After Estill: a conversation we need to have

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Dr Gillyanne Kayes

A couple of housekeeping things from me. Jeremy is very kindly videoing, thank you AOTOS for allowing us to video this. So there's no need to scrabble around and do notes and do stuff with your phones, because you're going to get everything. I'm going to issue the transcript of the whole talk that I'm giving you, and any PowerPoint slides that you're allowed to have. So you can kind of rest assured. One thing you will need is your lexicon of terms [see Appendix 1]

I'd just like us to start off by thinking about what our challenge is as teachers. And I have shamelessly nabbed this from the Professional Voice Teachers' Facebook Group, although I reworked it. The things that we need to think about are what's true from an understanding of science and other disciplines that inform us about singing voice. And also what's useful. Because you know there are some aspects of science that you go "yeah, alright, how do I use that?". So what we want to really focus on is that lovely point of intersection. And that's our job really, as professional voice teachers - that's why you're here isn't it? You want to learn.

OK. I'm just going to talk a little bit about me and why I'm here. Because there could be some people here thinking "Why is she talking about Estill? She's not an Estill trainer." And that's absolutely right, I haven't been an Estill trainer for just over 16 years. But I was, and I was a Vanguard Licensee, and that means that I was licensed at the highest level. I think, during that time that I was Jo Estill's representative in the UK, we must have organised

about 40 courses. A lot of them were financed by myself and Jeremy and the company that we ran to organise the courses, and of course I taught on a lot of them as well. It was a very exciting time. And I think as Ivor [Ivor Flint, chair of AOTOS] has indicated, if there are any AOTOS members who were here the first time around, and I think you are, it was a bit of a rough ride. You know, some of our preconceptions about voice were challenged. That was one of the things that Jo Estill brought to us, and many of those things are still of value now.

As an ex-Estill trainer, I think I can offer a genuine perspective on the influence of Estill on teaching in the UK, and also to review some of the topics, some of the words that we use, some of the techniques from a more contemporary voice science understanding. Because we've moved on a lot in those 25 years.

So I will be revisiting some terms that we use, some aspects of Estill, and what I hope to do is shed light on them. I'm also going to tell you a bit about my own journey as a teacher *from* Estill, and how things have evolved since that time for me.

Can I just ask how many people here have done an Estill Level 1 or 2. That's good because otherwise I'd be speaking perhaps to people who didn't get it. But everybody's heard of Estill? They've all heard of the Estill Model? Anybody not? Right! We'll sit down - we'll have coffee later.

OK. So like I said, please understand there may be some cognitive dissonance moments for some people. That's ok, we had that 20 years ago as well. This isn't about blowing things out of the water, it's about understanding better. We have a lot to thank Jo Estill for and I personally have a lot to thank Jo Estill for.

OK, let's have a look at our next slide.

Change happens in a context. We all know this, we've only got to look at our political situation in the UK right now, and across the pond, and we can see that there's a context. I think there's a very good reason why Jo's work was such a catalyst for change in the UK 25 years ago. You know, when the first Levels 1 and 2 were hosted by the British Voice Association in London, and that was very much instigated by Janice Chapman and Mary Hammond, at that time we had very little practical knowledge of the links between voice science and singing voice pedagogy. Most of us had learned in the sort of master-apprentice model, and we carried that with us.

I have to say this is very different from how things were in the United States, and some of you who are perhaps more familiar with the Estill Model will know that Jo Estill didn't get a very good reception in the US. And I think there's a good reason why, because they had many more - they had a history of academic pedagogy programmes. Can I just explain the word pedagogy because someone asked me about it the other day? Because it's not a word we use a lot in this country. There are two meanings of a pedagogue: one is that it's someone who thinks about the theory of teaching; apparently the more modern interpretation of the word pedagogue is a pedant. I'll leave you to decide which one I am.

So yeah, there were some significant academic pedagogy programmes already in place and some very important work done by people who were singer/researchers. You may have heard of William Vennard - Mechanism and the Technic, published in 1967. You may not have heard of Barbara Doscher, but I can assure you that her book The Functional Unity of Singing is a storming Norman, you know? Get it. It's out of print but get it from Alibris - read it!

And of course, our own adopted Meribeth Bunch Dayme and Dynamics of the Singing Voice. So these actually all predated Jo's published research and her arrival in the UK. And they also talk about things like voice onsets, behaviour of the vocal folds, laryngeal positions, and I found a reference even in William Vennard in 1967 to twang and the mechanism for twang. That's not to sayDENY that Jo did some ground-breaking work on twang, I think that she did. So what I'm saying is that we didn't have that. We didn't have academic pedagogy programmes in the UK. In fact, we barely have them now, they're just starting aren't they. So perhaps that's a reason why across the pond the impact was smaller from Jo's work. And I don't know what you remember but I think in 1992 when the first Estill Levels 1 and 2 were run in the UK, there really wasn't any training for singing teachers other than perhaps the odd term of the art of teaching at some of the colleges. You can correct me if I'm wrong on that - write it down! I think that was the situation. I think Jo's arrival accelerated this the change of thinking about voice in perhaps a more scientific way - the function of voice as we call it. And that was very important. So...

We do have to say this, thank you Jo. It's a lovely shot isn't it, from a video conversation I had with Jo in 1997, and you can see the little bit of warmth and humour and the twinkle in the eye. So Jo Estill was a trailblazer, and we do have to say that. She was not afraid to go against the tide, in fact she rather relished it. If you've seen Jo Estill present, you know that she was feisty. And as a result, we were kick-started into a different journey to find out more about the function of singing voice and that journey has continued. Actually, very soon after our first Estill course in the UK, lectures were set up in conjunction with the BVA for the course participants who demanded to know more about vocal function.

Later I asked Meribeth Bunch if she would revive her own course on dynamics of the singing voice and that ran for a number of years. I imagine quite a few people here went on that course. And it was attended by many people who are now leading trainers in the UK. And I guess I'm right that most teachers now aren't afraid to talk about the vocal folds, you know? We feel ok about it and we recognise the importance of understanding something about how the voice works. And I can see quite a lot of our newer, younger trainers here which is fantastic. You know, they know their anatomy and physiology, they've even learned some acoustics, they're rocking and rolling. This is good, this is progress.

So, what I'd like to do now is a little bit of re-examination. I want to look at some of these common terms I mentioned early - earlier. If you like they're part of the Estill legacy and they've kind of gone into our teaching culture to a greater or lesser degree. And I want to think about modern science interpretations and see where we go with that. I think I've got a little slide there, re-examining some common terms, yes.

Now if we're going to understand where Jo Estill's work came from we have to understand the original research. And I have spent quite a few weeks geeking out on considerable numbers of research papers, one which is 92 pages long. Being someone who is a researcher themselves it's been very interesting to see that, to see what the process was, how it generated the approach that Jo ended up with, and which she provided in her Levels 1 and 2 courses. Really interesting process.

Oh, here's a nice story. A conductor friend of mine recently attended a presentation from one of the Estill folk for ABCD and she rang me up later - she didn't know I'd been involved in Estill. And she said, "Do you know about this Estill stuff?" I said "Yes". And she said, "What do they mean by a model, what's a model?" Interesting question, isn't it? What does it

mean? Does it mean a method? I'm sure we could talk more about that. And what it led me to think is that the term "model" really belongs to the world of research, it's part of research language.

So let's go there and think about the intention of the original research. Because that led us to Levels 1 and 2 as I said. Now Jo's interest was in voice quality. And in particular she was interested in four voice qualities. That's how she started out. It was, er, I forget what she called the initial one but let's call it Speech, Cry, Falsetto and Twang. I think she might have called Speech something different originally, modal I think. Anyway, you'll recognise those terms of Speech, Cry, Falsetto and Twang. No, I've got that wrong. The original four were Modal, Twang which she called something slightly different, ring I think, Opera and Cry. ***[Ed. Speech, Twang, Cry and Operatic Ring].***

So those were the four. And in their research paper Colton and Estill, it was published in 1989 - this is the 92-page report. What they said was these four voice qualities were "arbitrarily chosen for their gross perceptual differences" and that should be "perceptually distinct throughout a singer's [total] phonational range". Right, so let me unpick that for you.

What that means is that in order to make a good research project, four voice qualities were selected that were kind of in the four corners of what was possible. So they were very sharply differentiated. And it was a key hypothesis of the research that you would be able to hear the singer do that voice quality right across their full singing range. That was a hypothesis. Let's just remind ourselves of what a hypothesis is... whoops, I think I've taken that out!

In research, a hypothesis is a conjectural starting point that we use in a research project - it's then put through a testing process. So it's conjectural and then you test it. Not all research proceeds like that. I did empirical research where I looked at what singers were doing so that I could understand it better. They are both very respectable ways of doing research.

OK, well you've already seen a little preview of what's coming up next. Let's talk about "tilting"!

How many people are familiar with that term? OK, I think that's a show of a hand from every person in the room which is great. What does it mean really? Let's think about that. Now the Estill Model proposes a tilted thyroid posture as a prerequisite for that Cry quality. Inside the larynx we have muscles that shorten the vocal folds and that is the TA or the Vocalis muscle. TA means Thyroarytenoid. I'm going to use the acronyms as we go through otherwise my talk would be even longer than planned. OK? And we have muscles that lengthen the vocal folds. These are the cricothyroid muscles or the CT muscles. So TA shortens and bulks the vocal folds, also stiffening them, and I'll be talking about what muscle stiffening is in due course. And CT elongates, thins and also tensions the vocal folds.

I want to show you a typical representation of how that might look in the larynx. Let's see if I can get the pointer working (it's that red button there). What you've got here is the rest position, so this is the non-tilted position where there's actually a gap, it's a very small gap, between the thyroid and the cricoid cartilage. That's the muscle that been positioned there. And for the solid line you've got the tilted position. So this is a tilted forward position. If I represent it just with my hands it's very common that you see people describing it in this way. OK.

But functionally *this* can also happen. This is a diagram - the diagram from Netter. The first one is from Ron Baken and the second one is from Netter. I will give you all the references for these in the transcript so you can look them up for yourself. Now what's interesting about this is that it looks like it's the wrong way round doesn't it? OK, so now what we've got, in this case the tilted the elongation of the vocal folds, is the dotted line. So because of these muscle bands that we have and the articulation of the joint of the cricoid and the thyroid, we have two possibilities for the stretching and thinning the vocal folds. You can either do this, or we can do that. They both achieve exactly the same effect.

And the important thing you need to know, according to the Harris Voice Clinic, authors of the Voice Clinic Handbook, some singers do it one way and some singers do it another. So these variations of movement are actually incredibly important because if we are going to teach our students to tilt, we need to avoid misdirecting them. Suppose you describe only the forward tilt of the thyroid and your student does it the other way around. They're going to be desperately hunting for that tilted position. Interesting thought eh?

We also need to bear in mind that the intrinsic muscles of the larynx, and we're talking here about two sets - the TA (Vocalis) muscle and the cricothyroid, and there are many others... Those intrinsic muscles of the larynx don't go it alone. We can't just work one without the others doing something. All the intrinsic muscles of the larynx are served by the vagus nerve. There are two branches of the vagus nerve and it so happens, which is a quite interesting little factoid if you're a voice geek, is that the nerve that serves the cricothyroid is different from the nerve that serves all the others. So we have a superior laryngeal nerve that serves the cricothyroid, and all the other intrinsic muscles are served by the recurrent laryngeal nerve that actually runs through the heart.

So we have to bear in mind that, although we like to think we have independent control over these groups, we're not just using one muscle at a time. And I'm sure Marcia [Carr] is going to have something to say about that later on this weekend. I certainly hope so.

OK, let's have a look. So I've already talked about the effect on the vocal folds that they will be elongated, thinned and tensioned.

OK this is a nice bit of research that was done by these two authors, a husband and wife team. They were looking at cadavers as you do if you're a medical person in the speech sciences. And they tested the effect of the cricothyroid muscle, and what they found was that it *can* alter the length of the vocal folds by round about 25%. That's a lot. Imagine holding an elastic band in your hand and pulling 25% longer. Stay with me! I'm not suggesting that the moment we engage the tilting mechanism that we go straight to 25%. There's every reason to indicate that you do it incrementally.

OK, just going to check where I am in terms of slides. So when you tilt, just hold in your mind the idea of an elastic band that is pulling and stretching, we change the mass per unit length of the vocal folds. This is really important. We all have a resting length of our vocal folds. We engage the cricothyroid mechanism we're going to change the mass, the thickness, of the vocal folds. And lots of you are probably familiar with that. Ok, we tilt and we thin the folds. That's great. But you know what, a longer thinner vocal fold is set to vibrate faster. You've only got to think about the string, you've only got to play with your elastic band and that's what it does. And a faster speed gives us a higher pitch.

So now this brings us to a little bit of a conundrum when we're thinking about holding a tilted set as for Cry, all the way across our phonational range. Following me? Good!

So we need to think about... because if we want to maintain the same pitch, and this is one of the Figure exercises by the way for those of you who don't know. You sing a particular note without tilt and then with. The idea is that you have this independent control. And it's interesting when you think about the effect and what's known in the literature about what happens with the cricothyroid mechanism. Because if you're going to tilt and you want to maintain the same pitch, some type of reset will be needed in the larynx. Other muscles are going to have to engage, otherwise you are going to change pitch.

So if it is our intention to take the Cry quality across the vocal range, I'm going to suggest that what we need to think about is how efficient or inefficient might it be to hold that tilted set across the entire range. How well is it going to work in the lower range where the vocal folds actually prefer to be shorter and thicker? And what should we do when the Vocalis muscle reaches its maximum tensile capacity, in other words we can't stretch it any further, because all muscles have that, if we haven't yet reached the top of our range? Wouldn't it make more sense to reset by moving into a falsetto where the vocal fold mass is looser, and then re-engage the tilting muscles, then re-engage the CT, so we can stretch further. And from the clinical standpoint, which I'm rather hoping that Linda [Hutchison] will cover, because we've had a little conversation about my topics, is that if you're going to maintain a hold on the tilted larynx even for classical singing, it might lead to what we call a muscle tension dysphonia.

Muscles like to be switched off, they don't like to be fired the whole time. Particularly if we're directed to do so with effort.

Has anybody here ever seen a real larynx? Yes, I have, I had the privilege of holding a larynx in my hand at one of the PEVOC events in Marseilles hospital. It was a pickled one. We did

actually have a real live larynx in the room, and later on Tom Harris told me in a rather serious voice, that was a car accident, you know that. Which was rather a sad thing. We were all so excited. Anyway, well, medical science relies on that sort of thing. Anyway, it's tiny. You could hold a larynx on your thumb, you could position it over your thumb. Can you imagine how small those muscle movements are between the thyroid and the cricoid and how easy it is to misdirect your students and ask them to cry harder?

And you know, recent thinking indicates that crying is a preverbal reflexive action which is controlled by our periaqueductal grey region in the brain. It's emotionally motivated. It doesn't have to be hard.

OK, now I'm going to talk about tilting the cricoid for belting. Again, lots of you will have heard about belting and you may even have read my book [Singing and the Actor] and in the first edition of my book I had cricoid tilting for belting. In the second edition of my book I sort of said well, we don't actually know how that happens so it could be something else. Moved on a bit since then!

People often ask me about this in masterclasses because they've read my book or maybe they've done their Estill courses and they see that I don't use it when I'm teaching people belt. So of course, their hand goes up: why, why aren't you doing it? Well the short answer is I don't do it because we can't do it. There are no muscles positioned in the larynx to pull the cricoid downwards in that way as Jo originally thought. I'll explain why she may have thought that.

Of course, if we had a cricosternoid muscle for those of you who are used to thinking about muscles and attachments, we could do it. But we don't have one of those.

So what I want to show is a fairly complicated diagram but it gives an idea of a more likely scenario. Given what is known about the intrinsic and the extrinsic muscles of the larynx, and this diagram has been very kindly supplied by Tom Harris. I did warn you it's quite complicated. Tom loves his vectors and this is actually a summary of what is known currently about the muscles that hold the larynx in position, what we call the extrinsic muscles, and the intrinsic muscles that move the vocal folds and the arytenoids and those that also stretch the vocal folds in tilting. And this is derived from Vilkman et al 1996, External Laryngeal Frame Function I think.

OK, right. What I want you to notice... let's see if I can get this going again... is that red arrow at the top. So this is the thyrohyoid muscle and it attaches to the hyoid. Now the hyoid bone is actually very moveable but there are lots of muscle attachments to it that can hold it steady. And if you just look down here - cricopharyngeus - this is the muscle that is the bottom of the three... they're called the constrictors of the pharynx. Sorry, they're called constrictors, that's what they do. We use them in swallowing. And there are two bands to that muscle so you've got two arrows going in different directions, but the sum of the pull is that dotted line there. And this is tracheal pull which is to do with the link between the... there's a lining that comes up from the trachea whose name has suddenly escaped me which someone can shout out if they remember it, which goes through the larynx ***[Ed. conus elasticus]***.

So if we can engage that thyrohyoid muscle can you see where the thyroid cartilage would go? It would actually open up so we've got a slightly up and back movement. Now if we did *that*, it would allow us to shorten the vocal folds somewhat for belting which is what Jo Estill suggested, and I actually don't disagree with that because otherwise the sound

wouldn't be as loud and as heavy as we hear. Because normally when we do belting it's above comfortable chest register, ok, so we want to keep a relatively thick vocal fold in that action.

And for those of us who teach a slight head-tip up, and I'm not talking about chin-forward or any of that stuff, I'm talking about nodding up. For those of us who do that it makes even more sense that we would actually be able to keep a slightly thicker vocal fold.

So, no, I'm not ready to go there... It's fair to ask what might Jo Estill have been seeing when she was looking down at belting, because she said that she saw the back of the cricoid. She could see the back of the arytenoids and that was why she assumed that, let me get this right [checking hand gestures], why *that* had happened. Fair enough. Well, actually it's very easy to misinterpret what you see when you have an endoscopic view of the larynx. Endoscope, you know, the little fibre-optic thing that goes down the nose and looks down from above. I did some endoscopy in my own PhD and I learned how easy it is to misinterpret.

So remember you're looking down at something that is actually positioned at an angle, it's on a slope. And when you see a structure like the arytenoids change position, it's very easy to make assumptions as to how that position was achieved, which muscles might be doing it. But since we know that a muscle on its own can only contract and relax - muscles don't stretch on their own, something else has to stretch them - it can only contract or relax in the same direction as its muscle fibres. So if I have a muscle that's going from there to there it can only stretch ***[Ed. oops, Gillyanne meant tense/pull]*** in that direction. Does that make sense?

So the bottom line for me is I think we should stop talking about cricoid tilting for belting because it's never a good idea to direct your student to do something physiological... if it's not possible to do it [Audience laughs].

Some of us use metaphorical language and imagery, and some of that imagery doesn't make sense physiologically but I don't think that matters. But if you're using a system of training that is supposed to be very married to physiology and that physiological movement can't happen, it needs to be reviewed.

We're 25 years on, we can do this!

What I'd like to share with you now, because I do think that Jo Estill did pioneering work on belting, and as far as I can work out she was the first person who really looked into it. You know when people started to talk about belting it was all "oh this is terrible, you mustn't do it, it's going to wreck your voice", and there are masses of articles that you can read about that. Well, the thing was that Jo could do it, and she could teach people to do it, and it was safe. And I think we need to acknowledge that because it's very important, even though in fact there's a lot of disagreement from people in the States as to what belting is. I'm not going to go there - that's another talk altogether.

But what I'd like to do is tell you a little bit about some updated thinking on belting. These are follow-ons from the work that Jo did. Because there have been some interesting new insights into things like breathing patterns and the closed phase of the vocal folds.

So let's have a think about breathing. Do we need a clavicular breath for belting? This is one of the things that was one of the main tenets and the shock factors of the Estill Model is that you must breathe high for belting. So, in her doctoral dissertation, Monika Hein in

Germany looked at breathing patterns of musical theatre and contemporary commercial singers. She didn't find a distinctive breathing pattern for belting, and when she compared legit and belting, what she found... (legit is most like head voice in musical theatre). What she found was there were differences in breathing behaviour *between* individual singers but they used the same breathing pattern in both belting and legit. Johan Sundberg who was one of my own PhD supervisors and Margareta Thalèn found similarly when they were comparing breathing patterns in six professional belters singing in what they called "Neutral" which I guess would be most like Speech Quality, and belting. They found no clear pattern of breathing for belting.

Oops, well, I'll just take that one away for a moment.

So, there's no scientific evidence that clavicular breath is required for belting. Personally, I don't teach it. A smaller breath, yes, but not clavicular. It doesn't make sense to me, because if we have high subglottal pressure from those vocal folds staying closed for a long time in each cycle, if we take a clavicular breath how are we going to control that subglottal pressure? I don't think I've ever taught it actually. I teach a small breath.

OK, so now I want to think about the closed phase of the vocal folds. And do you know, what I think we should do first is find out what a closed phase means, because I realise I'm talking quite a lot of science here. We're going to do a clapping exercise. And if my rhythm gets wrong my husband is going to stand up and correct me. This is one of the joys of being married to a musical director.

I want us to clap four times, and I want us to use the 1 and 2 and 3 and 4 and. Can we just do that on the pulse I've given you? Off you go [audience claps and speaks 1 and 2 and 3 and

4 and]. Now we're going to do a very long closed phase. Imagine your vocal folds [indicates hands] coming together for, you know, 1/220th of the note for bottom A which is 220 cycles a second [A below middle C]. I want you to keep your hands together until just after the "and", ok? Same speed. [Audience claps and speaks 1 and 2 and 3 and 4 and]. That's a longer closed phase of the vocal folds. Making sense?

Keep the same pulse and what I want you to do now is make sure that your hands have moved away from the midline *before* you say "and" [audience claps and speaks 1 and 2 and 3 and 4 and]. That's a short closed phase. And typically, a long closed phase is associated with louder sounds, and short closed phase with quieter sounds. OK.

In Jo's research, Jo proposed and as I understand it still in the Estill Model. She proposed the closed quotient of the vocal folds was *more* than 70%. Now we did about 55% I reckon, maybe 60%. Just think about what 70% might mean if you were doing that in a clapping action. I haven't come across that in any other research on belting. Some of the earlier research into belting which I think post-dated Jo's about four or five years later, indicates 50% as a bench mark, and actually more contemporary thinking indicates that even that was an overestimate. Now to be fair, the way that we calculate the closed phase of the vocal folds has changed somewhat since Jo's time. So it would be very interesting if someone was to get hold of the original research and do the formula now. I'll see if I've got anything else there. Yeah.

These researchers Lebowitz and Ron Baken in 2011 looked at 20 professional female singers. They were performing tasks in legit (remember that's like head voice) and belting. They found that at all times the average contact quotient was less than 50%, all the way through. But the higher the singers went, the more that figure *decreased*. What this means

is the higher we go in belting, the amount of time the vocal folds stay closed gets *shorter*. Which makes very good sense. So it's essential to remember that even when you're belting, your vocal folds will be adjusting mass as you go higher or lower. They also found - this is quite interesting - the significant thing that they found (significant is always to do with statistics just so you know) - the significant thing that they found when comparing the two styles was speed of closure. Because we can measure speed as well as contact quotient. And it's a no-brainer really. [Gillyanne claps]. You bring your hands together faster, you're going to get a louder sound. So that seems to be the more important difference between belting and non-belted sounds.

OK, there's been a little bit of work done on the acoustics of belting, and it has validated the advantages of a high larynx in belting, which was something that Jo was very keen on. We all went into shock, you know, 25 years ago, but we must keep the larynx low at all times. Actually, if you read Lilli Lehmann published in 1911 I think ***[Ed. it was 1902],*** she talks about raising the larynx for high notes. Somehow that got lost in translation.

There are advantages of a high larynx in belting, and this is a lovely quote from Ingo Titze, and he suggests that the most compelling explanation for a slightly raised larynx in belt voice is that acoustically there's an advantage to having the first formant frequency which is one of our bands of resonance in the voice, rise with pitch. So it kind of boosts our volume levels. And kind of across the more recent literature there's apparently this first formant frequency round about 100... a 1000 hertz. Soprano top C is 1047 so we're just below that. So we've got a resonance boost there. Of course, the human ear hears those high frequencies as louder so we've got this lovely advantage. If you want to know more about that I would say check out Ken Bozeman's Practical Vocal Acoustics which was published in

2013. Very nice book that I'm just looking at now. And also, recent articles by Ingo Titze in the Journal of Singing. There's one, the one I've just quoted from is 2007 but there's another one from 2011 which looks at female voice, and it talks about mouth shapes for... comparing mouth shapes in classical singing as well as musical theater belting. It's well worth looking at and it's not that difficult a read. When Ingo is writing for the Journal of Singing he's usually a little bit easier.

OK, how am I doing for time Ivor? *[Ivor says it's 25 past].* Oh yes, I can see that. I would like you because I've got an hour, haven't I? I would like you to tell me when I'm 10 minutes off if you wouldn't mind. Because I'm going off-piste, I knew I would. But that's good, it would be boring if I just read it, wouldn't it? Well I've got an instruction here, slide 14, read it out.

OK, let's talk about Falsetto. You know what, when I was teaching the 5-day course, I don't know if any of you who were on it remember, we had to call it the F-word, because there was always uproar: "Gawd, now it's time to do the F-word". Because there was so much disagreement about what falsetto is. That's partly to do with historical viewpoints of falsetto, but you know, I think I understand why that happened now. (Let's see if I've got that... oh, Titze Journal... yeah).

So what I'd like to think about is, is falsetto a quality or is a register? Thank you for that smile Hannah, it's much appreciated!

OK. Voice quality, let's just think about that. First of all, as a musical instrument our voice is unique. We kind of know that don't we. We're able to adjust shape - resonating shape - pretty much you know at will and continuously, and also the type of vibration. And I think

on your Lexicon of Terms I've just given you some of the words that are commonly understood, commonly used in relation to register mechanisms as we now know them.

Also voice quality is an important part of human communication. For example, when we say "Don't talk to me in that tone voice" it's because we've responded to the tone and not to what was being said. So there's a very widely accepted definition of voice quality that is used in the voice science community.

"Voice quality derives from two distinct factors in vocal performance. The first of these is to do with the nature of the individual speaker's own vocal apparatus. The second is not to do with the nature of the vocal apparatus, but to the use to which he puts it".

And in the linguistics literature, and that's where this quote comes from, from John Laver, a British researcher who identified 40 different vocal settings, and published in 1980. In the linguistics literature, a voice quality is defined as being such if it's held over several phonetic segments. What that means, if I hold the same sound across several syllables it's identified as a voice quality. So you can hear my voice quality that I'm using now, and if I really think about maintaining more or less the same pitch but add I a little bit of breath to my sound, you can hear that my voice quality has changed, and it gives a completely different impression. And I could then sort of change something ‘til it's kind of a little bit sort of thinner and more whiny, and I think I'm pretty much on the same pitch. I've got a husband there who's either nodding or shaking his head. He's nodding, this is good! He's my pitch tester. Then you can hear again there's a different voice quality. So that's what we mean by voice quality.

What I'd like you to remember, that this linguistics definition of voice quality is a bit different from Jo's. Remember that Jo said in order to be a voice quality it must be perceptually distinct across the whole range. In other words, the listener would hear it as being the same on any note in the singer's voice.

OK, so now I'm going to divert into registers. Let's go there. It's a little side-step and I promise you there is a point to it. Wow.

Registers are reported by singers of all types. We talk about the gear change, the passaggio, the transition, the turn of the voice. And you know what, in the past there's been massive disagreement about vocal registers. But register mechanisms as we now call them, they're much better understood and there's a very good agreement in the voice science community on the nature of Pulse, Modal and Falsetto registers.

Jo always insisted that her voice qualities were independent of register mechanisms. We were not allowed to talk about registers on the course, and it's very clear from the research papers that that was something that she wasn't going to look into. And during my own Estill trainer days I ignored registers too! And I rather think that was because I trained as a soprano and I never used my chest register anyway!

But after I moved away I began to notice that they really mattered. And it was especially obvious when I was working with female students if they wanted to take their voice quality across the range. Registers are patterns of vocal fold vibration that we make here at the sound source, so therefore underlying every voice quality there has to be a register mechanism. We can't escape that, there they are. Get over it!

So it then began to make sense to me that the qualities, the Estill qualities of Speech and Cry are both based on a modal register, what we sometimes know as M1 ***[Ed. This is the correct term in Europe - in the USA it's known as M2].*** In fact, you can think of them on a sort of a thick-fold-thin-fold, but it's a continuum. Falsetto is an entirely different mechanism with an entirely different vibratory pattern. You can see it on a stroboscope. It's got its own continuum in terms of range. In the female voice, we quite often use it in the middle range and even lower. It's not just belonging to the top of the range.

I'm going to show you a visual next that I think will make sense in terms of how this fits together. This is put together by one of our Accredited Teachers who is also an Estill CMT, and he devised this so that he could explain to his students how the voice qualities fitted into the register terminology. So I'm going to focus on the idea of modal here, rather than talking about the creak and the falsetto and whistle.

So I've just mentioned the word continuum - modal thick/thin continuum. And this is what Craig came up with and it's rather nice, slightly tweaked by me. Towards the lower part of the range we have thicker vocal folds, we're using the shortening muscles, and it's called TA dominant. And there's always more resistance to the breath because the vocal folds are thicker. Up towards the upper part of your range we have a thinner vocal fold. The lengthening muscles are dominant, the CT. The tilting muscles if you like. Less resistance to the breath because the vocal folds are thinner. And then we have this whole middle region, what he did for his students to help them cross the gear change was say there's a handover between the Cricothyroids and the TA. Find it in your voice.

This is very much in line with contemporary thinking on registers, that you can read about on the National Center for Voice website, that we have thicker, TA dominant and CT dominant versions of modal, and then we have falsetto.

So there are a couple of advantages to this approach that I want to tell you about. First of all, it frees up our thinking to create a wider range of tonal qualities than the six voice qualities that are in the Estill model. In our practice Jeremy and I teach 20 different mixes if you like on a modal register and 20 on a falsetto. And we have a lot of fun, we call it the mixing desk. OK?

There's another advantage. It allows for a better dialogue between the more mainstream approaches to teaching and singing and the Estill Model. We need it!

In our practice, we find it also helps us to work with trainers from other disciplines. We have Estill people on our courses, we have Complete Vocal Technique people on our courses, we have Speech Level singing people on our courses. And we can make an interface, we don't have to use a special language.

I'm going to talk about stiff folds, and then I'll probably do a little skip. What do we mean by stiff folds? Because the Estill Model proposed thick, thin and stiff. When we stiffen a muscle it's the result of contracting those muscle fibres against resistance. Similar to a bodybuilder showing off their biceps. I'm sorry I don't think I can do it. But if you lay your arm down on the table and keep it steady, you will be able to contract that muscle. Actually, where you're sitting now, if you don't move anything, and you tighten one of your buttocks, you're stiffening that muscle. OK, now the gluteus maximus isn't quite like the vocalis in that it isn't

attached to other muscles, but it gives you an idea. You didn't move anything else, but you know what, you can really... that's stiffening a muscle.

In falsetto the vocalis muscle is anything but stiffened in this way. And this is across the research literature. The vocalis muscle is *lax*. The vocal folds are actually looser. Lax means relaxed. What's more, it's not active in vibration, only the outer layer, the ligament and the mucosa layer are active, and they can touch. We know that in falsetto the vocal folds can be in contact. We hear it all the time in countertenor singing, and you hear it in good classical singers, female classical singers who use a falsetto setup.

So the action isn't in the stiffness of the fold, it's actually to do with the TA letting go of its contraction.

There's also the idea that we have a raised vocal fold plane in Estill. Which is that the plane of the vocal folds moves up as the muscles that open the vocal folds engage. Now, this doesn't really make a lot of sense, because when the muscles of the vocal folds at the back, the posterior cricoarytenoids, that is the breathing gesture. And you know what, on reflection I'm at a loss to know how the breathing gesture can actually be used efficiently in phonation. And again, this idea came from the fact that the arytenoids, you know, viewing, that the arytenoids seemed to move back. Well they only move back because the muscle that's been contracting has stopped contracting. You're not using PCA to lift the back of the vocal folds up.

I could have talked for a lot longer, couldn't I?

I think... wow, dare I go to breathing, or just move on to where I've gone since? Would that be good? Honestly, I've practised this! So, I'm ok actually. A little bit of skipping on.

I am going to say something about...

I'd like us to have a think about how a research model translates into a teaching model. Remember I've talked about the research. I do hear from other pedagogues who are anti-Jo that her research was based on an N of 1, that she only looked at one subject. Now that is actually nonsense. I've had a look at all the research papers and more typical numbers are between 5 and 10. So what's the issue here?

In this 92-page report, both Colton and Estill mentioned the difficulty of finding subjects who could do what Jo did. They had to be trained to do the voice qualities in the way that she did, and it comes over several times that they didn't find it easy to take the voice qualities across the range. And since these were qualities that Jo herself could make, and presumably in the way that she could make them, you can see how people have arrived at the idea that the research model, her research, was predicated on an N of one, i.e. herself.

Now an N of 1 isn't necessarily a bad thing. There's a lot of very respectable *exploratory* studies done which only used one person. In fact, it makes for an excellent control in research, but if you're going to translate it into a teaching model, there are obvious weaknesses.

The Estill Model of voice is what we call a determinative model. i.e. You're directed to make sounds in specific ways, you get a template of sounds, and these are further defined as to what is happening functionally. But as the eminent voice clinician Ron Baken pointed out... let's see if I can find it - I've lost you Ron! - there you are. "The entire speech system is characterised by many degrees of freedom. A given acoustic result, a sound output can usually be produced by different combinations of vocal tract actions". In other words, we

can make the same sound by doing different things. And that's why I'm saying it's a determinative model, ok? Because it says, "This is how you do it". But we can get there other ways. And we can measure that acoustically.

So what that means is that it's perfectly possible to use two different vocal settings, vocal tract configurations, and arrive at the same acoustic output. Do you know what? This is good news for us. It doesn't mean that Jo Estill got it wrong. Her research was where it was at that time. But what it means is that the Estill approach to voice quality is not the only way you can produce those sounds.

Or as someone naughtily mentioned in a Facebook post the other day, and it wasn't me, "The Only Way Isn't Estill". One size doesn't fit all.

So this is good news because it means you can apply, those of you who have done your Estill training, you can apply it on a case by case basis, and as teachers that's what we always need to do. You know, if there's one thing I've learned in the last 20 years since I first came to introduce the Estill Model to you guys, it's that the most important variable in the room is the student in front of you. One size *cannot* fit all, and it's now my considered opinion that people who base their teaching *only* on the Estill Model are not serving their students as best they might. It is insufficient. What we're looking at is six voice qualities out of many more possibilities, and that the functional aspect, in other words how the voice works, is extrapolated from those six voice qualities. Jo in her research paper talked about using the black box theory, where you test each component in its different positions, and I think that's what gave us the vocal figures. You know, "you can do these onsets, you have thin folds, you have thick folds, you have stiff folds", and all the nomenclature that she used. And if you're

only working out how the voice works from those six possibilities you're going to be missing stuff out.

I've probably got 20 minutes on breathing but I'm not going to go there.

Because famously Jo de-emphasised breathing. And this always caused problems on courses, and I made the choice when I wrote Singing and the Actor, when I definitely drew in the first edition quite strongly from the Estill Model, I made the choice to include breathing. Because breathing is an incredibly important component of voicing. It helps us to control volume, it helps us to control subglottal pressure and to maintain subglottal pressure, and if we don't look at that... it also helps us to manage the range for target pitches, target loudness, target subglottal pressures, if we don't factor that in to what we're doing, we're really not serving our students well.

You know, it's a kind of a subtle interplay between these factors, vocal fold activity, tensioning, loosening and contracting, and the way that this plays out in range management. And it's missed if we're just working with those six boxes, AND if we miss out the component of breathing. It's a dynamic interplay.

So I'd just like to talk a little bit about what I consider a good way to train teachers. You probably know that at Vocal Process we train teachers. I'm very passionate about working with teachers. One wants to share one's knowledge, largely because we work in an unregulated profession. And therefore, the more that we can share with each other the better. So we encourage all of our teachers to devise a client profile and here are some of the things we look at.

We listen to the spoken voice type, we think about the voice as an instrument in terms of heavy, light, bright, dark, all things that perhaps fit in the traditional voice categories of soprano, dramatic soprano and so on, what are called the Fach categories.

We look at someone's energy type. You know, is this someone who comes in and shakes your hand and goes "Yeah! I'm so excited to be here!" Or is it someone like me who 's "OK, let's see what you're going to do". Much more measured. It's really important when you're working with a performer. How do they process information? Are they visual processors, are they touchy-feely people, are they auditory processors? Their age in the life cycle is incredibly important. We also take into account their level. What do they want to do? Do they just want to have fun and sing in the choir, or do they want to study really seriously? And what beliefs are they carrying about singing? We all have them don't we - "I must never feel anything in the larynx." "I must always be in contact with my breath." "The breath must flow through the sound at all times." All of these things one needs to look at.

In terms of diagnostics, we look at the technical side. Pitching obviously, how the students manage the range, how do they access volume, how much range of volume do they have, what are the main mechanisms they're using at vocal fold level to bring the vocal folds together, what's their use of breathing and how do they support (if they support), balance of effort and energy, balance is the key word here, how do they resonate, what shapes are they making with their mouth, what about the tongue positions, are they constantly slightly nasal, and how do they articulate words? These are the things that we need to be thinking about. And if we want to us things like the vocal figures and the voice qualities in order to help us do that, I'm for it because they are very good diagnostic tools, they're used by clinicians, and they are also very useful for making interventions with your students.

I probably don't need to say much more. I'm going to have a quick flip through to see if there's anything else.

I quite like this - it's a feedback loop when we're teaching our singers. They've got their way of learning, we have to raise awareness in the student - that's how we use exercises and interventions. We can give them goal-specific practice. Maybe the goal is to get a two-octave range, maybe the goal is to have more control over volume. Maybe the goal is to get rid of a rather nasal tone. And then we teach them control and competence. And I'm sure that lots of you could add to this little feedback loop, other things that go in. This is all part of the learning. It's not really sufficient to my mind to simply learn how to move parts of the vocal tract. You've got to do a lot more than that when we're teaching people. It's a much more holistic process than that.

So I'm just going to finish by saying where does that leave us and where might we go in the future. We need to acknowledge Jo as being a pioneer singer/researcher. And she's inspired many other singer researchers such as myself. I've taken the plunge and I've done doctoral research and I'm by no means the only one who was inspired by what she did in that way.

I think she gave us a great starting map for using sounds that weren't on the classical timbre list, and people are still adapting these and using them for different musical genres. You know, classical was the only way in 1992 and we needed more.

I think her research into twang and belting has been particularly influential on the research community and she inspired others to further knowledge in these topics. And maybe her take on belting isn't accepted by everyone, but debate is good, because that's the way that we learn more. That's a really important legacy.

At the same time, we need to recognise that the Estill Model isn't and cannot be the end of the story. It doesn't tell us everything about how the voice works. Of necessity nowadays it's an archival model because Jo's passed away. And some of the functional aspects of the vocal figures and qualities need updating. I think I've demonstrated that quite nicely. And to say again, as a standalone training system it's not complete. And we also need to take into account new thinking that was maybe started by Janice Chapman that the reflexive responses we have in our system - those preverbal responses - that trigger sounds such as cry and moan and whinge and yell, and that maybe they needn't be quite so effortful, maybe we don't need to *do* them. Maybe we just need to make the sound and have the feeling. Jo's probably turning in her grave but you know, I think we've really moved on since then. She got us to think about the larynx, that was good.

There's a range of options now available for us. Janice Chapman's running courses, we've got Dane Chalfin and Kim Chandler offering some fun opportunities for contemporary commercial music singing, together the clinician Sue Jones Dane Chalfin has looked at more than 400 singers in the voice clinic and he's coming up with some really nice adaptations of Janice Chapman's Primal Voice. So a bit of a shoutout for the work that Dane's been doing over the last 10 years. So we can understand more about how to make those popular music sounds safely.

I'm impressed that AOTOS you've changed your own teaching programme. You recognise that teachers need mentoring. You recognise that teachers come from different disciplines. Maybe they're not music-literate in that sense but they still have something to offer. I think that's a great move forward. And then if we look at some of the work that Jenevora Williams is doing, devising accreditation for working with young voices, and some of the

VoiceWorkshop stuff which is looking at anatomy and physiology and acoustics of voice. We've got some great options here now. And what we need to be able to do - and our young teachers are doing - they're picking and mixing. They're creating their own brand of training. So what I look forward to most is when methods and systems are shared pedagogically. We need open discussion about concepts... a conversation we need to have! Methodologies and approaches. We need to invest our time and our energy into finding meeting points and not being in competition with each other! What is wrong with having an EVT certificate, a CVT certificate, a VP certificate. What's wrong, training is training. CVT, Complete Vocal Technique. And in particular on my personal wishlist is that I would love to see some sort of cross-methodology programme offered for training at an academic level, so that people can learn about the Estill Figures, they can learn about Cathrine Sadolin's Modes, and they can do Janice Chapman's work on Primal Voice and maybe Dane Chalfin's adaptation of that. Of course I'd like to write myself into that course too! And it needs to be presented in a more holistic context which includes bodywork, foundations of vocal function, that knowledge of how the voice works, some acoustics, and the practice of teaching. What teachers need the most is guidance and mentoring.

Watch this space because it's been on my wishlist for a very long time, and it may come to pass!

I want to end with this. I asked Stuart Barr if I could take this from a Facebook post that he put up. It's his.

"Plurality of thought is the source of progress. Embrace disagreement and learn from it"

Ok, so shall we talk?

I'm done and I'm ready for your questions!

Appendix 1

Lexicon of terms for Gillyanne's "After Estill" Keynote

Register names

Pulse/creak/vocal fry
Chest/modal/M1
Falsetto/M2
Head (sometimes identified as M1 CT dominant or sometimes as M2)

Air pressure

Subglottal pressure – the measure of pressured air in the trachea just below the vocal folds when they are closed. Subglottal pressure can be on a scale of low to high, sometimes using the terms breathy-flow-pressed

Supraglottal pressure – a measure of air pressure just above the closed vocal folds, that occurs due to a 'downstream' effect of the air. Twang is an example of an action that creates supraglottal pressure

Closed quotient of the vocal folds – a measure of the percentage of time that the vocal folds are closed during any one cycle. On the note A440 there are 440 closing and opening cycles of the vocal folds

Vocal Muscles

CT – cricothyroid muscles

CT mechanism – the action of bringing the cricoid and thyroid cartilages closer together to elongate and thin the vocal folds

TA – thyroarytenoid muscles, also called the vocalis muscles, which make up the deepest layer of the vocal folds

PCA – posterior cricoarytenoid muscles. Their main function is to open the vocal folds for breathing.

Muscle activity

Isometric muscle activity – where a muscle is activated, bulks and stiffens but without changing its length

Isotonic muscle activity – where a muscle is activated, elongates and increases tension due to the pull of another muscle (antagonist) that either pulls directly on it, or the firmer points to which it is attached.

Lax muscle – muscles contract and relax. When a muscle is described as lax it is relaxed and, in the case of the vocal folds, this usually implies that it is not in contact during vocal fold vibration

Nerves

Superior laryngeal nerve – motor to the cricothyroid muscles

Recurrent laryngeal nerve – motor to all the intrinsic muscles of the larynx (except the cricothyroids)

Vocal folds anatomy

Three-layered model of the vocal folds – outermost is the *mucosa*, the next layer inwards is the *ligament*, the innermost layer is the *muscle*