Sacred Heart University
DigitalCommons@SHU

Communication Disorders Faculty Publications | Communication Disorders

5-16-2014

The Use of Mobile Technology in the Treatment of Prosodic Deficits in Autism Spectrum Disorders

Elizabeth Schoen Simmons
Yale Child Study Center

Rhea Paul
Sacred Heart University

Frederick Shic
Yale Child Study Center

Follow this and additional works at: https://digitalcommons.sacredheart.edu/speech_fac

 Part of the Speech Pathology and Audiology Commons

Recommended Citation

Simmons, E. S., Paul, R., & Shic, F. (2014, May). "The Use of Mobile Technology in the Treatment of Prosodic Deficits in Autism Spectrum Disorders." Paper presented at the International Society for Autism Research Annual Meeting, Atlanta, GA.

This Poster is brought to you for free and open access by the Communication Disorders at DigitalCommons@SHU. It has been accepted for inclusion in Communication Disorders Faculty Publications by an authorized administrator of DigitalCommons@SHU. For more information, please contact santoro-dillond@sacredheart.edu.

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

Elizabeth Schoen Simmons[1], Rhea Paul[2], Frederick Shic[1]
[1] Yale Child Study Center, [2] Sacred Heart University

Yale Child Study Center
SINCE 1911
childstudycenter.yale.edu

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:
    1. currently receiving speech and language intervention as part of special education services;
    2. 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 them 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 ($p<.01$).
  - Greatest improvements were observed in production of more typical vocal intensity ($p<.01$) and stress patterns ($p<.01$).

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.

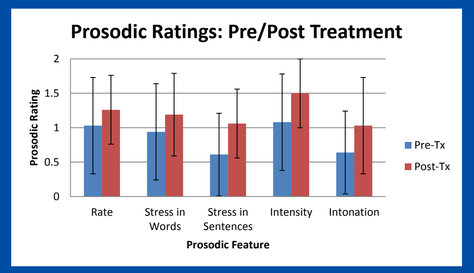


Figure 2. *Prosodic Ratings*

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.

Acknowledgments

This project was supported by the Small Business Innovation Research (SBIR) program of the Department of Education (ED-IES-12-C-0043). We would like to thank Michael Perlmutter for his assistance in data collection, Robert Tedesco and HandHold Adaptive LLC for the provision of their software, and the speech-language pathologists and students who made the study possible.

Selected References

[1]Centers for Disease Control and Prevention. (2009). Prevalence of autism spectrum disorders– Autism and Developmental Disabilities Monitoring Network, United States, 2006. *Surveillance Summaries, MMWR, 58* , 1 -20.

[2]Baltaxe, C., & Simmons, J. (1985). Prosodic development in normal and autistic children. In E. Schopler & G. Mesibov (Eds.), *Communication problems in autism* (pp. 95–125). New York: Plenum Press .

[3]Lewis, B., Freebairn, B., Hansen, A. & Iyengar , S. (2004). School-age follow-up of children with childhood apraxia of speech. *Language, Speech, and Hearing Services in Schools*, 35, 122-140.

[4]Shriberg, L. D., & Widder, C. J. (1990). Speech and prosody characteristics of adults with mental retardation. *Journal of Speech and Hearing Research,* 33, 627–653.

[5]Diehl, J. & Paul, R. (2009). The assessment and treatment of prosodic disorders and neurological theories of prosody. *International Journal of Speech-Language Pathology, 11,* 287-292.

Yale SCHOOL OF MEDICINE

Sacred Heart UNIVERSITY