

## Cutting up a Damp Skunk

This is a famous exercise devised by Professor John Ohala. The assignment focusses on the perceptual cues for stop consonants and is designed to explore the acoustic properties of consonant voicing, place of articulation, and nasality in English, by offering you an opportunity to use a waveform editor to chop up an acoustic signal, to reassemble it in a variety of ways, and to listen to and evaluate the results.

The questions that are the topic of the written homework are set off in graphic boxes. To give reasonable answers you must understand and keep track of all the manipulations you make in the signal, and it is best to listen to the results using headphones.

### **Instructions.**

*0. Get ready.*

Download the file “dampskunk.wav” from the ling110 webpage or record yourself saying this phrase (be sure, if you record yourself, to release the [p] of “damp” and the [k] of “skunk” as in [dæmp<sup>h</sup> skʌŋk<sup>h</sup>]).

Open the sound file in WaveSurfer. (I used the “Spectrogram” configuration to make the images in this handout.

*1. Make a copy of the /s/ of “skunk” and remove it.*

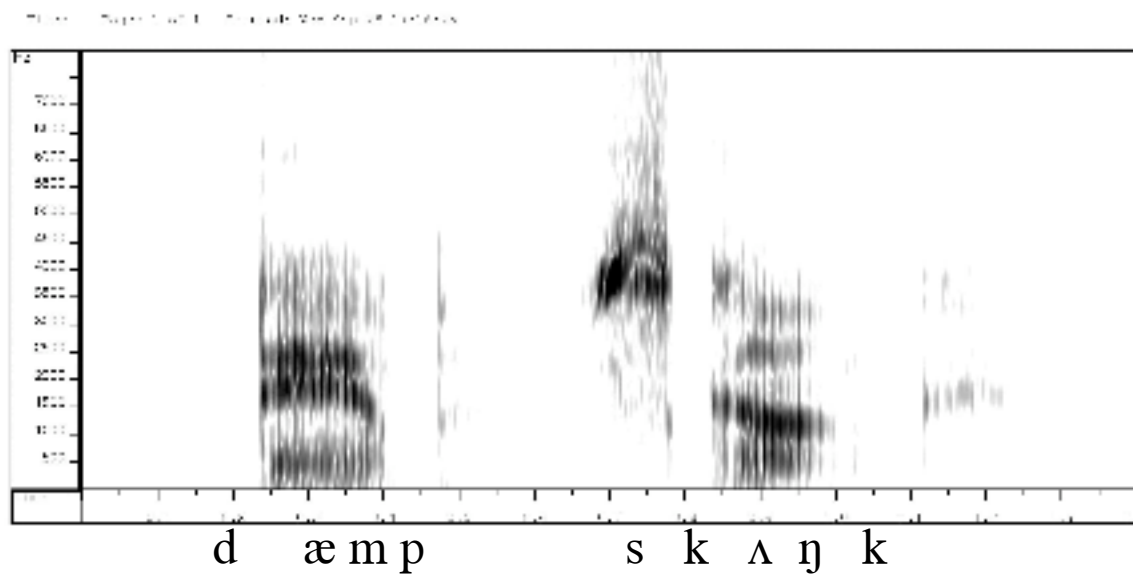
Locate the /s/ of “skunk” and select a portion of the signal that goes from a point in the silence before the /s/ to a point in the silence after /s/, about halfway between the end of the /s/ and the release of the /k/.

Use <ctrl>x to cut the /s/ portion out.

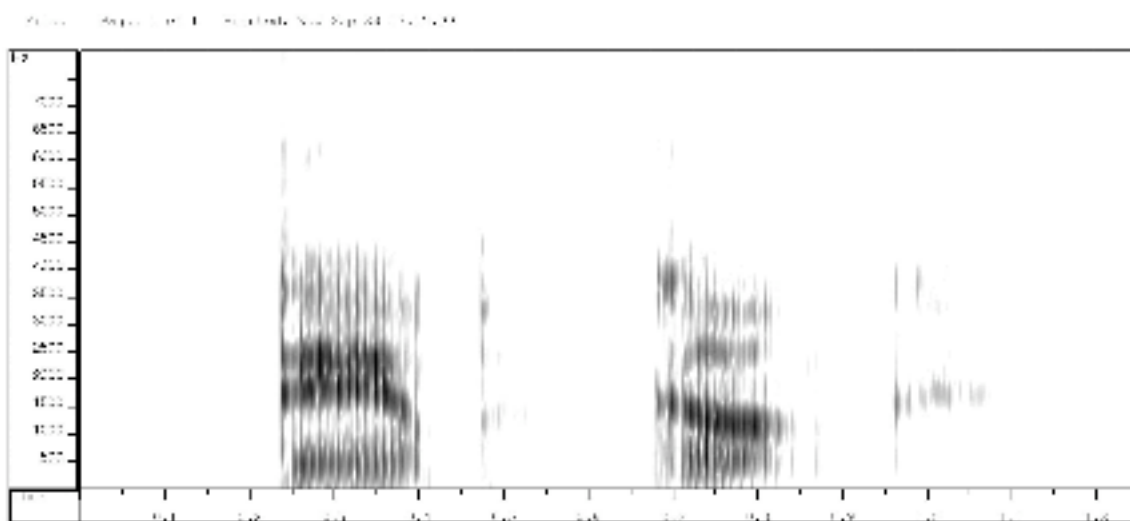
Select what remains of the word “skunk” and listen carefully to it.

**Question 1:** What does “skunk” sound like with /s/ gone? How do you account for this transformation?

(1) the original recording of “damp skunk” before any waveform editing.



(2) With the /s/ cut out.



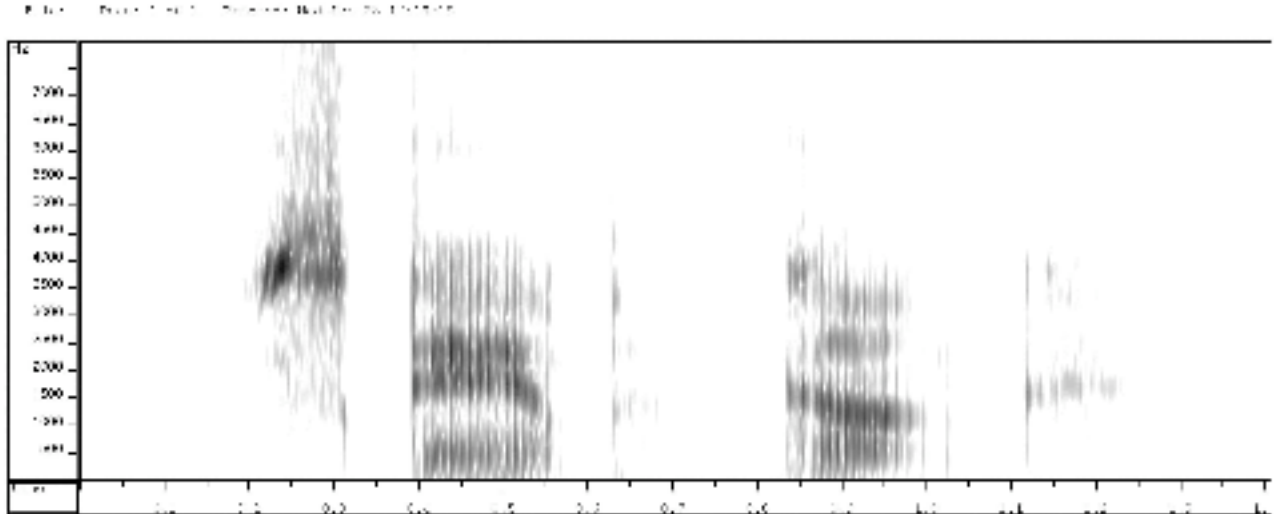
2. Insert the /s/ before “damp”.

Place your cursor in the silence before “damp”, about 50 milliseconds before the release of the /d/. Use <ctrl>v to paste the /s/ into this location.

Now, select the /s/ + “damp” portion of the signal and listen to it.

**Question 2:** What does “damp” sound like with the /s/ in front of it? How do you account for this transformation?

(3) With /s/ placed before “damp”.



3. Interchange the burst of the final stops of the two words. Do this in the following sequence:

(a) select the /p/ burst (from a point in the silence just before the release of the /p/ in “damp” to a point in the silence just after the /p/). Write down the starting point of your selection because we will want to paste the /k/ burst at that location. Use <ctrl>x to cut the /p/ burst out of the signal.

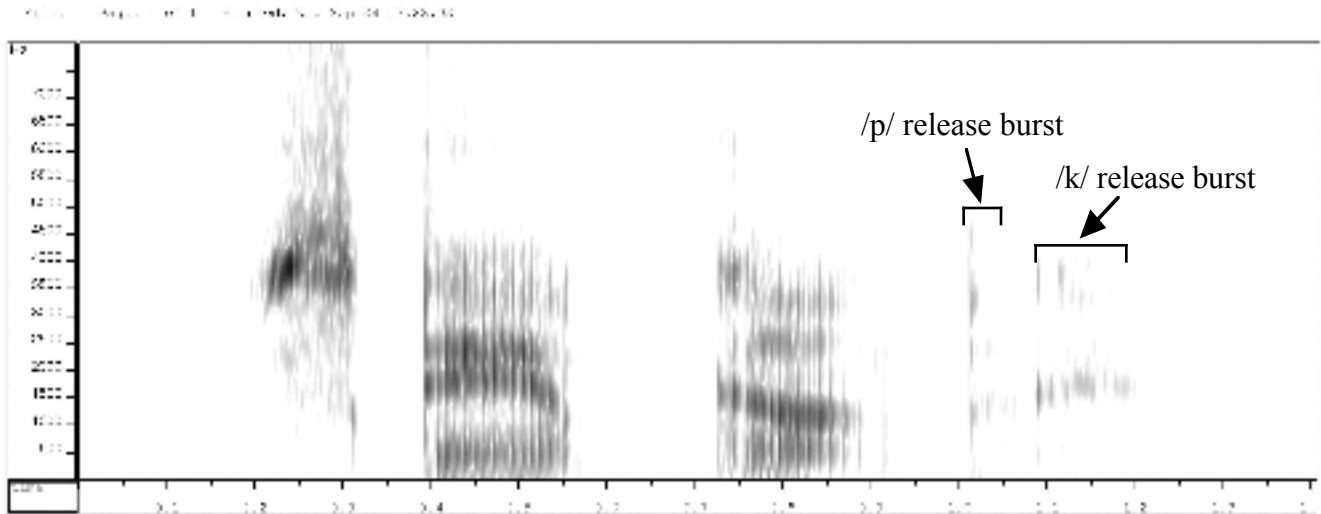
(b) Move the cursor to a point in the silence just before the release of the final /k/ in “skunk”. Use <ctrl>v to paste the /p/ release there.

(c) Select the /k/ release burst, from where the newly inserted /p/ ends to a point in the silence just after the /k/. <ctrl>x - cut the /k/ burst out.

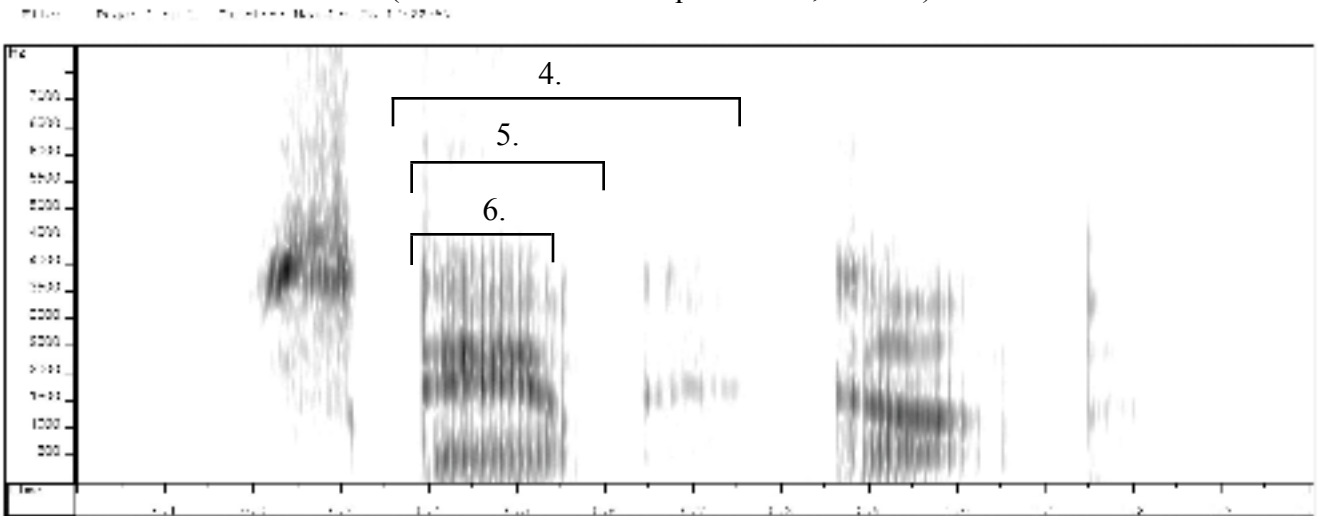
(d) Move the cursor to the end of what was formerly “damp”. Check your notes to make sure that you place the cursor at what was the starting point of the /p/ release that you removed in step (a). Paste (<ctrl>v) the /k/ release burst there. Note the starting and ending points of the pasted section.

**Question 3:** What do the words sound like now? How do you account for these transformations? Remember, you did nothing to interchange the nasals in these words.

(4) With the /p/ release burst pasted at the location of the /k/ release burst (which shifted to the right to make room for it)



(5) The release bursts have been transposed. (the numbers refer to questions 4, 5 and 6)



4. Remove the /s/ that remains in front of what used to be “damp”.

Actually, you don’t have to remove the /s/ just listen to the “damp” portion without the /s/ by placing the cursors as illustrated by the label “4” in spectrogram # (5) above.

Question 4: Is it still “damp”?

5. Try to find a portion of this word (what used to be “damp”) that sounds like one that just ends in a nasal by removing the stop at the end.

Listen to the portion marked “5” in spectrogram #5 above.

Question 5: When you delete the final burst of “damp” what does the word sound like? Where did the velar nasal go?

6. Try to make this into “damn” by cutting off 1, 2, and then 3 or more voicing periods at the end of the word.

To do this you may need to zoom in on the end of the word to see individual glottal pulses. A selection with one glottal pulse eliminated from the end of the word is illustrated with “6” in spectrogram #5.

Question 6: Can you get it to sound like “damn”? What does it sound like? Why shouldn’t this procedure succeed in getting “damn”?

7. Try the same thing with the second word and address the same questions as in the truncation of what was “damp”.

Question 7: Can you get it to sound like “gun”? What does it sound like? Why shouldn’t this procedure succeed in getting “gun”?