

Effect of Prolonged Speech and Deliberate Pauses on the Speech Intelligibility of Adolescents with Spastic Cerebral Palsy

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ABSTRACT

Purpose: This study explores the effect of prolonged speech and deliberate pause training on the speech intelligibility and naturalness of adolescents with spastic cerebral palsy. **Methods:** For the sample, we selected 16 adolescents (10 boys, 6 girls) with spastic cerebral palsy, who had received 8 sessions of prolonged speech and deliberate pause training. An additional 14 adolescents (9 boys, 5 girls) with spastic cerebral palsy, who had participated in the interactive language program, were recruited for the control group. Before and after the interventions, the participants' speech samples (including nine 6- to 12-word sentences and one short essay of 71 words) were collected using the same procedure to assess their speech intelligibility, speech naturalness, speaking rate, and temporal acoustic features (i.e., syllable duration, pause duration, and pause frequency). Changes between the pre- and post-training phases were measured to evaluate the training effects. **Results/Findings:** The results showed that (1) the prolonged speech and deliberate pause training was effective for improving the participants' speech intelligibility, reducing their speaking rate, lengthening their syllable duration, and increasing their pause duration and frequency. However, we observed that a few participants' speech naturalness decreased after undergoing the training. Although the control group experienced significant differences regarding speech intelligibility and naturalness, the effects of the interactive language program for increasing speech intelligibility were limited. Based on the analysis of covariance (ANCOVA) results, the post-training performances of the experimental group differed significantly from those of the control group. This

shows that the effect of the training for improving speech intelligibility was greater in the experimental groups than in the control group. (2) After 3 weeks of follow-up session, the effects of the prolonged speech and deliberate pause training on the participants' speech intelligibility and speaking rate were maintained. The speech intelligibility of control group was also maintained. According to the ANCOVA results, during the maintenance period, the speech intelligibility of the experimental group was significantly superior to that of the control group. **Conclusions/Implications:** The results of this study indicate that prolonged speech and deliberate pause training can improve the speech intelligibility of speakers with spastic cerebral palsy in clinical settings. A slight reduction in speech naturalness may be an acceptable sacrifice for a significant improvement in speech intelligibility. The effect of the interactive language program on speech intelligibility and naturalness among speakers with cerebral palsy still requires further investigation. Future studies can emphasize identifying slowing speaking rates that are effective for increasing speech intelligibility while simultaneously retaining naturalness. Finally, this study presents a discussion on the effect of this training program for improving speech intelligibility and presents suggestions for future speech training program designs.

Keywords: speech naturalness, speech intelligibility, spastic cerebral palsy, speaking rate, rate control

