting the target on the screen. That lets them know if they are saying the /r/ sound correctly."

According to McAllister Byun, speech sound disorders in childhood pose a barrier to academic and [social participation](#), can result in bullying, and may even have lifelong consequences for educational and occupational outcomes. Particular challenges are faced by children with residual speech errors, or atypical speech patterns that persist past nine years of age. These errors, which frequently involve sounds like /r/ and /s/, often remain unchanged despite years of therapy.

Even with its promising nature, very few clinicians have adopted biofeedback due to equipment costs or lack of familiarity with the method. However, recent technological advances have lowered the cost of biofeedback equipment, creating an exciting opportunity for widespread use of these methods. McAllister Byun is currently looking to expand her research and build the case for the effectiveness of biofeedback intervention through a research grant from the National Institutes of Health. She is now seeking research participants for a new treatment study.

McAllister Byun's previous study, published in the *American Journal of Speech-Language Pathology*, "Investigating the Use of Traditional and Spectral Biofeedback Approaches to Intervention for /r/ Misarticulation" (with Elaine Hitchcock, Montclair State University), examined whether children who fail to respond to traditional forms of treatment for /r/ can benefit from acoustic biofeedback intervention. Only two out of 11 participants made progress during an initial phase using traditional

treatment methods, but six more went on to make measurable gains after biofeedback was introduced.

"We're seeing a shift in the field of speech-language pathology toward increased incorporation of technology into treatment—whether it's a simple iPad app or something as complex as [ultrasound](#) imaging of the contours of the tongue," McAllister Byun explained. "My goal is to make clinicians aware of biofeedback as a tool that they can reach for when they meet these truly challenging, treatment-resistant cases. In the long run, I hope that this will help us increase the effectiveness and efficiency of treatment for difficult sounds like /r/."

**More information:** [ajslp.asha.org/cgi/content/full/21/3/207](https://ajslp.asha.org/cgi/content/full/21/3/207)

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