The untapped potential of human language: investigating the articulation of unattested sounds

Research Theme: Culture and Communication

In phonetics, sounds that form human speech are defined through two main parameters. These are the place of articulation- which parts of the mouth are used to make the sound- and the manner of articulation- what motions the articulators are doing.

For my project, I want to research the difference between trained and untrained phoneticians when pronouncing sounds that are typologically rare or unattested, commonly represented by empty/unshaded cells on the International Phonetic Alphabet (IPA) table, which has information of all attested sounds in human language. From here, I would look into how these sounds are perceived by listeners and apply my results in relation to constructed languages (conlangs) such as Klingon from Star Trek. By gaining a deeper understanding of the limitations of the vocal tract, we can apply the knowledge gained from this project into the creation of new conlangs. In other words, we are exploring why are there certain sounds that are not used in any human language!

I have chosen this project because I am interested in the production of conlangs and would like to see how they are made. The opportunity to use cutting-edge equipment and experimental methods not commonly available to undergraduates is also a great opportunity for me.

Sounds I will be investigating include a labiodental plosive, where the upper teeth and lower lip come together to create a stop in airflow. Examples of plosives include /b/ and /p/.

My sample will be a mix of volunteer students and trained phoneticians.

In my first summer, I plan to research the production of sounds between trained and untrained speakers using electromagnetic articulography equipment. This involves sticking sensors to key articulators and track their movement in 3D space and real-time. They will pronounce a sound that is both attested to on the IPA and is close to the unattested sounds in the manner and place of articulation. Participants will then be asked to attempt the pronunciation of the typologically unattested sound, which is what we will use during the analysis.

My second summer would shift focus to the perception of the sounds collected in my data. The first half of my second-year project would involve interpreting my data to decide whether certain sounds are not in use because they are auditorily indistinguishable from others that are commonly observed in human language. Next, I would apply my findings to conlangs and see how the results could be useful when constructing a language.

I would ensure that my project is successful by working closely with my mentor and taking the time to be trained on the articulography equipment to ensure that participants are safe. Although the timeline of my project is planned, I will be able to lead myself in a new direction if it is needed as this is a novel and unexplored research question.

In order to carry out this research, I will need a risk assessment prior to using the equipment which is going to be arranged prior to the study in collaboration with my department.

I believe that this project is new, interesting and has a lot of potential for further research. The scholarship would help me to start exploring the area of articulography further, and learn what other technologies are at the forefront of academia.