

Homework 5
Ling 151
Due before final exam
McGuire

Alien Autopsy

As a phonetician, you are contacted by the government of the U.S. They have found a partial alien head of unknown origin and want to know something about the alien's language. Here's what they tell you:

- The alien has a tongue, but it is quite rigid with only the tip being flexible (see drawing).
- The jaw is hinged, like a human's.
- The alien has a nasal cavity and something analogous to a velum.
- The alien has lips which are very similar, almost identical, to human lips.
- The alien has vocal cords in a larynx, just like a human's.

Answer the following questions about the alien's possible sounds and likely contrasts to start describing the possible phonetic systems of the alien:

Consonants

1. What places of the articulation might this alien have or not have compared to a human?
2. What manners?
3. How about ejectives and implosives? Is one more likely than the other?
4. Do you expect the alien language to have a voicing distinction in consonants?

Vowels

5. Are its possible height and backness distinctions as varied as a humans?
6. Is this alien more or less likely to have rounding contrasts?

Suprasegmentals

7. Do you think the alien is likely to have a length distinction?
8. What is the likelihood that tone is a phonemic distinction?

More info on articulation:

Let's say they find a more complete alien body. This alien has the same vocal tract in the first one, but there's also a second and independently controlled set of vocal chords, about 5cm below the other set.

9. How does this double larynx change the possibilities in the language? What doesn't it change?

Perception

An audiologist who examined the auditory system described it as being remarkably similar to a human's.

10. Is this expected? Explain.
11. Do you think this alien hears distinctions in alveolar place of articulation better or worse than a human?
12. How about tone?

Acoustics:

Assuming no lip rounding, no height changes in the larynx, nor use of the lower vocal cords, create a tube model of the vocal tract using only tubes open at one end (i.e. no helmholtz resonators) where the speed of sound is 34,000cm/s. Answer the following questions:

13. Give the first four formants of the alien's two most extreme oral vowels. Show and explain your work.
14. What if you remove the first three assumptions? How would each of these change your answers? You do not need to recalculate, just give general impressions.

**Approximate distances between
major landmarks in vocal tract**

Upper glottis to velum: 8cm
Velum to back tongue extremum: 8cm
Velum to front tongue extremum: 12cm
Back tongue extremum to lips: 9cm