Sarah Maria Sun

The effect of given ranges on the voice
(using a light lyric coloratura as an example)
and a short explanation of eight so called „extended vocal techniques“

Each type of voice has its own register, as well as its own strengths and weaknesses.

My personal vocal range spans from f-f''' (all pitches, both here and later, are written in the European system), but my vocal 'type' is that of a high soprano: to be exact, a light lyric coloratura. The best range for my voice is therefore between c'' and c'''.

A mezzo-soprano or dramatic soprano might well have the same range, but the function of the voice across that range would be completely different.

Some of the V**oice Types/Stimmfächer** existing are:

light coloratura, dramatic coloratura, lyric soprano, spinto, mezzo soprano, coloratura versus lyric or dramatic mezzo, alto, contralto, counter tenor, altus, spiel tenor, dramatic tenor, light baritone, 'Kavaliersbaritone', bass baritone, bass, dark bass and more. They can all be found at

https://en.m.wikipedia.org/wiki/Voice-type

They all have their preferred ranges and their own tessitura. Different vowels will suit different notes for each type, and so on.

A voice does not evenly span its entire range like an instrument might. It possesses its own unique specifications and limitations, but also endless possibilities for expression. Enjoy the process of finding out about it.

In the following text I try to explain some **general basics** of voice functions with the example of my own Stimmfach.

The effects of tessitura on a 'light lyric coloratura' are as follows:

f-c': Notes below c' should only be used in exceptional circumstances. They need to be formed as a mixture of chest and head voice to be healthy, but still don't sound particularly strong and will not be heard against even a moderately loud ensemble or orchestra. They should only be used as a special effect.

c'-g': The range from c'-g' is still low in the vocal range, meaning that these notes will have limited overtones. This range can be used for Sprechgesang; it should not however be over-used, and even in Sprechgesang the range a'-g'' is more common (see the Schoenberg pieces attached as examples).

g#''-c''': This range is considered to be in the 'high register'. N.B.: notes higher than g'' require considerable effort from the vocal chords and the rest of the body. Many composers believe that these notes can be written for a high soprano as if the voice were an instrument, but this is incorrect; the act of singing takes a very physical effort from the individual singer, particularly in the extreme ranges.

c#'''-f''' (or higher): Notes higher than c''' should only be used as a very rare exception! Some high sopranos can perform in this range in *pianissimo* as well as *forte*, while others are limited to one dynamic or the other. It is very difficult (although not technically impossible) to produce *messa di voce* in this register (crescendi and decrescendi). The f''' (or higher pitches) should only be used as a short note, not as sustained notes (except for extremely high vocal types (see above)).

Ensemble singing

As a high soprano in a vocal ensemble, I was required to sing very high notes for hours at a time. This is possible to some extent in the context of ensemble work as the notes are sung very softly, reducing the need to support your singing with your body. Your sound (including overtones) is mixed and added to the voices around you, meaning your individual sound is much less important and you can get away with a less than perfect support. It is however still frustratingly tiring.

Solo singing

When singing as a soloist, long passages between a''-c'' should be avoided; rather this range should be used as an expressive moment from time to time. Retreating to the lower range after a passage of high notes is helpful for the quality of the sound, after which this high range can be used again. This encourages the muscles to stay flexible instead of cramping.

Nevertheless, some singers have the physical ability to use their high register without a great deal of effort. These few high sopranos have a range extending up to g''' or higher.

N.B.: There are also contra-altos and mezzo-sopranos who can produce notes up to the third octave using a special technique, resembling a 'squeak' (a skilled colleague of mine refers to this as her 'mosquito style'). It's called Whistle Notes. Those notes don't expand in volume. If you are lucky enough to have a singer who is able to do this and want to use this register, you should work directly with the person to find out what sounds are possible. This technique should not be treated as if it were normal singing: i.e., dynamics must be limited. This sound cannot be produced with the necessary overtone richness or at a sufficient volume to cut through an ensemble or orchestra.

How to compose for voice while ensuring the best sound quality and without causing harm

Vocal lines that explore different ranges from c'-c''' (based mainly in the area g'-g'' but sometimes sliding or blossoming up to a high note) are the most comfortable for most, or even all, soprano voices and will ensure the best quality of sound.

Intervals: Jumps of large intervals (i.e., bigger than a sixth) are possible but require a lot of effort. Muscle tension in the throat and body has to be completely changed from one note to the other. It is possible for the singer to train themselves to use this technique virtuosically but it is demanding (particularly if attempting to maintain good sound quality) and is not ideal in a vocal line. (Imagine doing a high jump, long jump, sprint and marathon in sequence, without warming up or having recovery time in between; this can be compared with the changes a singer has to make in the many muscles used to produce vocal sounds).

Eight so called „extended vocal techniques" – basic knowledge

Hundreds of tonal colours or timbres can be produced by the voice: much more than on any physical instrument, due to the flexibility of its basic material (body tissue). The voice always has an unavoidable psychological impact on the listeners because all vocal sounds will evoke mirror neuron based memories/feelings connected with them, creating a bond between the audience's physical and psychological experience, This has always inspired me to use as much imagination and experimentation in the psychological side of performance as possible.

In my experience, the most common „extended" vocal effects are:

breathy voice

inhaled voice

multiphonics

tremoli

speaking/whispering

screaming

overtone singing

undertone singing

In the Pop/Rock/Jazz/Metal scene of course most of these techniques are constantly used as a normal part of the vocal expression. These techniques partly stem from diverse traditional techniques other than opera singing. They don't destroy the vocal chords. They simply require other usage and positioning of muscles and larynx.

Most humans won't be able to securely produce these effects right away – they need to be experimented with, practiced and performed in as relaxed a manner as possible in order to acquire the techniques in a way which does not damage the voice.

Breathy singing:

Breathy singing is not too disturbing for the vocal folds and throat, as the air is at least kept moist by the lungs. The vocal chords, however, are still not able to close and vibrate in the normal manner and the muscles connected with them have to work against the increased air pressure. The vocal chords also dry out much more quickly which is counter-productive as they need to be moist in able to work.

Inhaled singing:

In order to produce this effect, the muscles need to work in a completely different way than usual and the singer needs to find a way to keep as relaxed as possible so as to avoid cramping. The air in most venues is also not as moist as the air coming from your lungs, unless singing in a steam bath (while even there, unfortunately, the vocal chords would swell from the heat, making them impossible to use).

It should be clear, then, that the vocal chords will dry out quickly when singing while inhaling and will not be able to work adequately afterwards. A performer can still try to sing, even beautifully, for a while but it is not an ideal situation, as stated above: especially in longer pieces of more than 5 minutes.

N.B.: Give the singer a break and let the instruments play for a while so that they can swallow and moisten their vocal chords again. Then they can sing as usual.

* Side note for singers: if you are asked to perform speaking, whispering, breathy or inhaled passages, try to find the right balance of air and sound, using as little air as possible to produce the required effect. Use the lower muscles of your throat and prolong consonants as much as possible. If allowed by the vowels and pitches, try replacing the effect caused by your vocal folds by putting parts of your tongue together with the soft or even hard palate of your mouth, creating a filter. Make sure to swallow a lot, and you can even bite the sides of your tongue during small breaks, stimulating the production of saliva. Make sure you keep swallowing, and drink a lot of warm, slightly sweetened drinks afterwards, which also will encourage saliva production.

Tremoli:

Composers often ask for a *Monteverdi trill* – a quick staccato-like repetition on one note, using both the throat and diaphragm simultaneously. This technique has been used for a long time and just requires training.

If the voice has to widen the trill to bigger intervals, however, the technique could be conceived of as a molto legato 'sliding' between the notes. The tempo of this can be increased with practice, but the larger the interval, the slower the tempo will get as the voice needs more time to slide between the distant pitches.

Speaking/Whispering:

The speaking voice cannot produce the range of overtones achieved by a sung pitch and will therefore always sound dynamically weaker than the singing voice. If alternating between singing and speaking in one part, the singer will more or less have to scream the spoken text in order to keep the dynamic level balanced. It is extremely difficult for the speaking voice to cut through an ensemble or orchestral sound: ideally, the performer would use a microphone (or perhaps, for funny instrumentations, a megaphone or horn).

Different muscles need to be engaged when speaking than when singing. The typical 'faked' sound that opera singers often use when speaking on stage (e.g., in *The Magic Flute*) is actually a good way for a singer to cut through an orchestra and project their sound to fill a big venue while avoiding the risk of damaging their vocal folds.

Personally, I prefer a more 'real' sound when speaking on stage; there is however always the risk that this might make it difficult for me to produce beautiful, resonating high notes directly afterwards. Switching between these different muscle tensions and the separate demands placed on the vocal folds is demanding.

Whispering demands a lot of additional air to be pushed through the vocal folds. They therefore dry out quickly which is unhelpful, as the vocal folds need to be kept moist when singing. (See Inhaled Singing)

Pieces by Berio, Ligeti and others which require a lot of speaking, screaming and whispering would be more likely performed as the *finale* of a concert. Because afterwards, „normal" singing with rich overtones is hard to achieve. The ligament of the vocal chords is probably totally stressed out and would be grateful for a break.

Multiphonics:

The pitch of a multiphonic can be controlled to greater or lesser extent depending on the material and the singer's training and experience. Try to produce the sound by tensing the muscles with a normal balanced tension and by using the creaking technique that speech therapists use to help voices recover and to rebuild a healthy closing of the glottis. This technique is, in effect, a vocal fry in diverse registers (see below: Undertone-singing). To produce a multiphonic one would not use the plicae vestibularis, the „fake vocal chords"!

If there are any questions regarding this technique please contact a metal coach, a good speech therapist, me, or any colleague who understands how they physically produce this sound.

Overtone singing:

The higher the pitch (and therefore the thinner and shorter and the vocal chords have to

be to perform it), the less the main note will be able to be filtered out with the tongue in order to make the overtone audible. This means that, generally, a soprano register is not ideal for this technique and that clearly audible overtones require a ground note in the middle or low register.

Undertone singing:

There are, generally speaking, two different techniques for this:

- firstly, the vocal fry (German: Strohbass), which is a modulation of the oscillation frequency of the vocal folds and produces an additional pitch in the subharmonic register. The vocal fry is used regularly in electronic vocal music.

- secondly, there are various options where the so called „fake vocal folds“ are involved. The most commonly known technique is called Kargyraa. For further reading I would recommend going to this page:
http://www.oberton.org/obertongesang/untertongesang/kehlgesang/

Multiple tutorials for this and all manner of other vocal techniques are available on Youtube.

Screaming:

This should only be used if there is a very good reason to make a singer do this instead of using an actor, a recording, or mimicking the sound electronically.

Screaming easily creates oedemas on the vocal folds.

* Side note: A supported speaking voice does not require a perfectly smooth, even ligament and mucous lining: the massive inner part, the vocalist’s muscle, is mostly used, and the fine ligament much less. Singers in the contrary are dependent on a super smooth, intact ligament, because it is the body tissue that vibrates fastest and produces all the bright frequencies, which carry the sound through big spaces and „cut“ through an orchestra.

* Second side note: Personally I recorded a range of different screams which are available for any composer who needs any screams in the future.

Real screaming:

I hope I will never need to do this again. I generally needed days of rest afterwards, and in two cases weeks (an experience I share with some Wagnerian singers). Using the false cords (plicae vestibularis) with lots of pressure causes huge stress for the soft ligament of the vocal cords.

Fake sreaming:

Not a big problem. Just produce a multiphonic or vocal fry as a basis and change the pitches in quarter tones or even larger intervals irregularly. This won’t cause any harm whatsoever. Pull up your soft palate to gain a bright, fearful colour which will produce a sound like a *da lontano* or half-muted scream. You can experiment with the tone colours to create a wide variety of expressive possibilities. Amplification will help.

Half-fake half-real screaming:

Take the multiphonic but add body support, placing the sound lower in your throat and perhaps adding the ‘fake folds’/*plicae vestibulares.* Whatever you do, use your lower pelvic muscles to help support the vocal chords to deal with the increased air pressure and tension.

Final remark

Singing Wagner operas, or too much of any opera, incorrectly or in too short a space of time has (according to phoniatric studies) led to more coarse, damaged vocal cords than contemporary music has.

Wishing you lots of fun and fantasy,

Sarah

Sarah Maria Sun, *Sept. 2016*