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The Use of Mobile Technology in the Treatment of Prosodic Deficits in ASDs and other Developmental Disabilities

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Background

- ASDs are one of the fastest growing disability categories with a prevalence rate of 1 in 88.¹
- For the 80% of individuals with ASDs who acquire spoken language, prosody – the rhythm, stress, and intonation of speech – is among the most noticeable and chronic impairments.²
- Despite the impact of prosodic disorders on educational, social and vocational success^{3, 4}, there are currently a limited number of intervention strategies to treat these deficits with the majority of these strategies lacking empirical support.⁵

Objectives

- To assess the feasibility and utility of an application, *SpeechPrompts* for iOS devices, in the treatment of prosodic disorders in school-aged children with ASD and other developmental disabilities.

Methods

- Participants**
 - 10 speech-language pathologists volunteered to participate in this study.
 - Each SLP recruited 4 students on her caseload who met the following criteria:
 - currently receiving speech and language intervention as part of special education services;
 - presented with prosodic difficulties secondary to ASD, severe speech sound disorder, or other developmental disability.
 - A total of 40 students, ages 5 through 19 years, met study criteria and were enrolled for participation.
- Speech Samples**
 - Speech samples were collected pre- and post-treatment.
 - Samples were rated on prosodic features (2 = typical, 1 mildly atypical, 0 = atypical) for each of the following prosody characteristics:
 - Rate, Rhythm, Intensity, Stress in Words, Stress In Sentences, Intonation
- Application**
 - SpeechPrompts* (See Figure 1) is an application developed for iOS devices.
 - The main function is to provide a visual representation of the prosodic features of speech.
 - Provides both real-time feedback and opportunities for the student to match their speech to an adult or peer target.

Methods (continued)



Figure 1. Screenshots from *SpeechPrompts*

- SLP training**
 - Each SLP received an iPad preloaded with the *SpeechPrompts* application.
 - A 20-minute tutorial was provided to each SLP by the study coordinator.
 - Tutorial included instruction on the use of the main features of the application, provided the SLP with an opportunity to independently navigate through the application and to answer any questions that arose during the tutorial session.
 - Study coordinator was available for the duration of the study via email and telephone to provide technical assistance as needed.
- Intervention**
 - The application was presented to the enrolled students as part of their speech and language services.
 - The SLPs were instructed to use the application with each student as they deemed appropriate based on their clinical judgment or at least one time per week.
 - The intervention was delivered for approximately 10 weeks.

Results

- Usage data were analyzed from the application's built-in data collection feature:
 - SLPs accessed the application daily during the school week with a median frequency of 2.5 sessions per day.
 - Post-treatment prosody ratings based on speech samples obtained from students at the conclusion of treatment indicated improvement in prosodic functioning (all $p < .05$). (Figure 2)
 - Greatest improvements were observed in production of more typical vocal intensity ($p < .01$) and stress patterns ($p < .01$).
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Results (continued)

- Measures of engagement indicated that the majority of students enjoyed the sessions (88%), did not produce disruptive behavior while engaged with the application (88%) and were looking forward to using the application again (96%).
- End of study surveys revealed that all SLPs enrolled in the study felt comfortable recommending *SpeechPrompts* to colleagues.

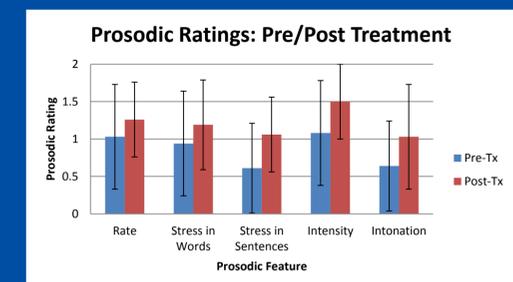


Figure 2. Prosodic Ratings

Conclusions

- Results of this study suggest that *SpeechPrompts* has the potential to be a useful tool in the treatment of prosodic disorders as seen by improvement in prosodic functioning in this small group of students.
- The application appears to maintain the student's attention and engagement over the course of treatment.
- SpeechPrompts* provides SLPs with an additional tool in their repertoire to address these difficult to treat set of speech difficulties commonly observed in children with ASDs and other developmental disorders.

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