LIN228H1F Phonetics
Lecture 3: Consonants and Allophony

Monday, May 10, 2021

Instructor: Emily Blamire

Today's Plan

1. Finish up English Vowel Allophony

2. Review the basic consonant sounds of English
   - Different ways to visualize consonants and vowels

3. English Consonant Allophony

4. Instrumental Methodologies

5. Announcements and reminders

English Allophonic Variation in Vowels

- **Nasalization:**
  - Vowels are realized as partly nasal when adjacent to a nasal consonant.
    - *Note: In English, the degree of nasalization can be greater when the vowel is before a nasal consonant than when a vowel is after a nasal consonant. In this course, we will indicate nasalization in both cases.*

December [dəˈsɛ̃mbəɹ] *antenna* [ˌæ̃nˈtɛ̃nə̃]

- **/æ/-raising (or ash-raising)**
  - Before a velar consonant in Canadian English, the vowel /æ/ becomes higher

bag [bæ̝g] *sang* [sæ̝ŋ]

Practice ex. 24 p.86

From Lecture 2

- In this course, we will use “Broad Transcription” and “Narrow Transcription” in very specific ways to distinguish between phonetic transcription that includes more or less detail.
  - Broad transcription will include all regular phonemic contrasts in Canadian English, plus:
    - Schwa in unstressed syllables
    - Vowel distinctions before /ɹ/
    - Primary stress on words of more than one syllable
  - Narrow transcription will include these additional details:
    - Length (both inherent and contextual)
    - Nasalization
    - Canadian Raising
    - Ash-raising
    - Rhotic Vowels
  - From now on, in order to be clear about which level of transcription we’re using:
    - We will enclose broad transcriptions in slant lines /.../
    - We will enclose narrow transcriptions in square brackets [...]

Consonant sounds found in English:

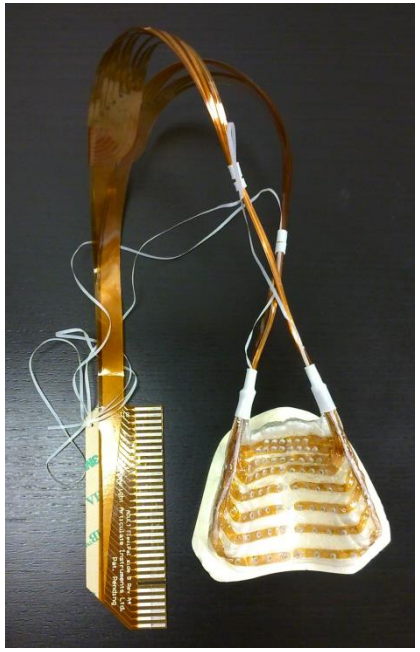
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Palatal	Velar	Glottal
Stop	p b			t d			k g	ʔ
Fricative		f v	θ ð	s z	ʃ ʒ			h
Affricate					tʃ dʒ			
Nasal	m			n			ŋ	
Approximant	ʍ w			ɹ		j	ʍ w	
Lateral approximant				l				

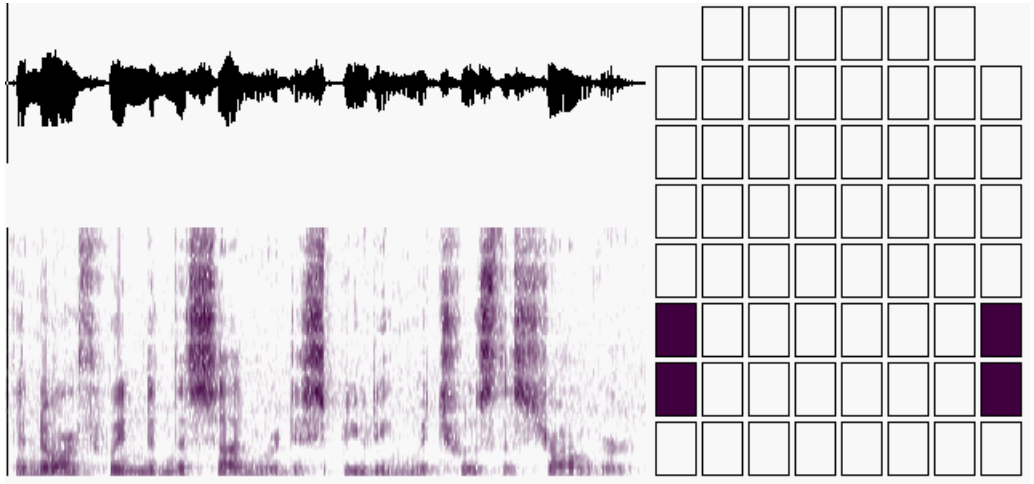
Consonant dimensions

- Voicing
- Place of articulation
- Manner of articulation

Phonetic methods: Electropalatography

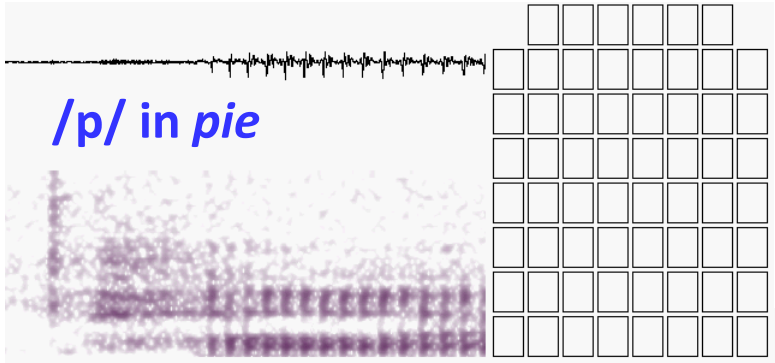
- Electropalatography (EPG) – a technique that
  - uses an artificial palate with built-in electrodes
  - to track the contact of the tongue and the roof of the mouth

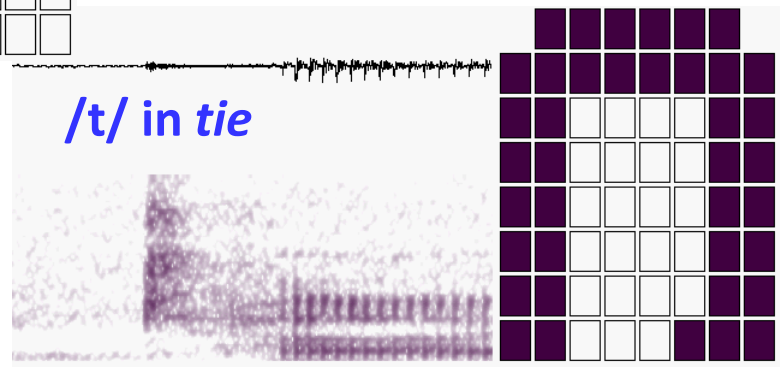


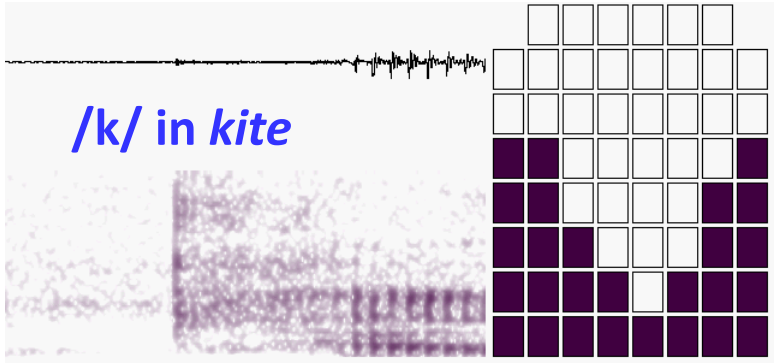


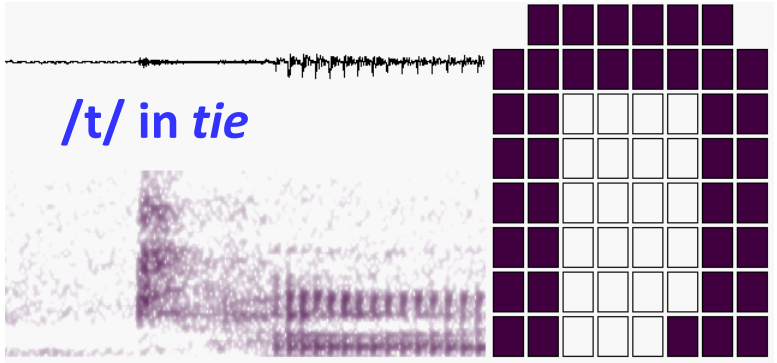
The North Wind and the Sun were disputing which was the stronger.

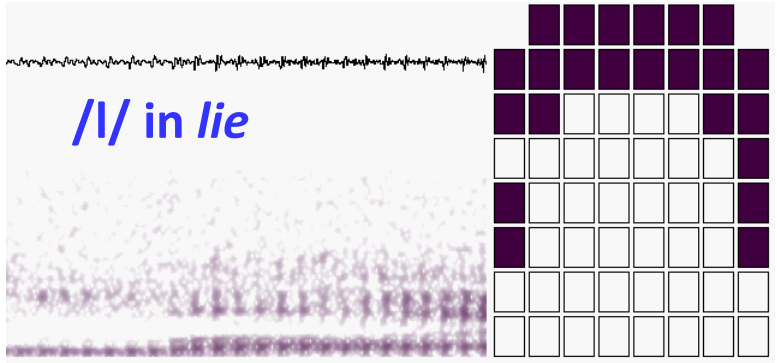
Phonetic methods: Electropalatography

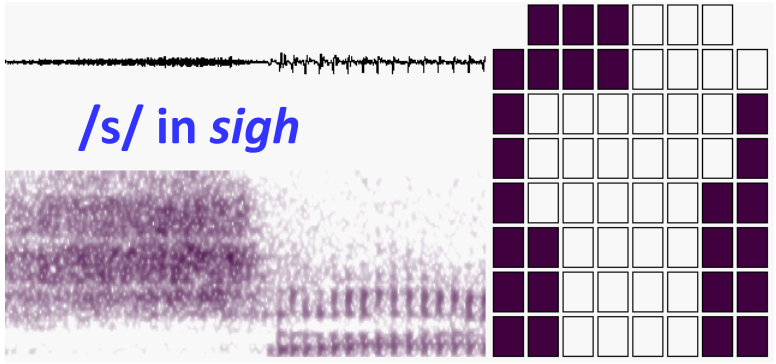


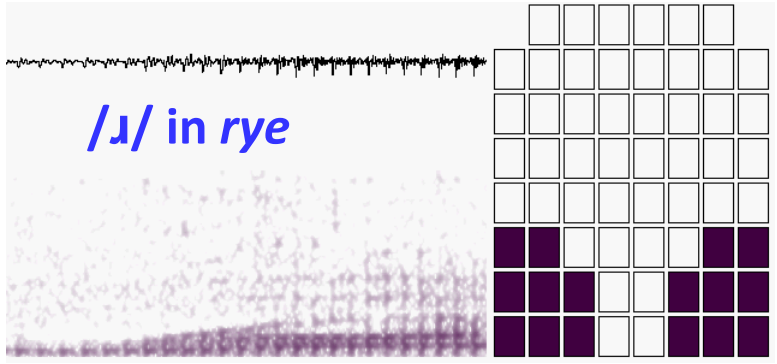


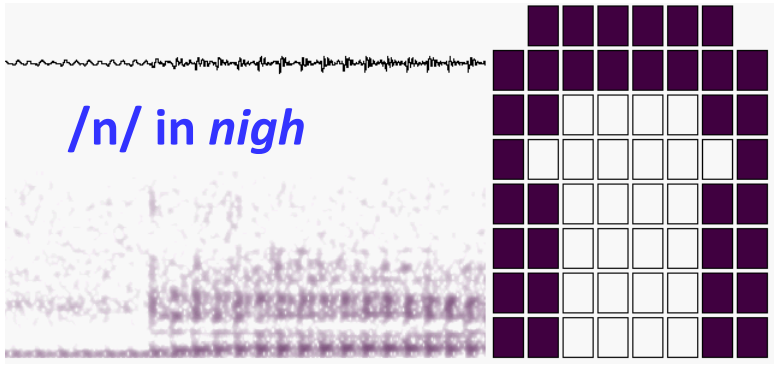


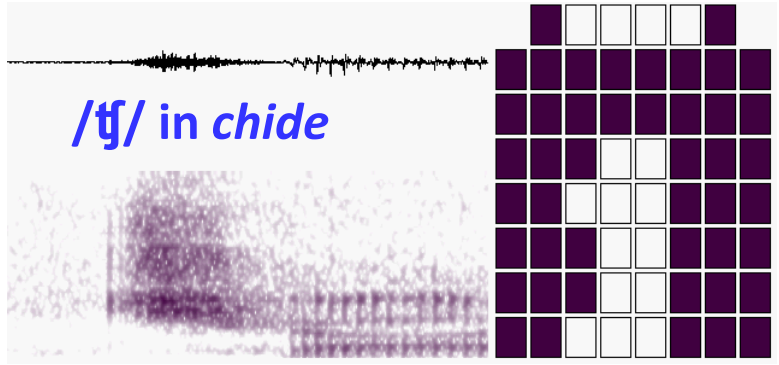

/t/ in *tie*


/l/ in *lie*


/s/ in *sigh*


/ɹ/ in *rye*

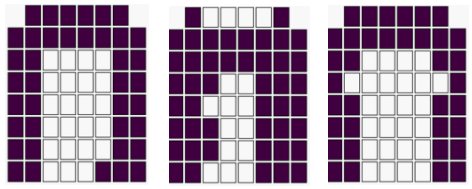

/n/ in *nigh*


/ʧ/ in *chide*

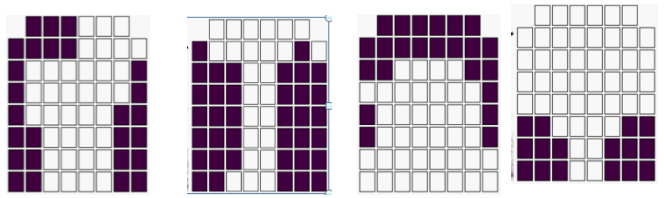
Degree of constriction

- ***p**ie, **f**ive, **t**ie, **s**igh, **n**igh, **l**ie, **r**ye, **ch**ide*

		p	f	t	s	n	l	ɹ	ʧ
Degree of constriction	closure (oral/nasal stops)	✓		✓		✓			✓
	narrow opening (fricatives)		✓		✓				✓
	wide opening (approximants)						✓	✓	



closure



opening

Line Drawings

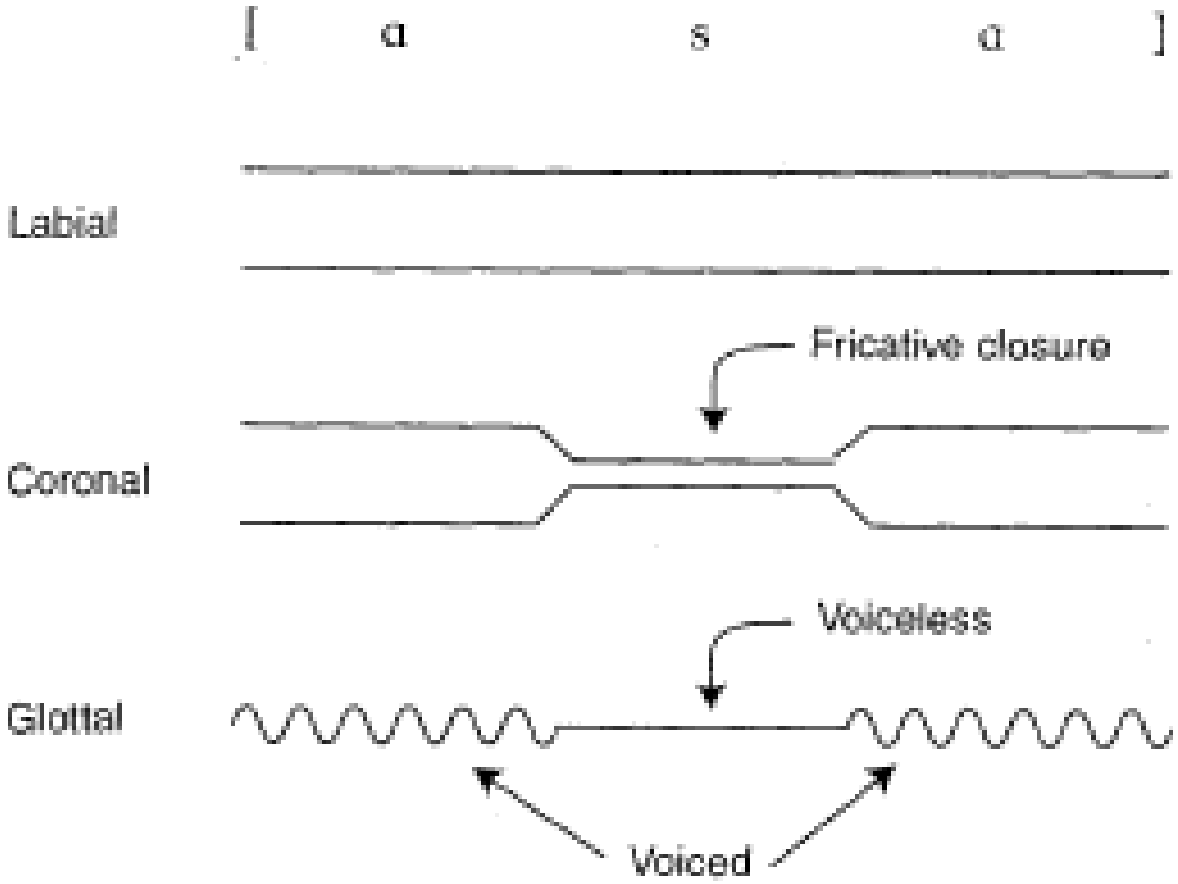


Figure 2.3 Line drawing of a voiceless coronal fricative

See text, pp. 25-27

Line drawings

Denoting specific articulations:
dent = dental, p-a = palato-alveoalar, lat = lateral, ret = retroflex, pal = palatal (for dorsal)

See text, pp. 25-27

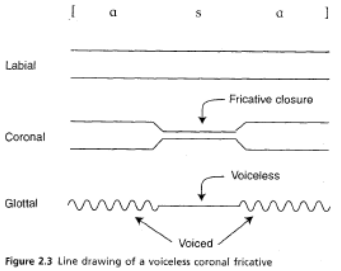
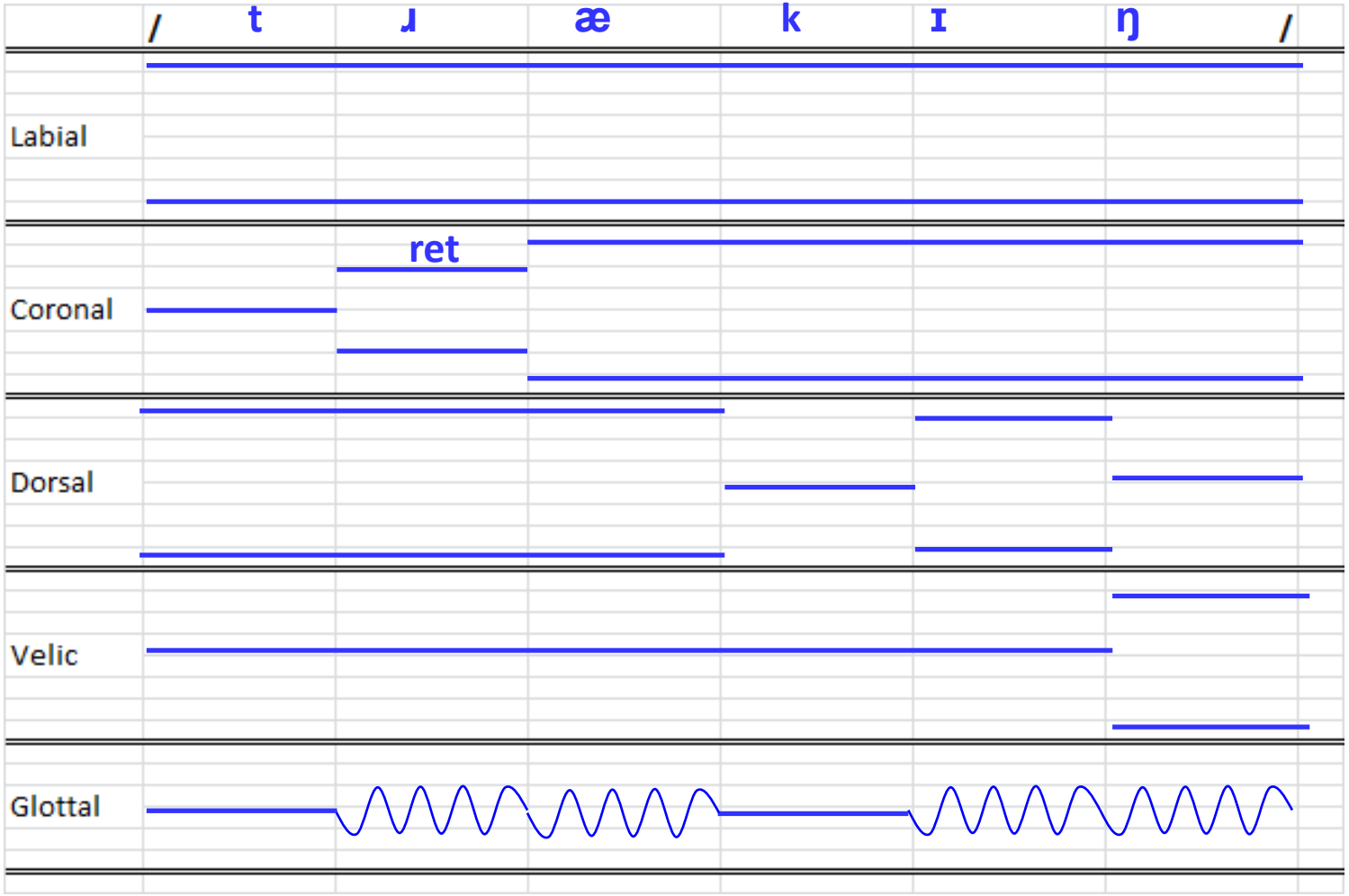


Figure 2.3 Line drawing of a voiceless coronal fricative



Broad vs. Narrow Transcription - Recap

- Remember: there is no such thing as *the* transcription of a word. Strictly speaking, you can only transcribe a single utterance at a single moment in time.

- If you want to go beyond a single utterance, to describe how the person or how a group of speakers pronounce an utterance in general, then you have to start making abstractions—which details to include and which to ignore.

- It's common to distinguish between two kinds of transcription, based on how many details the transcribers decide to ignore:
  - **Narrow transcription:** captures as many aspects of the pronunciation as possible.
    - Using **diacritics** provided by the IPA, it's possible to make very subtle distinctions between sounds.
  - **Broad transcription** (or phonemic transcription): captures only enough aspects of a pronunciation to show how that word differs from other words in the language.

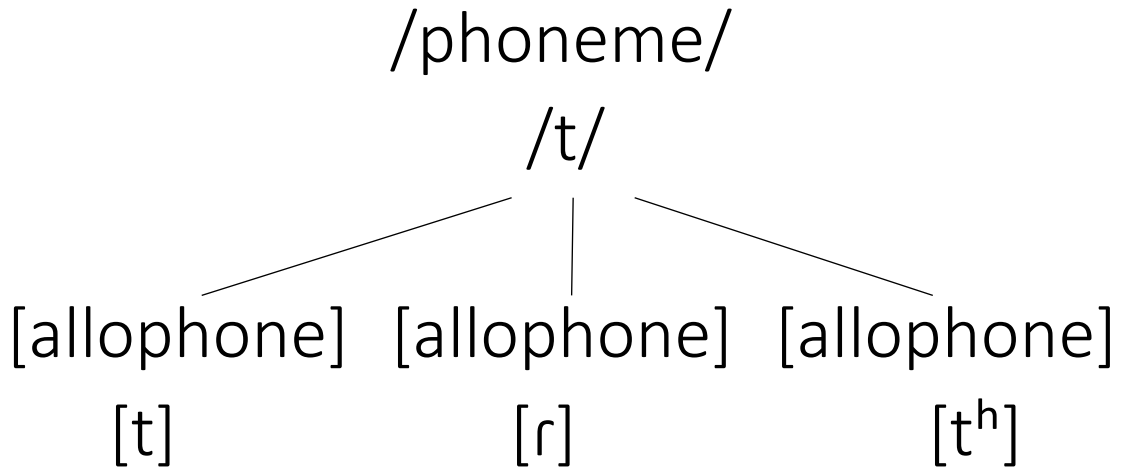
Allophonic Variation - Recap

- **Two sounds are contrastive if they are able to create a difference in meaning in a given language.**
  - For example, in English [t] and [d] are contrastive.
  - There are many examples illustrating this: *two* vs. *due*, *beet* vs. *bead*, *teen* vs. *dean*, etc.

- Sounds that are contrastive are called **phonemes** (of a given language).

- Not all sounds that occur in a language are able to create a difference in meaning.
  - Sounds that do not contrast in a language, are referred to as **allophones** of one phoneme.

Allophonic Variation



Connected speech

- Segments are often not produced discretely; before we finish producing one segment, we begin producing the next
  - Coarticulation: when more than one articulator is active
- Because of this, speech sounds spoken in sequence can undergo a number of processes for reasons of:
  - Efficiency: so that people can produce the word more easily
  - Distinction: so that people can distinguish the word more easily
- These are the reasons behind many allophonic alternations in speech.

Coarticulation

- **Overlapping :**
  - if **two stops occur adjacent to one another**, the closure for the second stop may be formed before the release of the first stop:

    apt /æpt/ → [æp̚t̚]

- **Yod coalescence:**
  - **across word boundaries**, **/j/** coalesces with **alveolar obstruents** and causes a type of palatalized affrication:

    get you /gɛt ju/ → [ˈgɛʧu]

    miss you /mɪs ju/ → [ˈmɪʃu]

Assimilation to neighbouring consonants

- <u>Assimilation</u>
  - When a segment becomes more **similar to the segments around it**.
    - One segment affects another segment's place, manner, or voicing (or some other aspect of it)

- **Dentalization**:
  - the **alveolars** /t, d, n, l/ are realized as dentals [t̪, d̪, n̪, l̪] when they occur **before the dental fricatives** /θ, ð/:

    tenth: /tɛnθ/ → [tɛn̪θ] *wealth*: /wɛlθ/ → [wɛl̪θ]

    Ex. 14 p.66

- **Labiodental nasals:**
  - Bilabial **/m/** is realized as labiodental [ɱ] **before the labiodental fricatives** /f, v/:

    symphony: /ˈsɪmfəni/ → [ˈsɪɱfəni]

Assimilation to neighbouring consonants

- **Retroflexion:**
  - alveolars become **retroflex** following /ɹ/:

    hurt /həɹt/ → [hə˞t]

    barn /bɑɹn/ → [bɑɹɳ]
  - /t/ and /d/ before /ɹ/ is often realized as **retroflex affricates**:

    tree /tɹi/ → [ʈʂɹi]

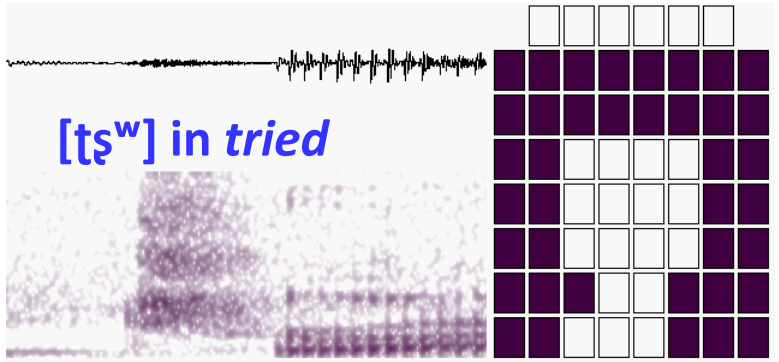
    dream /dɹim/ → [ɖʐɹim]

Note: these affricates are also rounded. See slide 22 for details.

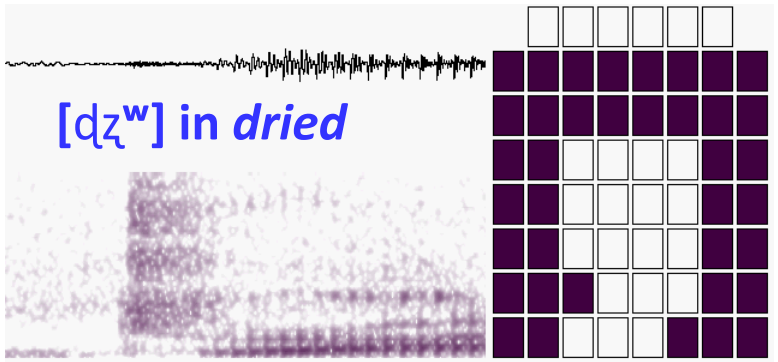
"Speakers who ordinarily make /ɹ/ with the tongue tip up may find that they use a 'bunched /ɹ/' after velars: crate, green. Conversely, speakers with a 'bunched /ɹ/' may keep the tongue tip up after alveolar stops: tree, drain." (p.59-60)

Assimilation to neighbouring consonants

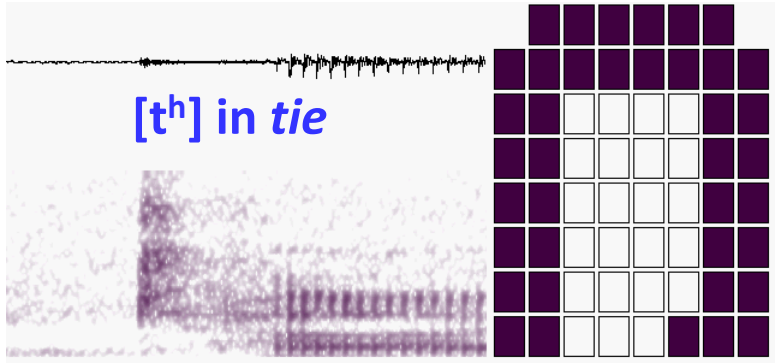
tried /tɹajd/ [tʂʷɹajd]

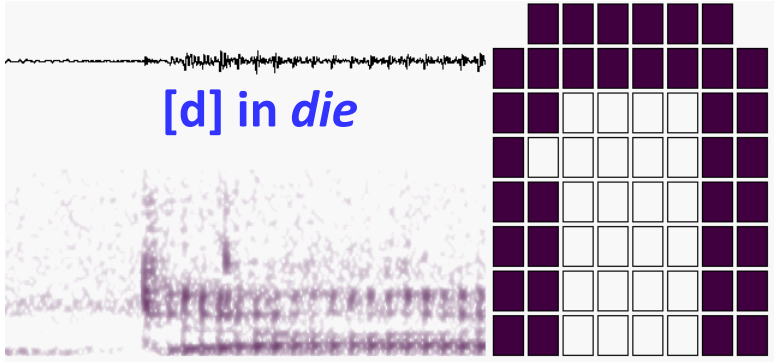


dried /dɹajd/ [dʐʷɹajd]



Compare to:





Assimilation to neighbouring vowels

- **Velar fronting**:
  - velars are produced with an articulation further towards the front of the mouth when they precede a front vowel:

    key /ki/ → [k̟i] *car* /kɑɹ/ → [kɑɹ]

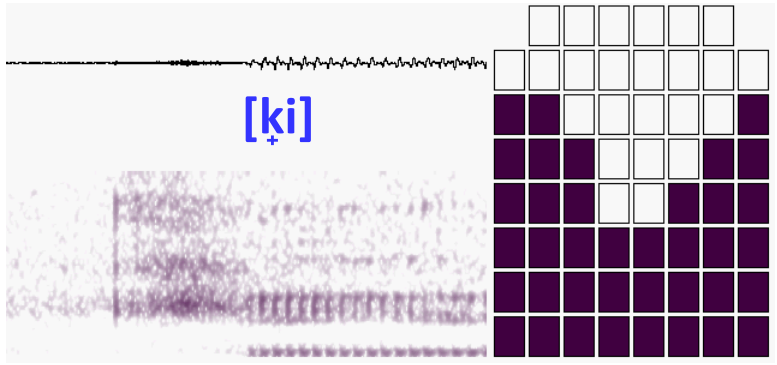
- **Rounding**:
  - consonants are pronounced with lip-rounding when they precede round vowels:

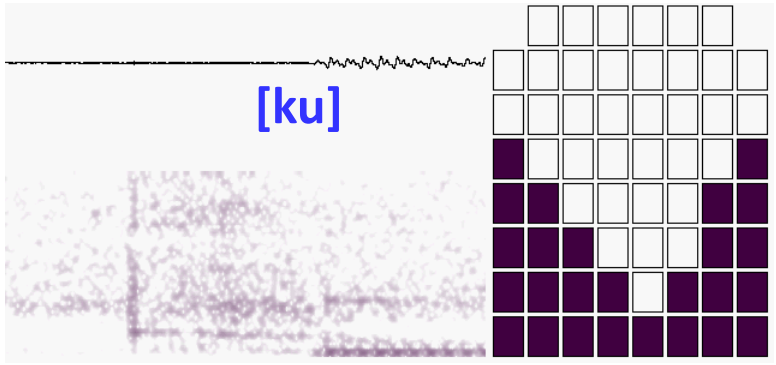
    kit /kɪt/ → [kɪt] *cool* /kul/ → [kʷul]

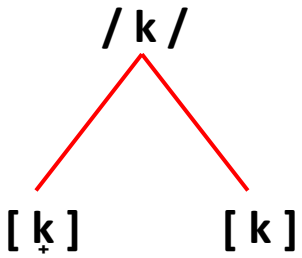
- **Allophones of /h/:**
  - /h/ is realized as a [ɦ] when in occurs between vowels.
    - *ahead:* /əhɛd/ → /əɦɛd/
    - [ɦ] is a murmured version of the following vowel produced with some vocal fold vibration but with the vocal folds still far enough apart to allow a lot of air through.
  - The voiceless palatal fricative [ç] is an allophone of /h/ that occurs before /j/ as in
    - *human:* /hjumən/ → [çjumən]

The degree of lip rounding can vary, but we will treat it all as the same in this course.

Assimilation to neighbouring vowels







Some inherent aspects of consonants

- **Inherent rounding:** In English, some consonants are produced with rounded lips no matter what vowels come after them.
  - Postalveolars
    - [ʃʷ] [tʃʷ] [ʒʷ] [dʒʷ]
  - /ɹ/ in syllable onset
    - [ɹʷ]
  - Note that the retroflex affricates we get before /ɹ/ are also rounded:
    tree /tɹi/ [tʂʷɹʷi] *dream* /dɹim/ [dʐʷɹʷim]

Notes on broad transcription

- **Yod dropping:**
  - Canadian English speakers generally do not pronounce [j] when it is in a stressed syllable with a **coronal** consonant followed by /ju/. This is so broadly consistent that we will not put the /j/ in the broad transcription.

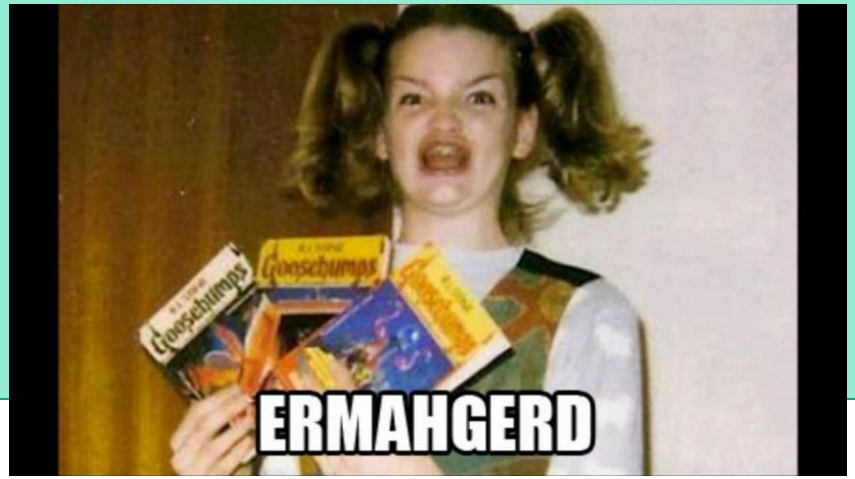
    tune /tun/ *new* /nu/ *sue* /su/

- **Homorganic nasals:**
  - In general, nasal consonants assimilate to the place of articulation of a following consonant. Make sure your broad transcription includes /m/ before labials and /ŋ/ before velars.

    impossible /ɪmˈpɑsəbəl/ ankle /ˈæŋkəl/

Schwar [ɚ]

- Consider words such as ‘her’, which we have up until now transcribed as /həɹ/.
  - Can you feel that there is a distinct vowel /ə/ followed by a consonant /ɹ/? Or do they seem to blend into one?
  - In most naturally produced speech, Canadian English speakers will produce a single “r-coloured” a.k.a. rhoticized vowel: [ɚ]



Syllable-dependent allophonic variation

- **Syllabic consonants:**
  - Every syllable must have a nucleus and in the typical case the nucleus is a vowel.
  - Sometimes a sonorant (nasal or liquid) may function as nucleus.

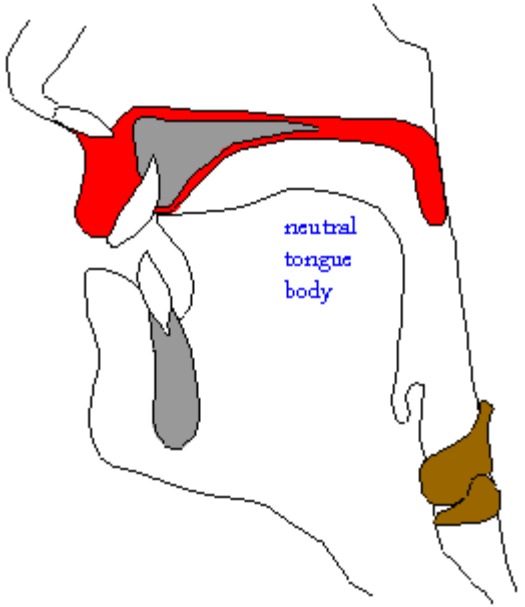
    sudden [ˈsʌdn̩] *buckle* [ˈbʌkɬ̩]

    Ex. 20 p.68

  - When /ɹ/ functions as a nucleus, we could transcribe it as [ɻ̩] or [ɚ] (a rhoticized schwa)
    - For consistency, I will use [ɚ] in this course whenever we need to transcribe this sound, but you may use either transcription.

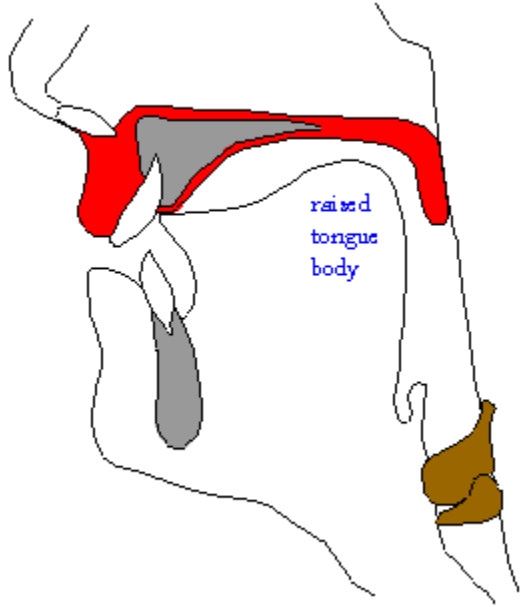
Syllable-dependent allophonic variation

- **Dark and light /l/:**
  - the lateral approximant is pronounced with the tongue dorsum raised towards the velum syllable finally:



tell /tɛl/ → [tɛɬ] or [t^hɛɬ]

let /lɛt/ → [lɛt]



Syllable-dependent allophonic variation

- **Aspiration**:
  - voiceless stops are aspirated at the beginning of a stressed syllable:

Ex. 9 p.64-65

pit	/pɪt/	[pʰɪt]	*spit*	/spɪt/	[spɪt]
kill	/kɪl/	[kʰɪl]	*skill*	/skɪl/	[skɪl]

- **Devoicing**:
  - approximants are devoiced when they follow aspirated stops:
    - *play* /plej/ [pʰl̥ej] *splay* /splej/ [splej]
    - *queen* /kwin/ [kʰw̥in] *squeal* /skwil/ [skwiɬ]

Ex. 24 p.69

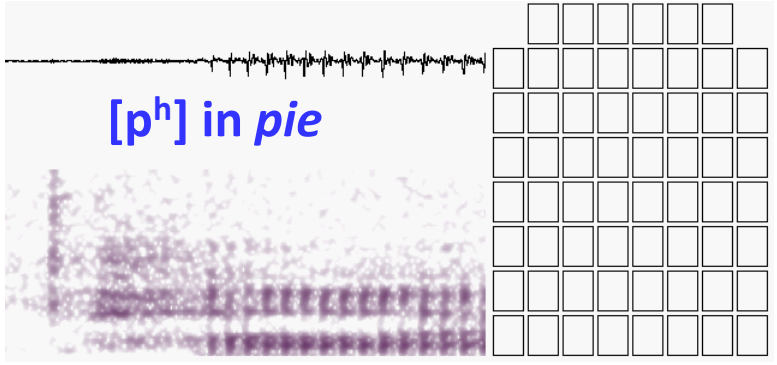
- **Word-final Devoicing**:
  - voiced obstruents are realized as partially voiceless word finally:

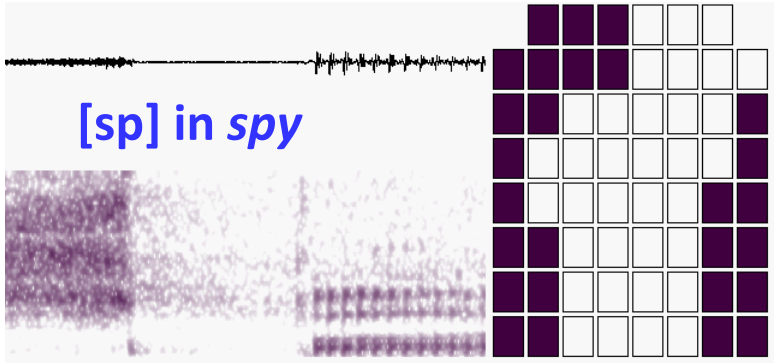
fuzz	/fʌz/	[fʌzz̥]	*spud*	/spʌd/	[spʌdd̥]

Syllable-dependent allophonic variation

- Aspiration

pit	/pɪt/	[p^hɪt]
spit	/spɪt/	[spɪt]
tone	/town/	[t^hown]
stone	/stown/	[stown]
kill	/kɪl/	[k^hɪl]
skill	/skɪl/	[skɪl]





Syllable-dependent allophonic variation

- **Tapping**:
  - the alveolar stops /t/ and /d/ are realized as a voiced alveolar tap in English, when they occur between two vowels and the second vowel is unstressed:
    city /sɪti/ [sɪɾi] *body* /bɑdi/ [bɑɾi]
  - A sequence of /nt/ between vowels is often realized as a nasal tap
    winter /wɪntəɹ/ [wɪ̃ɾ̃ə˞]

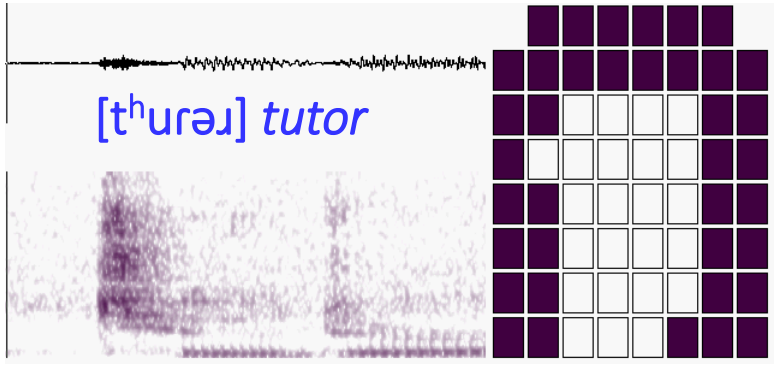
Ex. 15 p.66-67

- **Glottal stop:**
  - occurs as an allophone of /t/ for some speakers
    button [bʌʔn̩]
  - not phonemic in English, but is optionally present before a vowel utterance initially
    uh-oh [ʔʌʔow]

← Just for your information. Outside of this example we will not be noting this in narrow transcription

Syllable-dependent allophonic variation

- Tapping
  - *city* /sɪti/ [sɪɾi]
  - *body* /bɑdi/ [bɑɾi]



Announcements and Reminders

- Your second on-line homework will go up Thursday at noon and will be due Saturday, May 15th at 11:59 PM

- For Wednesday, you should read:
  - All of Chapter 7

Line drawings

See text, pp. 25-27

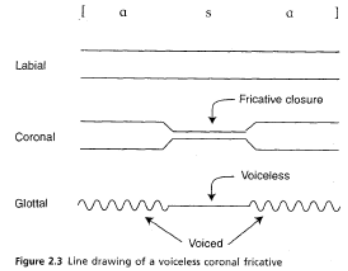
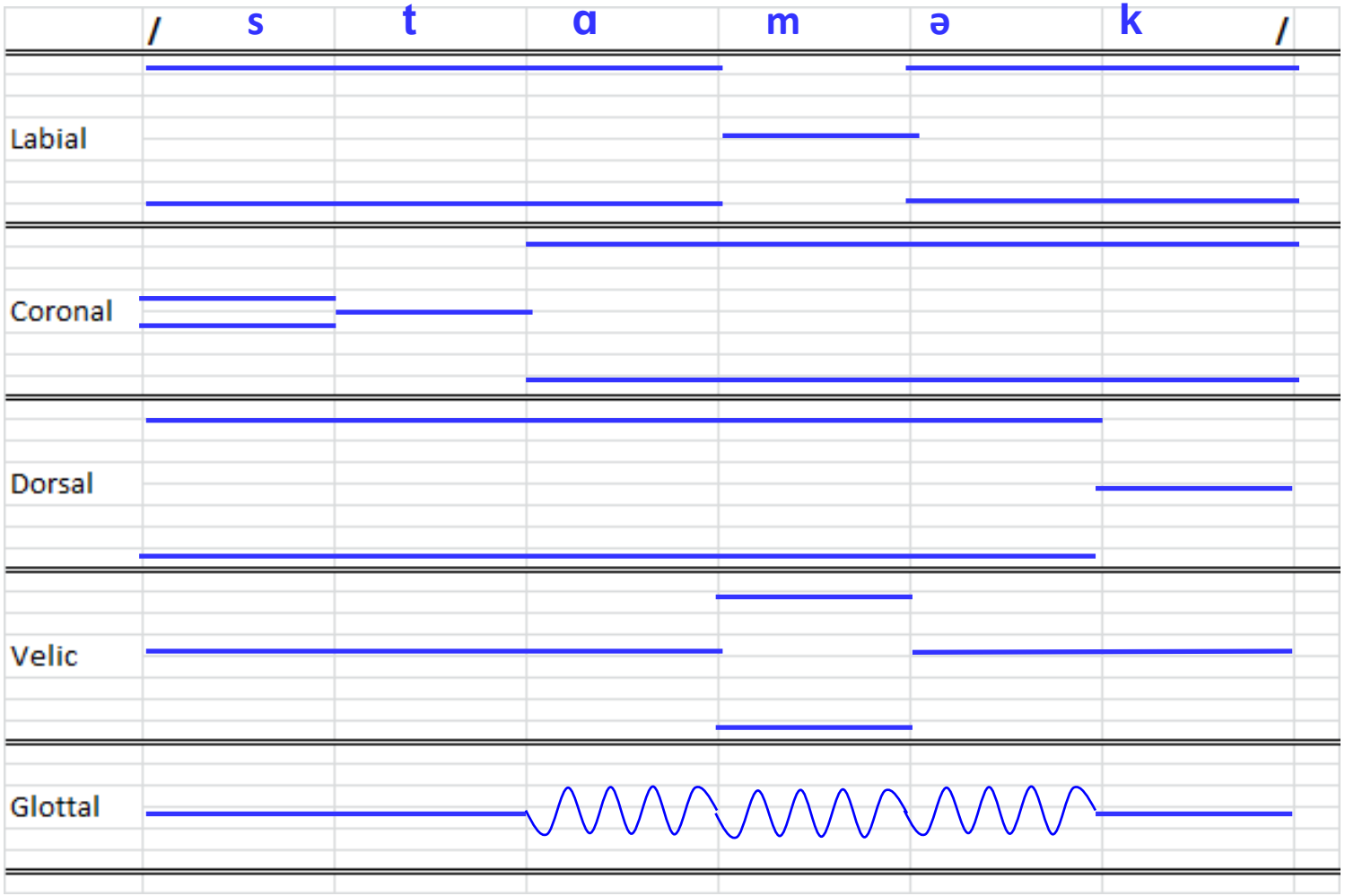


Figure 2.3 Line drawing of a voiceless coronal fricative



Review exercises

- Define the consonants

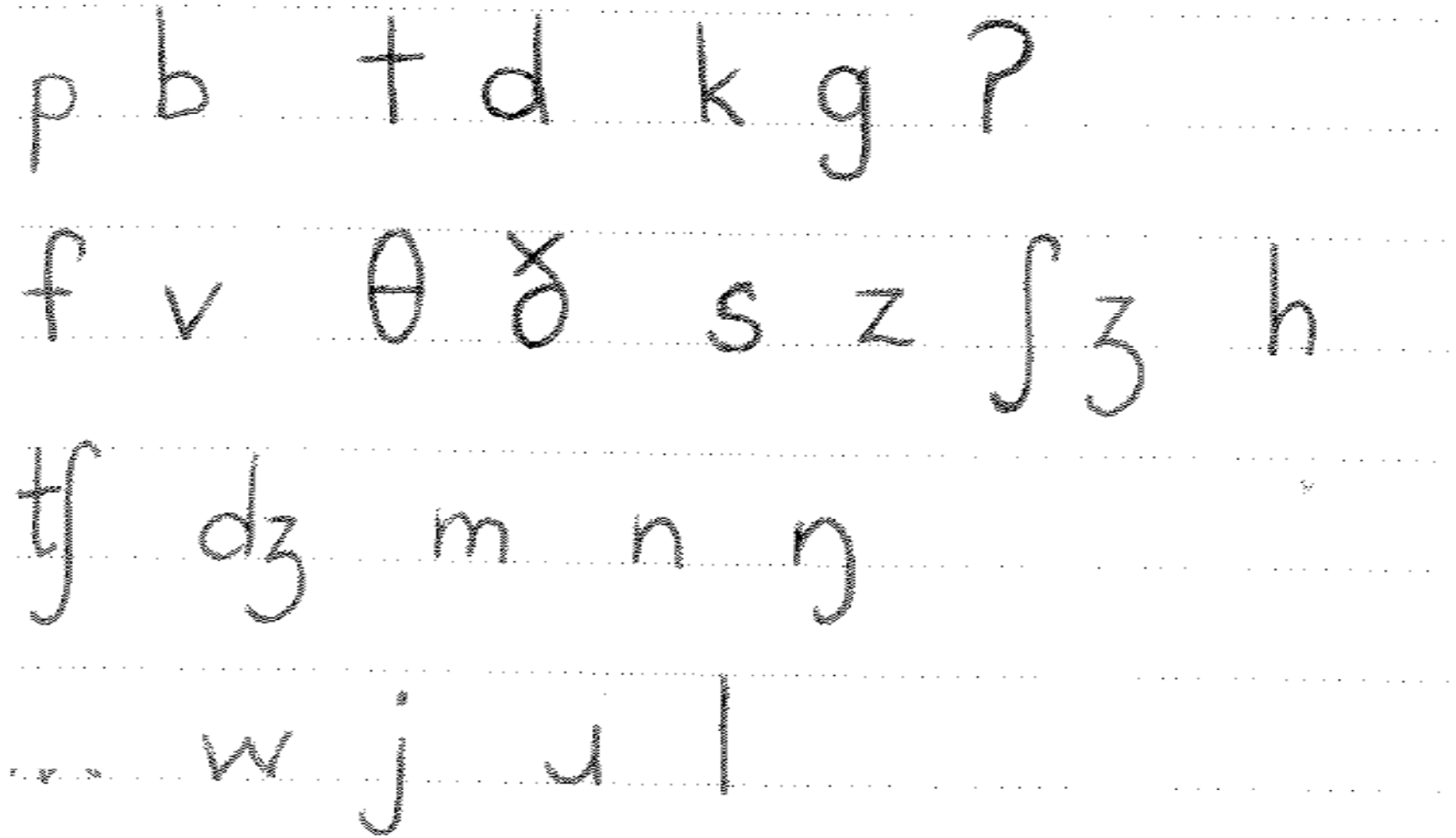
	place	oral/nasal	voiceless/voiced
*a**dd**er*			
*ho**pp**er*			
*fa**th**er*			
*si**ng**ing*			
*e**th**er*			
*ro**bb**er*			
*su**nn**y*			
*se**ll**ing*			
*plea**s**ure*			

Review exercises

- Define the vowels

	height	backness	rounding
a*dder*			
*h**o**p*			
*f**a**ther*			
*s**i**ng*			
e*ther*			
*s**ui**t*			
*s**u**nny*			
*s**e**ll*			
*s**ee**d*			

Handwriting IPA - Consonants



Handwriting IPA - Vowels