# Effects of an Accent Management Program on Intelligibility of Non-Native Speakers of American English

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**Abstract:** While a foreign or regional accent may preserve ties to cultural and ethnic identities, some individuals choose to seek accent management services to improve employment prospects or because of a personal desire to sound more like native speakers. English is a dominant language within the global economy and speech intelligibility plays a role in successful professional communications. Although an accent is a language difference and not a disorder, speech-language pathologists are uniquely suited to provide such services due to their training in segmental and prosodic aspects of speech. The purpose of this study was to evaluate whether a 14-session program targeting segmental and prosodic aspects of American English resulted in increased intelligibility on both scripted and spontaneous speech tasks. A pre-post-test small group design as well as individual performance of seven speakers of various native languages was used to examine outcomes.

Statistically significant pre-post differences were noted on intelligibility measures of spontaneous and scripted speech tasks. Large effect sizes were observed. These preliminary findings suggest that accent management instruction designed to target both segmental and prosodic aspects of American English has promise.

**Keywords:** Intelligibility, accent modification, accent management, prosody, instruction.

## INTRODUCTION

Accents can be defined as pronunciation that is not the result of pathology and is perceived to be different from the listener's speech production [1]. Every language user speaks with an accent, whether it is considered regional or foreign [2]. A foreign accent is speech produced by second language learners that differs in systematic ways from the native speaker of a given language [3]. English as second language (ESL) learners constitute an increasing population in the United States. In 2013, approximately 41.3 million immigrants lived in the United States, which is an all-time high [4]. As such, the diversity of foreign accents has been steadily growing. A foreign accent can preserve ties to cultural and ethnic identities. However, segmental and prosodic aspects of an accent can impact intelligibility [5]. This leads some individuals to voluntarily seek accent modification and management services in their second language (L2) to improve employment prospects in professional contexts or social/community interactions in personal contexts [6]. Unfortunately, few practitioners have special training in segmental or prosodic aspects of speech production [7, 8]. While an accent is a language difference and not a disorder, speech-language pathologists are uniquely suited to provide such services due to their training in segmental and prosodic speech aspects [9] and integration of accent modification training in graduate speech-language pathology programs will better equip future clinicians to serve members of the growing global workforce. However, more research regarding effectiveness of accent management services is needed to guide Speech-Language Pathologists in program development and implementation so they are better equipped to meet the needs of an increasingly diverse population.

### Instructional Approaches

Foreign accent can be described according to accentedness, comprehensibility, and intelligibility. Accentedness refers to how closely one's pronunciation is perceived to resemble that of a native speaker [10]. Comprehensibility measures are subjective and typically refer to a listener's perceived understanding of an utterance [11], for example a selection on a likert scale that spans from "difficult to understand" to "easy to understood". Intelligibility refers to a more objectively measured amount of a spoken message that is understood by the listener. While intelligibility is a broad term and various methods of categorizing it exist, this study measures intelligibility by number of words understood out of total number of words spoken [12, 13] and can be reported by a percentage score. Much research examining instructional accent programs base outcomes on one or more of these measures [10-13].

Intelligibility is enhanced when the prosody of ESL speakers corresponds with the target language [14].

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Derwing, Munro, and Wiebe [15] compared comprehensibility, accentedness, and fluency of three groups of ESL speakers on production of scripted sentences and conversational narratives. One group received no specific pronunciation instruction, one group received segmental instruction, and one group received a global instruction (i.e., prosodic aspects). Both the segmental and global groups improved sentence comprehensibility and accentedness; however, only the global group with prosodic instruction showed improvement in comprehensibility and fluency in conversational narratives. Derwing and Rossiter [16] extended this research. Forty-eight ESL speakers were assigned to one of three instructional methods (i.e., no specific pronunciation instruction, segmental instruction, global instruction). Native speakers rated reading and conversational narratives on ease of understanding and accentedness. Fluency was also assessed for the conversational speech samples. Results indicated improvement on accentedness with all three groups; however, the segmental instruction group had the greatest improvement. Only the segmental and global groups showed increased comprehensibility following instruction. As with Derwing *et al*. [15], no change was perceived for any rating on conversational narratives except for the global instruction group, which improved in fluency and ease of understanding but not accentedness. Kennedy and Trofimovich [10] examined accentedness, comprehensibility, and fluency of speech production with 10 ESL speakers enrolled in a 13-week pronunciation course targeting prosodic aspects of English. This program included a language awareness component to facilitate ESL speakers' knowledge about prosodic aspects. Results indicated that prosodic instruction yielded improvement in controlled tasks. Data on spontaneous speech production changes were not collected. Collectively, these studies indicate that prosodic instruction plays an important role in accent management services.

Inclusion of segmental instruction may play an equally important, albeit different role, than prosodic instruction. Saito [17] explored the impact of explicit phonetic training and corrective feedback on comprehensibility and perceived accentedness of Japanese learners of English. Twenty participants were randomly assigned to control and experimental groups. The experimental group received four hours across four weeks of explicit training in production of eight English phonemes that are typically confused by native speakers of Japanese. While results indicated no significant change in perceived accentedness, they did reveal a statistically significant increase in comprehensibility at the controlled sentence level. Saito and Lyster [18] evaluated an instruction focused on segmental production with and without corrective feedback on Japanese speakers' production of /ɹ/. The instruction was designed to encourage speakers to notice and practice the target feature in the context of meaning-oriented instruction. Both listener judgement and acoustic analysis was conducted on production of /ɹ/. Results indicated improvement following segmental production with corrective feedback during both controlled and spontaneous speech. Lee and Sancibrian [19] compared a segmental and a contrastive approach to accent management with eight non-native speakers of Korean background. The contrastive approach consisted of comparing segments within minimal pairs, while the segmental approach utilized drill of individual segments. Results indicated improved performance on word probes following contrastive instruction as compared to individual segmental drill.

Research lends support to the role of segmental or prosodic instruction on increased intelligibility [20, 21]. However, Derwing, Munro, and Wiebe [15] advocated a combined approach with both segmental and prosodic training. They suggested that prosodic training may facilitate improvement and maintenance of comprehensibility during spontaneous contexts and segmental training may facilitate communication breakdowns. Fritz and Sikorski [22] examined intelligibility of 167 Korean individuals who participated between 2006 and 2013 in a university accent modification and management program that provided training in both segmental and prosodic aspects of American English pronunciation. Pre-post comparison of intelligibility on the Sentence Intelligibility Test [23] indicated significant improvement. Intelligibility of spontaneous speech was not reported. Behrman [24] further examined the relative contribution of segmental and prosodic instruction to accent management in a controlled study. Outcome measures included segmental and prosodic probes as well as listener judgement of accentedness and ease of understanding of a 1-minute monologue of the non-native English speakers. Cross-domain effects were not noted in that prosody training did not yield improvement in segmental probes, and segmental training did not result in improvement in prosody probes. However, listeners reported lower perceived accentedeness and greater ease of understanding as a result of the

combined prosodic and segmental accent training. The author concluded that an integrated segmental and prosodic approach to accent management is critical. Taken together, results indicated that a combined segmental and prosodic focus of accent management training has potential to improve ESL speaker intelligibility and increase communicative success in the target language.

Regardless of the instructional targets during explicit training, integration of segmental and prosodic skills into meaning-oriented communication contexts may contribute to acquisition and maintenance of skills during spontaneous speech [18, 25]. Focus on form alone, without meaning-oriented activities, may not provide the most effective instructional format to promote generalization into spontaneous speech [17]. Lee, Jang, and Plonsky [26] call for more research to address the contribution of meaning-oriented communication contexts to production outcomes. Additionally, more research including spontaneous speech is needed. According to Thomson and Derwing [27], spontaneous speech tasks were used in only 20 percent of 75 studies sampled. In sum, providing an integrated delivery of segmental and prosodic training and designing meaningful communicative opportunities may be critical to achieving results beyond controlled contexts.

### Purpose of Study

The purpose of this study is to evaluate whether a university clinic based 14-session program targeting segmental and prosodic aspects of American English within explicit training and meaning-oriented contexts results in increased intelligibility on both scripted and spontaneous speech tasks. A pre-post-test small group design as well as individual performance was used to examine outcomes.

## METHOD

### Participants

Adult non-native speakers of American English were recruited via campus email and word of mouth contacts of the author on the campus of a local university (IRB#73415172). Participants were either students or professors at the local university in which this program was offered and had been in the United States from two weeks to twenty-five years. Native languages represented in the group were Japanese, Mandarin Chinese, Farsi, Spanish, and Nepali. All participants spoke their native language on a regular basis with a friend or family member, but depended on English language skills the majority of each day to complete work and school-related tasks. While no formal evaluation of grammar was completed, each faculty participant met minimum university English proficiency requirements for faculty employment on campus. For students minimum TOEFL scores were 79 internet-based, 213 computer-based total, or 550 paper based exam. No participants in this program were enrolled in additional English language courses at the time of this program.

Primary enrollment criteria required that participants reported a desire to modify spoken English due to a feeling that accent negatively impacted personal and or professional communication. Additional criteria included that a participant have no communication disorder and that their English “intelligibility relative to accentedness” rank greater than 2 (mild) as measured on a scale of 1-5 by subtests of the Comprehensive Assessment of Accentedness and Intelligibility with 1 being “negligible difference” from Standard American English and 5 being a “very strong accent” and “impossible to understand” [28]. Further description of the scale design is available in the CAAI test manual

**Table 1: Participant Information**

| Participant ID | Age (years) | Native Language | Length of Pre-program Residence in USA |
|---|---|---|---|
| 1 | 37 | Farsi | 3.5 years |
| 2 | 55 | Mandarin | 25 years |
| 3 | 34 | Mandarin | 7 years |
| 4 | 23 | Spanish | 3 years |
| 5 | 50 | Japanese | 20 years |
| 6 | 28 | Nepali | 2 weeks |
| 7 | 33 | Japanese | 9 years |

Note. ID = Identification.

**Table 2: Selected Pre-program Prosodic and Segmental Performance during CAAI Testing**

| Participant ID | | Accent Performance - Difficulty Score | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Intelligibility Relative to Accentedness | Sentence Level Intonation | Word Level Intonation | Lexical Stress in Single Multisyllabic Words | Derivative Stress in Multisyllabic Words | Contrastive Lexical Stress | Emphasis | Sentence Phrasing | Auditory Discrimination Transcription | Segmental Targets |
| 1 | 3.7/5 | moderate | no difficulty | moderate | moderate | moderate | mild | moderate | moderate | /sw/, /l/ blends, /z/, /l/,/ʒ/, /o/, /a/, /ou/, /ɝ/ |
| 2 | 2.5/5 | moderate | moderate | no difficulty | mild | moderate | mild | no difficulty | moderate | /k/, /z/, /v/, /d/, /ð /, /ʤ/, /e/, /æ/, /eɪ/ |
| 3 | 3.5/5 | moderate | no difficulty | moderate | moderate | strong | moderate | moderate | moderate | /z/, /v/, /ð /, /ʤ/, /θ/, /m/, /ŋ/, /i/, /e/, /æ/, /ɔ/ |
| 4 | 3/5 | no difficulty | moderate | moderate | moderate | mild | no difficulty | moderate | strong | /ʤ/, /z/, /ʒ/, /ŋ/, tense-lax vowel |
| 5 | 3.25/5 | moderate | no difficulty | no difficulty | mild | moderate | moderate | moderate | mild | /z/, /l/, /r/, /ɑ/, /ɔ/, /u/, /ɝ/ |
| 6 | 2.3/5 | moderate | moderate | moderate | moderate | moderate | strong | moderate | strong | /br/, /ts/, /ð/, /z/, /ou/, /ɛ/, /ʊ/ |
| 7 | 3.6/5 | no difficulty | no difficulty | no difficulty | moderate | mild | moderate | moderate | moderate | /r/, /l/, /s/, / æ/, /ʊ/, /ɔ/ |

Note. ID = Identification.
Note. No difference = Mild = moderate = See CAAI = Comprehensive Assessment of Accentedness and Intelligibility (2007).

and scoring form [28]. This was the first CAAI subtest to be administered in the pre-testing process. Each potential participant was evaluated by a team of two trained clinicians, with the first researcher present at each evaluation. One of the clinician teams included the third researcher. Each of the clinicians on the team rated the sample individually and an average of the two scores was used for reporting. This average was compared to the first researcher's score. No reported score varied more than 0.2 points from the first researchers score. Table **1** includes individual participant information including native language (L1) and length of time residing in the United States at program initiation.

Eleven participants were evaluated. One ranked higher than a 2 on the CAAI Intelligibility Relative to Accentedness [28] subtest at time of preprogram evaluation. Two participants presented with communication disorders of voice and fluency. While these individuals were enrolled in the accent program, they were excluded from this study. One additional participant was enrolled in the program but dropped out before any measures beyond original qualification testing could be completed. As such, a total of seven participants, five female and two male, were enrolled.

### Program Implementation

The *CAAI* was administered prior to program initiation to provide data on goal selection. Careful selection of appropriate targets based on client proficiency and individual goals is recommended for programming [29]. See Table **2** for individual performance on segmental and prosodic subtests.

Each participant attended a 7-week accent management program. The program included biweekly

**Table 3: Sample of Bi-Weekly Targets**

| Session | Individual Sessions | Group Contextualized Sessions |
|---|---|---|
| 1 & 2 | Discussion of preprogram evaluations and personal goals<br>Establish and practice 3 template sentences (Behrman, 2013; Gilbert, 2004)<br>Intonation for statement words/short phrases<br>Participant-specific consonant(s) | Introduce Terminology<br>Interactive scenes to demonstrate contrasting prosody/meaning<br>Conversational practice of template sentences and falling intonation at the word level |
| 3 & 4 | Instruction, discrimination, and production practice in:<br>Central vowels<br>Stress patterns for multisyllabic words and phrasal verbs<br>Voiced and voiceless plosives in initial and final position<br>Participant-specific consonant(s) | Conversational practice of pausing/thought groups and words with reduced vowels<br>Continued instruction on predicting intonation pattern of unfamiliar words and contextualized application thereof<br>Conversational practice of rhythm of short phrases with reduced vowels |
| 5 & 6 | Instruction, discrimination, and production practice in:<br>Stress patterns for multisyllabic words and phrasal verbs<br>Intonation patterns and word stress for multisyllabic words, short phrases & sentences<br>Back vowels<br>Participant-specific consonant(s) | Contextualized scene practice with targeted clinician feedback |
| 7 & 8 | Instruction, discrimination, and production practice in:<br>Intonation & stress for phrases and sentences<br>Rhythm & stress focus on reduced vowels<br>Intonation & stress for emphasis in statement sentences<br>Auditory discrimination and production practice of back vowels<br>Participant-specific consonant(s) | Contextualized scene practice with targeted clinician feedback |
| 9 & 10 | Instruction, discrimination, and production practice in:<br>Intonation contour for various question sentences<br>More complex template sentences | Contextualized scene practice with targeted clinician feedback |
| 11 & 12 | Focus on rhythm<br>Linking words in connected speech | Contextualized scene practice with targeted clinician feedback |
| 13 & 14 | Individualized based on progress thus far and participant goals | Contextualized scene practice with targeted clinician feedback |

sessions comprised of 45-minute individual sessions in which one to two segmental and one to two prosodic behaviors were targeted. Prosodic and segmental targets were introduced and trained in an order adapted from Van Riper's [30] articulation model and Behrman's adaptation of this model [24, 31]. Training for both prosodic and segmental targets began with an explanation of the target followed by focused auditory stimulation, auditory discrimination, production training, and practice in meaningful, interactive activities. Individual segmental and suprasegmental training stimuli were developed using available instructional resources [i.e., 32-36] and foundational knowledge of English phonology (See Table **3**). For example, visual representations for lexical stress and pitch contour of American English words and phrases developed by Edwards and Strattman [32] informed preparation and delivery of targets. Timing, linking tips, and rules for rhythm developed by Gilbert [33] and Lujan [35] informed instruction style and design.

Group sessions, 45-minutes in length, followed each individual session. Group sessions reinforced concepts taught in individual sessions and provided opportunity to practice new techniques in meaningful, communicative activities. These activities included scripted and spontaneous scenes, communicative games, and role-play of functional real-life scenarios (see Table **3**). During initial interviews, ESL speakers perceived that segmental features contributed to their accent. Most participants were not aware of the contribution of the prosodic aspects of speech to their intelligibility. As such during group session 1, open scenes were used to demonstrate the contribution of prosodic features such as vocal intensity, pausing, and pitch contour to the meaning of an utterance. Open scenes are brief and ambiguous scenes commonly used as exercises in acting classes. In open scenes, partners are given lines, then instructed to construct a small scene conveying information including: who their characters are, where they are, what their relationship to each other is, and how they feel toward each other and the current situation using only those lines. Refer to Table **4** for examples. The group guessed what was conveyed in each scene and discussed how varied stress patterns, amplitude, juncture, and pitch contributed to changes in meaning across lexically identical scenes. This exercise served to solicit participant support and enthusiasm for the combined segmental/prosodic instructional approach. Subsequent weeks included conversational practice and contextual scene practice with targeted feedback. These group activities included conversational language games, performance of short scripted scenes, and improvisation of everyday activities such as ordering in a restaurant or exchanging an item at the store.

**Table 4: Sample Open Scenes**

| | |
|---|---|
| Sample Instructions | Get into groups of two, person A and person B. Determine what scene you are going to present. Who are the characters? What is the relationship? Where are they? What are they doing? How do they feel about the situation and each other? Using only the following lines, act that out. Do not add any text and do not provide an introduction. |
| Sample Open Scenes | A: Good night.<br>B: Sleep well. |
| | A: You.<br>B: Who. Wait. How.<br>A: Um, yes.<br>B: Well, ok.<br>A: In ten minutes. |
| | A: Do you want some?<br>B: No thanks.<br>A: Ok.<br>B: Wait. Yes. |

A team including the first author and graduate student clinicians developed targets and instructional activities. The same graduate student clinicians delivered the instruction. Prior to delivery, the graduate student clinicians participated in a six-week training course delivered by the first author. The training course met twice weekly for one hour each meeting. During the initial four weeks, graduate students engaged in short lectures on segmental and prosodic aspects of speech best described as "mini lessons" for selected aspects of American English phonology. During week five, discussions revolved around evidence-based practice for accent management. Finally, week six included review and practice of accent evaluation tools. Graduate student clinicians were each assigned to work with one participant throughout the program. Clinicians did not have more than one client for individual sessions. Graduate student clinicians completed weekly session plans for both individual and group sessions. Clinicians took turns leading group sessions in teams of two and three in rotating assignments. Plans were approved and/or revised based on feedback from the first author. Additionally direct supervision from first author was provided during individual and group sessions to ensure planned weekly targets were incorporated into each session. Outcome notes were also submitted for each session

to track progress and for additional documentation on how thoroughly plans implemented by each clinician followed the pre-determined program.

### Outcome Measures

Pre- and post-program scripted speech tasks and spontaneous speech tasks were used to obtain intelligibility scores. Researchers of the current study selected intelligibility for outcome measurements as it is an objective measure of potential communicative success [8]. While there is no single way of assessing intelligibility, this study calculated deviations in listener transcripts from intended utterances [12, 13, 37]. Speech samples were recorded using a Behringer ECM8000 microphone and GoldWave v6.19 digital audio editing software. The participants read the Rainbow Passage to provide a scripted speech sample. This is a phonemically balanced text in the English language. It is recommended for intelligibility testing on the CAAI and is a text widely used by speech-language pathologists in the United States for analysis of speech production. Spontaneous speech samples were obtained by asking participants to read and then retell events of a short story. For scripted speech samples, intelligibility scores were calculated by dividing total number of words by the total number of words accurately transcribed. For spontaneous speech samples the total number of words understood was divided by total words spoken in each sample to obtain an intelligibility score. Vocalized fillers such as “uh” and “ah” were not included in either count.

### Data Collection and Analysis

Graduate student clinicians collected pre-and post-instruction scripted and spontaneous speech samples using a Behringer ECM8000 microphone and GoldWave v6.19 digital audio editing software. A team of two graduate students was assigned to listen to and score speech samples for intelligibility. The recordings were played for transcription free field via iTunes software from an Apple desktop computer in a clinical training room. Speech samples were not normalized for intensity at the time of recording. However, clinicians had the opportunity to adjust volume once at the beginning of the transcription process. While clinicians were permitted to pause during the transcription process, they were not allowed to rewind or listen to recordings more than once. The order of listening was not the same for each team; some teams listened first to the scripted sample and second to the spontaneous sample while other teams were asked to do the opposite. Graduate student clinicians did not transcribe and rate their own clients, however there were no procedures in place to prevent them from listening to a client with an accent with which they may have been familiar outside of their clinical training. Since intelligibility is listener dependent and varies from context to context, each recorded sample was randomly assigned to two different graduate student clinicians who transcribed and calculated intelligibility independently. As this was a random assignment, the graduate clinicians assigned to transcribe and score pre-program intelligibility were not necessarily the same graduate clinicians assigned to transcribe and score a client’s post-program intelligibility sample. An average of the two scores was used in the data reported in Figures **1** and **2**.

## RESULTS

Seven pre- and post-program scripted and spontaneous speech samples were compared. An

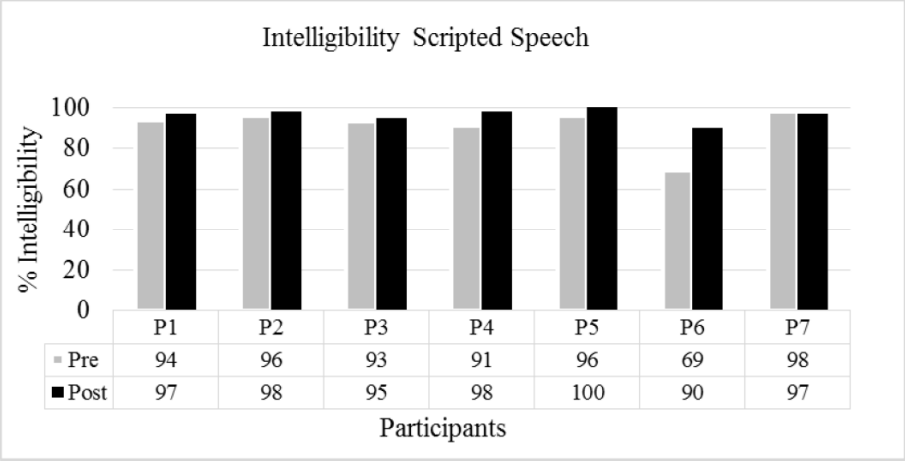


**Figure 1:** Pre- and post-program intelligibility ratings of scripted speech.

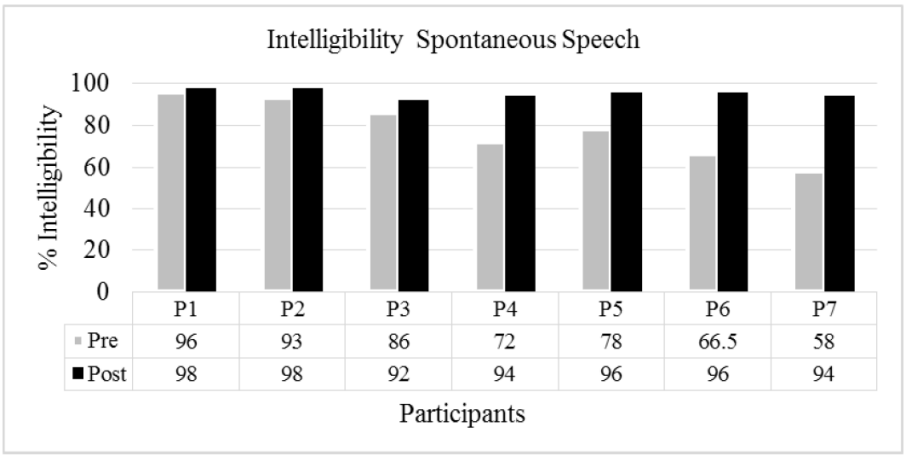


**Figure 2:** Pre- and post-program intelligibility ratings of spontaneous speech.

exploratory examination of resulting data was conducted by using a Wilcoxon signed rank test. The Wilcoxon signed rank test revealed a significant overall mean difference from post to pre-program testing in both scripted (Z=-2.201, p≤ 0.05) and spontaneous (Z=-2.366, p≤ 0.05) intelligibility measures (see Tables **5** and **6**). While an increase in mean intelligibility was noted on both scripted and spontaneous speech tasks, a greater change in intelligibility was noted in spontaneous speech than scripted speech. Mean scores of scripted speech intelligibility rose from 91% at pre-testing to 95% at post-testing (see Table **5**), while mean scores of spontaneous speech intelligibility rose from 78% at pre-testing to 95% at post-testing (see Table **6**).

While a statistically significant increase in mean intelligibility was noted on both scripted and spontaneous speech tasks, a more notable difference was observed in spontaneous speech intelligibility. Effect size was calculated using Wilcoxon signed rank test using the formula [size = z / sqrt(N)]. A large effect size [38] was discovered in improvements for both scripted (r = -0.588) and spontaneous (r = -0.597) speech intelligibility (see Tables **5** and **6** respectively).

Figure **1** includes individual intelligibility scores for pre- and post-program scripted speech tasks respectively. Figure **2** includes individual intelligibility scores for pre- and post-program spontaneous speech tasks respectively

## DISCUSSION

This study was designed to evaluate whether a university clinic based 14-session accent management

**Table 5: Pre- and Post- Program Scripted Speech Descriptive Statistics and Wilcoxon Signed Rank Test**

| Scripted Speech Intelligibility | N | Mean | Standard Deviation | Minimum | Maximum | Wilcoxon Z | Significance P | Effect Size r |
|---|---|---|---|---|---|---|---|---|
| Pre-program | 7 | 91 | 9.9666 | 69 | 98 | | | |
| Post-program | 7 | 96.43 | 3.207 | 90 | 100 | | | |
| Post- to Pre-program | 14 | | | | | -2.201 | 0.028 | -0.588 |

*Note.* N = number of participants.

**Table 6: Pre- and Post- Program Spontaneous Speech Descriptive Statistics and Wilcoxon Signed Rank Test**

| Spontaneous Speech Intelligibility | N | Mean | Standard Deviation | Minimum | Maximum | Wilcoxon Z | Significance P | Effect Size r |
|---|---|---|---|---|---|---|---|---|
| Pre-program | 7 | 78.5 | 14.0208 | 58 | 96 | | | |
| Post-program | 7 | 95.43 | 2.225 | 92 | 98 | | | |
| Post- to Pre-program | 14 | | | | | -2.366 | 0.018 | -0.597 |

*Note.* N = number of participants.

program targeting segmental and prosodic aspects of American English delivered in an instructional format that includes contextualized, interactive, meaning-oriented activities would result in increased intelligibility on controlled and spontaneous speech tasks. Small group comparison of pre-post intelligibility scores revealed improvement in both scripted and spontaneous tasks. Large effect sizes are consistent with previous studies evaluating pronunciation instruction [39]. Outcomes of this integrated program are encouraging and point toward further study.

Some studies have indicated that only prosodic instruction can yield increases in intelligibility during spontaneous speech production [15, 16]. Alternatively, studies have suggested that segmental training may contribute to improvement of intelligibility during spontaneous speech tasks [18, 19]. Other data, such as results from Behrman [24], have demonstrated that training in both segmental and prosodic elements is necessary to yield changes in intelligibility. Results indicate that a university clinic-based accent management program targeting a combination of prosodic and segmental aspects of American English speech within an instructional style that incorporates meaningful, communicative interaction can result in increased intelligibility of non-native speakers of American English on both spontaneous and controlled speech tasks.

As noted by Saito [18] integration of explicit instruction into meaning-oriented communication may be a critical component of accent management services. In this study, a contributing factor to increased intelligibility may be linked to the inclusion of both direct, individual instruction and interactive, group instruction. Further, Saito and Lyster [19] suggested that improvements following segmental training were due to the provision of corrective feedback within meaningful interactions. Within this program, corrective feedback on prosodic and segmental targets was given during both direct, individual instruction and interactive, group instruction. Additionally, this program included metalinguistic awareness training on prosodic patterns of American English. As supported by Kennedy and Trofimovich [17] understanding the role of prosodic targets for improved intelligibility may contribute to positive outcomes.

Since this is a small group comparison with limited generalization, consideration of individual performance is critical. Overall, intelligibility was higher during scripted speech tasks than spontaneous speech tasks at pre-program data collection**.** This may be due to a greater amount of cognitive resources needed for spontaneous speech tasks as compared to scripted speech tasks, as posited by Derwing, Munro, and Wiebe [15]. One exception was participant 1 who had a scripted intelligibility score of 94% at pre-testing and spontaneous intelligibility score of 96% at pre-testing. Both of these scores ranked rather high and revealed little variability between scripted and spontaneous speech for this participant on observed activities. Participant 6 was the only participant ranked below 90% intelligibility on pre-program scripted speech tasks (i.e., 69%). Results of the *CAAI* [28] placed her pre-program performance as moderate to strong difficulty on segmental and prosodic production and perception (See Table **2**). From pre-to post-program samples her scripted intelligibility score rose from 69% to 90%.

Increased intelligibility on spontaneous speech tasks was noted for all participants. Ultimately increased intelligibly at the novel and spontaneous level is among the main targets of an accent management program. Certainly controlled production is useful, especially as it equips a speaker with metalinguistic skills to repair communication breakdown. An individual who has received explicit segmental training, for example, would be able to focus on correcting a mispronunciation through focused repetition of the word or words initially containing the error [15]. Yet clients do not typically seek accent management services in order to perform well in a predictable clinical or classroom setting. The fundamental objective of accent management services is to allow a non-native speaker to more naturally and successfully communicate in all novel daily settings. Increased communicative competence means that a client will leave the instruction sessions with an ability to naturally recall and implement production strategies that improve ease of communication whether ordering at the deli, collaborating with colleagues, or relaxing with friends. Thus, increased spontaneous intelligibility was the most important measure of success in the current study. Greatest gains at the spontaneous level were noted for participant 6. This participant also had lower pre-program intelligibility scores and the lowest pre-program residency in the United States compared to all other participants. Participant 6 had only arrived in the United States two weeks prior to enrolling in this study. Her scores were among the lowest of all participants in both measures. She also made the greatest amount of progress among all participants on both scripted and spontaneous tasks from pre- to post-

program sampling. While no formal grammar evaluation was conducted, pre- and post-program spontaneous speech samples for participant 6 were informally analyzed to determine whether grammatical skills impact communication. The most noticeable syntactic errors included omission of auxiliary verbs and articles. These items were not directly targeted in intervention. Post-program results were similar to baseline testing. However, the client did demonstrate a more diverse vocabulary in the post-program spontaneous speech sample.

Participant 7 scored very high on scripted tasks with a pre-program intelligibility score of 98% when reading out loud. This participant's pre-program performance left little room for improvement on scripted tasks and no improvement was demonstrated on this scale. However, pre-program data indicated a breakdown in intelligibility when the speaker shifted to novel and spontaneous conversation, with an intelligibility score of 58%. Primary differences noticed between the scripted and spontaneous samples at baseline were a faster rate of speech and a great number of verbal fillers such as "um" and "uh" on less structured spontaneous tasks. This individual increased to a post-program spontaneous speech intelligibility score of 94%, which could partially be contributed to clearer speech with fewer verbal fillers and a reduced speaking rate. This increase in spontaneous speech intelligibility is promising.

While no surveys were collected to determine participant rating of the program, participants were each interviewed when reviewing post-program results to determine their overall reaction to the instruction received. Each of the participants had positive remarks about the instruction and graduate student clinicians. For example, participant 7 reported to his graduate student clinician that he felt more confident when speaking and was more likely to provide more information in conversation exchanges than previously. Two of the seven, participants 1 and 3 requested to continue in a similar program. They reported that while they noticed changes, they wanted to continue for even greater improvements. Participant 1 also reported enjoyment of the atmosphere of the classes.

Positive outcomes were obtained in scripted and spontaneous speech tasks following a combined segmental and prosodic accent management instruction program. Fritz and Sikorski [22] and Behrman [24] have pursued research regarding the combined impact of prosodic and segmental training on accent management training outcomes, though Fritz and Sikorski's results do not provide data on spontaneous speech as an outcome measure. Beyond these two studies, little attention has been paid to a combined approach. Results of this study indicates that continued examination of a combined prosodic and segmental instruction approach to accent modification is warranted.

## LIMITATIONS AND FUTURE STUDIES

Although results are encouraging and warrant further examination of this program, there are several limiting factors. The small number of participants limits generalizability and results should be interpreted with caution. Improved recruitment strategies will be crucial to increase subject participation in future exploration. Additionally, lack of control for participant's native language, English proficiency, length of time in the United States, and daily use of English limits findings. Future studies should control for these variables. Further attention to this line of research must include group comparison designs [27]. For example, explicit training versus meaning-oriented training outcomes should be considered. Command of L2 syntax also contributes to speaker intelligibility. No formal evaluation of grammar was completed. The scope of this study focused on production only; however, measures of English syntax skills would serve to improve future studies. Additionally, further exploration of this accent management program should consider program intensity measure (e.g., frequency per week, length of group and individual sessions, distribution of instructional strategies).

Study limitations include that intelligibility scores were the sole outcome measure and that unfamiliar listeners did not evaluate controlled and spontaneous speech samples. Future studies should consider transcriber familiarity with spoken material, listening environment, and listener bias. All clinician transcribers were aware of the programs goals and therefore subject to bias. While transcribing clinicians were not permitted to rate their own client, there was no control over whether they transcribed a client who spoke with a familiar accent. This may have led to elevated intelligibility scores. Further, each clinician was familiar with the Rainbow Passage used for scripted speech and the short story read by the client for spontaneous speech measures. Familiarity at pre- and post-program measurements controlled for content familiarity. However, there is a risk that this process, in addition to rater awareness of which samples were pre-

and post-program recordings, contributed to elevated intelligibility scores at both pre- and post-program evaluation. While transcribing clinicians were only permitted to adjust volume once at the beginning of each recording, there was no control of the sound field, yielding potential for variability in how well the recordings were transmitted to and received by listeners.

Additional outcome measures are needed to augment the intelligibility scores. Inclusion of client perspective, varied segmental and prosodic measures, and maintenance intervals will allow researchers to better understand the impact of this combined instructional approach. In continuing this line of inquiry, researchers will fully consider the participant experience and perspective in and beyond instructional sessions. Inclusion of real world outcome data will allow researchers and practitioners to provide a more meaningful service to clients.

All graduate student clinicians participated in a 6-week training program. Future research should include measures of pre-post training outcomes and structured daily assessment of instruction to ensure the instruction is delivered at comparable levels of proficiency. While results of the combined group indicate that this program was beneficial to participant 6, researchers cannot discount the fact that other factors such as length of stay in US and greater opportunity for progress compared to other participants may contribute to this change in performance.

This program was motivated by previous research lending support to an integrated program. Results indicate that a university clinic based 14-session program targeting segmental and prosodic aspects of American English within explicit training and meaning-oriented contexts results in increased intelligibility on both scripted and spontaneous speech tasks. However, these results are tentative and must be confirmed with more controlled study.

## SUMMARY

It should be repeated that an accent is not a pathology. It is a pronunciation difference perceived to be different from the listener's speech production. Accent is a natural part of one's cultural identity. Accent modification services are not a necessity. Yet for many L2 speakers of English the ability to manage an accent and improve communicative success makes a large impact on professional and social success in the target culture. To improve communication some individuals voluntarily seek services from speech-language pathologists and ESL instructors to provide expert guidance in the modification of their accents. Provision of accent modification and management services should be conducted with utmost respect of clients' personal goals and meet the same evidence-based standards of other areas within the SLP scope of practice. Speech-language pathologists needs to be equipped with adequate skills to serve this ever-growing global population. Thus, continued inquiry into methods for modification and management of accent is important so that the most effective and efficacious accent modification instruction can be made available.

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