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INTELLIGIBILITY: BUZZWORD OR BUZZWORTHY?

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Intelligibility is a much-touted concept in current research on second-language pronunciation teaching and in discussions of World Englishes. Some recent commentary has even asserted that the term has become a meaningless buzzword. However, interest in this very central aspect of language communication has a long history. Over a century ago, Henry Sweet's (1900) guide to practical language study made numerous references to it, and throughout the 20th century it has been of interest not only to language teachers, but also to a wide range of researchers and practitioners in the speech and communication sciences. Intelligibility is a fundamental requirement in human interaction, while the costs of *unintelligibility* range from minor inconvenience to matters of life or death. Although a focus on intelligibility has important repercussions for language teaching, social interaction, identity, and even human rights, defining the concept and determining its underpinnings have posed major challenges for researchers. In fact, many aspects of the notion remain poorly understood. This discussion examines the origins and significance of the construct, and identifies directions for future research on intelligibility that will help to establish the most effective ways of achieving it.

THE INTELLIGIBILITY CONSTRUCT

Of all the ideas embraced by contemporary pronunciation specialists, the notion of intelligibility as a sound teaching principle seems uncontroversial. In fact, it almost enjoys the status of a hallowed pursuit. And why shouldn't it? If, by intelligibility, we mean the extent to which utterances are understandable to a speaker's audience, it is difficult to conceive of many realistic circumstances in which *any* speaker would not want it. Language teachers therefore take it as self-evident that learners want and need to develop intelligible speech patterns, a fact reflected in the growing interest in how that end can be achieved.

Given the wide consensus on these matters, it seems astonishing to see intelligibility identified as a suspicious, politically-charged concept that cannot be justified in applied linguistics. Yet Rajagopalan (2010) does just that in asserting that intelligibility is merely a buzzword (p. 465) on a par with value-laden adjectives like *beautiful*, *ugly*, and *primitive*, which, according to him, "we have long learned to regard with suspicion" (p. 465). It is possible that his assertions arise from a misunderstanding of how the term *intelligibility* is applied by those concerned with fostering effective communication skills in ESL speakers. But whatever the explanation, his claims are patently false.

First, let's consider the statement that intelligibility is a buzzword – voguish and soon to be forgotten. Outside of language pedagogy, that is certainly not true. Telephone companies, sound engineers, architects, speech-language professionals, air traffic controllers and many others have been deeply concerned with intelligibility for many decades. The result is an accumulation of

thousands of research papers in technically-oriented publications like the *Journal of the Acoustical Society of America*, many dating back to the early 20th century. If that concern had never existed, our daily lives would be much the poorer – telephones would not transmit speech optimally; school classrooms would have poor acoustics, such that children would have difficulty understanding their teachers; and patients with speech disorders would have no hope of communicating effectively with family members.

It is not known when intelligibility was first discussed in connection with language teaching. However, the term goes back at least as far as Henry Sweet's (1900) book on practical language study. Sweet saw intelligibility as a guiding principle in the teaching of pronunciation, which, for him, was foundational in L2 learning. A half-century later, Abercrombie (1949) published his well-known article, articulating for perhaps the first time the dictum that second language learners should aim for a "comfortably intelligible" pronunciation rather than for a native-like accent. Still later in the 20th century, Gimson (1962) published his popular volume on English pronunciation. Revised by Cruttenden and now in its eighth edition (Gimson, 2008), it refers extensively to intelligibility, emphasizing that learners need not sound like native speakers. Gimson goes even so far as to suggest how L2 users can be understood by substituting particular consonants for ones they are unable to produce. Meanwhile, over the past 40 years, intelligibility has taken its place in a wide range of pedagogical materials (e.g., Rogerson & Gilbert, 1990), as well as in research agendas relating to World Englishes (Smith & Bisazza, 1982; Nelson, 2008) and L2 pedagogy (Munro & Derwing, 1995; in press). Intelligibility has been an active area of discussion and study for a very long time. Nor is there any reason to believe that concern about this topic will diminish in the near future. In short, far from being a buzzword, *intelligibility* is a well-established construct with a firm foundation in empirical and pedagogical traditions.

Second, let's compare *intelligible* with the adjectives *beautiful*, *ugly*, and *primitive* – all highly subjective terms. In fact, determining the intelligibility of speech does necessitate a response from an interlocutor, and the concept is evaluative in the sense that the intelligible is preferred over the unintelligible. But the difference lies in the reason for that preference. We prefer beautiful things and disprefer ugly ones as a matter of personal choice; ultimately, not much hinges on whether our preferences are honoured. As far as I know, no one has ever died from viewing something and judging it ugly or primitive[1]. But a loss of intelligibility has at times resulted in human tragedy. Over the past several decades, the NASA aviation reporting system has documented thousands of cases of communication breakdowns between pilots and air traffic controllers, many the result of unintelligibility. In some cases, a specific phonetic ambiguity was directly tied to tragedy. Cushing (1995) provides the following example:

> ATC cleared the aircraft to descend "two four zero zero." The pilot read back the clearance as, "OK. Four zero zero." The aircraft then descended to 400 feet (122 meters) rather than what the controller had meant, which was 2,400 feet (732 meters). (p. 3)

Tragically, as a result of this stress-related misinterpretation of *two* as *to*, four crew died. Even more troubling is that, according to McMillan (1998), this specific confusion is common in

[1] Here I am excluding from consideration any of those unfortunates in Greek mythology who looked upon the grotesque head of Medusa and were turned to stone.

aviation. Given that sobering fact, I leave it to you – the next time you are in an airplane – to ponder how comparable *intelligible* is to *beautiful* or *primitive*.

In second language (L2) classrooms, we don't expect to encounter life and death situations. But the ramifications of intelligibility loss for L2 learners are very real and very serious. Here we need only consider the plight of immigrant language learners who find that people don't understand them. Apart from the personal frustration they may feel, communication difficulties can damage educational and career opportunities. They can also lead to negative social evaluation, such that others avoid interactions because conversation seems a difficult chore. And that can lead to isolation from the host community and lost opportunities to use the L2. Denying that these serious consequences exist is not simply a mistaken view; it is a reckless and irresponsible position that dismisses the communicative needs of L2 learners.

EMPIRICAL APPROACHES TO INTELLIGIBILITY

In our research program, my colleague Tracey Derwing and I have developed a tripartite perspective on the study of L2 pronunciation (Derwing & Munro, 1997, 2005; Munro & Derwing, 1995). We distinguish among *accentedness* – how different someone's speech seems (often from the listener's variety), *comprehensibility* – the listener's experience of how difficult the speech is to understand, and *intelligibility* – how much of the speech is actually understood by interlocutors. Of these, *accentedness* is the least relevant to communication because listeners quickly adjust to many divergences from their own speech patterns; many L2 speakers have strong accents but are perfectly intelligible to their interlocutors. *Intelligibility* and *comprehensibility*, however, are more closely tied to communicative success, and therefore merit careful attention. One particularly important empirical finding is that it is possible for learners to become more intelligible or comprehensible through instruction with no noticeable change in accentedness (Derwing, Munro & Wiebe, 1998). Furthermore, when aspects of an accent change, there is no guarantee that benefits in intelligibility or comprehensibility will necessarily accrue. Here I identify some approaches to studying these dimensions and offer suggestions for further work.

Focusing on phonetics

Recent empirical work often aims at identifying phonetic properties of L2 speech that reduce intelligibility and comprehensibility. This focus represents an important shift, in that much previous research addressed the quite different question of whether teaching or lab training could improve perception or production of particular speech sounds. The problem with the latter orientation is its failure to distinguish between improvement that genuinely makes a difference for communication and improvement that is less consequential or mainly cosmetic. When we recognize that pronunciation instruction cannot possibly receive unlimited attention in the classroom, it becomes clear that teachers need to set priorities. Some research provides us with useful guidance on how to do this. It is now largely uncontroversial, for instance, that certain L2 prosodic difficulties undermine intelligibility, as demonstrated by Hahn's (2004) examination of primary (nuclear) stress. In that study, listeners' processing of utterances with and without primary stress errors was compared. A different approach was used by Tajima, Port, and Dalby (1997), who improved intelligibility of recorded L2 speech by digitally manipulating rhythmic patterns. And a third technique (Derwing et al., 1998) revealed improved comprehensibility in

narratives as a result of global prosodic instruction. Thus prosodic difficulties are not only detrimental to communication; they can be overcome.

With respect to the teaching of segmentals, pronunciation specialists generally accept that some vowel and consonant distinctions deserve higher priority than others. Statistically, low functional load (FL) contrasts in English, such as /θ/ – /f/ and /ð/ – /d/, distinguish relatively few common word pairs in English, so that confusions of these segments might be predicted to have minimal communicative impact. High FL distinctions, like /l/ – /n/ and /l/ – /ɹ/, on the other hand, should be important to maintain. These predictions are theoretically-driven (Brown, 1991; Levis & Cortes, 2008) and require empirical verification. So far, limited testing (Munro and Derwing, 2006) supports the importance of FL for comprehensibility, suggesting also that high functional load substitutions have cumulative effects on listeners, whereas low FL substitutions do not.

The promising techniques described above have already yielded useful results for the L2 classroom; further work on such matters as functional load is likely to provide more detailed evidence about the phonetic sources of unintelligibility.

Broadening our view

Despite its many merits, a purely phonetic approach to intelligibility is insufficient. In the first place, some intelligibility breakdowns lack a straightforward phonetic explanation. McMillan (1998), for instance, reports another aviation accident in which an air traffic controller instructed a pilot to "Take taxiway right" (p. 44). Instead, the pilot heard, "You can backtrack if you like." Although the two sentences are segmentally and rhythmically similar, it is impossible to establish how this transformation occurred in the mind of the pilot. Moreover, we cannot derive any clear lesson from this example to prevent a comparable error in the future.

A similar problem arose in an analysis by Derwing and Munro (1997). When describing a standard picture story, a Cantonese speaker produced an utterance that has proved unintelligible on first encounter to virtually everyone who has ever heard it. To our ears, the speaker seemed to say "one man dry cuckold," and it was only after multiple hearings that we determined the intended words: "One man drive car, go…" Here grammar and pronunciation, including a high pitched monotone intonation and staccato rhythm, conspired to cause unintelligibility. The "cuckold sentence" and the aviation example illustrate how listeners' perceptual systems attempt to find meaningful units within a stream of speech that does not conform well to familiar patterns. Reliance on top-down processes may lead to mondegreens – misinterpretations because of multiple ambiguities in the speech that interact in complex ways.

It is easy to forget that the causes of unintelligibility are not restricted to the speech itself. Much daily communication takes place under non-ideal listening conditions. In fact, many immigrants work in noisy environments – in food service locations, hospitals, and factories. Like all of us, they encounter noise and distortion during telephone conversations and public address announcements at airports. Even proficient speakers may experience difficulties in such circumstances. However, for L2 learners, the problems are magnified. On the one hand, L2 listeners experience a greater loss of comprehension than native listeners in noisy and reverberant conditions (Takata & Nábelek, 1990). On the other hand, when noise is present, L2

speech sometimes undergoes a greater decrement in intelligibility to proficient listeners than does L1 speech. In Munro (1998), for instance, I added cafeteria noise to native and Mandarin-accented English utterances, and presented them to listeners (along with noise-free speech). In the noisy condition, the intelligibility of both L1 and L2 speech was compromised; however, many L2 utterances showed a much more dramatic reduction in intelligibility than did the L1 speech. The reduction also varied considerably across speakers. While some showed moderate effects, one L2 speaker was about 85% intelligible in quiet, but dropped to less than 10% in noise. Thus, some L2 speech is more noise-resistant than other speech.

Native speakers reflexively adjust intensity, pitch, and rhythmic characteristics when speaking in noise – the *Lombard Effect* (Van Summers et al., 1988). However, little is known about the effectiveness of these and other possible adjustments on foreign-accented speech. An intriguing question is whether L2 speakers can learn techniques for enhancing their speech intelligibility in noise. Currently, pronunciation instruction is typically carried out in relatively quiet classrooms or language labs. Experience with a wider range of speaking and listening conditions may turn out to be a valuable complement to regular classroom work.

The flip side of non-ideal listening conditions is non-optimal speaking techniques, another concern that has little to do with phonetics. It encompasses such matters as poor vocal projection, excessive glottal fry (very low-pitched speech of weak intensity), covering one's mouth while speaking, ineffective pausing, and a host of other behaviors. Of course, these habits can be detrimental for all speakers; however, when an L2 accent is simultaneously present, it may be mistakenly identified as the chief source of unintelligibility. Such *accent scapegoating* may account for some of the negative judgments of International Teaching Assistants (ITAs) that have been reported for a number of years. In such cases, the solution may have little to do with accent; it may lie in teaching ITAs better classroom speaking skills, heightening their awareness of cultural expectations, and encouraging them to monitor their audience for comprehension.

Attending to the listener

Recent research examining listener factors in intelligibility serves as a valuable reminder of the two-way nature of oral interaction (Kennedy & Trofimovich; Zielinski, 2008): successful communication depends on the abilities and efforts of both speaker and listener. Listeners with certain experience, background, and perhaps aptitude may be more successful than others at comprehending L2 speech. For example, familiarity with a particular L2 accent may aid in comprehension of speakers with that accent (Gass & Varonis, 1984). Also, listeners from a particular L1 background may have an advantage in understanding English L2 speakers from a shared background. Although evidence supporting both predications exists, the size of the effects has been small and inconsistent (Major, Fitzmaurice, Bunta, & Balasumbramanian, 2002; Munro, Derwing, & Morton, 2006). A possible reason is insufficient linguistic information available in the speech. The "cuckold sentence" mentioned earlier was no better understood by listeners who had the same L1 accent as the speaker than by anyone else. Perhaps the speech lacked the phonetic and grammatical characteristics that any listener would need in order to understand it readily. If so, there is no reason why a listener from a shared L1 background would have any advantage.

While the effect of experience on listeners appears to be small, the similarities in responses to L2 speech between listeners are remarkable – even when native and non-native listeners are compared. For example, Derwing and Munro (under review) compared comprehensibility ratings from native English listeners and a group of high proficiency non-native listeners from mixed L1 backgrounds. The correlation between the groups' mean scores (Pearson *r*) was .94, indicating that the two groups strongly agreed on which speech samples were hard to understand and which were easy. While further work on the effects of experience and L1 background is still needed, researchers should consider exploring other listener factors that may prove more important.

One potentially influential variable is age. Burda, Scherz, Hageman, and Edwards (2003) have used our comprehensibility measure to evaluate perception by geriatric listeners with age-typical hearing acuity. In general older listeners have greater difficulty than younger listeners at understanding an accent other than their own. While the effect may be partly due to hearing loss, central processes in speech perception deteriorate with age. As a result, geriatric listeners have a harder time processing speech in general, and a novel accent may become particularly challenging.

The role of aging in speech perception deserves attention in immigrant-receiving countries like Canada. First, increasing numbers of immigrants work in health care and elder care. Second, linguistic diversity is increasing among the elderly as older immigrants enter the country and the existing immigrant population ages. Therefore, among geriatric patients and their caregivers, the likelihood of interactions involving different accents is increasing. This raises important issues for the training of health care workers. In particular, they need sensitivity to linguistic issues – especially intelligibility – and strategies for effective interactions. Research on speech in medical contexts has already taken some interesting directions, as in Radonovich, Yanke, Cheng, and Bender (2010), who found substantial declines in intelligibility due to the use of respirators and masks frequently worn by medical staff. Expansion of this line of work could prove interesting and practically useful.

Another aspect of the bidirectional nature of interactions is that when communication fails, it is incorrect to automatically assume that the speaker is at fault. It is well established that attitudinal and motivational factors affect how listeners respond to L2 speakers, such that misunderstanding may have much more to do with a listener's investment in an interaction than with aspects of the speech itself. For instance, prejudice against particular accents or against immigrants in general can distort listeners' perceptions during interactions and result in accent discrimination (Munro, 2003). Regrettably, the "accent reduction" industry often exploits immigrants' insecurities about their accents as a way of marketing their dubious and expensive services. But prejudice is not based on rational thinking, and attempting to adjust one's accent to placate those who discriminate is likely to be a fruitless endeavor. In some cases, however, native speakers' difficulties in interactions with L2 speakers are due to fear and inexperience. In such cases, evidence indicates that native speakers can change their outlook on L2 speech to become more receptive to such interactions (Derwing, Rossiter, & Munro, 2002). Further work on how intelligibility can improve through listener training has potential benefits for many contexts, including workplaces in which immigrants work closely with others from diverse L1 backgrounds. In immigrant-receiving countries we can expect such an approach to become more and more important in the future.

CONCLUSION

Intelligibility is the single most important aspect of all communication. If there is no intelligibility, communication has failed. In language pedagogy this is not a new idea; nor is the current interest in intelligibility a passing fad. Rather it is an empirically sound concept that will provide a basis for a wide range of pedagogically-oriented research in the future. While some such work will continue to focus on phonetic issues, more consideration needs to be given to the effects of speaking and listening conditions on L2 speech and to speaker behaviors that facilitate comprehension. We also need to expand our investigations to a wider range of listener factors such as aging. A final, potentially fruitful line of work is the development of ways to improve people's receptivity to different patterns of speech.

Many are familiar with Jonathan Swift's *Gulliver's Travels*, written around 1726. Swift was a social critic with a particular contempt for navel gazing. On one journey, Gulliver visits Laputa[2], an island that floats in the air and is populated by an intelligentsia that has control over the country of Balnibarbi below. Preoccupied with abstraction, the academics develop theoretically-based ways of doing almost everything that are adopted by the Balnibarbians. When houses are built, for instance, right angles are not allowed. To fit clothing, a tailor must not use a tape measure. The result is a country in shambles. The population is dirty and hungry, and walks around in rags.

L2 researchers would do well to heed Swift's lampooning of academia. If they are to be taken seriously by language teachers and their students, they must not lose sight of the accumulation of knowledge pointing to the centrality of intelligibility in communication. Among applied linguists there is no shortage of ideas about what is and is not important. But bad ideas – especially those motivated by overweening, abstract argumentation rather than practical realities – must not be allowed to trump learners' needs. In particular, we do not need to debate the issue of whether intelligibility is important. Rather, we need to carry on with our work on how we can apply this concept in the most effective ways.

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[2] It is probably no coincidence that *la puta* in Spanish translates to *the prostitute.*

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