



SINGING FINGERS

1-Line Summary

You see sound and discuss some of its properties, including the fact that sounds are different from letters.

Background:

This App is like a very simplified spectrogram: it makes a visual representation of sounds – it shows loudness, pitch, and silences (as with aspiration). Obviously there is more to speech production than this, but this is a good starting point. In addition, you can use this App to talk about the differences between sounds and letters.

Readings

Introductory

<http://en.wikipedia.org/wiki/Spectrogram>

<http://en.wikipedia.org/wiki/Vowel>

<http://en.wikipedia.org/wiki/Consonant>

http://en.wikipedia.org/wiki/International_Phonetic_Alphabet

Materials:

You can download the “Singing Fingers” App from the iTunes App store for \$1. Open the app, and hit the blank page in the top left corner to get rid of the instructions. You can clear the page and start anew by hitting that same blank page icon.

The Interaction:

The pitch – You wanna SEE what sounds look like?

Using the materials – To make this work, you have to produce sound WHILE you are moving your finger along the pad. This combination takes a bit of coordination and it is usually easiest to show how it is done first. Have the child say “hello” while you trace the line. Once the line is there, you can run your finger on it to replay the sound (in any direction). After you have shown how it works, let people do it for themselves. You can suggest different ways to shift the voice to make different points.

In terms of the visual representations, here’s what you can do:

- Changes in loudness are shown by different widths (wider = louder). This effect is a little bit subtle, and won’t show up well if you are in a very noisy environment.

- Different frequencies (pitches) are represented by different colors. The pitch tracking is a little bit crude, so you need the pitches to be VERY different – the minor pitch variations in normal speech don’t register very consistently. But singing notes in different octaves will show



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up. You can do a series of (longish) consistent notes and get a series of lines in different colors. Or, if you're willing to sing a little, you can get a single line that shifts color as you change pitch.

- Silences will appear as gaps. If the silence is small (as with the closure from a stop) then the gap will also be small – sometimes it will look like you're making little packets of sausage. Try hyper-articulating the aspirated parts of words to get stronger visuals.

Messages:

Critical take home: Sounds have properties and we can describe what those are – and with the right software, we can SEE what they are.

But wait, there's more: For example, PITCH. Many vowel sounds are distinguished by their pitch. High vowels have a higher pitch than Low vowels. But High and Low don't just describe the pitch, they also describe the position of the tongue within the mouth: we produce higher pitched sounds (/i/) when the tongue is higher in the mouth and lower pitched sounds (/a/) when the tongue is lower in the mouth. You can feel this in your mouth AND hear it in the sounds AND see it on the App. For younger kids, sung notes (high and low) are an easier way to get this point across.

And still more: For example, LOUDNESS. Some sounds (vowels) are intrinsically louder than others (fricatives). You can also show that some speech sounds are all about silence – and silence will show up as gaps in the line. Have people say very clearly articulated stops between two vowels (/apa/) and you can see the gaps appear. For younger kids, having them use indoor vs. outdoor voices or monster vs. fairy voices should show off the loudness effects.

And a little bit more: Talk about COARTICULATION. The App will let you play sequences forwards and backwards, and this is a great way to hear just how funny backwards speech sounds. One reason backwards speech is so different is that we adjust the way we produce sounds depending on what comes before and after it – speech is intended to be heard in only one direction. You can get people to feel the difference by asking them to say the words *milk* and *like* and pay special attention to where their tongue is when they say the /l/ -- for *milk*, you get the “dark” l at the back of the mouth (anticipating the velar /k/) and for *like* you get the “light” l at the front of the mouth (anticipating the front vowel /i/).



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And one more thing: Talk more about SPELLING. We think of letters as being simple ways to represent sounds, but they really are not. One fun way to see that in this demo is to think about PALINDROMES – these are words that are spelled the same way forwards and backwards (*Hannah, Racecar*). Ask people to say these word and then play them forwards and backwards: even though the letters are the same both directions, the sounds are not.

You can also have people say things that DO sound like a word going backwards (though not the same word!). Have people say *easy*. This word is a PHONETIC PALINDROME because it actually does sound the same forwards and backwards. Another one that works well is *fun enough*.

Homework:

For young kids, you can encourage them (and their parents) to think about how words break down into different sounds – *cat* is composed of 3 sounds and so is *that* even though it has 4 letters! You can turn this into a game by asking people to find the sounds in the word. This ability is called phonological awareness and it is a critical pre-literacy skill for kids.

For older kids & adults, you can encourage them to be on the lookout for palindromes – there are lots of famous ones out there and they are fun to think about. Get them started with some names (*Anna, Bob, Mom, Dad*) and some famous phrases (*Madam, I'm Adam; Sir, I'm Iris*). You can find a huge list here: <http://www.palindromelist.net/>

Make the Link:

You can pair this demo nicely with one of the proper spectrogram Apps available for download. “SpectrumView” is a decent free version, although our group favors “Spectrogram Pro” which costs \$2.99. When you’re using an actual spectrogram, it is much easier to show off the differences among the speech sounds.

You can also pair this demo with some of the many youtube videos out there showing how speech production works. One of our group’s favorites is “the diva and the emcee” which begins with MRI’s of people singing lots of vowels and consonants. It also includes discussion from researchers at USC about various subtleties about speech production.

Target Audience:

This demo works well with kids of many ages: the drawing (and yelling) are big attractions for very young kids, but the points about spelling and palindromes work better with older kids.

Acknowledgements:

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