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Critique of TheraVox from lingWAVES biofeedback computer program

I have had the pleasure to review and try out the new TheraVox computer visual feedback program from WEVOSYS out of Germany. In my work with children, I have found computer biofeedback to be extremely beneficial as a tool for eliciting optimal speech and suprasegmental modifications. I have worked extensively with the IBM Speechviewer series over the years, which is no longer being marketed. Therefore, I was excited to see a similar but enhanced biofeedback program coming onto the market.

TheraVox has utilized enticing animation for visual feedback. The primary theme involves dolphins performing various tricks and movements. Built into the program are visual reinforcers for accurate productions followed by combined visual and auditory reinforcement when a predetermined series of correct responses is reached (e.g. a ball appears for each correct response and when 5 balls appear, the crowd cheering reinforcement is provided). The modules provided for Voiced/Voiceless contrasts, Loudness, Pitch, Articulation, Voice Onset, and Coarticulation make this a versatile tool in therapy. Within each module are a number of options to keep the child's interest peaked and also to respond to different age levels of children who may be using this program.

The Voiced/Voiceless module has 3 contrastive modules, moving from simplistic picture changes to specific anatomical illustration of where voicing occurs. One particularly clever animation involves a dolphin moving up and down the screen (up when a voiced sound is produced and down when a voiceless sound is produced) to partake in schools of tiny fish. This enables the child to move back and forth with voicing contrasts while watching pictorial representation of the contrastive voicing of sounds.

There are four Loudness modules, three which involve dolphin animation and the other a tachometer to reflect varying levels of vocal loudness. The dolphin animation adds some flexibility in that you can do it with or without a target. In addition, there is a rhythm module in which loudness needs to be maintained in a rhythmic manner in an avoid-the-obstacle dolphin animation. This allows for the child to face a more challenging loudness differentiation than just simply making his/her voice louder or softer and watching a picture change accordingly.

Five Pitch modules are available, three of which involve dolphin animation, one which involves a keyboard showing notes on the piano lighting up with pitch changes, and one which involves a treble clef staff that allows you to program in a series of five notes for pitch matching. Like in the Loudness modules, two pitch modules with

dolphin animation allow for performance with or without a target. The other animated module involves the schools of fish moving across the screen in various positions, and a dolphin moving up and down the screen (depending upon the vocal pitch input) to partake in a yummy snack.

The Articulation module is one of the most complex, but also in my work, one of the most useful. Before using this module, a phoneme model file has to be created so that the computer knows which sound to compare to when the child produces a certain phoneme. Recordings are made ahead of time, with the need to have up to 4 different phonemes recorded for certain modules to work properly (e.g. need 4 different sounds to use the maze so that the object can move in 4 directions). For each module, there exists the ability to play the child's sound readily with a click on the arrow above the sound. By clicking on the sound itself, the user can readily move to a recorded sound menu from which to pick a different sound to target.

The Articulation modules range from simple exercises for practicing single phonemes to advanced exercises with 4-phoneme contrasts. Response threshold can easily be adjusted to allow for the child to experience early success with subsequent movement to closer approximations of the target sound for reinforcement to occur. This is simply done through the movement of a black arrow on the left portion of the screen. As the arrow is moved upward, the need for closer approximation of the recorded sound is increased before a visual reinforcer is provided. The degree of sound match is determined by a green arrow that moves toward the black arrow as the sound is closer approximated. There is also a setting under the "Settings" menu which allows the user to change the speed of the dolphin and obstacles moving across the screen when applicable.

There are two options in the Articulation module for single phonemes, one of which involves dolphin animation (dolphin carries ball and "shoots" into hoop as sound is produced), and the other which shows a pulley and load which is raised according to the sound approximation. For two-phoneme chains, two dolphins toss a ball back and forth depending upon which sound is produced. There are two 4-phoneme modules, one which involves a dolphin carrying treasures on the ocean floor onto a boat above, and the other involving a maze in which a spaceship-like object is trying to get to a treasure chest through a maze. There is a single phoneme rhythm module where a dolphin leaps over an island obstacle when the sound is produced and sustained. This challenges the child to sustain the sound over time and to time when to produce the sound as each successive island obstacle appears. The final Articulation module involves 2-phoneme contrasts with a timing feature as well. The dolphin attempts to snack on schools of fish by moving up and down the screen with a targeted phoneme at the top of the screen and one on the bottom.

Two Voice Onset modules are available. The first is a hard/soft contrast exercise, where the program discriminates between hard and normal voice onsets. This allows for visual feedback when a child is using too intense of a vocal attack. There is a neutral game format for this, in addition to the dolphin animation exercise, which can be especially useful for children who stutter. The second module in this section is soft rhythm, again designed to reinforce normal voice onset where a dolphin jumps over an obstacle only when normal voice onset is achieved.

The final module is Coarticulation which is set up to respond to language-specific analysis (i.e. English, German, French, etc.). This is designed for children to practice combinations of phonemes. Words/syllables can be selected from a sample word list or added to a user dictionary. There are modules for one word with target phoneme and two word contrasts with minimal pairs. Dolphin animation is provided for each.

In summary, TheraVox provides an enhanced visual biofeedback tool from what has previously been available on the market for working with children who have a variety of verbal communication deficits. The creators of this program have obviously gone to great extent to provide motivating animation and reinforcement for the child as well as ease of use for the therapist. The response threshold is particularly easy to manipulate without having to move out of the exercise, as had been the case with previous visual feedback programs. Alternating between targeted sounds in the Articulation module is also easily accomplished. Personal files can be created and saved for each child so that previous work can be built upon over time.

The children who may benefit from TheraVox computer visual feedback are wide-ranging. I personally have used other feedback programs very successfully with school-age children and adolescents who have persistent "r" distortions. The visual feedback has often been the key to facilitate accuracy for sounds that have not been amenable to change with other approaches. Certainly children with sound production disorders, but especially children with childhood apraxia of speech, can benefit greatly from the multi-sensory experience provided by this program. By observing their sounds not only for accuracy but also for duration and timing, overall motor planning/programming can be enhanced. As indicated, certain modules would lend themselves to working with children who stutter. Pictorial reinforcers for easy and sustained voice onset are utilized.

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