

Are English vowels less distinctive than French ones? A measurement of vowel dispersion in different speech contexts

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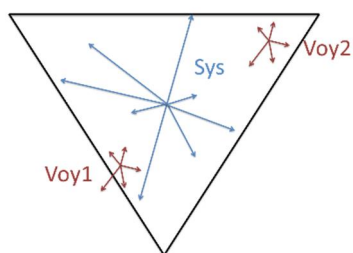
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Abstract

The great amount of variation in speech production is a heterogeneous phenomenon which can be explained by many different factors. One of them could be the way phonological systems are structured (number of phonemes, lexical and morphological properties, etc.). Previous work showed that the production of vowels by English speakers seems to be more dispersed than those of French and Spanish ones (Meunier et al., 2005, 2006). Furthermore, in a previous study (Meunier & Ghio, 2018) we showed that French speakers can be characterized by the distinctiveness of their vowel productions. In this way, we hypothesize that different languages could be distinguished with the same methodology. The objective of this study is thus to characterize English and French speakers thanks to a cue of distinctiveness in the production of vowels in different types of speech.

The characteristics of vowel production is a challenging topic and concerns several research questions: language comparison, variation due to speech types or situation, specificities of different population (healthy/pathological, first/second language, etc.). From a methodological point of view, the vowel system reveals gradual variations within the same mode of production, which is not the case for consonants. In this way, vowel centralization appears as a consequence of several factors such as speech rate increase (Gendrot & Adda-Decker, 2007; Meunier & Espesser, 2011), unaccented syllable (Lindblom, 1963), etc. At the contrary, the dispersion of vowel system has been related to the production of %clear speech+ (Smiljanić & Bradlow, 2009).

However, we consider that vowel variation should be related to a combination of two dimensions (rather than only one): 1/ the size of the overall vowel space (of the system) and 2/ the size of the production space of each vowel category. In this way, Huet & Harmegnies (2000) proposed a more dynamic cue taking into account the relationship between the dispersion of the whole vowels in the system and the average dispersion of each vowel in its category.



To go on with this idea we proposed a cue of distinctiveness (ID) in order to provide speakers' profiles. The basis of ID is a ratio between vowel system dispersion and vowel categories' dispersion (figure 1).

Our first results confirm differences between speakers (Meunier & Ghio, 2018). The cue itself is not always related to the overall dispersion of the system but highlights a more precise interaction between the vowel and the system.

Following this first step, we compared English and French speakers producing two different types of speech (isolated words and read texts). The analyses showed that despite variation depending on speakers' characteristics, French and English show different global ID cue suggesting that English vowels are less distinct than French ones. Moreover, both languages show different ID according to speech types: as intended ID shows that isolated words provide a more distinct system than read texts.

The involvement of ID cue will be discussed at the conference.

References

- GENDROT, C.; ADDA-DECKER, M. (2007), Impact of duration and vowel inventory size on formant values of oral vowels: an automated formant analysis from eight languages, *Proceedings of the International Conference of Phonetic Sciences*, Saarbrücken, Germany, p. 1417-1420.
- HUET K.; HARMEGNIES B. (2000). Contribution à la quantification du degré d'organisation des systèmes vocaliques, *Actes des Journées d'Etudes sur la Parole*, Aix-en-Provence, France, p. 225. 228.
- LINDBLOM B. (1963), Spectrographic study of vowel reduction, *The Journal of the Acoustical Society of America*, 35, p. 1773-1781.
- MEUNIER, C.; FRENCK-MESTRE, C.; LE BESNERAIS, M. (2005); Vowel variability in speech production context: a cross-linguistic study, *Phonetics And Phonology in Iberia*, Barcelona, Spain.
- MEUNIER, C.; ESPESSER, R.; FRENCK-MESTRE, C. (2006), Aspects phonologique et dynamique de la distinctivité au sein des systèmes vocaliques: une étude inter-langue, *Actes des Journées d'Etude sur la Parole*, Dinard, France, p. 333-336.
- MEUNIER, C., ESPESSER, R. (2011), Vowel reduction in conversational speech in French: The role of lexical factors, *Journal of Phonetics*, Volume 39, Issue 3, July 2011, p. 271-278.
- MEUNIER, C; GHIO, A. (2018). Caractériser la distinctivité du système vocalique des locuteurs. *Actes des Journées d'Etude sur la Parole*, Aix-en-Provence, France.
- SMILJANIC R., BRADLOW A. R. (2009), Speaking and Hearing Clearly: Talker and Listener Factors in Speaking Style Changes, *Language and Linguistics Compass*, 3(1), p. 236. 264.