

Study of the voicing contrasts in English affricates
Due 11/12

The full set of voicing minimal pairs is as follows:

choke joke
chain Jane
char jar
chest jest
chunk junk
cheer jeer
chin gin

We use minimal pairs to try to control for any factors that might affect the realization of the affricates other than their underlying voicing (e.g. following vowel quality might affect VOT or intensity of affrication).

We will record these words in two carrier phrases, one in which the target word follows a voiceless stop, and another in which it follows a vowel:

Type “X” for me.
Say “X” for me.

The main focus of interest is the first sentence because we expect the voiced affricates to be devoiced following a voiceless stop, and we want to study how the contrast between /tʃ/ and /dʒ/ is realized when /dʒ/ is devoiced. I’ve added the second carrier phrase to see if we can compare devoiced and voiced /dʒ/ (assuming word-initial /dʒ/ is voiced between vowels). That will allow us to see if any differences between devoiced /dʒ/ and /tʃ/, e.g. in duration of affrication, are similar to differences observed where [dʒ] is voiced.

The last two pages contain the lists of sentences to record for the experiment, one in pseudo-random order, and the other in reverse order (to try to counter-balance any effects of position on the list). I’ve added an extra item to the end of each list in case the speakers use different prosody on the last item in a list. Don’t measure these items (*chive*, *jive*)

Procedure: I suggest that you work in pairs, with at least one native speaker of English (any variety) in each pair. That way you can work together to make the recording, and can each measure half of the data (one full set of items). If you would like help making recordings, contact Leo Rosenstein, leaena@mit.edu, the lab manager for the linguistics department.

Measurements

For each target word, measure the following:

- Voice Onset Time – duration from the release of the stop closure to the onset of clear periodicity at the beginning of the following vowel.

- Intensity during frication – measure intensity away from effects of the release burst and the following vowel. If this leaves any choice about where to measure, take the highest intensity value. **NB You must adjust the window length over which rms intensity is calculated: Go to ‘Pitch’ menu, select ‘Pitch settings’, change the lower value of ‘Pitch range’ to 200 Hz.**
- F1 at voice onset (or at onset of F1 if F1 is not apparent at voice onset).
- Classify voicing of stop closure and affrication of each affricate
 Closure: full, part, or none
 Affrication: full, part, or none
 - do not count a period or so of voicing at frication offset as partial voicing

Record the measurements in a spreadsheet/tab separated text file with one item in each row, and measurements arranged in columns, e.g.

Word	Context	Repetition	VOT (s)	Intensity (dB)	F1 (Hz)	clos. voice	affric. voice
choke	stop	1	0.096	56.3	494	none	none

Say "chunk" for me.
Say "jest" for me.
Say "gin" for me.
Say "Jane" for me.
Say "chest" for me.
Say "choke" for me.
Say "cheer" for me.
Say "char" for me.
Say "joke" for me.
Say "jar" for me.
Say "chain" for me.
Say "junk" for me.
Say "chin" for me.
Say "jeer" for me.

Type "junk" for me.
Type "jest" for me.
Type "joke" for me.
Type "chin" for me.
Type "jeer" for me.
Type "Jane" for me.
Type "char" for me.
Type "chunk" for me.
Type "chain" for me.
Type "jar" for me.
Type "gin" for me.
Type "chest" for me.
Type "cheer" for me.
Type "choke" for me.
Type "chive" for me.

Type "choke" for me
Type "cheer" for me
Type "chest" for me
Type "gin" for me
Type "jar" for me
Type "chain" for me
Type "chunk" for me
Type "char" for me
Type "Jane" for me
Type "jeer" for me
Type "chin" for me
Type "joke" for me
Type "jest" for me
Type "junk" for me

Say "jeer" for me
Say "chin" for me
Say "junk" for me
Say "chain" for me
Say "jar" for me
Say "joke" for me
Say "char" for me
Say "cheer" for me
Say "choke" for me
Say "chest" for me
Say "Jane" for me
Say "gin" for me
Say "jest" for me
Say "chunk" for me
Say "jive" for me.

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