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Winifred Strange
Speech Perception and Linguistic Experience: Issues in Cross-Language Research
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How is speech perception shaped by experience with our native language and by exposure to subsequent languages? This is a central research question in language perception, which emphasizes the importance of crosslinguistic studies. *Speech Perception and Linguistic Experience: Issues in Cross-Language Research* contains the contributions to a Workshop in Cross-Language Perception held at the University of South Florida, Tampa, Fla., USA, in May 1992.

This text may be said to represent the first compilation strictly focused on theoretical and methodological issues of cross-language perception research. For this reason, and in view of the contributors' expertise, this book should be welcomed by speech scientists, phoneticians, linguists, psychologists, second language teachers, speech pathologists, and students of these disciplines.

The book contains 16 chapters organized in three main sections: (a) investigation of how speech perception develops in the course of learning the first language; (b) assessment of how patterns of speech perception may change when a second language is learnt, and (c) exploration of how speech perceptual patterns may be modified in the laboratory or clinic. These sections are preceded by an introduction and followed by a final chapter devoted to future directions in cross-language speech perception research.

Part I, 'Introduction', includes a single chapter written by the editor. It is an excellent historical review of cross-language studies in speech perception providing a clear conceptual framework of the topic. Strange presents a selective history of research that highlights the main theoretical themes and methodological paradigms. It begins with a brief description of the basic phenomena that are the starting points for the investigation: the constancy problem and the question of units of analysis in speech perception. Next, the author presents the principal theories, methods, findings and limitations in early cross-language research, focused on categorical perception as the dominant paradigm in the study of adult and infant perception in the 1960s and 1970s. Finally, Strange reviews the most important findings and conclusions in recent cross-language research (1980s and early 1990s), which yielded a large amount of new information from a wider range of languages and phonetic contrasts.

Part II, 'Linguistic Experience and the Development of Speech Perception', contains five chapters devoted to the role native language experience plays in shaping the way speech is perceived. In chapter 2, Linda Polka, Peter W. Jusczyk, and Susan Rvachew provide a review of strengths and limitations of the most important techniques used in cross-language studies with infants and children. With regard to infants, they describe and test the High Amplitude Sucking technique and its variations, as well as the Conditioned Head-Turn, the Habituation of Visual Fixation, and the Head Turn Preference procedures. On the other hand, the authors suggest special precautions when assessing the perceptual abilities of preschool children (aged 3 years and

older), mainly to ensure comprehension and attention to the task, and motivation to perform and complete the task.

Chapter 3, by Peter W. Jusczyk, Elizabeth A. Hohn and Denise R. Mandel, is devoted to picking up regularities in the sound structure of the native language. These researchers from SUNY at Buffalo put forward theoretical considerations as to how and when infants begin to pick up information about the organization of L1 sound properties. They review a set of studies focused largely on features that relate to phonetic and phonotactic properties of the native language, and to the way infants' sensitivity to these properties develops. The fourth chapter by Patricia K. Kuhl and Paul Iverson concerns the 'perceptual magnet effect' [Kuhl, 1991]: a perceptual distortion around a phonetic prototype. The Native Language Magnet Model maintains that exposure to a particular language results in a change of the acoustic space underlying speech perception. The magnet effect is a very interesting concept, but later investigations have revealed it to be problematic, at least in adult perception [Lively and Pisoni, 1997]. In chapter 5, Janet F. Werker discusses age-related changes in infant cross-language speech perception and outlines questions that remain unanswered.

Finally in chapter 6, Catherine T. Best addresses the topic from an ecological theoretical perspective, in contrast to the theoretical positions held by other authors in the book (Flege, Jusczyk et al., Kuhl and Iverson, Werker). Best defends a Direct Realism approach, in which articulatory gestures are assumed to be the perceptual primitives for speech perception. Listeners directly recover these gestures from the speech signal without recourse to innate knowledge of the vocal tract (as the Motor Theory states), in the same way as other auditory objects or events are perceived. Interestingly, this approach makes a coherent set of predictions about how listeners perceive non-native phones,

and how they discriminate non-native contrasts against the phonological categories of their native language. This issue directly connects with the content of the following part.

Part III, 'Speech Perception in Second Language Learning', addresses the question as to how the perception of speech sounds is influenced by the learning of a second language. It opens with a methodological review of the principal variables in cross-language speech perception research with adults by Patrice S. Beddor and Terry L. Gottfried (chapter 7). In the next chapter James E. Flege reviews the principal findings and problems in L2 speech learning, and presents his Speech Learning Model. This model sets out to account for age-related limits on the ability to produce L2 vowels and consonants in a native-like fashion. Flege assumes that 'the phonetic systems used in the production and perception of vowels and consonants remain adaptive over the life span, and that phonetic systems reorganize in response to sounds encountered in an L2 through the addition of new phonetic categories, or through the modification of old ones' (p. 233). A consequence of Flege's model is that foreign accents are caused, at least in part, by the inaccurate perception of sounds in an L2. The phonology of the native language filters out features of L2 sounds that are important phonetically but not phonologically. This fact would cause a true 'perceptual foreign accent' that hinders phonetic production of the second language.

In chapter 9 Flege's collaborator Ockes-Schwen Bohn centers on the aspects of the native language that *do not* influence the perception of L2 sounds. In chapter 10 Reiko A. Yamada examines the relation between the age of L2 acquisition and the perception of American English /r/ and /l/ by native speakers of Japanese. In the final contribution of this part (chapter 11), Henning Wode discusses the implications of the results of speech perception research for linguistics, and vice versa.

Part IV, 'Modifying Speech Perception in the Laboratory and Clinic', examines, in four chapters, how speech perception may be modified for applied goals, especially in second language learning and articulation disorders. As previous sections, it begins with a methodological chapter that serves, in part, as an introduction to the topic. Thus, John S. Logan and John S. Pruitt (chapter 12) deal with methodological issues in training listeners to perceive non-native phonemes. They mainly review aspects related to training goals, stimulus presentation in discrimination and identification tasks, feedback provided to the subject, and duration of training. In the next chapter, Bernard Rochet discusses the perceptual basis of foreign accent along the lines of Flege, and presents results from two experiments on auditory training for the teaching of French sounds in adults.

In chapter 14 Susan Rvachew and Donald G. Jamieson propose that adult L2 learners have several things in common with young children that misarticulate sounds in their native language, because, in most cases, difficulties in producing sounds are correlated with difficulties in identifying sounds. Therefore, perceptual training can also improve phonological production in the case of articulation-disordered children. The authors show promising results with natural stimuli targeting the sound contrasts related to the child's production errors. Finally, in chapter 15, David B. Pisoni and Scott E. Lively discuss findings obtained from different areas to highlight the importance of stimulus variability in perceptual learning of novel linguistic contrasts.

Part V is dedicated to future research directions; it includes chapter 16, 'Cross-Language Speech Perception: Perspective and Promise' by James J. Jenkins and Grace H. Yeni-Komshian. It links what we know in cross-language perception with the cardinal questions that remain. The authors claim that research in this

area is a 'growth industry' with multiple needs for further work on the learning of languages by speakers of many different L1s learning many different L2s, for more coherent developmental research, for a detailed theory of the relation between L1 and L2, and for a theory of individual differences in speech perception.

In sum, this volume is an extremely valuable reference book for researchers and professionals in speech science interested in a cross-linguistic perspective. It is a coherent set of chapters that represent up-to-date summaries on the main issues in cross-language speech perception research. The authors have different theoretical orientations; most of them are heads of research teams and well-known experts in the field. The editor has achieved a coherent coordination of contents in a multi-authored volume. There remains a certain – unavoidable – redundancy between some of the chapters, and notwithstanding the excellent general introduction to the volume by Winifred Strange, individual overviews would have been welcomed at the beginning of each part.

References

- Kuhl, P.K.: Human adults and human infants show a 'perceptual magnet effect' for the prototypes of speech categories, monkeys do not. *Perception Psychophysics* 50: 93–107 (1991).
- Lively, S.E.; Pisoni, D.B.: On prototypes and phonetic categories: a critical assessment of the perceptual magnet effect in speech perception. *J. exp. Psychol. hum. Perception Performance* 23: 1665–1679 (1997).

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