

Sound in the Choral Context of Secondary Education:

Vocal Assessment Model and Practical Strategies

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RESUMEN

El canto coral, además de ser una actividad de equipo que proporciona un amplio desarrollo vocal y auditivo, es una poderosa herramienta de comunicación a través del sonido por su relación con el texto y sus armonías específicas. Son ya numerosas las investigaciones que demuestran los beneficios que la actividad coral ofrece a los adolescentes; sin embargo, es llamativa la amplia diferencia entre el número de coros juveniles frente a los coros de niños o de adultos. Una de las razones es que, durante este período, los adolescentes sufren sus mayores crisis vocales, como consecuencia de los abruptos cambios hormonales que afectan a su laringe. Para los directores y directoras de coro supone un desafío acomodar el material existente o crear material específico para estas dificultades vocales, y la falta de herramientas de los directores y directoras de coro para tan específico colectivo puede ser lo que justifique que haya tan pocos coros de adolescentes.

Este artículo presenta un modelo de diagnóstico vocal para el trabajo coral con jóvenes, basado en categorías sonoras, y plantea una serie de estrategias para desarrollar el sonido en las agrupaciones corales juveniles a través de ejercicios diseñados para entrenar dichas categorías adaptadas a las dificultades específicas de los adolescentes.

ABSTRACT

As well as a group activity that provides wide-ranging vocal and auditory development, choral singing is a powerful communication tool through sound because of its relationship with the text and its specific harmonies. There is plenty of research demonstrating the benefits that choral activity offers adolescents; however, the difference between the number of youth choirs and choirs for adults and children is striking. One reason is that adolescents go through their biggest vocal crises due to the abrupt hormonal changes that affect their larynx. It is a challenge for choral conductors to accommodate existing material or create specific material for these vocal difficulties, and the lack of tools available for conductors of such ensembles may justify the shortage of adolescent choirs.

This article presents a vocal assessment model for choral work with young people based on sound categories, and proposes a series of strategies to develop sound in youth choral groups through exercises designed to train those categories in ways adapted to the specific difficulties faced by adolescents.

Introduction: preliminary considerations about choral sound

Choral sound is more than the sum of individual sounds. While it is true that each voice is unique, choral sound requires different voices to sound and be perceived as just one. The collective experience provides the opportunity for choristers to share a joint activity that involves ensemble work, balance, tuning and blending of voices.

In recent years, the importance of choral activities in schools has become clear – they provide many extra-musical benefits, especially during adolescence (Santamaría, 2019; Turnon & Durrant, 2002). Youth choir work is particularly necessary on a social level, since it fosters collaboration, consolidates dynamics and values such as empathy and respect, provides a means for communication and expression, generates a sense of belonging and integration, and offers common objectives, both interpersonal and for group work (Caycho, 2018; Fernández Herranz, 2013; López-Casanova et al., 2021; Kennedy, 2002). Choral activity also facilitates knowledge and mastery of one's own body in a period of personal crisis. It provides a space where adolescents can strengthen not only their specific musical training but also their learning capacity and physical and psychological wellbeing while developing their abilities, their confidence and personal assertiveness (López-Casanova et al., 2021; Sandu, 2019).

Unfortunately, several authors have verified the lack of or decrease in youth choirs compared with children's or adult choirs, which is why they advocate the need to set up more choirs in schools (Grau, 2009; Collins, 2011; Calle, 2014; Fernández Rivera, 2015). This decrease seems to be due, in large part, to the lack of didactic training in specialised singing and the basic technique of choral conducting for compulsory secondary education and Baccalaureate teachers. Teachers of older year groups in schools and institutes do not generally receive training to teach singing, and even less so surrounding the particular problems of adolescents who are going through such a critical period for their voice, including voice breaking, body insecurity, and hormonal changes so abrupt that they affect vocal production and mood, as well as social and interpersonal issues arising from group work (Elorriaga, 2011). Youth choirs also face significant challenges in making assembled sounds, given the variability produced by hormonal changes in teenagers. Some authors have echoed this problem and formulated strategies for educational sessions that address key aspects of the organisation and operation of an amateur choir in a secondary education or Baccalaureate context (Benavides, 2019; Souza, 2020; Cruz, Paixão & Oliveira, 2021; Rodríguez Pérez, 2019), which we will develop and expand on in this article.

The main objectives of this research are, firstly, a bibliographic review of the meaning of choral sound and its particular characteristics among adolescent groups; second, the proposal of a model for assessing the individual vocals of young choir members based on categories and, finally, extending the existing proposals for choral exercises in secondary education, focusing on strategies that develop the sound in such collectives, taking into account the unique characteristics of their members. We are convinced that greater and

more accessible material contributes not only to increasing the still limited quantity of specialised exercises in adolescent choirs but also to promoting interest in and consideration of this activity among a group with such specific characteristics.

Characteristics of youth choirs

Youth choirs are different from other choral groups. Their particularities derive mainly from gender issues, since most teen choirs are made up of women. María Jesús Fernández Rivera (2015) found that there is a considerable difference between the percentage of males (26%) and females (74%) who sing in children's and youth choirs in Spain. This is due to both social and physiological reasons. First, as Cristina Arriaga (2007) explains, the difference in the percentage of girls and boys in youth choirs is due in large part to gender stereotypes instilled during childhood and maintained in adolescence. A similar conclusion was reached by Patrick Freer (2012) about youth choirs in the United States; he proposes that choir directors need to maintain adolescents' motivation to continue singing.

The greatest challenges with a youth choir go hand in hand with the abrupt changes that adolescents experience. These come up in social situations, such as a choir, where they must use their voice when it is in the middle of a hormonal revolution. For this reason, the choral director must pay particular attention to, have specific knowledge of, and use exercises designed to overcome the specific difficulties of this group. Adolescence, between approximately 10 and 18 years of age, produces the greatest change in the voice, most noticeable in male voices. During this time, there are rapid changes in the growth of the larynx: its length increases and the vocal cords gain mass and thickness, giving rise to a change in range, which drops by an octave. At the same time, vocal power increases thanks to the development of the lungs and the resonant cavities.

This rapidly changing situation inhibits the adolescent from quickly adapting to their new vocal pattern, generating an unstable sound and detuning. At this stage, it is very common to observe vocal disorders such as "puberphonia" or mutational falsetto (characterised by "bitonality", pitch breaks when speaking, hoarseness and tiredness of the voice), "bitonality" (caused by an abnormal vibration of the vocal cords) or "diplophonia" (the production of a vocal sound with two different tones simultaneously) (Elorriaga, 2012).

Getting to know the choristers' voices might sound obvious; however, when we talk about such a group of young people, we have to take into account a fundamental characteristic: the voice breaking. To choose the most appropriate repertoire for this age group, the vocal director needs to understand the instability and changes in the adolescent voice. Most of the studies of voice breaking deal with male voices; however, even though females do not go through such a radical change as males, verifiable changes are observed for the former too (Harris, 1987; Gackle, 1991). Lynne Gackle (1991) also divides voice breaking into different phases (which have no fixed character but that function as a model of order) through which the voice changes in a prolonged way over time, and which are due to the level of

maturation of the laryngeal organ, and the timbre and quality of the voice when it is time to sing. If we add to this situation the contemporaneous hormonal and psychological changes, we can understand the difficulty an adolescent faces to adapt the behaviour of their vocal tract to speech and, even more, to singing.

Strategies for approaching choral sound with adolescents

There are many possible options for choral work with adolescents, including the formation of a youth choir that regularly rehearses during school or break times, the implementation of an optional subject related to choral singing (only possible in certain autonomous communities), or holding one or more weekly choir sessions as part of the music curriculum. Within any of those options, the shaping of choral sound should be afforded sufficient rehearsal and preparation time by the choral director (presumably the school's music teacher). This is important because music is, in large part, the art of communicating through sound, and that also brings to the fore work on sound in a choral context.

Directors make use of particular tools and activities to obtain the sound they consider suitable for their choir or for a certain piece. In the case of a youth choir, these tools must be adjusted to take into account the main aspects of adolescent changes that affect their vocal, physical and emotional status. Given the speed with which the voices of young people change, it is necessary to assess their voices on an ongoing basis to know what elements of vocal pedagogy should be used at all times.

Vocal assessment

First, we propose a tool that enables the process of vocal training to be monitored to benefit the choral group's performance. The chorister's tessitura and passagio note are observed to develop a greater understanding of the range in which the young person will feel most comfortable singing. Given the abrupt changes during this period, it is essential to constantly monitor and record the tessitura to protect vocal health. This aspect will give more information to the conductor and will allow the chorister to know their voice and reinforce their confidence when singing. In the same way, there is a record of their proficiency in high and low registers, enabling their range to be adapted as their voices change. It is also essential to record their ability to tune, breathe, articulate, use dynamics, and blend their voice, as well as their physical state, to map out activities aimed at development and training within those categories. Finally, singers' vocal health must be pursued as the main objective. An early assessment of possible disorders will not only prevent choristers from abandoning choral singing but also pre-empt future physical and emotional difficulties in young people.

We recommend keeping a record of each choir member (see Table 1) and making a first assessment at the beginning of the choral activity (the month of September or October in the case of a school). In addition, it would be opportune to repeat said assessment in December and March or April (assessments 2 and 3 in Table 1) to confirm the data, add to it and, based

on the results, make any changes to the choral ranges. Based on this, it is possible to create a specific work plan that addresses the problems encountered, if any, and improve the sound quality of the group in the medium term.

Categories	Assessment 1	Assessment 2	Assessment 3
Tessitura (E2 – A5)			
Passagio note (Observed / Not observed)			
Proficiency in high registers (No / In progress / Yes)			
Proficiency in low registers (No / In progress / Yes)			
Tuning (No / In progress / Yes)			
Dominant timbre (Sob, Falsetto, Twang, Speech, Opera, Belt)			
Blend (No / In progress / Yes)			
Vocal disorders (Not detected / Yes)			
Posture (Correct / Incorrect)			
Ability to relax (No / In progress / Yes)			
Proficiency in breathing (No / In progress / Yes)			
Resonance (No / In progress / Yes)			
Proficiency in articulation (No / In progress / Yes)			
Proficiency in dynamics (No / In progress / Yes)			

Table 1. Vocal assessment categories.

Strategies for a first assessment

We must take into account, as already mentioned, that choral sound requires both general and specific individual and group vocal work, which will vary according to the piece that is being learned and the characteristics of the choir and each chorister. In this article, we therefore propose a series of guidelines and exercises aimed at improving each one of the aspects that directly affect the sound of youth choral groups, but not without first referring to an essential aspect: carrying out an initial test to gain a good understanding of choristers' vocal characteristics. As previously mentioned, it is necessary to assess the voices within a month of starting the choral activity to discover the particularities of singers' voices, range, tessitura, timbre type, and ability to adapt to a suggested sound, as well as to detect potential disorders early on.

Given adolescence is a period in which it is common to feel embarrassed or afraid to sing alone or in front of other people, it is necessary to have a repertoire with a wide range of strategies that solve or lessen this problem. In this regard, we suggest performing the assessment during the third or fourth rehearsal, after having made a vocalisation and sung

a piece together. Having already met the conductor and other singers, the youngsters will not feel as exposed as on the first day. In earlier sessions, exercises could be done to build trust with the director, overcome embarrassment, and ensure that the choristers feel comfortable with the group. An individual assessment also enables more realistic results to be obtained, provided the voice is not distorted by nerves. We recommend carrying out an evaluation every two or three months in order to compare the results obtained the first time, observe vocal development, and put together a plan of improvement for the following months.

The session, which involves only the conductor and the singer, begins with making two vocalisations. Exercise 1 (Figure 1) is performed in a central register, first going up and then down by semitones on each repeat (without passing D₄ or C₃). This enables the director to observe the vocal timbre and if there is any speech or respiratory disorder, in which case it should be referred to a specialist. The use of “n” and “s” makes it possible to assess the student’s ability to emit consonants according to their manner of articulation (nasal or obstruent) and phonation (voiced or voiceless). As for vowels, when singing “o” (open or low vowel) during the first exercise, the vertical dimension is visible with the movement of the jaw and tongue.

The second exercise (Figure 2) serves to determine pitch and detect possible voice defects that can lead to vocal damage. For this, the chorister sings in both high and low registers. This exercise incorporates “i” (closed or high vowel), which together with “a” (central open vowel) allows the teacher to assess articulatory ability.



Figure 1. Exercise 1.



Figure 2. Exercise 2.

Thanks to the insistence of singing teachers, the repertoire sung by youth choirs in recent years has begun to be selected based on vocal potential and vocal health so as not to injure voices that are still developing (Rodríguez Pérez, 2019). The selected repertoire can be a big reason for adolescents being attracted to and remaining in the choir. Therefore, it is very important to consider age-specific vocal limitations alongside musical tastes. According to Isabel Villagar (2019), adolescents mostly enjoy short pieces with a

lively rhythm, a melody that is spread across all voices so that everyone feels like a protagonist and not just an accompaniment, logically distributed breaths, a clear and easily memorised structure, a dialogue that alternates between the voices, and a text that is not childish. Take account of the tastes of the choristers, as this directly affects their permanence within the group and enthusiasm.

The next step is for the students to be asked to sing a fragment of a song of their own choosing. This activity provides an understanding of both the student's repertoire as well as the register in which they feel comfortable singing. Furthermore, it is an opportunity for the director to round out their understanding of the timbre and detect difficulties with the output. Finally, they will be asked to sing along with the conductor or a partner of the same sex who has greater experience and vocal proficiency, to observe their ability to adapt to what they hear¹.

This information is used to complete the assessment table (Table 1), although it is important to note that some categories will be more difficult to assess on first contact. For example, the blend and the use of dynamics are aspects that we cannot verify during this first meeting because they require working together and with the repertoire. These categories may be evaluated in the second and third assessments.

Strategies for specific sound work in the choral context²

This proposal does not establish a session schedule because we devised it as a series of exercises that the person in charge of the group must select according to each rehearsal's objective. Therefore, in their preparation for the rehearsal, the choral director will decide which activities can be attempted, their duration in proportion to the time available, and other aspects, such as whether they are performed as proposed or whether it is necessary to make some adaptation for the group³.

a) *Group vocal technique exercises*

Many studies have verified the positive effects of vocal psychomotor training for respiratory development (lung capacity and breathing control), tuning, expanding the tessitura, and precision of sound (Mang, 2001; Phillips & Aitchison, 1997; Ternström & Sundberg, 1988).

- Physical relaxation:

Stretch the arms, back and neck, avoiding sudden movements. Open the arms in a cross for a greater aperture of the sternum and do hip, knee, ankle and wrist twists, to activate

1 We refer only to those exercises aimed at discovering a singer's vocal characteristics through their direct relationship with choral sound, but it would be appropriate to complete the vocalization with the repetition of single notes or intervals and perform other exercises to evaluate listening skills.

2 The suggested exercises are inspired by those learned from some of our choral conducting teachers: Basilio Astúlez, Josep Vila, Elisenda Carrasco, Marco Antonio García de Paz, Josu Elberdin, David Azurza and Javier Fajardo.

3 In addition to our specific proposal of exercises to develop choral sound, the technique of choral direction allows the conductor, after active listening, to modify and transform the sound in real time through gestures.

muscles and joints. Arrange the singers in a line, one behind the other, resting their arms on their partner's shoulders to make a train. Give the person in front a soft massage, rotating the thumbs on the back and shoulders, avoiding the surface of the shoulder blades and the spine. Afterwards, switch the direction of the train so that the last person in line also receives the massage.

- Facial relaxation:

Perform a gentle massage on the forehead, eyebrows, cheekbones, jaw and area in front of the neck, and open and close the mouth leaving the jaw very relaxed while paying attention to the gap that is generated in front of the ears, where both jaws meet. Stick out the tongue and move it from side to side, upwards and downwards, run it in and out of the teeth, and blow kisses to activate the lips too.

- Lip trill, lip roll, or blowing a raspberry:

Make the lips vibrate as if blowing a raspberry and perform ascending and descending glissandos, gradually extending the range with each repetition. To successfully perform this exercise, the facial muscles must be completely relaxed. Also, it may help to place the index fingers on each side of the lips and gently press to start the movement.

- Body placement:

Good body position starts with the feet. They should be approximately shoulder-width apart and a little open (not parallel to each other), so that balance is not lost if the trunk moves backwards and forwards. The knees should not lock and the chest should be in a naturally open position. The shoulders and neck should be relaxed as well, as should the arms, which should remain at the sides of the body without crossing them or putting the hands together.

It is also good to remind choir members that strengthening the abdominals helps to anchor the trunk and can provide support. At home, do forearm planks, side planks, crunches (lying face up, separate and lift the shoulder blades off the floor so that the abdomen is contracted), knees to the chest (lying face up, bring the knees to the chest and extend the legs without supporting them), and climbers (plank, bring knees to chest) – these are floor exercises and are difficult to do in a classroom.

- Proprioception⁴:

The first exercise is to sing a short melody. Open and close the mouth slowly several times with eyes closed, noticing how the jaw moves. Check what the tongue, jaw, and lips do, and how much space is generated. Then transfer attention to the breath and the rest of the body, the abdomen and the shoulders, to check if there is any tension. Finally, sing the initial melody again, now more aware of what happens in the respiratory and vocal tracts. The Proprioceptive-Elastic Method (PROEL), the discipline of mindfulness and the Feldenkrais method all propose exercises that improve our proprioception, which

4 La "propiocepción" es el sentido que nos permite percibir la ubicación, el movimiento y la acción del cuerpo. Nos permite regular la dirección, el rango de movimiento y contribuye a la imagen corporal y su relación con el espacio.

helps us understand which movements benefit vocal sound and comfort when singing, as well as the tensions and blockages that inhibit healthy phonation.

- Breathing:

Close the eyes and take three deep breaths, each at their own pace. This helps connect with breathing, focus attention, and achieve silence in the classroom if the group is unsettled. The same exercise can be done sitting on a chair, with the elbows supported in the area above the knees, which implies that the body is leaning forward slightly – a comfortable position for abdominal breathing.

With feet apart, as indicated in the body placement section, but with the torso leaning slightly backwards and the hands on the waist, inhale slowly while the conductor clicks their fingers four times, then expel air by making the *ssss* sound for 14 conductor clicks. Imitate the conductor, who will perform four-beat rhythmic patterns with the sounds *tsss*, *shhh*, *ffff*, *ksss*, and *hhhh*. Fricative consonants are useful for developing respiratory awareness. It is essential to emphasise that there should be no glottal attack when making rhythms with *hhhh*.

- Projection-resonators:

Circular humming: make glissandos with the letter “m” while turning the lips and jaws, as if imitating a cow chewing cud. The jaws must be slightly apart and the lips together but relaxed, to allow a tingling sensation and feel the nasal resonators. Another option is to inwardly say the syllable *nol*, keeping the shape of an “m” on the lips. Another variation would be to do the same exercise but with five-note descending scales (G F E D C), rising by semitones on each repeat and descending when a high register is reached (Figure 3).



Figure 3. Exercise 3.

Perform descending major third intervals (Figure 4) while pronouncing the words *man-go mungo mungo*. Raise by semitones on each repeat, lower by semitones, or pretend that the first note is unexpected, to activate the hearing and maintain focus. The nasal consonants “m” and “n” combined with the “g” allow the exploration of resonant cavities.



Figure 4. Exercise 4.

Make siren sounds (wide glissandos) through a straw inserted into a large glass bottle half-filled with water. A wider straw diameter will enhance how the exercise is performed, so we recommend using straws approximately 12 mm in diameter. This exercise is based on Sihvo's Lax Vox method – a technique initially devised for vocal rehabilitation – which is used in singing because it encourages maximum vocal economy and efficiency, trains the resonant capabilities, and improves control of airflow. This system also enhances proprioceptive development during vocalisation (Manzano Aquiahuatl, 2018).

- Match the register:

The lip trill, explained earlier, is also used to connect the chest voice and the head voice, and thus work on the continuity of the register.

Sing the song being rehearsed with continuous legato through a straw inserted in a bottle of water, pronouncing the syllable *buuuuuuu*. It is important to observe that the lips are forward when doing this. Then repeat the exercise without the straw, maintaining the position of the lips and pronouncing the same syllable.

b) Balance between voices: exercises for listening to the rest of the group

For the conductor to manage, control and direct the sound of the group and its balance, it is essential that each member actively listens to their colleagues while they are singing. It is very common for choristers to focus solely on their voice and what they are singing, and this prevents them from achieving some elementary things like adjusting their volume to the rest of their range or the choir as a whole, or attempting a more uniform timbre. It is key to bear in mind that, in a choir, we sing with someone, not just alongside someone.

- Standing in a circle, the conductor sings a note and “passes” it to the person next to them, who passes it on to the next one, and so on until all choristers have participated. It is important that no-one stops singing until the next person has started singing so there is no silence, but also that there are no more than two or three people in a row singing at the same time.
- The conductor sings the three notes of a chord (for example, D-F sharp-A) and then all choristers individually choose which note they want to sing. Everyone sings their chosen note when the signal is given and, at the end, they are asked whether they can identify which note the person on their right was singing. Typically, very few were listening and that makes them realise that they are not singing with their fellow choristers, just alongside them.
- Place eight people in a row, one next to the other. Ask them to count from one to eight, each saying a number in order. The goal is to keep the same dynamics, speed, character and timbre while counting; the dynamics, character and timbre are set by the person who says one, but the speed is set by the person who says two.

c) *Teamwork exercises*

Teamwork is particularly beneficial for developing these vocal categories. A study by Anrie van Rooyen and Andelina dos Santos (2020) concluded that participation in a community choir offered adolescents meaningful experiences whereby they discovered their musical voices, increased their self-awareness, self-esteem and confidence, and developed ways of expressing and regulating emotions. Choirs are also an excellent environment for developing young people's social skills, due to the "constant interaction of their members" (Balsera & Gallego, 2010) that requires everyone's cooperation and solidarity, introduces leadership skills and commitment to activities, and improves relationships beyond the group context. As Barbosa-Bustos (2014) points out, a choir is a team where responsibilities are shared. Understanding is necessary, as is respect for other members, who must be able to listen to each other to achieve better results.

- "Ordered":

The choristers stand up in the centre of the room and, from then on, are forbidden to speak until the game is over. They are asked to line up in height order, without speaking and without further instruction. At the end of the activity, it is good to reflect on what has happened: did someone take the initiative – putting themselves at one end, as the tallest, for example, or trying to help others to position themselves through gestures? Good, effective teamwork relies on everyone participating and contributing, putting their qualities and ideas at the service of the group. Some take the initiative and others join them or even take a step back because, while a lack of initiative can sometimes paralyse a group, chaos ensues if too many people want to do things their way. A choir is a constant exercise in teamwork.

- "Touch the balloon":

Choir members are distributed around the room, standing randomly, and pass a balloon that can never touch the ground. The rules state that no-one can tap it twice and everyone has to participate, forcing them to come up with a joint strategy to ensure that the balloon does not drop.

d) *Tuning exercises*

- With the conductor positioned in front of the choir, sing a note, glissando upwards for approximately a quarter tone and then lower it, guided by their hand rising and falling in the air. This exercise allows choristers to discover gaps smaller than a semitone and facilitates improvements in pitch, although it is very important to take into account that tuning difficulties often arise due to choristers' different vowel placement in the mouth.
- Divided into three vocal sections, the choristers sing a chord with a Twang timbre and move slowly from one vowel to another⁵. They must pay most attention to the harmon-

⁵ According to Jo Estill (Steinhauer et al., 2017; Salisbury, 2014), timbre is a configuration of the vocal tract that is composed of the active "aryepiglottic" sphincter, larynx, and high soft palate, which usually generates a vocal sound re-

ics that are generated in the changes between vowels. Modifying the position of the lips also helps to highlight some harmonics more than others. The teacher's example is basic in this type of exercise, and we must bear this in mind. When harmonics have never been actively listened to, it is difficult to identify them and it takes time to learn how.

- The choristers stand in a circle and the conductor issues a note and "passes" it to the person on their right. The singing does not stop this time, but rather each singer joins in with those who are already singing. When there are about 10 people singing, the teacher sings another note and then another, which they imitate in the same order as at the beginning, so that chords are formed. In addition to the usual triads, 7th and 9th chords can also be produced, for example.

e) *Blending exercises*

A choir with a correctly blended sound means that no singer can be heard above the rest of their section and that the pronunciation of the text, both vowels and consonants, is similar among all the members. Before doing any exercise to develop blending, the director must arrange the choristers appropriately in the space, within their section and the choir, taking into account the volume and timbre of each singer as this is essential for ensuring that the group sounds cohesive.

- Perform a piece from the repertoire: divide the group into quartets and give each person a different part, with the ultimate goal of unifying rhythm and pronunciation. An earlier step could be to carry out the same exercise but with only the members of the same section singing.

f) *Exercises for tackling specific aspects of a piece of music*

- Text:

Uniformity of the vowel sounds is achieved when all the choristers direct the air into the same area of the mouth and maintain a similar position while singing (lips, tongue, jaw opening and gap generated in the area of the soft palate). This can be improved by changing the vowels without taking a breath in between, on a held note (E, for example) in the following order: UOAEI.

To achieve even consonants and correct articulation, it is the director's responsibility to clarify where the final consonants of the sentence are pronounced and to ensure that silences are respected. A game for improving articulation could be to read a text aloud while holding a pencil between the jaws without squeezing, ensuring that the tongue is relaxed, and then reading the same text without the pencil.

Regarding the phrasing, the text of the piece that is being rehearsed can be read with its rhythm and corresponding speed but without the melody, accentuating the places that stand out in each sentence. It is important to suggest that the singers exaggerate signif-

icantly because the effect is halved when it reaches the audience.

To work on the pronunciation of a piece that is written in another language, it is helpful if a person who is fluent in that language reads each sentence at their own pace with correct pronunciation, slower than the score indicates if necessary, and the choir repeats it. It is recommended that they mark the correct phonetics of the words that are more difficult for them on the score.

- **Timbre / color:**

An individual's vocal timbre is made up of a sound and its harmonics or vocal formants. Physically, this depends upon the vocal cords, the larynx, and the resonant cavities. In a choir, we can modify the collective colour of the voices by playing with different timbres. This is achieved if we use more or fewer harmonics, change the direction of the air or the vibration of some resonators above others, and modify the mouth, lips or jaws, among other tools. We can even make conscious use of the acoustic space for this purpose. Jo Estill organised six vocal qualities called *Sob*⁶, *Falsetto*⁷, *Twang*⁸, *Speech*⁹, *Opera*¹⁰ and *Belt*¹¹, which allow us to categorise timbral differences in singers (Steinhauer et al., 2017; Salisbury, 2014).

Choristers can play by imitating voices like a witch, a duck, a suspicious man, or a small child so that the different vocal timbres are put to work.

- **Emotion/meaning of the text:**

In this exercise, students discover different types of sounds related to emotions. Divide the space into four parts, where each section is dedicated to investigating the sound effects of a different emotion: anger, falling in love, sadness and happiness. All students occupy the space of the first emotion (sadness) and make sounds similar to when they are sad. Later, students describe what the sounds they produce are like, taking into account the tone, air pressure, melodic line, timbre, etc. In this way, they become more aware of the different sound emissions related to vocal performance.

A variation of this exercise could be for a group of eight choristers to perform a song from the repertoire that they know by heart while walking through the space, still divided into the four emotions. They must adapt their performance to the emotion of the space they

6 *Sob* occurs when the thyroid cartilage is tilted, the glottis is open, and the vocal cords are stretched. It also has a vibrato.

7 Vocal quality in which the vocal folds are held rigid in an effort to keep the glottis closed. This timbre is generally used in the higher registers.

8 During the *Twang*, the vocal tract narrows, generating a powerful and shrill sound that is often nasal.

9 This quality is like spoken sound in everyday life. The vocal tract is open, relaxed and free of tension.

10 The recognizable *Opera* quality combines *Speech*, *Sob* and *Twang*. The use of a high or compressed tongue and a low larynx position, combined with the vibrato, creates this characteristic sound.

11 The *Belt* is a vocal quality generally used in musicals. It is the result of tilted cricoid cartilage, vertical thyroid, larynx and tongue in a high position, and elevated soft palate.

are walking through. There could also be a group of choristers who do not know what the emotions are, and they have to guess by listening to their classmates.

Warm-up focused on choral sound

Finally, we propose a potential complete warm-up aimed at working on choral sound:

- Imitative percussion:

The director performs four-beat rhythmic patterns with body percussion and the choristers repeat it. It can be done as an accompaniment to a pop song they know, to resonate more with them. The exercise requires silence and this improves attention and concentration, both of which are essential in rehearsals, as well as movement, which we will expand on below.

- Singers' massage:

Stretch the arms, back and neck freely. Gently place the hands all over the body and face while making free movements with the tongue inside and outside the mouth. In this way, the muscles and joints are activated for singing.

- Breathing:

From the correct standing position indicated above, drop the head towards the thighs, arch the backs and leave the arms hanging down to the ground. The neck and jaw should be completely relaxed and the knees should not be locked.

- Vocal imitation:

The director says "Good morning!" in different ways (loudly, whispered, nasally, sadly, tiredly, happily) and the singers repeat it, imitating them. This activates both the voice tract and the resonators.

- Resonance:

Perform wide glissandos, ascending and descending, with a fricative *v*.

- Vocalisation:

We propose a first vocalisation (see Figure 5) that works on the evenness of vowels, and a second (see Figure 6) that trains the high register and in which we can include a little bending of the knees before the highest note in the phrase. In both cases, the repeats will go up and down by semitones, although jumps (wider intervals) can also be made from one repeat to another to train the hearing and avoid monotony.



Figure 5. Exercise 5.



Figure 6. Exercise 6.

Regarding the tessitura of all the proposed vocalisations, we suggest that each chorister sings the notes that they feel comfortable with – that are part of their range. We recommend that boys who are in a period of vocal change do not stop singing during that stage but only sing the notes that come easily to them. This will prevent potential injuries to the voice tract and allow them to stay connected with the choir.

Conclusion

Choral sound in adolescence presents particular characteristics that suggest a series of challenges when working in the classroom. The sudden changes in adolescents' voices, added to the lack of technical mastery, result in great insecurity when it comes to singing and a significant decline in the number of choral singers.

The periodic assessment model presented takes into account different aspects of vocal production and allows the director to gain specific knowledge about the potential and struggles of each young person at the outset, to prevent disorders arising from overexertion. They can then rearrange or restructure the ranges according to the vocal circumstances of each chorister during that period and, finally, pay attention to the choir's weaknesses and insecurities and work on individual and group aspects that help to maintain the group and the desire to continue singing. In turn, young people develop specialised knowledge of each aspect of their own sound, giving them increased awareness, increasing and strengthening their self-confidence, and decreasing their embarrassment when singing because they understand that those changes relate to a given period and each aspect can be trained and improved.

This work serves as an introduction to future research related to the development of vocal, sound and teamwork strategies with adolescents in a choral group.

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