Chapter 13

Computer-Based Perceptual Training as a Major Component of Adult Instruction in a Foreign Language

Charles S. Watson
Communication Disorders Technology, Inc., USA & Indiana University – Bloomington, USA

James D. Miller
Communication Disorders Technology, Inc., USA & Indiana University – Bloomington, USA

ABSTRACT

Millions of adult learners have acquired good-to-excellent literacy in English, but most of them continue to have difficulty with oral communication in that language. The more obvious their problem is with pronunciation, which varies from just noticeably “foreign” to very difficult to understand, the less apparent, but possibly fundamental to their overall skill level in English, is their difficulty in recognizing spoken sounds, words, and phrases of that language. Contemporary research has shown that adults are capable of learning to perceive a new language quite accurately, through systematic training. Perceptual skills acquired through such training are likely to contribute to continuing improvement in pronunciation and to an increasing vocabulary. Such a training program is described in this chapter, the Speech Perception Assessment and Training Program for ESL (SPATS-ESL). After 20-30 hours of training with this program, most ESL students are shown to achieve near-native recognition of the sounds of English and of words in sentences spoken at normal conversational rates.

INTRODUCTION

The worldwide number of adult speakers of English as a second language is expected to grow to over two billion within the next few years (Graddol, 2007). A significant problem with the majority of those who have learned English as a second language is that while they may have achieved excellent literacy their conversational skills lag far behind. This is most apparent from their spoken language, which may range from understandable to a native speaker of English, but noticeably accented, to virtually unintelligible.
What is far less salient about these non-native speakers of English is their failure to understand English spoken at normal conversational rates, which is often obscured by nodding and smiling in response to utterances by a native speaker. Many cultures place great importance on politeness and find it very difficult to indicate that conversational speech has not been understood. This only becomes apparent when the non-native speaker fails to operate an instrument as instructed or provides an incorrect medication to a patient. The solution to this problem is not easy, but one component of it is to rigorously and systematically teach the perception of the sounds of English to non-native speakers. Like the teaching of pronunciation, perceptual training has been largely ignored by ESL programs because it requires drills in which immediate feedback is given in response to correct and incorrect identification of the sounds to be trained. This can be done by one-on-one teaching, but that form of instruction is prohibitively expensive, in contrast to teaching literacy skills to entire classes. A feasible alternative is to administer perceptual training drills by computer with training software designed to optimize the learning of new perceptual skills. This chapter describes a novel approach to the training of speech perception by adult students of a foreign language, the Speech Perception and Assessment and Training System, for students of English as a Second Language (SPATS-ESL), which has been developed and tested in recent years by the authors. Before describing that system and reviewing perceptual training data obtained through its use, several important findings from the research literature are identified as essential components of any discussion of adult speech perception training. We begin by briefly identifying eight research-based conclusions that we consider to provide a strong foundation for the inclusion of perceptual training as a critical component of foreign language instruction. Some of these are discussed in greater length in later sections; however, listing them at the onset is intended to give the reader a comprehensive view of the theoretical and empirical basis of the work presented here. One or two supporting references are provided in each case, although these conclusions are each supported by an extensive literature.

1. During the first year of life infants with normal hearing learn to recognize the catalog of sounds of their native language. Toward the end of the first year of life infants learn to ignore speech sounds that are not meaningful (phonemic) in their native language, although they were previously sensitive to these sounds (Werker & Tees, 2002).

2. Adults can be trained to hear spectral and temporal details of complex non-speech sounds, to which they are initially insensitive (Watson & Kidd, 2007).

3. The time course of auditory perceptual learning for non-speech sounds varies from as little as 1-2 hours, to 6-10 months, depending on the complexity of the stimuli and the size of the catalog to be learned (Watson, 1991; Watson, et al., 2008).

4. Although adults, like infants after their first year of life, may be insensitive to some speech sounds that are not meaningful in their native language, 20-30 hours of intensive training are commonly successful in re-establishing their sensitivity to those sounds (Bradlow, et al., 1999).

5. In contrast with the common assumption that adults cannot achieve native-like (“unaccented”) pronunciation of a language learned as an adult, some adults have been shown to do so, possibly as a consequence of systematic speech perception drills (Bongaerts, et al., 1997; Nikolov, 2000).

6. The so-called “critical period” for language learning is not a discrete age range, and it is definitely not the only period within which native-like proficiency in a language can be acquired (Hakuta, Bialystok, & Wiley, 2009).