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**PRESENTATION/POSTER**

# TEACHING SEGMENTALS VS. SUPRASEGMENTALS: DIFFERENT EFFECTS OF EXPLICIT INSTRUCTION ON COMPREHENSIBILITY

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This investigation reports the results of a pronunciation intervention to enhance the comprehensibility of learners of English as a foreign language (EFL) at a university in Costa Rica. Three groups of EFL students received pronunciation instruction on segmentals, suprasegmentals, or a combination of both using explicit phonetic instruction and communicative tasks during 10 weeks (30-mins each week). We collected spontaneous speech samples in a pretest and a posttest, and presented them to a group of 40 native speakers of English to be rated for comprehensibility. Our results indicated that the group trained in suprasegmentals significantly improved in comprehensibility by the end of the intervention. Additionally, the group of learners who received instruction with a combination of segmentals and suprasegmentals also improved in comprehensibility at the end of the intervention—although not significantly. Finally, the group trained on segmentals did not improve in comprehensibility. Our findings suggest that an intervention on suprasegmentals seems to help learners in the development of comprehensibility in a short period of time (see Gordon & Darcy, 2016; Levis & Muller Levis, 2018), and that incorporating pronunciation little by little into the regular language classroom can help learners achieve comprehensible speech in the long run (Darcy, 2018; Derwing, Munro, & Wiebe, 1998; Sardegna, Chiang, & Ghosh, 2016; Sicola & Darcy, 2015).

## INTRODUCTION

The field of second language (L2) pronunciation teaching and research is currently experiencing renewed interest, which is evident in an increase in the number of studies in recent years (Thomson & Derwing, 2015). In spite of growing research evidence, new findings are not necessarily incorporated in L2 classrooms due to factors such as limitations in teacher training (Baker, 2014; Foote, Holtby & Derwing, 2011; Huensch, 2018; Murphy, 2014), or the lack of interest in pedagogical interventions on the part of researchers (Derwing & Munro, 2015). Nevertheless, more collaboration between researchers and teachers is crucial for implementation of research-based classroom practices that could help L2 learners enhance their pronunciation (Derwing & Munro, 2005, 2015; Levis, 2016). In this study, we present the results of a classroom pronunciation intervention using an experimental treatment anchored in research evidence that aimed at improving the comprehensibility of a group of English-as-a-foreign-language (EFL) learners in Costa Rica. The following literature review presents the theoretical background that motivated our study.

## LITERATURE REVIEW

Recent meta-analyses that investigated the value of pronunciation instruction (e.g., Lee, Jang, &

Plonsky, 2015; Saito, 2012) have confirmed its effectiveness to enhance intelligible (i.e., actually understandable) and comprehensible (i.e., easy to understand) L2 speech (see Derwing & Munro, 2009). Effectiveness of instruction is indexed through improvement in phonetic accuracy (accent change), or through speech that is rated as more comprehensible (see Thomson & Derwing, 2015). Additionally, research has demonstrated that pronunciation instruction can be effective not only in beginner learners (see Zielinski & Yates, 2014), but also in L2 learners who have spoken the language for a long time in different settings and whose pronunciation presents entrenched characteristics (e.g., Derwing, Munro, & Wiebe, 1997; Derwing, Munro, Foote, Waugh, & Fleming, 2014).

Importantly, the research scope of most pronunciation studies carried out in recent years has been consistent. For example, in their meta-analysis on the efficacy of pronunciation instruction, Lee et al. (2015) found that the majority of pronunciation studies administered in recent years have focused on the development of segmentals (e.g., Baker & Trofimovich, 2006; Kissling, 2013; Saito, 2013a, 2013b), whereas fewer studies have investigated the development of suprasegmentals (Derwing, Rossiter, Munro, & Thomson, 2004; Hahn, 2004; Saito & Wu, 2014; Trofimovich & Baker, 2006), or a combination of both (Derwing, Munro, & Wiebe, 1998; Derwing & Rossiter, 2003; Saito & Saito, 2016). In a similar manner, Thomson and Derwing (2015) mentioned that most of the studies in their narrative review of 75 pronunciation studies (63%) were guided by accent or nativeness principles, as opposed to the 24% of those studies that were guided by intelligibility principles or the 13% that included a combination of both (see Levis, 2005, for a discussion of these principles).

Because the research evidence indicates that explicit pronunciation instruction can be effective and that it can help learners in the development of comprehensible speech (Thomson & Derwing, 2015), we implemented a pedagogical intervention in this study to enhance the comprehensibility of EFL learners. The methodological steps we applied are presented below.

## THE CURRENT STUDY

In this pronunciation intervention, we investigated the effects of implementing three types of explicit pronunciation instruction in three groups of EFL learners. The study was guided by two research questions:

1. Do EFL students improve their comprehensibility by the end of a 10-week pronunciation intervention in the classroom?
2. If so, which type of explicit instruction (based on segmentals, suprasegmentals, or both) leads to more comprehensible speech?

### Participants

**Speakers.** Three intact EFL classes at a small university in Costa Rica received pronunciation instruction during a period of 10 weeks for 30 minutes each week. We collected speech samples from students in these classes in a pretest and posttest in the form of video-description narratives. All the EFL learners were enrolled in a first semester of English class, and their ages ranged from 17 to 21[i]. They were undergraduate students of Computer Engineering and Tourism, and their L1

was Spanish. Each class was composed of about 25 students; however, because of logistics constraints common in this type of research (e.g., student absences during treatment), we considered only students who completed all the training sessions (see Derwing & Munro, 2015; Mackey & Gass, 2016). Therefore, a total of 22 students were included in the final analyses (i.e., 7 students from the Segmental group, 8 students from the Suprasegmental group, and 7 students from the Mixed group). Additionally, two English as a first language (L1) speakers provided speech samples to be used as a baseline. They were male and female, ages 19 and 21 respectively, both undergraduate students at an American university in the Midwest. These participants recorded the speech samples only once**.**

**Raters.** A group of 40 English L1 speakers rated the speech samples from the group of EFL learners (and the two English L1 speakers) for comprehensibility – on a scale of 1 to 9 where 1=*extremely easy to understand* and 9=*impossible to understand* (see Munro & Derwing, 1995). The raters were undergraduate students at an American university in the Midwest, between 17 and 21 years of age. All were from the same Midwestern region for the purpose of uniformity. They were all untrained raters, and did not speak any language fluently other than English. They were enrolled in a second semester Spanish language class at the time of the study.

## Treatment

This study followed a pretest-posttest design; the three groups of EFL learners received treatment based on segmentals, suprasegmentals, or a combination of both over 10 weeks for 30 minutes each week. As for the sequence of activities in the treatments, we used Celce-Murcia, Brinton, Goodwin, and Griner's (2010) communicative framework for pronunciation instruction, which included activities in a continuum from explicit phonetic instruction to communicative meaning-based activities. Table 1 below summarizes the sequence of different activities followed by each group.

Table 1

*Sequential treatment in three experimental groups*

| Instructional Stages and Techniques | Segmental Group | Suprasegmental Group | Mixed Group |
|---|---|---|---|
| Description & Analysis / Listening Discrimination | Explicit instruction and analysis of segmental features:<br>*-Oral introduction of topic*<br>*-Visual aids*<br>*-Listening discrimination tasks* | Explicit instruction and analysis of suprasegmental features:<br>*-Oral introduction of topic*<br>*-Visual aids*<br>*-Listening discrimination tasks* | Explicit instruction and analysis of segmental and suprasegmental features:<br>*-Oral introduction of topic*<br>*-Visual aids*<br>*-Listening discrimination tasks* |
| Controlled & Guided Practice | *-Minimal pair drills*<br>*-Analyses of words and phrases*<br>*-Reading short passages* | *-Drills (word and sentence stress)*<br>*-Analyses of words and phrases*<br>*-Reading short passages* | *-Minimal pair drills*<br>*-Drills (contrastive stress)*<br>*-Analyses of words and phrases*<br>*-Reading short passages* |
| Communicative Practice | Meaning-oriented activities<br>*-Task-based communicative activities* | Meaning-oriented activities<br>*-Task-based communicative activities* | Meaning-oriented activities<br>*-Task-based communicative activities* |

As for the selection of content, the Segmental group received instruction on vowels [i, ɪ, ɛ, æ, ʌ, ɑ, u, ʊ] and consonants [p, t, k, b, d, ɡ], which were selected based on functional load criteria—that is, segments with a high functional load when they occur in different minimal pairs (Brown, 1991; Munro & Derwing, 2006). The Suprasegmental group, in contrast, received instruction on prosodic aspects of English such as word and sentence stress, rhythm, intonation as well as aspects like linking, contractions, and vowel reduction. Finally, the Mixed group received instruction on both segmentals and suprasegmentals similar to the activities designed for the other groups.

## Pretest and posttest

We collected speech samples from the learners in the form of a pretest (at Time 1 or at the beginning of their course) and a posttest (at Time 2, or during week 11 after treatment). The participants recorded descriptions of two short video cartoons found on the internet (*Simon's Cat*, 2009, 2010) at Times 1 and 2 (a different video at each time; both were about 2:30 minutes long). We asked the participants to watch each video completely and to pay attention to the story depicted. After that, we asked them to describe what happened in each video giving as many details as possible. The recordings were made individually on a personal computer (13-inch Macbook Pro, with a Logitech USB Headset H390) in a quiet room at a library, and we used the speech software Praat (Boersma & Weenink, 2016, version 6.0.15) to record each participant. There was a specific action in the plot of each video that was described by all the participants, and we selected 20 seconds of the description of those actions to be presented to the group of English as an L1

raters for uniformity purposes. As noted above, two English L1 speakers recorded descriptions of both videos only once.

### Rating task

The rating task was conducted in a computer lab using high-quality headphones. Before completing the task, the raters watched the two video cartoons described by the speakers to avoid biased ratings with the first speech samples (see Derwing et al., 2004). They also completed a short warm-up in which they rated five speech samples (produced by speakers from another study) to get familiar with the task. We presented the speech samples from all the speakers to the group of 40 raters using the survey software Qualtrics. They heard the randomized samples from the pretest and posttest, which they rated for comprehensibility using a Likert scale from 1 to 9, where 1=*extremely easy to understand* and 9=*impossible to understand* (Munro & Derwing, 1995). The results of the task are presented below.

## DATA ANALYSIS AND RESULTS

We carried out a linear-mixed effects model using Comprehensibility Ratings as dependent variable, declaring Group (Segmental, Suprasegmental, or Mixed) and Time (pretest & posttest) as fixed effects, and Speaker and Rater as random effects. There was a significant effect of Group ($F(3, 14) = 8.55$, $p = 0.0018$), which confirmed that the EFL learners and the L1-English speakers were judged very differently by the raters. As expected, the L1 baseline speakers were the most comprehensible speaker group. Table 2 below shows the mean scores obtained by each group during the pretest and posttest.

Table 2

*Mean comprehensibility scores of L2-learner groups and native speakers*

| **Group** | ***M* Time 1** | **SD** | ***M* Time 2** | **SD** |
|---|---|---|---|---|
| Segmental | 3.92 | 1.73 | 4.35 | 1.87 |
| Suprasegmental | 4.58 | 1.92 | 4.21 | 1.93 |
| Mixed | 4.18 | 1.83 | 4.05 | 1.67 |
| Native Speaker | 1.21 | 0.91 | 1.18 | 0.65 |

In order to isolate results from the L2 learners, we carried out subsequent analyses with the three groups of EFL learners excluding the L1 speakers. Even without the baseline group, we found a significant *Group* by *Time* Interaction ($F(2, 1222) = 8.77$, $p < 0.001$), in which the Suprasegmental group significantly improved in comprehensibility from time 1 to time 2. The Mixed group also became more comprehensible from time 1 to time 2, but this increase in comprehensibility was

not significant. Finally, the Segmental group also presented a significant difference from time 1 to time 2, but this difference resulted in a decrease in comprehensibility. Table 3 presents the main differences from pretest to posttest in each one of the groups. Figure 1 summarizes the results in comprehensibility in both the pretest and posttest in the three EFL groups.

Table 3

*Mean difference from pretest to posttest in three L2-learner groups*

| **Group** | **Mean diff. T1 to T2** | **S.E.** | ***t*-value** | ***p* value** |
|---|---|---|---|---|
| Segmental | 0.4350 | 0.1443 | 3.02 | 0.0026 |
| Suprasegmental | -0.3708 | 0.1317 | -2.82 | 0.0049 |
| Mixed | -0.1300 | 0.1443 | -0.90 | 0.3677 |

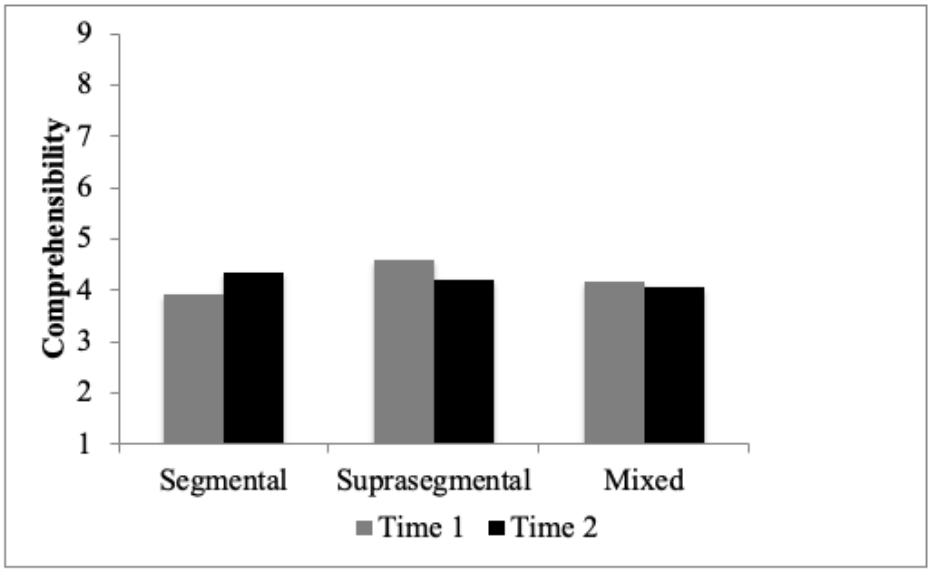


*Figure 1*. Comprehensibility ratings across time in three learner groups.

## DISCUSSION AND CONCLUSIONS

Although this study presented common difficulties that are typical of this type of research (e.g., students with different proficiency levels, attrition, see Derwing & Munro, 2015), its modest results provide more support for the importance of explicit phonetic instruction in pronunciation teaching and learning. Our first research question asked, *Do EFL students improve their comprehensibility as a result of a 10-week pronunciation classroom intervention?* According to the results obtained, there were different types of improvement in both the Suprasegmental and

Mixed groups. Whereas the Suprasegmental group became significantly more comprehensible by the end of the experimental treatment, the improvement in comprehensibility shown by the Mixed group in the posttest was not significant. While this improvement in the Mixed group is certainly positive, it is possible that a treatment of 10 weeks of only 30 minutes a week is simply not enough to develop substantially more comprehensible L2 speech based on instruction of both segmentals and suprasegmentals at the same time in an EFL context. It is necessary to stress that whereas the Mixed and Suprasegmental groups improved their comprehensibility, the Segmental group was rated as less comprehensible by the end of treatment. It is important to remember that the three groups followed the same sequence of activities during treatment, but with different phonetic content. Thus, it is possible that the learners in the Segmental group mainly focused on producing segments accurately in spontaneous speech without using other aspects that are generally known to make speech more comprehensible (e.g., discourse organization, syntactic, lexical, and phonological accuracy). Derwing et al. (1998) reported a similar finding in their study in which a group trained on segmentals did not improve comprehensibility in spontaneous speech, possibly because of allocation of attentional resources. One of the possible interpretations Derwing and colleagues cite for their finding is that, because of their experimental training, the learners in their segmental group focused their attention on the production of segments. This in turn did not leave learners any attentional resources to use in a more demanding task like a spontaneous picture description (e.g., using grammatically-correct sentences, lexical retrieval, discourse organization, phonological accuracy). In a similar manner, it is possible that our learners in the segmental group also focused their attention on accuracy of segmental production, at the detriment of other aspects that are also necessary to develop comprehensibility in spontaneous speech (e.g., fluency, lexical and sentence stress, rhythm, appropriate pauses, intonation; see Isaacs & Trofimovich, 2012).

In the second research question, we asked, *Which type of explicit instruction (based on segmentals, suprasegmentals, or both) leads to more comprehensible speech?* Our results suggest that a treatment based on suprasegmentals seems most effective in a short period of time, at least in this particular context. The significance of this result is twofold: first, our results align with previous studies that demonstrated that a treatment on suprasegmentals during a short period of time can enhance comprehensibility (Gordon, Darcy, & Ewert, 2013; Gordon & Darcy, 2016; Levis & Muller Levis, 2018); secondly, these results again confirm the prominent role of suprasegmentals in the perception of comprehensible speech (Anderson-Hsieh, et al., 1992; Field, 2005, 2008; Hahn, 2004; Isaacs & Trofimovich, 2012; Kang, Rubin, & Pickering, 2010). This does not mean that there should not be any focus on segmentals in pronunciation instruction. In fact, it is widely recognized in the pronunciation field that segmentals are important for intelligibility at the lexical level and that any pronunciation intervention should consider a combination or "cocktail" of both segments and prosody (see Derwing et al., 1998; Zielinski, 2006). Additionally, previous studies have demonstrated that learners' knowledge of segmentals can help disentangle confusion in the perception and production of minimal pairs (Derwing, Munro, & Wiebe, 1997, 1998). However, the results obtained here also confirm that training L2 learners in suprasegmentals can help them sound more natural and comprehensible in spite of the presence of a foreign accent (Derwing & Munro, 2015).

As a final note, these results confirm that embedding pronunciation instruction in speaking classes—even for short periods of time in each lesson—can help learners achieve comprehensible speech in the long run (Darcy, 2018; Derwing, Munro, & Wiebe, 1998; Sardegna, Chiang, &

Ghosh, 2016; Sicola & Darcy, 2015). These results also suggest once again that pronunciation instruction is likely to be effective when it makes use of a communicative component where learners practice the language in a continuum of activities that range from explicit instruction and controlled activities to more meaning-based communicative tasks (Celce-Murcia et al., 2010; Levis & Grant, 2003; Trofimovich & Gatbonton, 2006; Zielinski & Yates, 2014). Therefore the combination of explicit phonetic instruction with controlled and meaning-based activities could give learners the opportunity to put into practice—in both controlled tasks and spontaneous speech—the phonetic forms that they learn under more controlled conditions, in order to help them develop comprehensible and intelligible L2 speech.

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[i] There was no specific parameter to determine the proficiency level of these students. Although there were different proficiency levels among the students due to previous instruction in secondary schools, most college students who come from public secondary schools in Costa Rica present a very basic or false-beginner proficiency level when they take their first EFL class at the university level.