Phonetics & Phonology
Homework 1: Phonetics vs. Phonology
Due Tuesday, January 26

A. Given the following phonetic realities, we'd expect many languages to have related phonological processes. Consider each phonetic description, notice what kind of sound would be difficult in each case and then formulate a phonological process that would turn such sounds into the versions that would be phonetically easier to produce/perceive. Explain the motivation for the change in each case.

The bullet points are provided to help break down the answer– please give a paragraph-form answer, rather than a point-by-point. Note that languages tend to change some phonetic parameter(s) of a targeted sound when not doing so would be problematic, rather than more "extreme" changes, such as deleting the sound.

Please note that it will not be helpful to try to pronounce the sounds described and/or judge level of difficulty from the facts of English. The descriptions and following questions should be treated as something of a logic exercise– "Given P and Q, what follows?"

Example:

It is difficult to perceive the place of articulation of a nasal when it comes before another consonant. The place of the following consonant is more easily perceivable.

- Because of this difficulty, what phonological process would we expect to find in many languages?

Because the place of the following consonant is more perceivable, we would expect many language to have a phonological process of nasal place assimilation, where a nasal before another consonant takes on the place of that following consonant.[1] **The fact that the place of the nasal is less perceivable then becomes moot, since it will then have the same place as the more prominent following consonant.**

Homework questions:

(1) When producing a nasal, the velum is lowered, allowing air to flow out of the nasal cavity. When moving from the articulation of a nasal into another consonant, it takes some time to raise the velum and voicing (air flow through loosely-closed vocal folds) continues during that process. Further, when the velum is raised high enough to stop the "nasal leak", it continues to rise further, increasing the volume of the oral cavity, which causes air to (continue to) leak through the vocal folds.

- What phonetic influence does a nasal have on a following sound?
- What kind of sound would therefore be difficult to produce after a nasal?
- What might a language do to avoid this configuration? (State and formalize as a rule)

[1] As discussed in class, we don't have a great way to write a rule for this process. We could write
nasal C → labial / ___ labial C
nasal C → alveolar / ___ alveolar C
etc.

(2) It is difficult to maintain air flow through the glottis (=space between the vocal folds) during the closure portion of a stop, and becomes more difficult the longer the stop is held, because it's hard to keep forcing air through the glottis to vibrate the vocal folds when there is nowhere for the air to go (since there is an oral closure).
Sounds that occur at the end of the word are prolonged, due to a phonetic process called final lengthening.

- What kind of stop is harder to produce, voiced or voiceless?
- For your answer to the preceding bullet point, does it become easier or harder to produce word-finally?
- What might a language do to avoid the difficult configuration? (State and formalize as a rule)

(3) Vowels tend to trail into voicelessness when they occur word-finally (at a fairly arbitrary point in the vowel). Speakers of languages that contrast vowel length (that is, distinguish short versus long versions of vowels (e.g. [i] vs. [iː]) pay attention to only the voiced portion of vowels.

- Why might speakers have trouble perceiving a distinction in vowel length word-finally?
- What might a language do to avoid having to distinguish vowel length word-finally? (State and formalize as a rule that targets short **or** long vowels)

B. Consider the following descriptions of alternations in English (taken from *A Course in Phonetics* by Ladefoged). For each, decide if it is a phonological or a phonetic process (as discussed in class) and discuss why we want to categorize it as one or the other. If it is phonological, write a rule if needed (and explain if one isn't needed).

(4) Voiceless stops /p, t, k/ are aspirated when they are word-initial, as in words such as "pip, test, kick".

(5) Obstruents (that is, stops and fricatives) classified as voiced (that is, /b, d, g, v, ð, z, ʒ/) are voiced through only a small part of the articulation when they occur at the end of an utterance (as the /v/ in "Try to improve").

(6) The approximates (that is, liquids and glides) /w, r, j, l/ are at least partially voiceless when they occur after initial /p, t, k/ as in "play, twin, cue".

(7) Voiceless stops /p, t, k/ are unaspirated when they occur after /s/ (as in "spew, stew, skew").