

Pronunciation: Intelligibility, Frequency Considerations, and Instruction

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Abstract

This paper offers an enumeration of specific phonological factors known to interfere with intelligible perception and production of English. We also present findings from two studies that we carried out in order to elicit the segmental characteristics of, first, a substantial amount of the lexical material required in oral interaction and of, second, a lexical set thought to have core properties and to be the basis for subsequent vocabulary learning. Last, a survey of pronunciation methods and techniques is provided. It is hoped that this collection of information and insights will help address gaps in teacher education, on the one hand, and in classroom instruction, on the other.

Introduction

If one considers that instructors are not being formally trained to teach pronunciation (Breitkreutz, Derwing, and Rossiter, 2002; Jenkins, 2000; MacDonald, 2002), that students receive little pronunciation training because the subject is marginalized in most language programs (Fraser, 2002; Setter and Jenkins, 2005), and that there is “little published research on pronunciation teaching and very little reliance on the research that does exist” (Derwing and Munro, 2005, p. 383), one cannot but reach the conclusion that we are failing to properly emphasize the importance of pronunciation and the role it plays in language use as well as in language learning. This paper seeks to contribute to the resolution of this situation by enumerating and discussing specific phonological factors that are thought to interfere with production and perception of English. We also present findings from segmental analyses of, first, a substantial amount of the lexical material required in oral interaction and of, second, a lexical set thought to have core properties and to be the basis for subsequent vocabulary learning. The discussion then provides a survey of methods and techniques in pronunciation teaching otherwise dispersed throughout the literature.

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Some general observations on the role of pronunciation in language use

Simply put, pronunciation is the vehicle of verbal communication. Productively, pronunciation skills serve to encode the acoustic realization of a message and, perceptively, they serve to decode the acoustic signal that carries a message. Moreover, interlocutors bring in expectations and exercise accommodation that conveys communicative content and intent (modulation of speech rate, extent of enunciation, adjustments in rhythm, placement of emphasis, etc), these activities being manifested in and reflected by pronunciation (Jenkins, 2000). Thus, successful verbal communication is a convergent and dynamic process where shared rules are exercised at the phonological level (as well as other linguistic levels).

The role of pronunciation is highlighted when one assesses pronunciation in light of the effects of divergent, partial, or absence of skill and knowledge. While a complex collection of linguistic abilities is required to participate in verbal communication, it would be an impossible charge to attempt to argue that pronunciation is not one of these skills or that its contribution is not critical. Insufficient pronunciation skills or the use of a divergent phonological system can impede spoken interaction and, in some cases, lead to breakdown of communication (Celce-Murcia et al., 1996; Dalton and Seidlhofer, 1994). Furthermore, the requirements of pronunciation in communication necessitate adequate perceptive and productive abilities, encompassing the capacity to parse and process speech as listener together with the capacity to construct and produce speech as speaker (Setter and Jenkins, 2005). The influence of productive and receptive skills (and knowledge) is such that a speaker with good pronunciation skills can overcome deficits at other linguistic levels, such as grammar and vocabulary while, conversely, a speaker who is highly proficient in those same areas may struggle to produce and understand if his or her pronunciation skills are weak (Fraser, 2000).

Furthermore, given the social nature of language use, the manner in which we pronounce determines, to a large extent, how we are perceived, understood, and judged by others. “Pronunciation, it seems, is a more sensitive area of language than the other linguistic levels because of the way in which it encroaches on identity and elicits strong attitudes” (Setter and Jenkins, 2005, p. 6). Unsurprisingly, there is evidence on how accent can, for example, influence employment opportunities and consequently how pronunciation can have a disproportionate effect on our quality of life (Fraser, 2002; Lippi-Green, 1997). It is of relevance to mention that this kind of misguided judgment is not reserved to those speakers with foreign accents and equally includes prejudice towards speakers of different native varieties (Lippi-Green, 1997). The problem is therefore global (not limited to our concerns) and there is evidence that, when the intelligibility of accented speech is called into question, the source of the problem can be attributed to psychological blockage on the part of linguistically unsophisticated listeners (Gass

and Varonis, 1984; Kachru and Nelson, 2006; Matsuura, Chiba, and Fujieda, 1999; Matsuura, 2007).

Derwing (2003) reports on research that explores the relationship between prejudice and accented speech (regardless of skill level), reaching the conclusion that it is to be expected that language learners will “encounter deleterious reactions to their accents”. The case to be made is that, fluent or not, and whatever the causes, “reduced intelligibility [...] may serve as a basis for negative social evaluation and discrimination” (Derwing and Munro, 2005, p. 385). There is no escaping the observation made by Setter and Jenkins: “Pronunciation plays a major role in our personal and social lives” (2005, p. 1).

Some general observations on the role of pronunciation in language learning

Pronunciation has an impact on the process of language learning itself, in the best of cases facilitating it and, in the worst of cases deterring it (Celce-Murcia et al., 1996; Fraser, 2000; Guiora, 1972; Horwitz et al., 1991; Young, 1986). Briefly, inability to decipher the speech stream reduces the amount of input that learners can employ to develop skills and knowledge in, for example, vocabulary and grammar. In the EFL context where input is severely restricted, perhaps limited to the classroom, poor exploitation of the input reduces L2 exposure even further. Similarly, the inability to produce intelligible speech can compromise output, an aspect of learning that serves many purposes outside of pronunciation and that includes an amalgamation of learners’ hypotheses and trials seeking confirmation in feedback (Swain, 1993, 1995). Thus, pronunciation-based obstructions in communication reduce the quantity and quality of interaction and opportunities for validation. Good pronunciation skills, on the other hand, make it possible to optimize those learning opportunities afforded by input as well as exploit those interactions where feedback and validation may take place. It is with these considerations in mind that we can appreciate Fraser’s (2000) comment: “Learners with good pronunciation can [...] increase their general language skills at a greater rate than those with poor pronunciation”.

Additionally, pronunciation has an impact on affective factors that, in turn, bear on learning. Guiora (1972, 1983) describes language ego as central to the learning process and the skill of pronunciation as essential in the psychological maelstrom associated with the adoption of new linguistic systems (Horwitz et al., 1991). Because of the role that pronunciation plays in language use as the observable realization of speech, it is not uncommon for learners to, rightly or wrongly, base self-assessments on pronunciation skills alone. Based on interviews with 100 subjects, Derwing (2003) comments that “over half the respondents felt that pronunciation played a role in their communication problems, yet when asked what their pronunciation difficulties were, many were unable to answer”.

A collection of affective factors are at play: self-esteem, inhibition, language ego, extroversion, empathy, and stress (Brown, 2000; Guiora et al., 1972; Schumann, 1999). Thus, the delivery of a learner - even one that has achieved a high degree of fluency - can be rendered halted, broken, even incomprehensible, by feelings of insecurity, negative self-perception, or self-doubt originating in pronunciation deficits. As mentioned, this situation reduces the effectiveness of output as a means to test hypotheses and obtain feedback. Similarly, a negative psychological disposition can impede the processing of input, effectively acting as a barrier (Krashen, 1985). It is important to mention that, conversely, good pronunciation skills may lead to a positive psychological disposition (i.e. feelings of confidence, self-assurance, or lack of inhibition) which can supersede shortcomings in other areas, consequently, maximizing input and output while enabling a wider range of learning opportunities.

Specific phonological features that interfere with production and perception

Phonological features can be conceptually grouped into the segmental and the prosodic. Segmental features involve the phonetic inventory and its distributive properties, that is, contrastive segments and how these combine to form clusters and syllables. Prosodic features involve temporal and dynamic aspects of speech such as stress, rhythm, and intonation. We will now briefly discuss specific prosodic and segmental features that are thought to impact intelligibility and interpretation in perception and production.

Lexical stress refers to the relative prominence of syllables within a word, common convention distinguishing strongly stressed syllables from lightly stressed and unstressed syllables (Celce-Murcia et al., 1996). Cutler (1984) observes that intelligibility is compromised when syllables are stressed in unexpected/unconventional fashion, that is, when strong syllables are weakened and weak syllables strengthened. Field (2005) provides evidence that left and right shifts in stress placement have unequal bearing on intelligibility (the latter being more detrimental), particularly when the shift does not involve changes in vowel quality. It is of interest to note that research findings suggest intelligibility is compromised irrespective of listeners' linguistic backgrounds. Field posits that one possible explanation for why the shifting of lexical stress is universally problematic could be attributed to the manner in which words are represented in the mind together with the role that stressed syllables may play in their retrieval.

Nuclear stress has been identified by Jenkins (2000) as likely "to present the greatest suprasegmental threat to intelligibility" (p. 45). In English, speakers use pitch and pause to divide the speech stream into thought groups, that is, sequences of words that form "a semantically and grammatically coherent segment of discourse" (Celce-Murcia et al., 1996, p. 175), generally coinciding with syntactic boundaries. Nuclear stress is used to highlight the prominent element

within the group by use of loudness, length, and pitch (Celce-Murcia et al., 1996; Gilbert, 2006). Jenkins (2000) posits that, because English lacks indicative morphology and has a rigid word order, nuclear stress is an essential cue for topic marking as well as for the salience of the thought group itself: “Failure to divide the speech stream into these units can result in grammatical ambiguity or misinterpretation” (p. 45).

Global prosodic features (intonation, stress, rhythm) are considered to manage interaction and organize content since they serve to signal discourse functions such as turn taking, alignment, perspective, thematic cohesion, among other things; additionally, global prosodic features serve to distinguish new from old information (Celce-Murcia et al., 1996). The inability to appropriately recognize prosodic cues may render an interlocutor unaware of vital information as when, for example, the use of intonation is an indication “to quit talking, to respond in a particular fashion, or to pay particular attention to a piece of highlighted information” (Celce-Murcia et al., 1996, p. 200). Therefore, interpretation of meaning and message can be compromised by the use of divergent global prosodic cues as “the intonational message often [takes] precedence over the lexical” (Jenkins, 2000, p. 44).

At the segmental level, the first stumbling block is the phonetic inventory itself. Inaccurate perception or production of the phonemes that make up words is possibly one of the most damaging factors interfering with the identification of words and, therefore, intelligibility (Jenkins, 2000; Kashiwagi et al., 2006; Tench, 2001). The matter is further complicated since a single phoneme can be the unique phonological characteristic that distinguishes two words (minimal pairs) and, consequently, divergent or partial knowledge of the phonetic inventory can lead to confusing certain words with others (Catford, 1987; Munro and Derwing, 2006; Suenobu, 1992). Although developmental factors are also at play (Major, 1986, 2001), difficulty in the acquisition of perceptual and productive skills in regards to phonetic segments is mainly attributed to the influence of the L1 in the learning process (Best, 1995; Flege, 2003; Major, 1987; McAllister et al., 1999; Michaels, 1974). Briefly, perceptual categorization and productive articulation of L1 segments are considered to be powerful influences at the cognitive and physiological levels in the discussion of the acquisition of L2 categories and their corresponding memory mappings between articulatory gestures and sounds (Guenther, 2003; Kuhl, 2000).

While divergent perception and production of both vowels and consonants can equally contribute to shortcomings in intelligibility, there is research that indicates that vowels in particular are often the cause of misidentification or incomprehension of words (Jenkins, 2000; Kashiwagi et al., 2006). Unlike consonants, vowels lack concrete articulatory targets, making them more ambiguous and far harder to pronounce with accuracy. Moreover, vowels undergo changes in duration due to the effect of final (lennis vs. fortis) consonants and these variations

in length are known to compromise intelligibility, possibly more so than changes in quality (Jenkins, 2000). Moreover, English morphology relies on consonants for grammatical functions of frequent occurrence, inflection being the most prominent. Gilbert (2006) identifies plural and tense markers as “essential for both intelligibility and listening comprehension” (p. 11). In this situation, the meaning of a given word may not be problematic, yet its grammatical function and relationship to surrounding words might be obscured, thereby, compromising interpretation.

Clustering and sequencing of segments are not random. Rather, distributive properties are governed by what are referred to as phonotactic constraints, a system of rules that varies from language to language (Dalton and Seidlhofer, 1994). The English system of consonant clusters is complex and thought to have a bearing on intelligibility (Celce-Murcia et al., 1996; Suenobu, 1992). Before affixation, up to three consonants can occur in sequence following specific constraints, that is, not all consonants combine with each other and, when they do combine, they do not do so in just any order (Kreidler, 1997, 2004). Impediments to intelligibility in production stem from phonological processes such as insertion of vowels to break up consonant clusters, omission of consonants in order to simplify clusters, as well as the substitution or approximation of certain consonants in a cluster with others that are easier to produce (Gilner and Morales, 2000; Jenkins, 2000). Comprehension difficulties lie in, first, the simplification of clusters where the saliency (sonority, stridency, nasality, etc) of a consonant may obscure adjacent ones or where the use of epenthetic vowels breaks up the cluster (Altenberg, 2005; Dupoux et al., 1999; Tarone, 1987) and in, second, the substitution of certain consonants according to L1 or L1-L2 composite categories (McAllister et al., 1999; Flege, 2003).

Phonotactic constraints go beyond consonant clusters and also govern the structure of syllables. Given the challenges to intelligibility at the segmental and cluster level, and given that different languages construct syllables differently, the production and perception of syllables (as sequences of segments with specific structural constraints) must also be taken into consideration (Altenberg, 2005; Broselow, 1984, 1993; Dupoux et al., 1999; Kabak, 2003; Nakashima, 2006). In Japanese, for example, syllables do not allow consonants in coda position and consonant clusters in any position in the syllable. Spanish syllables, on the other hand, allow bisegmental consonant clusters (and only bisegmental clusters) in onset position and single consonants in coda position. Thus, learners of English from these L1 backgrounds are often challenged by English syllables that violate the phonotactics of their respective languages, the intelligibility of their speech being compromised by common words such as *build*, *spring*, or *strength* (Celce-Murcia et al., 1996).

This section has served to identify and briefly elaborate on specific elements of pronunciation that are thought to bear on intelligibility and interpretation. In view of the premise of this paper

regarding the importance of pronunciation teaching, this terse discussion should be indicative of the complexity underlying speech production and comprehension and, consequently, the many difficulties that learners face as well as the necessity for adequate classroom instruction.

Segmental analyses of core vocabulary in speech and learning

Before addressing teaching approaches, we present findings from two of our studies that illustrate the importance of pronunciation from a different perspective, namely, the segmental requirements of language use in speech as well as in instruction.

The first study involved the transcription and analysis of 1,000 frequent words used in spoken discourse. The vocabulary content of the approximately 10,000,000 token spoken subcorpus of the British National Corpus (BNC) was used to obtain a representative sample of frequent words employed in fluent speech (from data provided by Kilgarriff, 1995). After removing non-words (e.g., *er*, *mhm*, *erm*) and proper nouns (e.g., *Michelle*, *Yorkshire*), we extracted 1,000 frequent words that collectively account for 74.94% of the tokens of the subcorpus (specifically, 7,768,956 of the 10,365,623 running words in the subcorpus). Considering that Kilgarriff (1995) reports that the subcorpus contains 134,558 types (unique words), the 1,000 words selected for this study are significantly more frequent than the remaining 133,558 types in the subcorpus as these could only account for a maximum of 25% of the running words. That is, if distributions were even, each word in our 1,000 list would appear 7,768 times while each word in the 133,558 remaining would appear approximately 20 times.

Note that the frequency distributions observed in the spoken subcorpus of the BNC are not limited to large corpora, or any particular variety, and that texts of any size (even down to a few hundred words) from a wide range of sources also exhibit similar metrics (Gilner and Morales, 2008a). Consequently, it can be safely said that these 1,000 words are ubiquitous, accounting for three out of every four words heard and said in English.

In order to carry out the segmental analyses, we transcribed the 1,000 word list in broad citation form, including syllable boundaries as well as primary and secondary stress information. The dialect model used was North American English (NAE) and the phonetic representation adopted was derived from articulatory descriptions provided in Celce-Murcia et al. (1996), Yava (2006), Kreidler (2004), and O'Grady et al. (1993). As syllabification is an important aspect of this study, the implementation of a coherent approach was a priority, particularly in light of inconsistencies regarding the attribution of intervocalic consonants (Kreidler, 1997, 2004; Ladefoged, 2001). Consequently, the Maximum Onset Principle (MOP) was strictly adhered to, that is, intervocalic consonants were affiliated with the onset of a subsequent syllable rather than the coda of a previous one (Anderson, 1982; Pulgram, 1970; Yavas, 2006) as long as the result

was a properly formed syllable according to the phonotactic rules outlined by Kreidler (1997, 2004). Note that, in all cases, syllables were transcribed including a vowel nucleus and, thus, syllabic consonants were transcribed as schwa + consonant for this study.

We developed custom software to carry out the following analyses. Findings show that these 1,000 words are made out of 1,540 vowels and 2,866 consonants. Instances of all vowel and consonant segments were found with the exception of /ʒ/. Furthermore, approximately half of the 1,000 words form minimal pairs (MPs). We found 882 MPs formed by words in the list, 245 vowel MPs and 637 consonant MPs. There being a possible total of 91 vowel and 252 consonant contrasts in the language, the 1,000 word list yielded 69 of the vowel contrasts (75.82%) and 177 of the consonant contrasts (70.23%).

Of particular interest are those contrasts that differentiate segments by means of only one or two features as agreement of features may be taken to be a measure of learning difficulty due to perceptual similarity, difficulty of disambiguating articulation, etc. (Tarone, 1987; Celce-Murcia et al., 1996). Following O'Grady et al. (1993), the consonant features taken into consideration were: consonantal, sonorant, voice, labial, round, coronal, anterior, strident, high, back, nasal, continuant, lateral, and delayed release; the vowel features were: sonorant, vocalic, voiced, round, high, back, low, tense, continuant. These considerations identified 30 out of the 91 possible vowel contrasts as sharing all but one or two features (11 single, 19 double) and 45 out of the 252 possible consonant contrasts (18 single, 27 double). In regards to the 1,000 words under investigation, 25 of these 30 vowel contrasts and 32 of these 45 consonant contrasts were present. Looking at consonant clusters and syllables, a tabulation of the model dialect of this study yielded a total of 45 types of onset clusters, 130 types of coda clusters, and 20 possible syllable shapes. In the 1,000 word list, we found 29 types of onset clusters, 64 types of coda clusters, and 14 syllable shapes.

As can be seen by these results, the pronunciation requirements of 75% of the words used in speech are extensive. Nearly the entire inventory is at work while 501 of these words form 882 minimal pairs, showing the degree to which frequent words are contrastive. That many very frequent words are minimally different from other very frequent words is exemplified by the abundance of segmental contrasts found. A large amount of the vowel contrasts (75.82%) and of the consonant contrasts (70.23%) are necessary to distinguish words, numbers that increase when we consider contrasts differentiated by only one or two features (83.33% for vowels and 71.11% for consonants). At the consonant cluster level, the range of bisegmental (70) and trisegmental (23) sequences in both onset (64.44%) and coda (49.23%) position is significant as is the variety of syllable shapes (70.00%). This being but a partial analysis of the segmental requirements of spoken interaction, the difficulties faced by learners are more than understandable. On the one

hand, some aspects of the language are central to its processing and production. On the other hand, these aspects occur with such frequency that their use is unavoidable in communication and, if absent or divergent, conspire to make communication an error-prone activity.

The second study involved the analysis of the pronunciation requirements in the classroom, that is, what a learner has to contend with in order to manage and exploit the language that has been selected for instruction and learning. This is crucial to pronunciation teaching since, at this point in time, the requirements of pronunciation are subordinated to decisions regarding selection and sequencing of content in other areas of language learning (i.e. vocabulary, grammar). We take heed of the observations made by Nation and McAllister (2007) regarding selection and adopt, for this study, the General Service List (West, 1953) since, according to Nation (1990, 2004), this list of words constitutes a core vocabulary and can serve as the basis for subsequent vocabulary learning. Briefly, research findings show that the General Service List (GSL) offers a wide range of utility (Nation and Waring, 1997; Sutarsyah et al., 1994; Hirsh and Nation, 1992), provides token coverage similar to recently compiled word lists (Hirsh and Nation, 1992; Nation and Hwang, 1995; Nation, 2004; Sutarsyah et al., 1994), and, of particular relevance to this study, offers better token coverage of spoken (~90%) than of written (~80%) discourse (Nation, 2004).

The 2,284 GSL headwords and their corresponding 3,856 inflected forms (6,140 words in total) were transcribed and analyzed following the same procedures as those employed with the 1,000 most frequent words in the 10-million-token subcorpus of the BNC previously discussed. Table 1 presents metrics for the model dialect as well as results for speech (1,000 most frequent words) and core vocabulary (GSL).

Table 1. Comparison of segmental characteristics across lists.

	NAE	1,000 frequent words		6,140 GSL words	
Vowel segments (including diphthongs)	15	15	100.00%	15	100.00%
Consonant segments	24	23	95.83%	24	100.00%
Words that form MPs (against all in list)		501	50.10%	4,031	65.65%
Vowel contrasts	91	69	75.82%	86	94.50%
Consonant contrasts	252	177	70.23%	233	92.46%
Vowel contrasts (single + double features)	30	25	83.33%	30	100.00%
Consonant contrasts (single + double features)	45	32	71.11%	37	82.22%
Onset consonant clusters types	45	29	64.44%	39	86.66%
Coda consonant clusters types	130	64	49.23%	119	91.53%
Syllable shapes (e.g., CV, CVCC, etc.)	20	14	70.00%	19	95.00%

The first observation is that, together, the words that learners face in learning are more demanding in segmental terms than those words that frequently occur in speech. Moreover, these demands nearly coincide with those of the language as a whole. The second observation is that all vowel and consonant segments are present in the GSL and that, as with the 1,000 most frequent words, the GSL is a highly contrastive set in which 65.55% of the words form 7,517 MPs. The third observation follows from the second; almost every vowel and consonant contrast in the language plays a role in the GSL and serves to distinguish GSL words from each other. There are 1,167 words that form 5 or more MPs, the maximal case being the word ‘white’ that forms 20 MPs (22 counting homophones). The possibility of confusion in perception and production is, therefore, great and goes a long way to explain breakdowns in communication (note that these 6,140 words account for 79.69% of the tokens of the spoken subcorpus of the BNC). The fourth observation is that the phonotactics of the language are comprehensively demonstrated by the GSL words and are required for the learning, exploitation, and appropriate use of this core vocabulary.

In sum, our two studies show that the use of English requires extensive knowledge of the segmental characteristics of the language, be that the inventory or its distributive properties. This is a first and important consideration since there is no a priori rationale that forces a particular set of words to exhibit any given characteristic of the language and, certainly, not all of them. The collective choices made by fluent speakers (as represented by the BNC corpus) as well as the core vocabulary compiled by researchers in the field, however, bring together a highly contrastive lexical set, prone to collision and confusion, while making use of the range of phonetic features exhibited by the language. A second and intriguing consideration is that, from an instructional

point of view, the core vocabulary offers practitioners a concentrated version of the language in regards to the phonetic aspects investigated (Gilner and Morales, 2008b).

A survey of pronunciation methods and techniques

While pronunciation may not enjoy the same kind of attention that other skills receive, applicable and effective instructional material abounds in the literature. The following survey identifies techniques that address specific issues and is arranged to roughly parallel the discussion presented earlier regarding features that interfere with production and perception. Closing this section, comprehensive methods are briefly touched upon. The goal is to provide the interested teacher with a starting point from which to explore the options available.

Students can be made aware of the role of lexical stress in a variety of ways. Celce-Murcia et al. (1996) suggest that jokes and poetry can be used to model and practice appropriate stress placement. Similarly, attentive listening and discovery activities that encourage learners to deduce patterns from input are thought to be beneficial (Dalton and Seidlhofer, 1994). Attentive listening might involve audio cues paired with a reading in which the target feature is made visually obvious (e.g., via transcription, underlining, highlighting, etc.) to the learner; alternatively, learners can be charged with identifying lexical stress based on a listening task. Discovery activities might involve the presentation of a collection of language samples that illustrate lexical stress and subsequent observation, hypothesizing, and discussion (pair, group, class) of the input. Phrase expansion can also be used to raise awareness of the import of lexical stress; tasks involve building up complete utterances from a limited number of words (Dalton and Seidlhofer, 1994).

The identification of the role and use of nuclear stress in thought grouping can be reinforced through audio and visual cues. Gilbert (2006) recommends listening discrimination activities and provides examples of exercises that make use of sentences (lexical and mathematical) in which pause placement alters interpretation. This kind of activity could easily be expanded to include productive practice by having students themselves provide the audio cues and, further expanded, by having the rest of the class transcribe what is heard rather than choose from written prompts (as originally suggested by Gilbert). Readings of short stories containing dialogues can also provide practice and exposure to the informative function of thought grouping. Celce-Murcia et al. (1996) suggest that chants and speed delivery activities can serve as opportunities for practicing alternating stress within thought groups.

Beer (2005/6) provides an example of contextualized picture discrimination tasks designed to help students notice how thought groups can disambiguate meaning and, therefore, aid comprehension. Students listen to a story and choose the matching sequence of pictures. A

variation of this activity can involve students creating their own picture sequences which can then serve as the basis for subsequent activities. This kind of task lends itself to both receptive and productive exposure and practice.

Cauldwell (2005) presents a discourse-based approach to listening comprehension. Speech samples are presented through the use of tone units (thought groups) in order to facilitate awareness of how speakers use pitch, timing, and pause to organize their message and communicate meaning. Cauldwell (2002) explores misconceptions regarding timing in language and the inaccuracy of the stress-timed versus syllable-timed language distinction. It is posited that timing is a tool which speakers modify depending on participants, context, and management techniques. Cauldwell goes on to propose that learners will benefit from being made aware that speech rhythms result from “decisions made by speakers concerning the lexical choices and how to package them into tone-units” (p. 16).

Tench (2005/6) explains that any monologue or dialogue can be used to show how intonation “is relevant in all spoken language” (p. 51), supporting the observation with an overview of intonation in terms of its informational function (thought groups/intonation units, nuclear stress, prominence, contrastive pitch movements), its syntactic function (disambiguation of meaning), its textual function (organization of extended stretches of discourse, i.e. phonological paragraphs), and its genre-specific function (prosodic composition of different genres, news reports sound different than storytelling).

A selected text can serve as the basis for imitation, humming, ear training, transformation, matching, discussion, noticing, prediction, recording, and self-assessment activities which target the discourse functions of intonation (Dalton and Seidlhofer, 1994; Tench, 2005/6). Aufderhaar (2004) conducted a study into discourse intonation-based pronunciation training. Findings showed that listening activities which exposed learners to intact and filtered samples (prosodic and phonemic information on separate tracks) of audio literature appeared to have a positive influence on production as measured by both subjective (raters’ judgments) and objective (vowel duration) means. Consequently, Aufderhaar recommends exposure to and analysis of authentic audio literature such as radio shows, interviews, and poetry readings.

Ramírez Verdugo (2005/6) suggests that combining a discourse intonation model and computer technology can make the “subconscious and elusive” (p. 29) nature of intonation easier to grasp. It is posited that comparison, analysis, and interpretation of pitch graphs of controlled and spontaneous speech provides concrete visual cues that highlight the role of intonation in speech. Chun (1987) also suggests that pitch graphs can support the recognition and production of intonation contours and prominent syllables, as long as both students and teachers have been trained in interpreting the graphic display. Free recording and editing software applications make

it possible for interested practitioners to educate themselves on how or if this kind of training is appropriate for their circumstances.

Reading aloud is another means of targeting suprasegmental features by providing exposure and practice with stress placement, linking, and other phonological processes that naturally occur in speech and that contribute to the overall rhythm of the language (Gabrielatos, 2002; Gibson, 2008; Wrembel, 2001). Potential benefits of using this technique include reinforcing sound-spelling associations, providing a means of oral proofreading, and encouraging autonomous learning as a task students engage in on their own (Gabrielatos, 2002). Selected scenes from popular movies or television shows are potentially engaging and entertaining material from which to base reading aloud as well as drama reenactment activities. Wrembel (2001) observes that the “emotional involvement and context provided by the dramatic situation foster communicative competence and lead to increased empathy and self-esteem” (p. 64) as well as increased expressiveness and fluency. This observation is supported by findings presented in Gibson (2008) which indicate that careful and sensitive implementation of reading aloud can have a positive influence on learning.

There are many well-established techniques used to train students in segmental aspects of the sound system. The phonemic contrasts can be addressed through explicit instruction or contextualized within interaction (Celce-Murcia et al., 1996). Some learners may benefit from specific and direct instruction in the articulation of sounds and how L2 articulation differs from that of the L1 (Gilner and Morales, 2000). Cruz-Ferreira and Abraham (2006) propose that vocal tract self-awareness is necessary in order to produce vowels or consonants which have no visible cues while Jenner (1992) focuses on the role of articulatory settings in production.

There are also a range of less explicit activities that can be deployed. Using the vowel continuum, for example, is another way of making students aware of similarities and differences between the articulation of the L1 and L2 vowels (Gilner and Morales, 2000). The influence of slight shifts in jaw, lips, and tongue can be demonstrated/described/discovered/felt by gliding from one extreme of the oral cavity (high-front) to the other (high-back). Additionally, a schematic drawing of the vowel space can provide visual cues that pinpoint where in the continuum different vowels fall. Bilingual minimal pairs (orthographical similar forms) can also be used to raise awareness of the difference in articulation between two languages (Bowen and Marks, 1992). Minimal contrast sentence-answer pairs can be used to illustrate the communicative value of contrasts (Gilbert, 1993). Target segments can be reinforced through phonemic scrabble, which uses phonetic symbols rather than letters, as proposed in Taylor (1993). Hancock (2006) suggests that we not underestimate the potential of language play (alliteration, tongue twisters, jokes, witticisms); the idea is that long-established activities that

target segmental discrimination can be made into meaningful, entertaining, and challenging material as well as practice opportunities.

Catford (1987, 2001) proposes that silent articulation and introspection can lead to an awareness of articulatory movements and gestures that might be obscured when attention is focused on processing the sound itself. Catford and Pisoni (1970) found that direct and explicit training in the articulation of novel sounds resulted in significantly better performance when compared to auditory training alone. Scores - on both receptive and productive discrimination tests - indicate that subjects who had received explanations regarding the articulation of L2 sounds and had engaged in silent practice outperformed those who had received ear-training and had done mimicry drills.

When it comes to consonant clusters, learners can benefit from seeing how clusters are realized in actual speech and how phonological processes affect production. Dialogues that present contextualized use (and consequent modification as in, for example, simplification and reduction) can help students distinguish which kinds of modifications do and do not interfere with intelligibility. Listening discrimination tasks can provide a means of highlighting differences in interpretation due to presence/absence of grammatical morphemes (Gilbert, 2006). Celce-Murcia et al. (1996) also indicate that activities involving monthly schedules provide a means of practicing consonant clusters in ordinal numbers. Additionally, students can be encouraged to create word lists that illustrate a particular cluster and then to share these with the class, either directly or indirectly, through short presentations.

While most of the literature on pronunciation instruction comes in the form of self-contained activities and techniques that can supplement instruction in other areas, there are also comprehensive approaches that focus on oral proficiency as a function of pronunciation skills. In the program presented by Morley (1992), for example, pronunciation is viewed as a process of modifying pre-existing sound patterns toward increased speech intelligibility. Theories of speech production and comprehension support the idea that L2 production is dependent upon establishing corresponding categories in the brain (Best, 1995; Flege, 2003; Guenther, 2003; Kuhl, 2000; McAllister et al., 1999). It is posited that the acoustic space must be resegmented and restructured in order to accommodate novel input and the association of particular articulatory gestures with the production of L2 sounds and sequences of sounds.

Within Morley's (1992) program, training takes the form of controlled, rehearsed, and extemporaneous production activities that provide for the cognitive, psychological, and performative needs of learners. The method centers on the needs and capabilities of adult learners, addressing these in a manner that fosters intellectual stimulation as well as positive and active participation. The intention is to raise learner awareness and to create a learning

environment in which learners establish their own goals and learn to monitor their performance, thereby becoming consciously aware of their progress.

The role of the teacher is to guide, monitor, support, and encourage learners to set and reach high standards. Learners progress from controlled production of selected features (individual segments → stress → rhythm → intonation) to rehearsed speech practice (oral readings and pre-planned talks). The studied features are put to communicative use in partially planned and unplanned talks, presentations, and discussions as well as in question and answer sessions. In the final stage, skills and knowledge become internalized as the learned patterns are integrated into spontaneous production (extemporaneous speech practice). Throughout training, learners record themselves and assess their production, focusing on particular aspects consistent with each practice mode. Given the availability of audio software, recordings have become a viable means of providing practice, self-evaluation, and feedback (Aufderhaar, 2004; Celce-Murcia et al., 1996; Walker, 2005).

Fraser's (1999) Critical Listening approach also makes use of student recordings; their use is believed to be most suitable since it externalizes speech and provides a means of subsequent analysis and feedback. Critical Listening focuses on observation and analysis of interactions. This approach highlights the fact that there is a difference between what people think they say, what they actually produce, and how it is perceived by others. Therefore, prominence is placed on the instructor's insight into where learners are coming from in order to lead them to new understanding (Fraser, 1999).

The instructor's job is to help the learner understand how listeners use speaker cues to interpret the message being communicated and the factors that lead to successful as well as unsuccessful exchanges. In her discussion, Fraser speaks of recordings of real-life interactions in which learners participate. These recordings are analyzed in the classroom where effective and ineffective strategies are identified and addressed with the assistance of the instructor and classmates. Fraser (2006) suggests that methods that work well "are based on the insight that pronunciation is a cognitive skill... [and] involves both 'knowing' things (subconsciously) about language, and being able to do things physically with the body" (p. 4). It is relevant to note that analysis of third party interactions and student group recordings can also serve as input for discussion and reflection.

Another approach is offered by Kjellin (1999). Accent Addition is a prosody-based method inspired by research in the fields of perception physiology and first language acquisition. Kjellin proposes that persistent training in prosody perception combined with exercises that stimulate retraining of the speech articulators is a mode of acquisition similar to that of a first language but adapted to the adult's cognitive and physical assets and constraints. Fossilization is viewed in this

framework as preventable since, Kjellin posits, it arises from lack of instruction rather than any kind of biological, affective, or psychological constraint.

Training follows a strictly ordered three-step process. The first step involves learners singularly identifying target phonemes and phonological structures. This stage very much depends on the aid of the instructor, who points out the salient features and then provides multiple repetitions of a sample phrase in order to exemplify the realizations (and its intra-speaker variation) of the target feature. Next is the automatizing phase, which entails the learners producing multiple chorus repetitions of the sample phrase and receiving immediate feedback, encouragement, and reassurance from the instructor. It is suggested that this kind of drilling helps train the speech organs and allows the learner to discover the category boundaries that yield permissible phonetic variability in target language speech. The last step in the process is that of transferring the newly acquired skills to novel utterances. Kjellin contends that it may take place instantaneously if learners are motivated and teachers are enthusiastic but is not specific in reference to instructional implementations. Of note, this kind of training lends itself well to the kind of lexical phrases that are often targets in commercial course books. It is feasible to consider spending part of the class engaging students in the first two stages as a way of reinforcing a chosen feature that is presented in the text.

Lastly, Neufeld (1987) describes a delayed production approach to pronunciation training. In this case, learners are discouraged from vocalizing the L2 until appropriate acoustic imprints have been acquired. It is posited that inaccurate imprints will result in pronunciation divergences while accurate imprints will yield target-like productions. Since the imprint of the pronunciation of a language (its acoustic image) is established through experience and exposure to the language, students are discouraged from producing too early as their own speech can upset the imprinting process.

The proposed method involves attentive listening to short phrases (1-8 syllables in length) composed of frequently occurring lexical items, audiovisual presentation of common intonation contours and rhythmic patterns, and auditory discrimination of phonemic contrasts. Of note, this training regime was part of a controlled experiment designed to test the hypothesis “that adults retain the potential for acquiring native like proficiency in a new language” (Neufeld, 1987, p. 323). The 18-hour treatment (15 hours of non-productive training, followed by 3 hours of productive training) yielded strikingly positive results. Subjects were in fact able to achieve native-like production (as based on native-speaker judgments) after very limited contact with the language.

Conclusion

Pronunciation skills are essential in language use and learning. An enumeration of specific factors that interfere with the intelligibility of perception and production, together with their frequency of occurrence in speech and instruction, reveals a serious obstacle to learning and performance that requires a degree of attention to pronunciation that it currently does not receive. Failure to instruct teachers - and, consequently, students - implies deficits in pronunciation skills that affect the development of other linguistic areas. In other words, early pronunciation instruction may ease the burden of learning as well as facilitate the labor of teachers. We are in a position to address the issue because, first, we know where specific problem areas lie and, second, we have at our disposal a range of methods and activities adequate to the task.

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