Changing the voice

The voice is the intersection of 3 primary qualities, and several secondary qualities. The basic sound that you hear if you were to simply speak a single word is the intersection of

1) Pitch – where does the sound begin
    In males, the sound starts quite low, in the 125hz range
    In females, the sound starts a bit higher, in the 200hz range
2) weight – how buzzy is the sound
    In males, the sound is quite buzzy. It has a gravelly quality to it, because testosterone has thickened the vocal cords and given them more weight and inertia
    In females, the sound is clearer and purer, as the vocal cords are lighter and easier to move
3) resonance – how far apart are the various frequencies that make up your voice. Yes, there are many, many frequencies as you will see in the upcoming diagrams.
    In males, the frequencies of the voice are close together and thus there's less frequency range
    In females, the frequencies of the voice are spread out, and so there's more frequency range

In changing these qualities of your voice you must (ultimately) strive for a balance. Your physicality (neck length, airway size, mouth shape, etc) will "enforce" a "sweet spot" if you will of a certain amount of vocal weight, pitch, and resonance. Having too much of one and not enough of the others will sound unnatural, however it is still best to isolate and practice these primary qualities separately. In this way you can feel you are making progress towards a more "minor" goal, and not become discouraged because all three things are not coming together as you would like from the start. Also, practicing in isolation makes it easier to refine your technique later, for example going too far with resonance may make you sound like a cartoon character, necessitating a change in weight to bring the voice back into balance again.

Secondary qualities that can change the perceived gender of the voice are

1) How words are pronounced.
2) How smoothly words flow into each other
3) Rate of speech

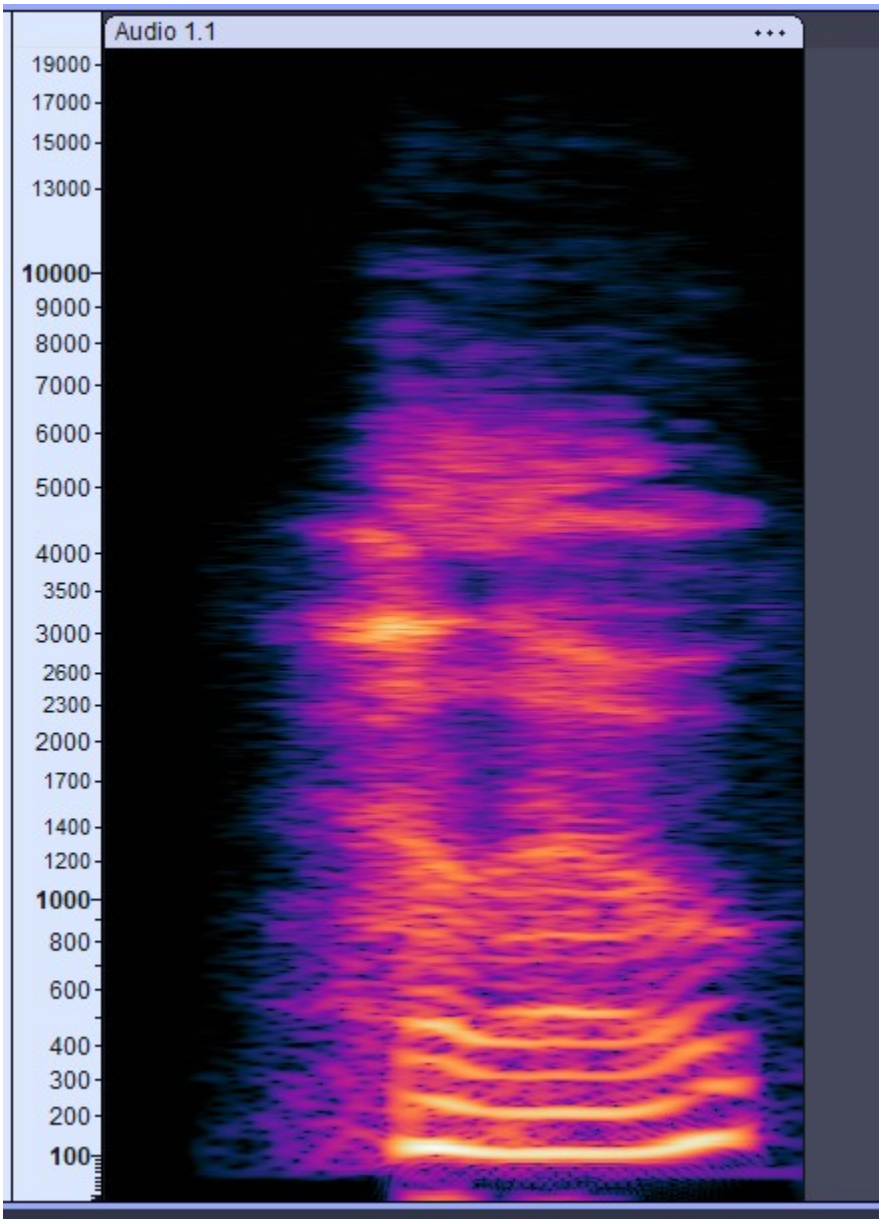
This document will primarily focus on the weight, resonance, and pitch of the voice, as those are easiest to see on a spectrograph and thus gauge your progress visually.

Using a spectrograph is beyond the scope of this document, Audacity is free and fairly easy to use and there are tutorials online for how to record and view waveforms and so knowledge of how to do this will be assumed.

Step 1: Vocal Weight and Seeing the 3 “R” values

Brightening and lightening the voice is accomplished by manipulating two separate systems at once: reducing the apparent mass of the vocal folds, and retracting the false folds. In practice, this means basically relaxing the throat in order to reduce the overall “vocal weight” as it’s called. This helps to undo the effects of testosterone, making the vocal cords easier to move and getting rid of the gravely quality male voices possess. This voice should be fairly quiet unless you pump a lot of power into it (at this stage) and not have any “edge” to it.

The easiest place to begin is with the “false” folds, or the tissue that covers and protects the vocal cords. These must be relaxed so as to keep the voice light. Physically during practice, your throat should feel like it’s spreading out, and if done correctly you should sound a lot like Patrick Star of Spongebob fame. Here is a rather neutral “hello” spoken at (what I hope is) a fairly relaxed way.

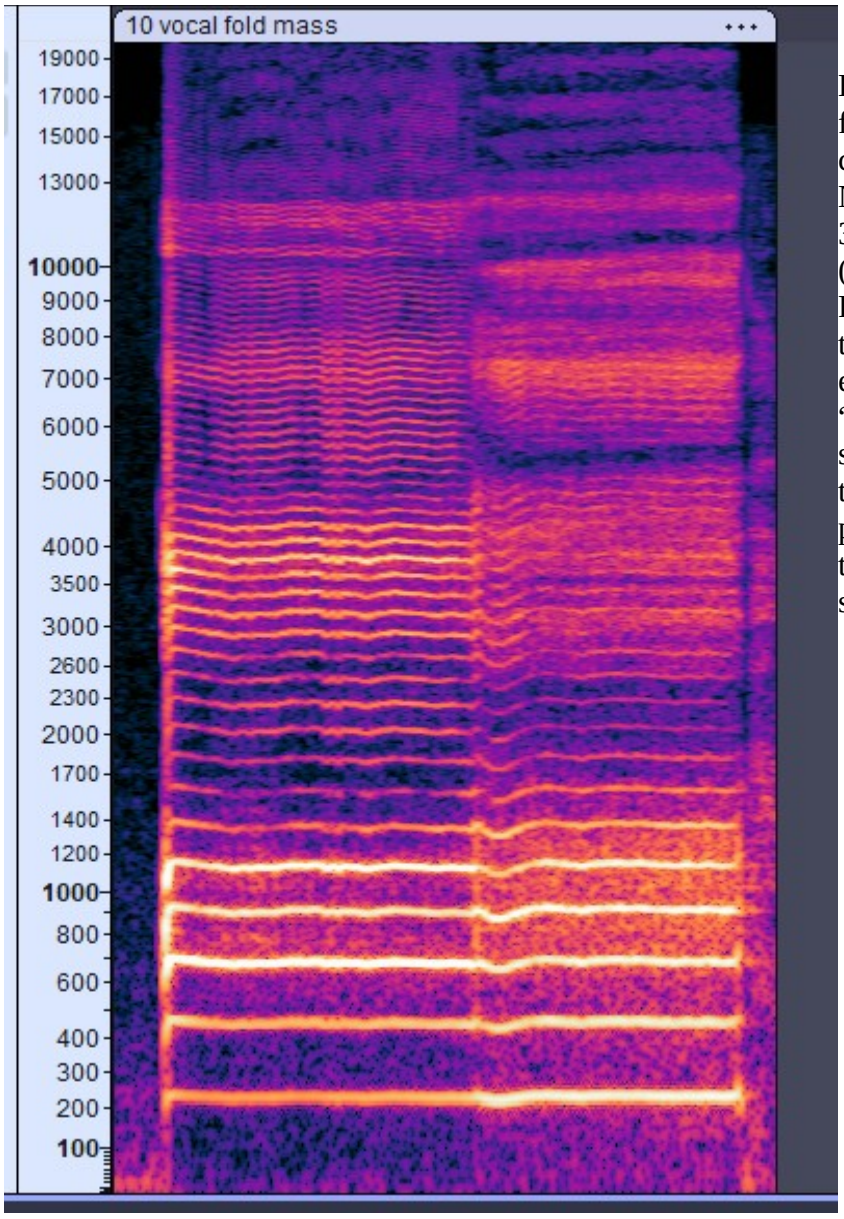


Notice the three “bright” areas that are visible at this stage. Between 100-600hz, between 800-1200hz, and then from 2600-3200hz. These are what we call R1, R2, and R3. Your throat resonance, mouth

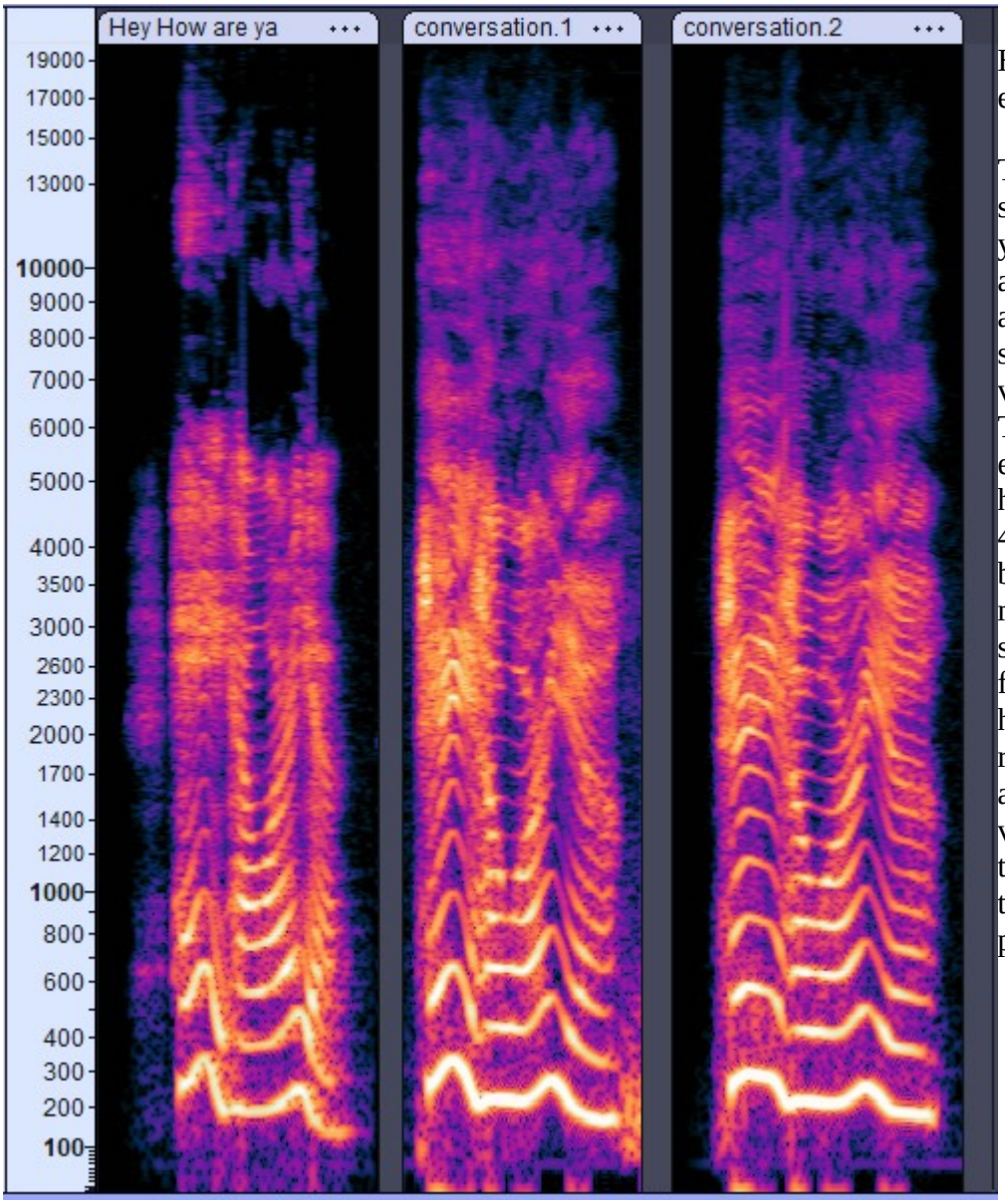
resonance, and nose resonance. You will want to work to maximize where the energy is and is not, focusing on bright lines for R1, and dimmer lines for R2 and R3.
(Resonance is an audio term for sound bouncing around inside a container. Doing the old “fill up a glass with water while you hit with a spoon” will demonstrate how it changes in a way that can easily be seen and heard)

As an exercise to physically feel this happening, simply let out a breath of air. Try to feel the throat spreading out such that no matter how forcefully you exhale, you can hardly hear it. Then, keep the throat in that position and say a word or two. Try to say a whole sentence. Then a paragraph. Spend time with only doing this until you can comfortably talk with your throat relaxed before moving on.

The second part to then work on in reducing vocal weight is the vocal cords themselves. Sadly, you have thick, unwieldy vocal cords “gifted” to you by your exposure to testosterone. You must thus learn how to speak using them with less force, lightly buzzing them in the throat rather then heavily buzzing them. Thankfully, this state is rather easy to see on our spectrograph.



Here we see a very smooth transition from heavy engagement of the vocal cords to very light engagement. Notice from top to bottom the area 3000-6000 hz losing energy (brightness) and spreading out more. Further down 600-1200hz stays about the same, while 200-400hz gains energy. As an exercise, a sustained “Ah” while you watch the spectrograph can visually show you these changes, simply note the physical sensations you experience in the correct “mode” and then try speaking in that mode.



Here is a further example:

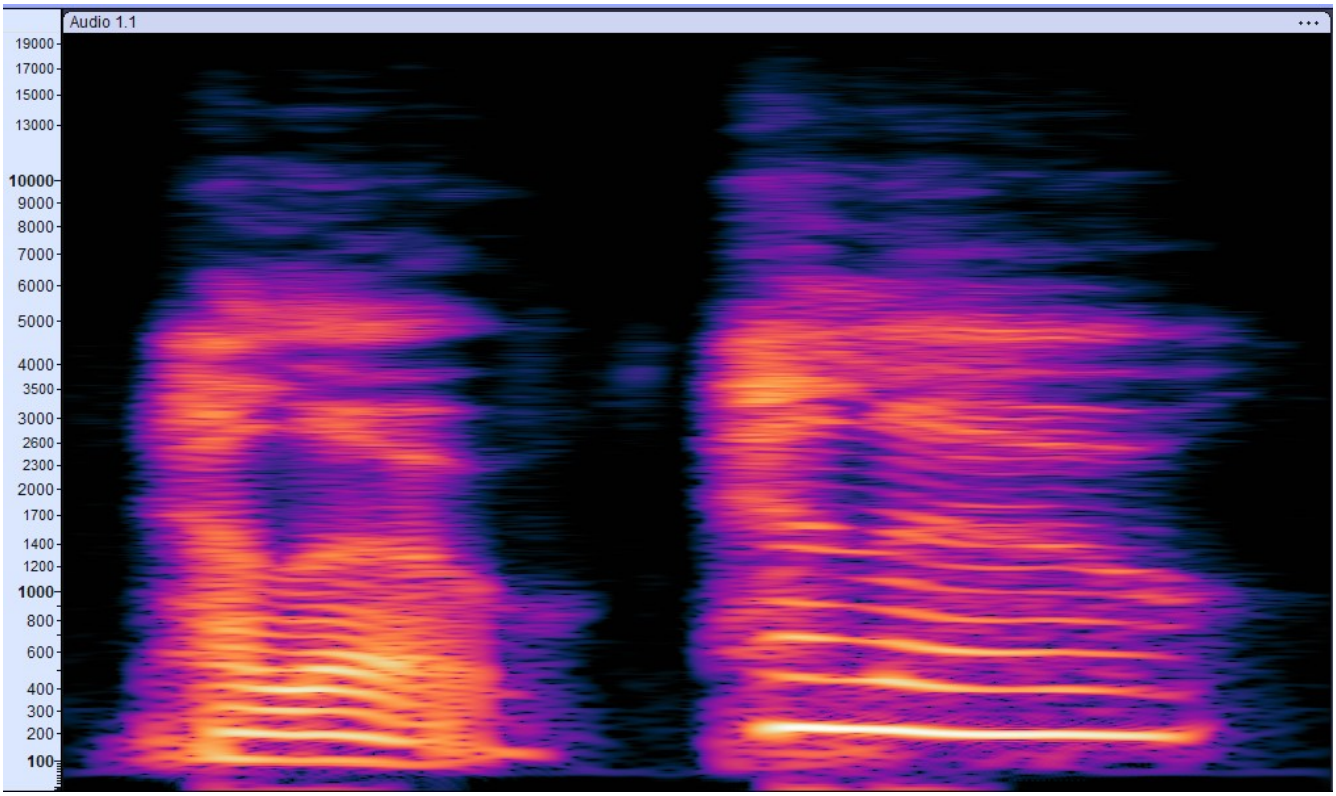
This is a female speaker saying “Hey how are ya?” To the right is me attempting the same, and achieving a rather light sound but with too much vocal cord engagement. To the right of that is less engagement. You’ll see how the energy at 2300-4000hz has lost brightness and become more distinct. There is still some way to go, the female speaker has hardly any energy in that range, but the first attempt of mine has a very harsh quality to it that is undesirable while the second is more pleasing.

One caution here, and something I struggled with a lot for months without even realizing it. Relax the entire “system” if you will, throat *and* neck. I was, perhaps unconsciously, tensing up my neck muscles in order to try and make my windpipe smaller. It doesn’t work like that, but the stain will end up changing your sound. So try to keep everything relaxed and open while you speak.

Step 2 – fixing R1

As we saw above, R1 is your throat resonance, and you could see 5 distinct lines between the frequencies 100-600hz. This “Patrick Star” voice probably didn’t sound very feminine, and the reason is that feminine speakers have their lines much further apart.

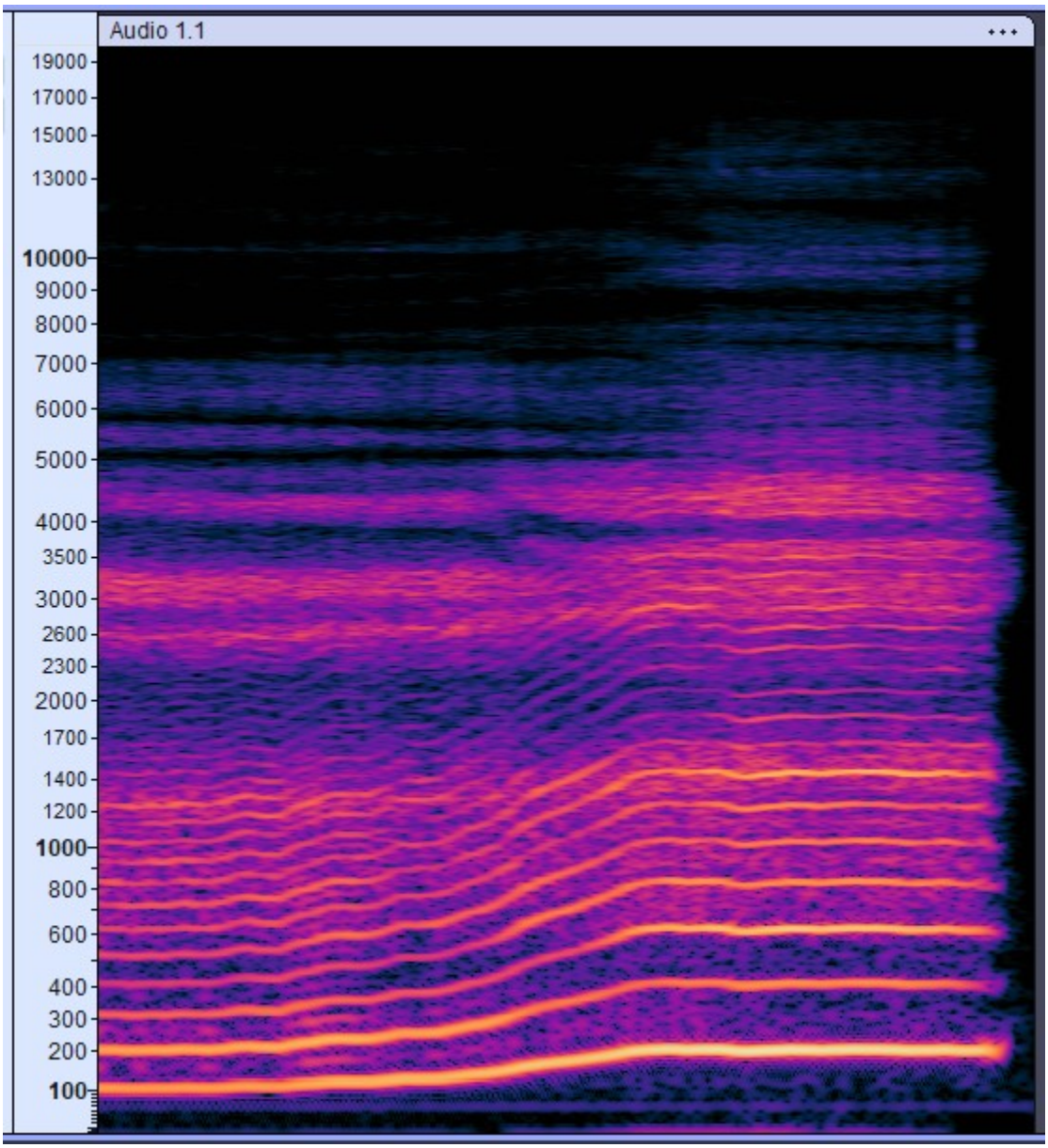
Spreading the lines apart results from raising (though I saw “tilting” used once, don’t know how accurate that was) where the sound comes from in the throat. In other words the voice box, or larynx. This makes it so the sound doesn’t have to travel as far to exit the mouth, which has the added bonus of an apparent pitch increase. For example, here is me speaking in my old voice, not trying any modification at all and saying the word “hello” followed by me raising my larynx and saying “hello” in as close to the same way as I could. Notice how my “male” voice concentrated the lines near the bottom, but spread them out using my “female” voice.



As an exercise for raising the larynx, we want to make a vampire hiss sound. Make a “whoaaaa” sound and then try to make it sound higher pitched with your fingers against your throat. As you are not using your voice, in other words do not sing a note while doing this, only a neutral “air moving around” sound, raising the “pitch” of this sound should be achieved by raising the larynx. With your larynx in this position, just as before, try to say a word. Then several words. Keep your larynx raised while you talk.

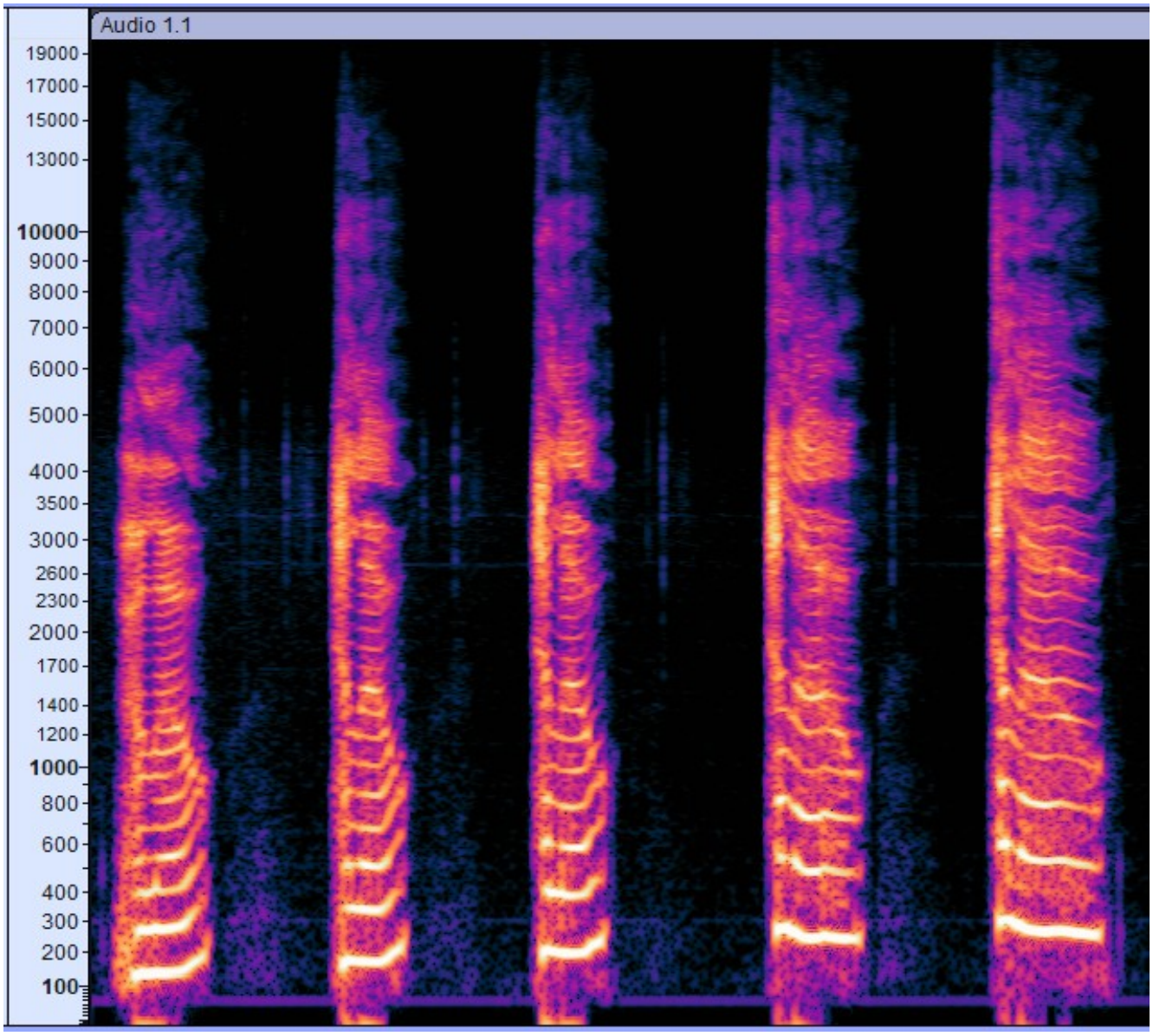
Step 3 – Raising Pitch

Pitch is just “hitting piano keys to the right” and probably the thing you can already do most easily. This is also the easiest to practice with external tools, like a pitch tracker app or simply a piano. Play a note and try to match it. Here I’m shifting my pitch from 100 to 200 hz. You’ll probably want to shoot for 250hz for a feminine sounding voice.



Step 4 – putting this together

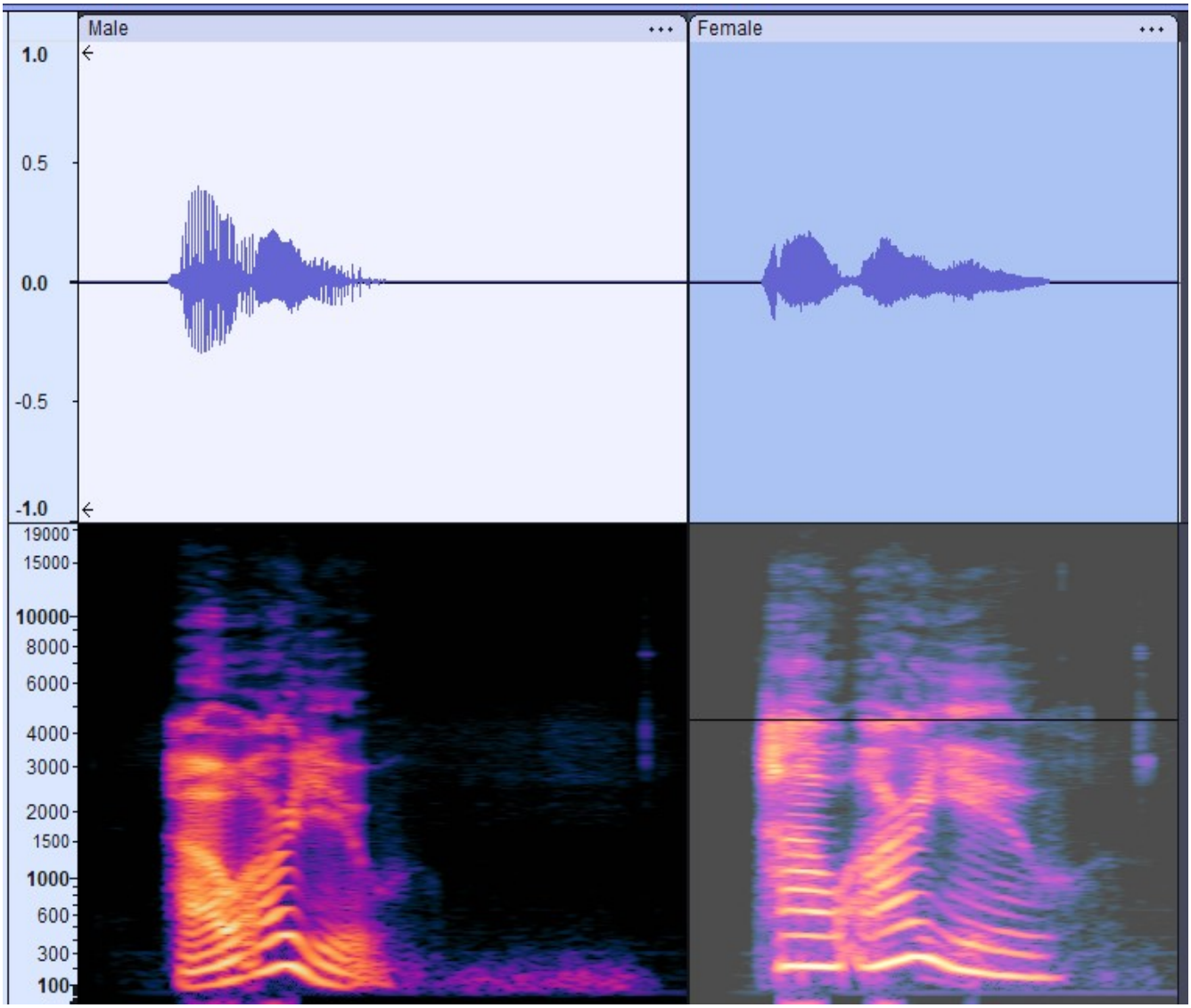
You should now have had several weeks of speaking with less vocal weight, and several weeks of learning to raise your larynx. Now comes the time to get them together. One way to do this is to begin with a light vocal weight, and raise the larynx in steps until you hear a sound you are happy with. In this example, I am simply saying “hello” multiple times until I feel my voice is bright and has a high resonance.



Hopefully you get a sound you are happy with! Again, you may have to play with the exact amount of vocal weight and larynx position to find your “sweet spot” but as you have been practicing these separately (right?) you should have a fairly good idea of how they sound independent of each other, and can now begin exploring what they sound like when modified together.

Step 5 – secondary qualities

Now for the secondary effect of emphasis. Males tend to use volume to emphasize parts of words, which can be seen with the waveform. Female speakers use pitch. Here's an example of me saying "how are you" in a male way and a female way. Note the large "bump" at the beginning and the waveform gradually tapers off, where the heights of the words in the second waveform is about the same height.



Of course you can see my pitch still changed, due to simply being unable to stop myself after trying to focus on such things for so long, or simply because that's a feature of speech no mater what gender you are trying to convey. I can't say which is more true at this time.

Brightening of vowels and rate of speech is harder to show on a spectrograph, and should be investigated outside this document. Brightening can be achieved by pinching the corners of the mouth together while speaking, or said another way trying to have a slight smile, while keeping the tongue high in the mouth. Both of these help to reduce the space for R2 and can further brighten the voice.

Troubleshooting and Final Thoughts

In general, record something spoken by someone else and carefully examine how your spectrograph and theirs differ differ. You can erase parts of the waveform using the tools to get a better sense of how each frequency group sounds, and erasing those same parts on the sample speech you can see if isolating just certain frequencies sounds closer to the ideal or not. Then decide what you need to adjust- pitch, weight, larynx height? As you've seen above, each part does produce a distinct feature of the spectrograph, so hopefully this has helped to identify problem areas easier so they can be worked on.

Keep in mind this is all about the *basic* sound of your voice. The words you choose, how you pronounce them, your posture and behavior, all serve to influence other's perception of you. This guide can get you most of the way there, voice wise, but it is just a starting point.

In conclusion I wish you luck. Know that this is a very slow process, and one that may seem impossible to you right now, but many have done it before you. You can do it too, if you put in the time and effort to practice. I hope this gives you a good feeling that there are tools to help you on that journey, and now you know more about how to use them, you'll know what to look for and that will speed that journey along.