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Thinking Allowed

Research into practice: How research appears in pronunciation teaching materials

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Research into pronunciation has often disregarded its potential to inform pedagogy. This is due partly to the historical development of pronunciation teaching and research, but its effect is that there is often a mismatch between research and teaching. This paper looks at four areas in which the (mis)match is imperfect but in which a greater recognition of research can lead to better teaching materials (high variability phonetic training, intonation, information structure, and setting priorities). Furthermore, two areas in which teaching materials are desperate for research to be carried out (connected speech and the primacy of suprasegmentals) will be discussed.

1. Introduction

Research into teaching/learning pronunciation in a second language (L2) is on the upswing in applied linguistics and language teaching. General conferences for applied linguistics and Teaching English to Speakers of Other languages (TESOL) have increasing numbers of well-attended sessions on L2 pronunciation. Dedicated international L2 pronunciation conferences (e.g., English Pronunciation: Issues and Practices; Pronunciation in Second Language Learning and Teaching; Accents; New Sounds) are now held regularly in North America and Europe. Research is published in a wide variety of journals and encompasses topics as varied as sociolinguistics and speech recognition. In a survey for the new *Journal of Second Language Pronunciation*, from 2010 to 2012 there were at least 55 articles on L2 pronunciation from 31 different journals most commonly cited in applied linguistics/TESOL. This upswing is relatively new. Deng et al. (2009) reported that from 1999 to 2008, 14 high-profile journals averaged about 3% of articles on topics related to second language pronunciation.

This disparity indicates that significant changes are happening in the field of L2 pronunciation, changes that Murphy & Baker's (2015) history of modern L2 pronunciation teaching identifies as waves of innovation in the history of L2 pronunciation. Their wave analogy is imperfect, admittedly. Each wave adds to, rather than replaces, the features of earlier waves, and all the characteristics of each wave can now be observed in how pronunciation is currently taught and researched. In Murphy & Baker's first

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intuitive-imitative wave (starting in the 1850s), pronunciation was taught through repetition and intuition, with the teaching methods of Charles Berlitz and others leading the way. The second wave (starting in the 1880s), an analytic-scientific one, emphasized descriptive accuracy and deeply influenced the teaching of foreign languages. This wave was marked by the founding of the International Phonetic Association, the central role of phoneticians in describing how languages are pronounced, and a subsequent central role for pronunciation in foreign language teaching. This wave lasted nearly 90 years and included such methodological innovations as audiolingualism and situational language teaching, before a third wave emerged in the 1980s. This pedagogy wave was marked by the large-scale distribution and development of classroom textbooks and professional materials, making use of the techniques of the first two waves, but adding new (not always successful) communicative approaches. The fourth wave (starting in the mid-1990s), the emergence of empirical research, began to provide empirical support for pedagogy while raising new questions about topics such as ultimate attainment and social contexts of learning.

The most important issue in Murphy & Baker's description, at least for this article, is the timing of the waves. Pronunciation teaching existed long before researchers began to examine it, both in the scientific approach to teaching pronunciation associated with their second wave, and in the empirical research of the 1990s following the widespread appearance of textbooks and teacher resources. By the time of the empirical research wave, many practices were entrenched and part of tradition; research into L2 pronunciation was necessarily deeply influenced by questions important to teaching. The modern rebirth of pronunciation pedagogy in the third wave also pre-dated a robust approach to research, but as yet, increasingly coherent research agendas typically have not led to teaching changes. As a result, few areas of pronunciation research are well represented in teaching materials although research is better represented for some areas than others. Indeed, Murphy & Baker predict a fifth wave in which empirical research findings will be infused into materials development, teacher training, and classroom practice.

This paper will examine six areas in which L2 pronunciation research findings are UNEVENLY CONNECTED to pedagogy. Two of these, the use of High Variability Phonetic Training (HVPT) and research on intonation, are where current research is not well reflected in teaching materials. Two others are WELL REPRESENTED in teaching materials: pronunciation's role in signaling information structure, and prioritizing instructional targets. EXTENSIVELY INCLUDED are connected speech processes and the presumed primacy of suprasegmentals, but the paucity of supporting research raises questions about their pedagogical ubiquity.

Choosing six topics to include was challenging. The selection discussed here are among those that have the greatest pedagogical presence and potential, but they only scratch the surface of applied research into pronunciation, that is, the teaching of phonetic features of speech for both production and reception. Every interaction in which pronunciation plays a role in success or failure involves both listeners and speakers, usually with each person playing both roles. Not only must speakers pronounce in an understandable way, they must also be able to negotiate the pronunciation of the other(s). Intelligibility may mean different things depending on whether one is a speaker or listener, but pronunciation is always critical (Levis 2005, 2006).

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2. Pronunciation research that is underrepresented in teaching materials

In this section, I discuss two areas where current research is underrepresented in teaching materials: the use of high-variability input in perceptual training, and research into intonation. The first of these is a newer area of research that has great potential to change the way materials are constructed, while the second is a mainstay of teaching materials whose presentation is largely divorced from current research. The teaching materials I refer to are mostly top-selling North American materials (as they are the ones I know best, but I also refer to British materials with which I am familiar).

2.1 HVPT

Perceptual training is a central element of teaching pronunciation since learners rarely produce new sounds they cannot hear or distinguish from other perceptually similar sounds. Some research has demonstrated that improvements in perception lead to improvements in production (Bradlow et al. 1997; Lambacher et al. 2005). What kind of perceptual training is most likely to be effective in understanding natural speech? Increasingly, research suggests that input that fully represents the range of variation in normal speech leads to more robust acquisition of an L2 sound system. This is commonly known today as HVPT. Thomson (2012) reviews the use of HVPT, showing that input with high variability (multiple speakers and many tokens in varied phonetic environments) leads to greater perceptual improvement, especially if it is combined with immediate information about success (i.e., feedback). This contrasts with traditional training. When first learning to teach pronunciation, I was taught that I should always use the clearest exemplars possible. For example, vowels would be taught in stressed contexts before voiced consonants (*raid*, *lose*) or in open syllables (*see*, *go*) as these provided learners with a clear model. This seems to be a mistaken approach, given how L2 learners build reliable models of L2 speech sounds. The use of HVPT training means that we now have a greater range of options for developing perceptual skills.

Lively, Logan & Pisoni (1993) and Lively et al. (1994) began testing HVPT began in the early 1990s with studies of /l/ and /r/ for Japanese learners of English. Japanese learners of English find the /l/ and /r/ contrast particularly difficult. These sounds have been widely studied because of their ability to demonstrate how new categories can be constructed and new sounds acquired. Results of early HVPT training were very promising. In a later study, Wang & Munro (2004) examined computer learning of three sets of vowels (some modified) in North American English and found varied but demonstrable increases in perception, a finding confirmed by Nishi & Kewley-Port (2007, 2008). Iverson and colleagues (Iverson & Evans 2007, 2009; Iverson, Hazan & Bannister 2005) examined the effect of L1 in HVPT training, showing that the effectiveness of HVPT can be different depending on learners' L1s. The cause and effect relationship of L1 and training is not yet clear.

Thomson (2011, 2012) created HVPT training materials for Mandarin first language (L1) learners of English targeting ten Canadian vowels. Using a controlled experimental methodology, the training materials were designed for instructional use using

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computer-assisted pronunciation teaching outside of the classroom context. The HVPT materials included multiple speakers (ten male and ten female). In addition, some of the materials were acoustically manipulated, doubling the duration of the vowel nuclei to make them more noticeable. Previous research has shown that learners' vowel categorization after the first year in an L2 environment is minimal in naturalistic development (Munro & Derwing 2008), so Thomson's use of HVPT to create perceptual improvement in English vowel categorization would, if successful, provide hope for pronunciation improvement.

Thomson used examples of each of the 20 speakers pronouncing the ten English vowels in open syllables with bilabial onsets ([pV] and [bV]), and found that (1) most learners increased their ability to identify the English vowels, (2) training on the bilabial CV (Consonant-Vowel) context transferred to some other environments, (3) improvement persisted on a delayed posttest, and (4) the learners became more confident in their ability to identify the vowels. The increased duration in some stimuli, however, did not help them identify the vowel categories, suggesting that this feature alone was not able to increase improvement.

These findings show that HVPT training has great promise in pronunciation training, even on features that seem particularly resistant to instruction. Thomson (2011) says that 'when the stimuli are highly variable, and when the training program promotes the orientations of learners' attention toward the phonetic properties of the stimuli, further enhancement of the stimuli is unnecessary' and 'even less than ideal training items will provide the sort of input that can promote learning' (p. 759). In an extension of his research, Thomson created a training app for mobile devices and computers, *English accent coach*, using the same principles.[1] In a language learning and teaching environment in which pronunciation training materials will increasingly become digital and embedded in apps and e-books,[2] this is a promising look toward the future.

It is important to carry out other studies using 'multiple talkers': for example, talkers all from the same dialect area, of both genders, of varied voice qualities, of different dialects, with native and nonnative models. We do not yet know what possibilities exist for multiple talkers, but decisions are likely to differ based on the goals of the L2 teaching context. Currently published pronunciation teaching materials do not typically use multiple talkers, although materials with multiple talkers are now widely available on the internet. In an analysis of commercial pronunciation software carried out by students in my graduate class, most programs had only one speaker for all activities. This should, and can, change.

2.2 Intonation

Since the late 1970s, theoretical and laboratory research into intonation has exploded with new findings, not only for English but for many other languages (e.g., Hirst & Di Cristo 1998). Almost none of this research has found its way into teaching materials, despite excellent resource books connecting theory and practice (Wichmann 2000; Wennerstrom 2001; Chun 2002). While some materials have been written as direct applications of models of intonation,

[1] www.englishaccentcoach.com.
[2] Paul Heacock, Cambridge University Press, personal communication, 10 April 13.

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such as Brazil's (1997) discourse intonation (e.g., Bradford 1988; Cauldwell 2002; Gorsuch et al. 2012), intonation in most textbooks does not reflect current research. Indeed, rather than addressing intonation's role in conversational management and turn-taking (Chun 2002), its ability to send nuances of pragmatic meaning (e.g., Thompson 1995), and its role in marking topic shifts through paratones (i.e., extra high tones that mark topic shifts in spoken discourse, see Wichmann 2000; Levis & Pickering 2004), textbooks still overemphasize intonation as a reflection of grammatical form and as having a special role in expressing emotional meaning, a belief that has long been questioned (e.g., Crystal 1969).

What do we know about intonation from research? First, intonation functions in multiple domains within speech (Pierrehumbert 1980; Ladd 2008; Levis & Wichmann 2015). Intonation in English is meaningful at the ends of phrases and sentences, at topic changes, and is especially meaningful in emphasizing words and syllables. Second, intonational meaning is primarily semantic and pragmatic, not grammatical (Levis & Wichmann 2015). Any utterance with any type of grammar can be spoken with multiple intonation patterns, each of which will change the meaning of the utterance. Some of these meaning differences may be subtle, and some very obvious, but the basic effect of changes in intonation is not mispronunciation (as in saying *sink* for *think*) but a difference in how speaker intent is communicated (e.g., the question *Are you going?* spoken with rising intonation may sound more polite while the same question with falling intonation may sound more businesslike, see Thompson 1995 for more on this distinction).

Third, intonation is both holistic and atomistic. Intonation functions across the whole of a phrase, but is made up of smaller meaningful elements (e.g., described as discrete pitch levels for Americans, but preheads, heads, tonics, and tails in British treatments), facts long advocated by both American (Pike 1945) and British (O'Connor & Arnold 1963) authors and now reflected in the work of laboratory phonologists (e.g., Ladd 2008) who use the autosegmental approach pioneered by Pierrehumbert (1980) for intonational description and meaning (e.g., Pierrehumbert & Hirschberg 1990). In this newer approach, intonation is described in terms of High and Low tones in three domains: pitch accents (emphasizing particular syllables), phrase accents (at the end of an intermediate or utterance-final phrase) and boundary tones (at an utterance-final phrase boundary). Thus, a falling intonation contour would be described as HLL (an H pitch accent followed by an L phrase accent and boundary tone). In this description we see both the smaller meaningful elements and the overall contour. Fourth, intonation is interactional in conversation (Szczepek Reed 2012) in such areas as turn-taking and regulating conversational interaction. Fifth, intonation has many more patterns than rising and falling, including falling-rising, and rising-falling levels (e.g., Brazil 1997), as well as de-accented (low pitch, non-highlighted) syllables following nuclear stress. In discourse, de-accenting can be a signal of given information being present (Wichmann 2000: 74–75).

Although intonation is taught in almost every pronunciation book and in many general English as a second language (ESL) textbooks (Derwing, Diepenbroek & Foote 2012), few current research findings are found in teaching materials, which remain focused on intonation's role vis à vis grammar (Levis 1997). In British materials, the discourse intonation approach of David Brazil is influential in applied circles but it has little overlap with theoretical and laboratory research into intonation. Historically, theory and practice were closely related

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in both North America and the UK (e.g., Pike 1945; O'Connor & Arnold 1963). As a result, intonation teaching was descriptively and pedagogically richer in the past than today. Currently, intonation teaching tends to be limited to rising and falling patterns at the ends of sentences, with a direct connection to grammatical form. This limited account does not reflect normal spoken discourse, in which intonation continues a spoken turn or ends it, signals idea boundaries, achieves cohesion, and builds rapport (Levis & Wichmann 2015). Bridging the divide between research and practice (as in Wennerstrom 2001 or Chun 2002) will be essential to transform intonation teaching.

3. Pronunciation research that is well represented in teaching materials

Two areas of research fall into the category of being adequately represented in teaching materials: the representation of information structure, and prioritizing pronunciation targets. Even though these areas have a long way to go before they can be seen as excellent examples of research findings in practice, they reflect research findings more than many other topics.

3.1 Pronunciation's role in expressing information structure

While current research on intonation (in the sense of the role of pitch movement at the ends of phrases/sentences) is not well represented in teaching materials, intonation's role (through nuclear stress) in marking discourse information structure (Halliday 1967) and in signaling contrasts is widely found in pronunciation materials. By 'nuclear stress' I refer to the emphasis given to a syllable (the nucleus) in a phrase, e.g., *Where are you* FROM*? The United* STATES. This emphasis is signaled by a combination of pitch change, increased duration, change in loudness, and clear articulation of segmentals. This feature of speech has been called tonic, sentence stress, prominence, primary phrase stress, focus, etc. The term 'nuclear stress,' though old, seems to be reliably understood by pronunciation researchers around the world, which is not true of the other terms. Appropriate use of nuclear stress is essential in both greater understanding of discourse and in how listeners evaluate speakers (Hahn 2004). It also is particularly salient to listeners (Pennington & Ellis 2000). Nuclear stress also calls attention to categorical contrasts (e.g., 'THAT'S a fabulous sportscar' as opposed to whatever other sportscars were being discussed), another element of information structure that appears to be very learnable (Pennington & Ellis 2000; Muller Levis & Levis 2012). Finally, nuclear stress offers a manageable and realistic connection to discourse in pronunciation teaching.

The role of nuclear stress in marking contrasts and information structure is consistently represented in textbooks. Examples of North American books presenting contrasts and/or given/new information are Reed & Michaud (2005), Henrichsen et al. (1999), Miller (2000), Grant (2010), and Gilbert (2012). An alternative view of information structure is found in books following the work of David Brazil, in which the nuclear tone (i.e., the nuclear syllable and its subsequent pitch movement) marks given and new information, with rising tones signaling given information and falling tones new information. Level tones, on the other hand, mark routine information and make no spoken commitment to the information

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structure of an utterance. Bradford (1988) says that 'speakers use falling tones in parts of utterances which contain information they think is new for their hearers – when they are telling them something they don't already know' (p. 12) and that they use [rising] 'tones in parts of utterances which contain ideas they think their hearers already know about or have experience of' (p. 13). Contrasts in this approach to intonation are not tied to the given/new distinction but are a function of emphatic stress or 'key' in Brazil's (1997) terminology.

Advocates of both approaches agree that information structure is essential in teaching materials. Each approach, however, suffers from not utilizing current research literature on contrast and given/new information. Most of this work is conducted by theoretical and laboratory phonologists (e.g., Baumann & Grice 2006), and by those working in pragmatics (Riesco-Bernier & Romero-Trillo 2008). It is clear that the placement of nuclear stress cannot be fully accounted for by either model of information structure, and that speakers have enormous freedom in what they call attention to or emphasize (Bolinger 1972). Materials developers should consult these studies to develop more complete approaches to given/new information (Levis 2014).

3.2 Setting instructional priorities

Most pronunciation teaching materials assume that we must set priorities. This assumption is based on simple reality (we never have enough time) but also on research into intelligibility and comprehensibility (Munro & Derwing 1995), functional load (Catford 1987; Brown 1988; Munro & Derwing 2006), and the Lingua Franca Core (LFC) (Jenkins 2000). Setting priorities reflects a change from a focus on native-like attainment to intelligibility (Levis 2005). Intelligibility for language teaching is not a recent concept (Abercrombie 1949) but it finally took hold with the rise of the World Englishes movement and the desire to quantify mutual intelligibility among outer and expanding circle speakers (Smith & Nelson 1985). Munro & Derwing (1995), whose paradigm is now dominant in applied research on intelligibility and comprehensibility, use similar terms ('intelligibility', 'comprehensibility', 'accentedness') with slightly different meanings in a research approach based on the work of James Flege.

Although some textbooks continue to be comprehensive in their inclusion of all pronunciation targets (e.g., Orion 1997), evidence of prioritizing is evident in the relative placement of pronunciation targets in books, and in what is not included. Grant (2001) makes an explicit appeal to intelligibility, saying her book 'is designed to improve the speech intelligibility of high intermediate to advanced learners' (p. vi). Gilbert (2012) extends intelligibility to listening comprehension as well, while stating that her book deals with the most important topics first. Intelligibility may sometimes seem to be a buzzword (Munro 2011) rather than a strong principle in textbooks, though even the use as a buzzword suggests the currency of the idea among practitioners. For example, while Miller (2000) talks about the importance of suprasegmentals for intelligibility, she talks more about changing accents (a traditional term), giving a teacher the sense that there are priorities, but that reducing accents is the path to greater intelligibility.

A second prioritizing principle is that of FUNCTIONAL LOAD. Functional load is a measure of how much work two phonemes do to distinguish words in a language (Brown 1988). For

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example, in English, /l/ and /r/ have many minimal pairs, both at the beginning and ends of words, while /l/ and /j/ do not; thus /l/ – /r/ is a high functional load contrast. Munro & Derwing (2006) provide evidence of the validity of functional load for prioritizing instruction. Books that provide limited materials for working on segmentals show inconsistent evidence of appealing to functional load. Grant (2010), for example, prefers to work only on troublesome sounds, but these sounds contain both high and low functional load contrasts (e.g., /θ/ vs. /s, t, f/ and /u/ vs. /ʊ/). Prioritizing is evident, given that only five vowel and five consonant lessons are provided, but the prioritizing in this case includes not only research findings but teacher desires for certain contrasts (personal communication, June 2014).

A third prioritizing principle is Jenkins' (2000) LFC in which only those targets likely to improve intelligibility for NNS-NNS (nonnative speaker) communication should be taught. Walker (2010) provides a pedagogical application of Jenkins's recommendations, while Deterding (2013) has recently provided more data for NNS-NNS communication. Jenkins's LFC (based on a limited data-set) is largely segmental in nature, with some sounds left out, especially /θ/, /ð/, and [ɬ]. The only suprasegmental to be included in the LFC is nuclear stress. Jenkins' work, though ostensibly meant only for NNS-NNS communication, was invaluable in making many researchers and teachers address the issue of prioritization (e.g., Dauer 2005), and its influence in making priorities a centerpiece of pronunciation discussion is unrivaled. Her recommendations were taken seriously by those operating in English as a second language (ESL) and English as a foreign language (EFL) contexts, perhaps because they understood that it is impossible to leave out native speakers (NSs) as communicative partners. They recognized that NNS-NNS communication could not exclude these other contexts, and that the LFC's recommendations spoke also to them.

Although much work remains to be done on priorities, there is explicit recognition in most materials that not all possible targets merit equal attention in classrooms. Some are not worth the effort of either teachers or learners. However, research has yet to establish definitively what will make the biggest difference to intelligibility and comprehensibility.

4. Pronunciation research that is overrepresented in teaching materials

Again, two areas of practice have been chosen to represent those topics which have a much higher pedagogical profile than is justified by the research literature: the teaching of connected speech processes, and the presumed pedagogical superiority of suprasegmentals over segmentals. In both cases, pedagogical emphasis outstrips what is justifiable based on research findings. It may be that future research will justify the emphases these practices enjoy, but we are far from that point.

4.1 Connected speech processes

Connected speech processes (CSPs) reflect the pronunciation differences of words in discourse versus their citation forms (e.g., *gonna* vs. *going to*). CSPs include linking (*one of*), deletion (*Did*

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he go?), insertion (*We are* said as *We yar*), modification (*can't you* as *can chew*), and reductions (such as the consistent reduction of vowels in function words), all of which occur alone or in combination (Alameen & Levis in 2015). During the third wave revival of pronunciation teaching in the mid-1980s, research into CSPs, especially linking, was carried out by Henrichsen (1984) and Hieke (1984, 1987). Highly salient CSPs (e.g., *gonna, wanna, whaddya*) also gained pedagogical attention from Weinstein (1982). Following this there was a paucity of research into CSPs from the 1980s to the mid-2000s, when some descriptions of CSPs (Shockey 2003; Cauldwell 2013) were published in areas typically read by applied linguists and teachers. In speech recognition publications, however, massive phonetic changes of connected speech were addressed extensively because of their effect on recognizer accuracy rates (e.g., Greenberg 1999).

CSPs in English are heavily influenced by the rhythmic timing of English syllables, especially variation in syllable length and clarity between stressed and unstressed syllables. In general, unstressed vowels and coda consonants in discourse are more prone to changes such as deletion, insertion, modification, and reduction (Greenberg 1999), while all word boundaries are prone to linking. After the 1980s, the inclusion of CSPs in textbooks became nearly universal. When widespread research into pronunciation began to be evident in the mid-1990s, CSPs were largely absent, returning with an edited volume by Brown & Kondo-Brown (2006) highlighting work by Japanese teachers and scholars. A practical handbook on teaching CSPs was recently published by Brown (2012). Another recent locus of research into CSPs is Taiwan, but this research remains little known (e.g., Lee & Kuo 2010; Lu & Kuo 2011).

CSPs are ubiquitous in published teaching materials but their importance sometimes seems overstated. 'A few of the more useful rules for blending [modification] and linking follow. These guidelines will help your comprehension as well as your pronunciation of English' (Grant 1993: 157). Although CSPs are useful for both parts of the communication process (perception and production), CSPs are typically taught as especially useful for production. Indeed, this bias toward production is true of most pronunciation materials. Older research on CSPs recognized the value of CSPs for listening comprehension (Hill & Beebe 1980; Brown & Hilferty 1986), and this focus is now evident in more recent research in which CSPs are tied to micro-listening involving bottom-up processing of speech that is critical in listening comprehension, especially in word recognition and lexical decoding. Field (2003, 2008) persuasively argues for the importance of bottom-up processing, a goal related to CSPs but seldom reflected in pronunciation materials. This raises the question of how CSPs are related to intelligibility and comprehensibility. An answer is not yet evident. Most assertions about CSPs are based on little more than teacher intuition. Prator & Robinett (1985), in an unusually ambitious treatment of sandhi (i.e., CSPs) said that 'it is not easy to draw the line between forms you should be able to use, those you need only to understand, and those you are not likely to find useful or appropriate. NSs are far from unanimous in judging such matters, and decisions must necessarily be very subjective' (p. 198). That they remain subjective three decades later is telling. What we know is made up of small clues collected over many years, like finding pieces of a puzzle that are never sufficient to give a sense of the whole picture.

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4.2 The pedagogical superiority of suprasegmentals

The reinvigoration of pronunciation teaching in the 1980s occurred for many reasons. Not only was there recognition that pronunciation would not take care of itself in communicative language teaching (CLT) (Hinofotis & Bailey 1981), there was also growing recognition that pronunciation was central in communicative success in specialized registers such as international teaching assistants' lectures (e.g., Tyler, Jefferies & Davies 1988). More important, however, was a greater emphasis on suprasegmentals for short-term changes to intelligibility. Suprasegmentals fit much better with the communicative and discourse-oriented goals of CLT because suprasegmentals are not constrained by the sound or word level. In perhaps the clearest statement of the superiority of suprasegmentals, McNerney & Mendelsohn (1987, 1992) claimed that suprasegmentals should be the priority in a short-term pronunciation class because they were far more likely to lead to noticeable improvement than teaching segmentals. How to make suprasegmentals a priority was not always clear. For example, Celce-Murcia (1987) advocated teaching pronunciation communicatively 'through tasks that focus on meaning' (p. 6), but admitted that she was unsuccessful in applying her ideas to suprasegmentals, saying 'the one glaring omission in my current approach is that I am still having problems with fully integrating stress and intonation into my teaching of English pronunciation' (p. 11).

Nonetheless, the idea that suprasegmentals were more important, more likely to lead to quick improvement, and more central for teaching was a seed that fell onto fertile ground. During the 3rd wave of the history of pronunciation (Murphy & Baker 2015), textbooks and teacher training materials began to emphasize suprasegmentals in a new way (e.g., Kenworthy 1987; Wong 1987). Although intonation had earlier received serious and extensive treatments for both American and British English (Pike 1945; O'Connor & Arnold 1963), and even during the neglected decade of the 1970s (Allen 1971), information about how to teach suprasegmentals was scarce and pronunciation teachers were hungry for information.

Unfortunately, the research establishing the superiority of suprasegmentals was, and is, scarce. Derwing, Munro & Wiebe (1998) demonstrated that a pedagogical focus on suprasegmentals led to improvements in comprehensibility in extemporaneous speech and reading tasks. While a pedagogical focus on segmentals also led to significant comprehensibility improvement in sentence reading, listeners did not perceive improvement in comprehensibility in the extemporaneous speech task 'when the nature of the linguistic task necessitated that attention be divided among multiple areas of linguistic form' (p. 406). Saito (2012), in a review of 15 studies looking at the effect of instruction on pronunciation improvement, found no discernible pattern of greater improvement for suprasegmentals, although most studies did not compare improvements of the two areas. Zielinski (2008) makes it clear that deciding whether segmentals or suprasegmentals are more important is a false choice: segmentals are dependent on suprasegmentals in English, and suprasegmentals always have segmental effects. Although few experienced researchers or teachers today draw an either/or distinction for suprasegmentals and segmentals, it is my impression that many teachers and materials developers still want to draw such distinctions.

The second problem with an uncritical focus on suprasegmentals is that, as in the case of segmentals, not all suprasegmentals appear to be equally learnable or profitable. Pennington

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& Ellis (2000), in a study of the ability of Cantonese learners of English to perceive four different stress/intonation features (juncture, tag question intonation, compound stress, and contrastive stress), found that instruction was effective only for contrastive stress. In another study, Levis (1999) argued that rising and falling intonation distinctions were much more important for incomplete sentences and declaratives than for yes-no questions with inversion, where intonational distinctions were less clearly connected to meaning. Even for features that can be predicted and seem sensitive to instruction, such as nuclear stress, not all patterns seem to be equally useful. Hahn (2002) found that while instruction on predictive patterns for nucleus placement demonstrated improvement, many patterns in delayed post-tests reverted to initial levels of performance or even got worse. Only a few prediction rules demonstrated long-term learning. For word stress, Field (2005) demonstrates that rightward misstressing on 2-syllable English words (e.g., *ofFER*) seemed to affect intelligibility more than leftward misstressing (e.g., *LAgoon*). It is clear that not all suprasegmentals are equally important.

5. Conclusion

This sampling suggests varied (mis)matches between pronunciation research and teaching materials. Although there are increasing numbers of pedagogically oriented studies, research into L2 pronunciation has often taken place without obvious connections to teaching materials, and these (which are still often a decade or more behind the times) show uneven awareness of research findings. In some cases, the mismatch comes simply from the different goals that researchers and teachers pursue. But in other cases when the interests of research and teaching overlap, there is research available for teachers and textbook writers to draw from, and there are teaching contexts in which researchers can discover questions to examine. Classroom-based studies are challenging because of the multiple variables that must be controlled in a context that often defies control. Better ways to address the issues faced by researchers would be very helpful in making connections between research and practice.

The field is changing and the interactions between teachers and researchers are more numerous than even ten years ago. Besides the many general conferences in which pronunciation-related topics are discussed, there are now conferences devoted to pronunciation, and a refereed *Journal of Second Language Pronunciation*. In addition, research on pronunciation is found in diverse professional journals, reflecting how pronunciation-related questions overlap with concerns in many other areas. There are numerous reasons for optimism in teaching, teacher training, and research into L2 pronunciation. The increased interest in questions related to L2 pronunciation suggest that interactions between research and practice can only increase, and that both areas will be richer because of it.

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