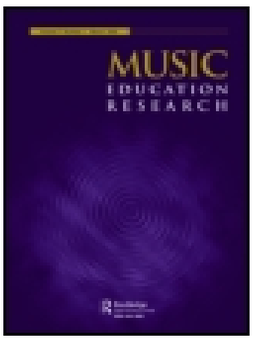

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What voices have emerged? Lessons on boys' vocal dispositions and choral tone from a new choral leaflet series

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What voices have emerged? Lessons on boys' vocal dispositions and choral tone from a new choral leaflet series

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ABSTRACT

Emerging Voices is a choral series published by Oxford University Press. The aim is to cater for adolescent male voices at various stages of change. Part ranges conform to the 'cambiata' system developed by Irvin Cooper. The paper asks whether a unique, characteristic timbral quality exists in voices at the mid-point of change and can be heard as distinctively different from unchanged 'treble' and newly emerged baritone timbre. The first 12 pieces in the series have been recorded by choirs ranging from beginner school groups to a prestigious national youth choir. During the recording process, samples of individual parts were taken to analyse and evaluate the vocal timbres that 'emerged'. A distinct midvoice timbre was only found in choirs where boys possessed significant choral experience gained as trebles. Such voices were more adaptable to different choir dispositions, able to manoeuver between a low alto part and a high tenor part. The paper concludes that Cooper's ideal of 'fitting the song to the voice, not the voice to the song' is only fully realised in solo singing instruction but where boys lacked significant choral experience, placement in cambiata parts that matched speaking voice pitches could result in pleasing choral tone through skilled blending of midvoice stages.

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Introduction

Since an Arts and Humanities Research Council (AHRC) funded a project to work with the National Youth Choirs of Great Britain in 2008 the present author has wrestled with issues concerning the timbral quality of choral performance by 11- to 14-year-old males. The topic is of importance because of its links with vocal identity and the perceived musical value of the voices. Previous research has shown the extent to which boys will be antithetical to singing if they believe that their voice does not project the identity they are trying to construct (Ashley 2009, 2010; Freer 2009; Harrison, Welch, and Adler 2012). This paper will investigate some of the technicalities relating to the unique choral timbre that potentially identifies the 11–14 age group. The author has previously shown the extent to which this timbre is largely unknown. Boys for whom this vocal identity might be the most appropriate may imagine that the only opportunities available to them are either not to sing at all or to sound like boy chorister peers who retain a soprano range through falsetto (Ashley 2009, 133). Though some writers stress the benefits of older boys as role models, 11- to 14-year-olds may also be discouraged from finding their true voices by older teenage boys with strident, newly developing baritone voices (Ashley 2008, 2009). The research questions therefore ask whether a choral timbre unique to voices at the mid-point of change is viable as a performing

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resource and what kinds of choral groupings are most suited the task of making it present. Eleven to fourteen is the age group from which the heaviest losses from singing tend to occur and it might be argued that losses could be reduced if the potentially unique musical contribution of the voices were more highly valued.

An invitation to act as consulting editor, supported by a composer colleague, for a new series of choral leaflets published by Oxford University Press provided an ideal opportunity to explore the issues through the commissioning of works and a subsequent project to record them. The editors were concerned from the outset that their work was to be not merely the stemming of losses from choral singing but the creation of works of musical integrity in relation to the potential quality of the voices. The title 'Emerging Voices' was chosen, not by the editors but by the publisher. That reflects an important perception. The publisher appears to accept as a given that the voice is not fully formed and will become something else in due course, assuming an adult type after maturation and study.

Whether the something else is something better or something different is a moot point. Any assumption in favour of better perhaps reflects ingrained attitudes from an earlier age. Edward Bairstow, the celebrated composer and organist of York Minster, wrote in 1930:

> My experience is that if a boy uses his voice naturally and without forcing it, he never goes through a period when he cannot sing at all but, while in such cases it does very little harm for him to sing, it is no use him trying, as his voice is gradually changing in compass and in timbre. (Bairstow 1930)

The research since 1930 that is shortly reviewed has supported Bairstow's position in confirming that it does a boy 'no harm' to keep singing as his voice 'gradually changes in compass'. The practice reported, however, surely represents a significant advance on Bairstow's position. Practitioners today would certainly dispute Bairstow's assertion that there is 'no point in trying'. The question of gradual changes in *timbre*, however, has received rather less attention from practitioners and leaves plenty of scope for further research.

Range and choral timbre in young male voices

Several schemes have been postulated that deal with the downward shifts in vocal pitch that occur and need to be accommodated during the years of male puberty. That produced by John Cooksey (1942–2012) remains the most well-known and influential system of staged voice classification (Cooksey 1977, 1992, 2000), though Cooksey was by no means the first to identify staged changes. Finn wrote in some depth about the topic in America during the 1930s (Finn 1939). Wiseman in the UK also advocated staged changes (Wiseman 1967), though his ideas had little impact upon the English choral practice described by Bairstow.

Cooksey's scheme has been widely quoted and used by subsequent researchers such as Welch (2006), Williams (2012), Thurman (2012), Denison (2012) or Freer (2015), as well as the present author. None of these researchers has disputed Cooksey's findings, indeed Morris has considered that Cooksey 'had it nailed' (Morris [personal communication, 2011]). All are agreed that the traditional English practice of using only the top register for as long as possible until the voice 'breaks' directly into a baritone that has been suppressed is not a suitable approach. Clearly, if no recognition is given to states that precede this baritone, most of the emerging voice and what it might be capable of goes unrecognised. Phillips (2013) is particularly critical of this 'English choirboy' approach, advocating instead a three-register approach with emphasis upon a mixed middle register. The result is certainly greater versatility in part deployment.

The problem with many interpretations of Cooksey's scheme is that they overlook the fact that it was devised with the ordinary high school boy in mind, not the experienced choral singer. Freer (2007) reminds us of the distinction that must be made between singing as part of general music and singing within a choral ensemble, pointing out that the works of pioneers such as McKenzie, Cooper, and Swanson all focused attention on the singing voice in junior high general music classes.

This may be so, but the distinction between general music class and choral work, while undoubtedly relevant, is not a straightforward one (Harrison and Young 2017). Certainly, in the UK a diverse range of circumstances relating to the ages and contexts in which boys may take a serious interest in choral singing blurs any clear distinction (Ashley 2015). This complication forms a significant component of the empirical work reported in this paper.

Cooksey built on the earlier work of his tutor and mentor, Irvin Cooper (1900–1971) who went so far as to devise a complete system of alternative vocal ranges for adolescent boys (see Stockton 2015; Robertson 1970 for full accounts of Cooper's work). Following pioneering work by Duncan McKenzie, who produced an 'alto-tenor plan' (McKenzie 1956), Cooper believed that none of the conventional SATB part ranges were suitable during the main period of voice change. He was, though, clearly well aware of the difference between general class music and choral work, noting that 'selected students in choral ensembles' would be more versatile singers with greater ranges than would be found in general music classes (Cooper and Kursteiner 1965). His tenet that for the more general singer 'the song must fit the voice, not the voice the song' was enthusiastically endorsed and promoted by his successor Don Collins at the Cambiata Vocal Institute (Collins 2000, 2006). Collins died in 2016 and was succeeded by Alan McClung until 2017. McClung made several revisions to Cooper's original scheme, resulting in five changing voice-part ranges more closely aligned with Cooksey's system (McClung, n.d.a).

For better or for worse, McClung's 'cambiata' parts form the basis of the scoring system adopted for *Emerging Voices*. Although Cooksey wrote in some detail about which parts might be sung by boys at each of his stages, he did not go as far as Cooper, Collins and McClung in specifying unique parts for boys. Table 1 shows McClung's phases and Cooksey's stages set out side by side:

The fact that *Emerging Voices* uses cambiata parts does not necessarily mean that McClung's system is uncritically endorsed. For one thing, the entire notion of voice parts staged to match pubertal progression has been significantly critiqued by Leck (2009). Leck objects particularly to the range contraction that results from the staged voice change belief that safe, healthy use of the voice should focus only on the new lower voice as soon as it becomes viable. In Leck's *Expanding Voice* system, both falsetto and modal voices are used, and an attempt is made to fuse the two seamlessly by downward vocalisation across the gap or 'clunk' (see Willis and Kenny 2008 for a detailed treatment of the 'phonational gap'). Since boys in puberty may have a falsetto range that could extend to the top of the soprano range as well as a new modal voice that might increasingly extend into the bass range, a versatile singing range of over three octaves can be temporarily achieved. A survey by Denison (2016) found Leck's work to be increasingly influential amongst American choral directors. Freer described its results as 'unarguably and stunningly effective' (Freer 2010, 33).

Young (2016; 2018) in Australia recognises the existence of soprano to the baritone range without necessarily fusing the two together. Both baritone pitch 'chest' voice and treble pitch 'head' voice might be used independently, the latter giving way to the former as boys become less comfortable with high voices (Taylor 2016, 345). Williams (2012) in the UK does not see an inevitable confrontation between expanding and contracting voice schools. She suggests that the narrower, modal range may be suitable for inexperienced singers while boys with sufficient experience to draw upon both thick and thin fold production as appropriate might retain a larger range as their voices change. Crucially, Williams regards a limited amount of falsetto as acceptable for extending the modal range. Her objection is to the exclusive use of falsetto to preserve 'treble' voices after they have changed.

Table 1. The McClung phases and Cooksey stages.

Phase	Range	Cooksey stage	Cooksey range	
Cambiata I Phase A	A3–A4	1 Midvoice I	**B3–G4**	Ab3–C5
Cambiata I Phase B	F#3–F#4	2 Midvoice II	**G#3–F4**	F3–A4
Cambiata II	E3–E4	3 Midvoice IIA	**F#3–C4**	D3–F#4
Baritone Phase A	C3–D4	4 New baritone	**D#3–A#3**	B2 = D#4
Baritone Phase B	A2–C4	5 Settling baritone	**B2–G#3**	G2–D4

Far from there being 'little point in trying', there are clearly effective approaches to voices 'gradually changing in compass' that might be attempted. The difficulty is in finding an approach that works for all the possible voices between unchanged 'treble' and settling baritone that might be found in a choir. It is unlikely, in this respect, that Cooper's ideal of 'fitting the song to the voice' can be entirely successful for every single singer. A recent publication by Hobbs and Campbell (2012) has drawn on Cooksey's work to present 'songs within an octave' that will appeal to teenage male solo singing pupils. Through presenting a choice of songs with limited range, printing in alternative keys and a further injunction to transpose as necessary, almost any *solo* voice can be accommodated. The rather greater challenge of accommodating every single voice in a *choral* context is recognised by McClung in these words:

> It would be grossly inaccurate to assume every voice precisely fits the prescribed range boundaries of a singer's assigned category. On an individual basis, each boy is experiencing a vocal transition. However, it can be assumed that a large majority of singers can manoeuver vocally within the appropriate ranges designated above. (McClung n.d.b, 9)

Manoeuverability is critical. In conventional SATB choirs, baritone voices can be manoeuvered into tenor or bass parts, perhaps by miming any notes out of range. This may not be the best practice, but it is common. It is voices above baritone pitch that present the greater challenge. The problem does not arise, of course, wherever the English 'cathedral system' of life extended boy 'trebles' with adult ATB is used. Beyond this, however, there have traditionally been two main possibilities:

1. SSA Choirs, consisting of up to three parts, soprano I, soprano II and alto (or treble I, II and III). In theory at least, the singers should all be boys who have either not begun puberty or whose progress through puberty has been insufficient to impact noticeably upon vocal stability.
2. TTBB Choirs for young men that largely follow the voicing of an adult male voice choir, first and second tenor and first and second bass parts. The first tenor part may well be a high one, similar in range to a low alto or cambiata part.

The project of recording the first 12 pieces from *Emerging Voices* revealed clearly the extent of the challenge. Some choir directors believed that all changing voices could be accommodated within a TTBB disposition. Others felt it better to create specifically cambiata choirs with boys allocated to cambiata 1, cambiata II and baritone parts as specified by the *Emerging Voices* choral leaflets. Yet others felt that the optimal solution, for the *Emerging Voices* series at least, was to offer the lower voices from an SSA choir the opportunity to combine with TTBB voices where organisational factors permitted. One requested that the allocated piece be recorded in a lower key than the one set, perhaps reflecting the emphasis Freer places upon flexible voicing (Freer 2007).

Flexible voicing, manoeuverability and the miming of notes out of reach are all solutions that allow choral parts to be populated. Whether all produce an equally satisfactory result in terms of choral timbre, however, is part of the question under investigation. An artistic result requires more than merely finding workable solutions to pitch. Although Freer regrets the fact that falsetto ranges are omitted from the oft-quoted charts produced by Cooksey (Freer 2010) it is in Cooksey's work that we find the most detailed and helpful analysis of timbre.

Earlier research by the present author evaluated boys' singing by the method of audience response to commercial CD recordings (Ashley 2008). This left little doubt that a good, unchanged 'treble' voice will almost always be more highly valued than any voice that is changing. Although the pitch is undoubtedly relevant, Cooksey's detailed spectrographic analyses point towards another less-often considered factor. Only the unchanged voice possesses a full and complete range of harmonic partials comparable to a good adult voice. Once voice change has set in, there is a progressive loss of upper partials, resulting in increasingly less interesting voices. The thin, harmonically weak sound of many 'schoolboy basses' is almost certainly a reason for their rejection by English choral

directors working in cathedrals. Cooksey records that adult-like characteristics are still not apparent even during the last 'developing' or 'settling' baritone stage of his scheme.

This is not to say that emerging baritone voices lack raw power, particularly when boosted by the accent method breathing system devised by Morris and Hutchison (2016) and employed by Young (2016; personal communication, 2018). Cooper was certainly aware of the contrary need to curb their 'exuberance' (Cooper and Wikstrom 1962). The present author has coined the term 'roaring baritones' for the voices of 16- and 17-year-olds that completely obliterate any subtler sounds in younger voices, save for unchanged 'trebles' whose 'ring' can carry above both adult singers and loud organs or orchestras (Howard et al. 2014). It is these subtler voices that form the research interest here.

Cooksey records that in the stage IV voice 'perceptually, listeners can hear some of the emerging baritone quality in the lower pitch range, but the upper pitch range remains light' (Cooksey 1992, 59). Of the immediately preceding stage he wrote, somewhat tantalisingly, 'this classification produces a unique voice quality' (Cooksey 1992, 57). Other than something 'huskier and thicker than midvoice I' there exists something of an enduring mystique concerning this voice quality. If the emerging baritone quality is not perceived until the next stage (and then only in the lower pitch range) is this still a voice with 'boyish' rather than 'young man' quality? Quite what is this quality? An adequate answer to this question seems hitherto to have defeated almost all writers on the topic, who seem able to describe it only in such terms as 'not yet dropped an octave, but has a tone quality different from that of the boy soprano' (Ars Nova, n.d.) or 'may sound more like an unchanged voice but the lower tones will begin to be stronger' (Leedberg, n.d.). Turning to the original source only enhances the mystique as Irvin Cooper considered a perfect example of cambiata to be the voice of Wayne Newton. This is a bizarre choice since Newton suffered from delayed puberty and can hardly be considered representative.

More helpfully Alan McClung recently wrote:

> This results in some boys whose voices are in the second phase of change (having been classified as tenors) being mixed with boys whose voices are in the first phase of change (cambiata). This practice severely limits the vocal potential of the cambiata because music must be chosen which seldom goes higher than an E flat or F above middle C and he is never allowed to use his upper voice which contains some of his most beautiful tones.

Here he is describing exactly the problem that frequently arises when the only possibilities available are the SSA choir in which the mysterious voice is unable fully to exploit its lower range and the TTBB choir in which 'some of the most beautiful tones' will not be heard.

Research method

Although the primary interest reported here is in the 'mystical' voice that inhabits the zone between the qualities of the SSA choir and the TTBB choir, the research was conceived with an open-ended ambition simply to discover what voices actually 'emerged' when composers were given a brief to write according to the guidelines of the Cambiata Vocal Institute. There are thus two phases reported on here. The first concerns the briefing of composers with analysis of the potential difficulties. The second concerns the recording of the subsequent works by different types of choir with analysis of the voices found.

Owing to the relative dearth of cambiata music published in the UK and consequent novelty for many composers, conductors and teachers, the compilers of the series had the additional problem of appeal to a wide range of choral groupings that perhaps included the needs of the general music class at one end and the accomplished choir at the other. An immediate question concerned the number of parts to be provided. At the simplest level, unison songs for one part only to demonstrate and exploit a particular voice were considered. At the other extreme, challenging four or even five-part settings could have been possible. In the end, a compromise of

Table 2. Part specifications for composers/arrangers.

	Comfortable tessitura	Full range
Two-part voicing for boys		
Cambiata	G3–E4	F#3–F#4
Baritone	D3–A3	A2–C4
Three-part voicing for boys		
Cambiata I	A3–F4	F#3–G4
Cambiata II	G3–D4	E3–E4
Baritone	D3–A3	A2–C4

two and three-part scoring was agreed upon. Composers were provided with the specification shown in Table 2:

Two areas of tension particularly stand out. First, composers understandably feel constrained if they cannot write for a wider range that a 5 or 6 note tessitura. Second, stage 3 and 4 voices are difficult to place whatever system of disposition is chosen for a choir. To this dilemma must be added the further consideration that progression through stages 3 and 4 can be quite rapid, the relative numbers allocated to each part need to have some balance and busy teachers are unlikely to have time for constant re-assessment of individual voices. Table 3 shows cambiata parts alongside the most closely corresponding SATB choral parts more familiar to the composers.

Each part is now examined in detail in order to explore the theory underlying specific issues identified in the literature review.

Cambiata I

McClung specifies two phases of cambiata I. On the grounds that five-part scoring would be impractical or of limited appeal, these two phases were combined into F#3–F#4 (tessitura G3–E4) for two-part compositions (cambiata and baritone) and F#3–G4 (A3–F4) for three-part (cambiata I, cambiata II and baritone). The highest permissible note in either case was thus G4, which corresponds with Cooksey's G4 for the first stage of change. The range bottom proved more of a problem. McClung's range for Phase A is A3–A4. This invites immediate comparison with the range of the unchanged voice. Both have A3 as the lowest pitch.

This is problematic in UK schools where, unlike the US middle/junior high system, boys enter secondary school at the relatively young age of 11. Teachers may, for good reasons, be anxious to involve their new intakes of eleven-year-olds in singing, but a significant proportion of these boys will still possess unchanged voices. Arguably, such voices are not at their best in the lowest possible part of the range. At the same time, there will be other Y7 boys who have reached Cooksey's stage 2 (midvoice II) or the McClung cambiata I phase B stage. These boys will potentially be satisfactory between A3 and D4, but the extension of speech register singing towards the top of the range can produce increasingly undesirable results. Boys at Cooksey stage 1 (midvoice I) are probably best suited to the CI parts provided in *Emerging Voices*, but if chronological age or school year is to be determining factors in part allocation the overall result is likely to be the product of at least three stages of voice change within the one part.

Table 3. Cambiata part ranges and SATB part ranges.

Cambiata part	Range	SATB nearest equivalent	Range
		Soprano	C4–C6
Cambiata I (A)	A3–A4	Mezzo-soprano ("Treble")	A3–F5
Cambiata I (B)	F#3–F#4	Contralto	F3–D5
Cambiata II	E3–E4	Counter-tenor	E3–E5
Baritone (A)	C3–D4	Tenor	C3–A4
Baritone (B)	A2–C4	No real equivalent	
		Baritone	G2–F4
		Bass	E2–E4

Cambiata II

McClung suggests only one phase of Cambiata II, the range being E4–E5. This was the range specified by *Emerging Voices* for pieces with three-part voicing (with tessitura G3–D4). It is a particularly problematic range for conventional choirs, being too low for all but a very few singers in SSA boys' choirs. It might be taken by high tenors in a TTBB choir, but if the tessitura is higher than the specified G3–D4, young, newly changed voices could strain and may encounter difficulty with the *phonational gap* – notes between C4 and E4 that are difficult to sound and where a sudden break in to falsetto may occur in untrained voices (Willis and Kenny 2008). The reasons for the difficulties are all too apparent when Cooksey's scheme is consulted. The E3–E4 range sits uncomfortably between Cooksey's midvoice II (F3–A4) and midvoice IIa (D3–F#4). These stages are the most difficult, characterised by 'extreme instability in the upper pitch range where strain can occur easily' (Cooksey 1992, 59). Progression through these stages is likely to be rapid in the majority of cases. A boy enrolling for a choir in September at midvoice II stage may well be midvoice IIa or new baritone by the time of a concert towards the end of the school year.

Unlike CI, there is no ideal voice stage for CII. Midvoice II (stage 2) sits slightly above the range and midvoice IIa (stage 3) slightly below it. In reality, a CII line is likely to be made up of a combination of at least these two stages and possibly also some stage 4 voices. An obvious factor that teachers and conductors need to consider is a balance of parts. It may be necessary to populate CII with voices that are strictly outside the range simply to achieve a viably sized section relative to the rest of the choir. Whether or not the mystical 'low boyish' timbre is achieved or the part tends more toward the 'young man' baritone quality depends on how this is done. Even coverage of the entire range may well require a mix of both voice types, which, together with the rapidity of change, makes the CII a particularly interesting section.

Baritone

The range given to composers for Baritone was A2–C4 (tessitura D3–A3). Again, McClung specifies two phases of baritone. Baritone A is C3–D4, and Baritone B is A2–C4. These ranges demonstrate more clearly than any other the difference between an emerging voice and an adult voice. Baritone A is equivalent in range to an adult tenor, but with the 'head voice to falsetto' notes missing. This presents interesting challenges for a TTBB choir. Do they use tenors or baritone/basses on this part? Baritone B is lower, but still a little higher in range than an adult baritone. Cooksey's final stage of 'settling baritone' (Stage 5) has the same bottom note as an adult baritone, but, in Cooksey's words:

> Settling voices should sing gently and not attempt the volume of which adults are capable. If boys are asked to produce vocal sounds that imitate adult like qualities, they must use their laryngeal and vocal tract muscles with excess effort to do so. Typically, they increase subglottic air pressure beyond appropriate levels, intensify all laryngeal muscle contractions including vocal fold closure force, and expand vocal tract dimensions to adult dimensions by excessively contracting vocal tract muscles. (Cooksey 2000)

In practice, provided that the part writing stays within the D3–A3 tessitura, it will be comfortable and accessible to both stage 4 and stage 5. However, if the composer extends the part much below this tessitura for any length of time the presence of a critical number of mature stage 5 boys is essential if the lowest notes of the full part range are to be accessed comfortably without pitch compression. As already noted, stage 4 boys might alternatively be allocated to CII, a likely deployment if a good number of stage 5 voices is available. Again, provided the composer pitches predominantly within the CII tessitura (G3–D4), stage 4 boys should manage a CII part with little strain. If the composer writes towards the top of the full range, however, stage 4s may strain on CII and their highest notes will likely be flat in pitch with unpleasant tone.

Recording and analysis

Ethical permission for this phase of the study was granted by the ethics committee of the university at which the author is an emeritus professor. Data on individual singers are presented in aggregate form only and no boys are identified in the study. An earlier publication by the present author (Ashley 2014) provided several case studies to illustrate how choirs of different type dealt with the problem of accommodating young adolescent male voices in choral work. As far as was possible the same choirs were approached with the request to record one or more pieces of the *Emerging Voices* series. Directors were given to understand that, while one objective was to produce the highest quality performance possible for a CD, another included the desire to research the vocal disposition of the choirs, analyse the tone produced and evaluate the success of the series regarding its stated objective of catering for emerging voices.

Each choir was allocated one or two pieces from the series to rehearse for the CD recording. The choirs chosen were not all the same standard or disposition, the criteria for choice being (a) a desire to show progression in the series and illustrate the kinds of result choirs of comparable circumstance might aim for and (b) to explore the effectiveness of the series in catering for young voices across a range of likely contexts. Table 4 shows the types of choir chosen. It will be seen that there is a mixture of the different dispositions described in the previous section.

The choirs were visited by the author for a day each, primarily to make the recordings. However, with the agreement of the choir director, samples of each voice-part singing on its own without accompaniment were made. Individual parts were asked to:

- Sing unaccompanied a representative line of the piece being recorded;
- Perform scales, vocalises or messa di voce exercises in the tessitura of the part being recorded.

Individual parts were also split up according to the ages and apparent developmental stages of the boys, and the above exercises then repeated for each sub-section of the part. The voices of some boys were also sampled individually and speaking voice fundamental frequency (SF0) of those boys was measured by the *Speech Test* smartphone app[1]. Recordings were subjected to analysis of pitch, sound pressure level (SPL) and formant distribution by means of the Praat software package. SPL was referenced against a white noise level of 75 dB. For some choirs where permission had been secured, video recordings of the demonstrations were also made to aid analysis. Ideally, the voice of every boy would have been individually sampled. However, the sheer scale of the project and the pressure of prioritising a CD quality recording within one day did not permit this.

Results

Results are presented in the form of an analysis of the types of voice found in each part.

Table 4. Types and dispositions of choirs used for recordings.

Tracks	Type of choir
Pascoe: *Red red rose*	Community cambiata
Brooke: *Molly Malone*	School cambiata
Crawford: *Gospel train*	
Brooke: *Angels watchin'*	National youth: boys' changed voices section
Bullard: *Health and safety*	
Pascoe: *Two spirituals*	
Quartel: *Different rum*	School cambiata
Bullard: *Not too fast*	TTBB + SSA
Brooke: *Piano man*	TTBB + treble choristers
Brooke: *Haul away*	School
Tarney: *Lover's ghost*	School cambiata group with Y9 ex-cathedral trebles
Tarney: *Sea fever*	

Cambiata in two-part settings

Understandably, the publisher requested that the pieces be graded for difficulty through a three-dot system where one filled dot was the easiest and three filled dots the most difficult. While two-part settings might be simpler to teach and perform, the problem of matching voices to parts is harder. A single 'cambiata' part has to cover three vocal ranges: CI phase A (A3–A4), CI phase B (F#3–F#4) and CII (E3–E4). These ranges are themselves compromises with actual vocal stages. Additionally, for the organisational reasons explained above, some pre-cambiata voices (A3–F5) might be anticipated. The consequences of this are evident in *Beat of a Different Drum*. The choir that recorded this contained a predominance of Y7 (11–12-year-old) voices on the cambiata part. The relative inexperience of the cambiata section was a factor in choosing a two-part piece though the teacher could hardly be criticised for wanting to include a good intake of young voices new to the school.

The consequences are evident in sound sample 1 which consists of two vocalises by the younger boys. In the first, the tone is relatively consistent and the SPL ranges from 73 dB on E4 to 71 dB on A3. The A3 is sung at a pitch of 222 Hz, which is a 15.6 cent# pitch deviation. In the second, the tone falls off in intensity and becomes croakier as the boys attempt to reach below what is the range bottom for many of them. This is reflected in SPL, which falls from 71 dB on the B3 to 62 dB on the E3. The E3 is sung at a pitch of 166 Hz, which is a deviation of 56.8 cents# from the true pitch of 164.8 Hz. This is an example of the *pitch compression* that occurs when singers attempt to reach for notes outside their range. When the boys are halted on the E3 and made to listen to the note sounded on the piano, they improve their tuning to only 11.5 cents#, but this is unlikely to happen in a performance.

For the two-part composition *Not Too Fast Not Too Slow* two groups of singers from the same organisation were invited to record. The main choir was a TTBB one, but some younger boys from the organisation's SSA division were invited. Sound sample 2 is of a descending E major scale (E4–E3) sung first by the TTBB boys and second by the SSA boys.

It can be seen in Figure 1 that the TTBB boys (left) are collectively weak at the high end of the scale, strengthening towards the lower end, while the SSA boys are almost the exact reverse.

When both groups sing together there is even coverage of the cambiata part. From the point of view of choral performance, there is thus a good part fit, though this cannot be guaranteed as optimal for each individual voice. Perceptually, the tone of the two groups is different. The SSA group has a brighter 'boy-like' modal quality on the higher notes, while the TTBB group commences in a weaker 'head'/falsetto-like quality that transforms to baritone quality as the scale descends.

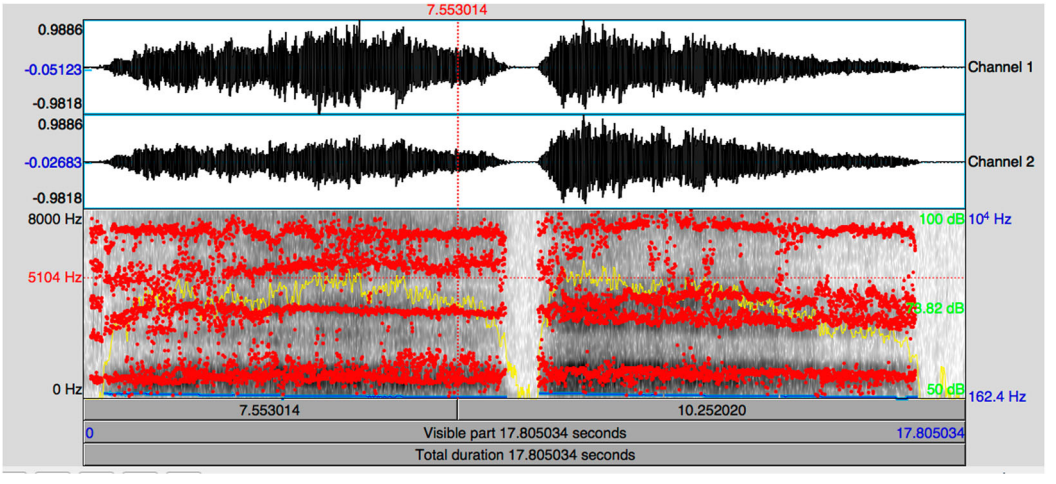

Figure 1. Spectrograph and SPL of descending E major scale, TTBB voices (left), SSA voices (right).

Cambiata I in three-part settings

In theory, splitting the cambiata voices into parts I and II should alleviate some of the potential difficulties inherent in a single cambiata part. Realisation of this theory in practice, however, is dependent upon actual choir demographic. The choir that recorded *My love is like a red, red rose* was an example of the *demographic creep* issue discussed in Ashley (2014, 124–130). Though describing itself as a cambiata choir, the choir was in reality a TTBB choir since the boys had aged and matured somewhat since the choir was originally formed. The CI line consisted of four older boys and three younger boys. SF0 samples were taken from one boy in each group. An SF0 of 194 Hz indicated stage 2 for the younger group while 129 Hz indicated stage 4 or 5 voices in the older group. Although a clear difference in timbre could be identified perceptually when the groups sang on their own, the younger group contributed little to the overall effect. The older group on its own rated 81.3 dB and the younger 75.1 dB. Theoretically, these should sum as 82.3 dB but the actual figure recorded when both groups sang together was 81.4 dB. Baritone quality obliterated any midvoice II quality present in the younger voices.

A comparison of CI parts in *Angels watchin'* and *Piano man* indicates that part tessitura may be a factor to be considered. *Piano man* has a high part tessitura of C4–G4, which matches Cooksey's midvoice I tessitura well, but is high for midvoice II. It is also accessible for unchanged voices. For the recording, boys of similar age (11–12) to those in *Beat of different drum* were employed and this time experienced none of the difficulties phonating notes below Middle C. Sound sample 4 demonstrates a C4–A5 vocalise by 11- and 12-year-olds in which C4 is secure as the range bottom.

The tessitura of *Angels watchin'*, however, is lower at A3–F#4. The part extends upwards to A4 but the composer provides an optional alternative of B3 in anticipation that some voices might find the A4 uncomfortably high. A4 would indeed be a tone above Cooksey's stage 1 (midvoice I) tessitura, though comfortably within the extreme range of A3–C4. For stage 2 (midvoice II), the A4 would be the top of the extreme range and four semitones outside the tessitura.

The choir chosen to record this piece was described as neither TTBB, SSA nor cambiata. In the words of its conductor:

> We just describe them as Changed Voices. We have thought about using the cambiata word, but feel that it's a term only understood in the sector and as a result calling a choir a name that requires further explanation isn't helpful. We have only this morning talked about Chang**ing** Voices as a title without entire resolution at this point. I feel that naming the voice parts very distinctly as TTBB defines them within an adult context, and that's not necessarily helpful as a label when the voice is very fluid and can change registers. We have them

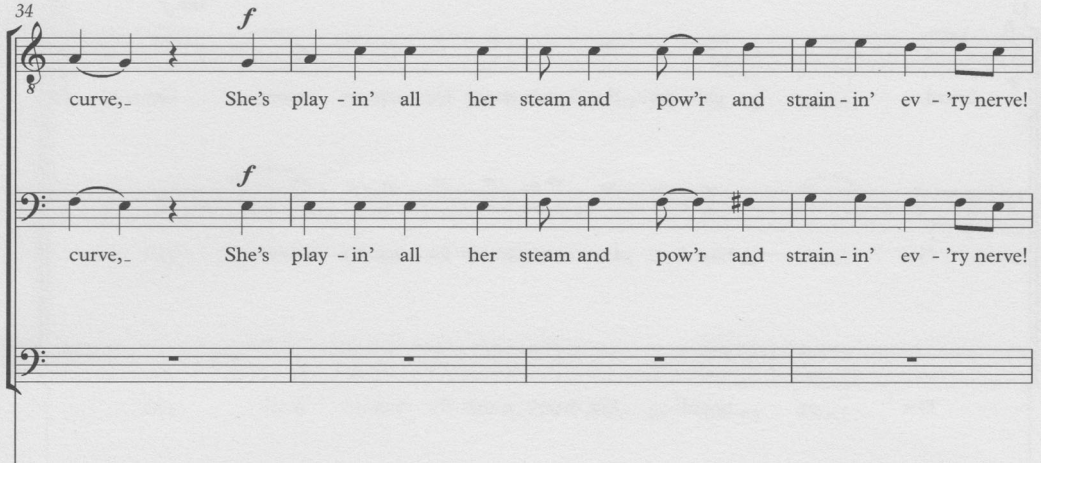

Figure 2. Crawford: *Gospel train*. Bars 34–37. (Oxford University Press).

> for an intense week during which they don't change. But over 6 months they can entirely change, and I have found that a choir with 20 cambiata voices in April has only 10 in August – something we may experience this weekend.

None of the voices in this choir was less developed than stage 3, rendering it a moot point whether, as the conductor suggests, the choir should be called chang*ed* or chang*ing* voices. For some choirs, a CI part without stage 1 or 2 voices might present difficulty. The optional top A4 was omitted in this recording and exploration of the voices through a *messa di voce* indicated comfort in the range F3–F4. A pleasing timbre midway between baritone and a lighter top register was achieved without the support of stage 2 voices. No difficulty was encountered with the phonational gap region, a fact almost certainly attributable to a higher level of training that allowed the use of blended registers. Nevertheless, the difference in relative comfort can be heard in sound sample 5, which is a *messa di voce* on the notes Bb3, F4 and F3, first by the CIs and then by the CIIs. The CIIs are weightier on the F3 and sound slightly strained on the F4, while the CIs are comfortable on the F4 but lack weight on the F3.

Cambiata II in three-part settings

Straddling as it does the most volatile stages of voice change the CII part can present real dilemmas. The vocal stage with the most perfect theoretical fit is stage 3 (midvoice IIa) but this is a weak voice, easily overpowered in its light, upper range by stage 1 and 2 voices, and in its lower proto-baritone range by stage 4 and 5 voices. Moreover, Cooksey noted that the voice only lasts an average of 3–4 months and can be as short lived as three weeks. When a single cambiata line is divided into CI and CII, decisions need to be made as to how many stage 2 voices and how many stage 4 voices are to help stage 3 voices on the CII part. This dilemma was very evident in the *Emerging Voices* recordings. In the case of *Red, red rose*, the available singers were relatively mature and the CII part was populated entirely by stage 4 and 5 voices with full baritone quality the inevitable result. In the case of *Gospel train*, the available singers were relatively young. On their own, their timbre was bold and had a boyish quality indicating mostly stage 2 voices. The voices of the same choir present in the single cambiata part for *Molly Malone* were asked to sing separately. In sound sample 6, the timbre of the CII voices is very similar to that of the CI voices when singing the same pitches and vowels ('alive').

However, when the single cambiata part was split into CI and CII for *Gospel Train*, the CII line was overpowered by both CI and baritone voices. The middle part could hardly be heard when harmonising with the baritones in bars 13–26 and most notably could not be heard when harmonising with the CIs in bars 31–38.

A shortage of true CII voices is the most likely explanation for the similarity of timbre in *Molly Malone* and the weakness of the CII line in *Gospel train*. Were the performance to be repeated the conductor might be presented with a clear dilemma in whether to reinforce the CII line with younger or older voices.

In *Piano man*, the CII part, as well as the CI part is high, with a tessitura of A3–E4. Much use is made of a descending motif from E4–C4. If CII is sung by stage 3 it will occupy the light, upper part of the voice range with little baritone quality. Reinforcement of the part by stage 2 boys would do much to relieve stage 3s of sustained work in this potentially unstable part of their range. Alternatively, reinforcement by stage 4s would likely result in a purely baritone quality. This 'baritone timbre' effect can be heard in sound sample 8. A six-note vocalise beginning on the lowest CII note (E3) is first sung by the stage 3 and 4 voices together, then by the stage 4 voices alone and finally the stage 3 voices alone.

An SF0 sample of 123 Hz was taken from one of the boys identified as stage 4 and samples of 175 Hz and 169 Hz were taken from those identified as stage 3. Each of these boys is heard as a soloist in the recording where the difference between boy alto and baritone quality is readily apparent.

The boy alto quality, however, is not evident when the 175 and 169 Hz voices sing with the CIIs. It is evident only when the boys are individually picked out by the solo microphone.

Baritone

No significant issues with baritones were encountered during the recording process. To an extent, this may have been fortuitous since the choirs that recorded the lowest baritone parts were also those with the largest proportions of stage 5 voices. Had a choir more reliant on a majority of stage 4 voices recorded a piece such as *Red red rose* with its low A2, some pitch compression below C3 might have been expected. The author has experienced this on other occasions but it did not arise during this particular project. Given the effects of demographic drift, the baritone part is seldom likely to be a significant challenge since stage 4 voices mutating to stage 5 might solve any difficulties through the action of nature alone.

Perhaps meriting more significant comment is a response to the question of whether a TTBB choir should use tenors or baritone/basses on baritone parts in cambiata arrangements. No tenor voice quality was found in any of the young men participating in the project. In that sense, there *were* no tenors. This both confirms Cooksey's contention that adult voice qualities simply do not exist in teenage singers and supports the position taken by the conductor of *Angels watchin*' that naming the voice parts distinctly as TTBB defines them within an adult context when it is their fluidity that should be recognised.

Discussion

The strapline on the *Emerging Voices* choral leaflets is 'songs for cambiata choir' and the descriptor paragraph reads '... engaging short pieces tailored specifically to the needs of changing or cambiata male voices'. It was known at the outset that sales to specifically 'cambiata choirs' might be low as there are few such choirs in the UK. This is reflected in the CD itself where only four out of eight choirs used the term 'cambiata'. The other 50% used variously allocated boys to parts through terms such as tenor or alto. A key issue for discussion therefore concerns whether a CCB cambiata choir has any significant advantage over more conventional dispositions such as SSA and TTBB.

The *Emerging Voices* CD contains some arguably fine performances, but it cannot be claimed that Cooper's ideal of fitting the song to the voice, not the voice to the song has been realised entirely without compromise. Despite the care taken by the composers and editors, the results of this study indicate that satisfactory part matches were not achieved for all voices.

It was anticipated in the review of theory that because of the early start to secondary schooling in England, boys with voices insufficiently changed to access comfortably the lower notes of the CI range might be an issue. This turned out to be very much the case in practice. One of the most common difficulties was with eleven and twelve-year-olds singing uncomfortably low in their ranges. The CI parts sometimes descended lower than some of the boys could satisfactorily phonate and the better parts of their voices were seldom used to advantage. The issue here is not the appropriateness of the CI parts themselves, but their appropriateness to the specific circumstances of UK state-maintained education (see Ashley 2015, 8–11 for an extended discussion). This paper has shown that when populated by boys at stage 1 (midvoice I) the parts work well, producing a good tone and a comfortable fit to most boys' voices. Unfortunately, making it a requirement that only boys at this stage should be used would not serve well the interests of English secondary schools.

On this consideration alone, teachers and conductors might be better off looking at SSA music for their younger choirs. There would, however, be several disadvantages to this. It is already an issue in many schools to provide separate choirs for boys and girls. The workload of providing for choirs can be doubled by any perceived need to provide equally but separately for boys and girls and it is unsurprising that many schools shy away from such a task. One of the main attractions of a cambiata choir is that younger boys and older boys sing together. The task of providing separate SSA and TTBB

choirs alongside a junior girls' choir and other possible groups would be simply too much for most hard-pressed heads of music, though at least one involved in the present work seems to have achieved it.

The analysis undertaken in this paper has demonstrated that the population of CII parts was also a task that presented some difficulties and dilemmas. Again, this was foreseen in the theoretical review. As anticipated, the way this part straddles the most volatile stages of voice change created issues. It was possible to populate the part and no strain, fatigue or complaint was noted as the singers manoeuvred to fit a part that did not correspond exactly to their current individual range. Was the mystical, unique timbre achieved? In a minority of cases, a pleasing timbre that had none of the strident quality of unrestrained young baritones nor the weakness of pre-baritone voices singing too low in their range was achieved. It was notable, however, that the ability to carry 'boyish' vocal quality down into the CII range without undue loss of phonation was found only in the choirs comprising boys with significant experience as trained trebles.

In the majority of cases, the CII part was populated by a mixture of boys mainly at stages 3 and 4. Whenever this occurred, the subtler tone quality of the stage 3 voices was obliterated by the stridency of the stage 4 voices, only baritone quality being heard on the CII part. It might be argued that a better home for stage 3 boys might be found on the lowest parts of SSA music. Against this, conventional alto parts can go too high for stage 3 boys, taking them across the difficult region of the C4–E4 phonational gap, particularly as the voices mutate to stage 4 during the year. The research appears to support McClung's claim that without CCB voicing, the 'most beautiful tones' of the true cambiata voice are lost. The reservation here is that it was only the choirs comprising boys with significant choral experience that achieved these tones.

The baritone parts in general presented the least difficulty. Any choir that was in possession of a good number of stage 5 voices could be assured of a good, robust and comfortably situated baritone line. No difficulties were encountered with the part fit. In choirs with perhaps a younger average age, however, part fit to stage 4 voices was less satisfactory. Although all such voices sang well toward the top of the range, tonal compression and phonational weakness could be evident at pitches below C3 (tenor C). This should be no surprise given Cooksey's specification of B2 as the extended bottom range of voices with a D#3–G#3 tessitura. Whether such voices are best allocated to CII parts or baritone parts is a decision that conductors need to make, taking into consideration the length of time between audition and performance, the number and quality of available stage 3 voices, and the overall age profile of the choir.

Conclusion

The *Emerging Voices* series has, of commercial necessity as much as an educational rationale, been devised with progression in mind. Just twelve pieces have attempted to cater for the needs of beginner ensembles that are little different to general music classes, to accomplished choirs comprising boys with significant choral experience. It was only in the latter that the elusive, mystical sound that this paper has sought to identify and analyse was found. If nothing else has been achieved, it might be claimed that understanding of what this voice is has been advanced.

Can this vocal quality be achieved in the general music class or with boys lacking previous choral training as trebles? Where boys with less choral experience are concerned Cooper's ideal of the song must fit the voice, not the voice the song seems fully realisable only in the case of solo singing students. Nevertheless, the degree of manoeuverability required by the CCB parts in *Emerging Voices* was demonstrably less than that required for wider ranging SATB music and at least satisfactory cambiata tone could be achieved by an intelligent blend of voices at different stages. As always, the vital ingredient is the guidance offered by the teacher. The *Emerging Voices* series cannot on its own be sufficient in the face of inadequate subject knowledge in dealing with adolescent voices.

Can new adjectives be added to readers' own subjective interpretations of what other writers have called 'not yet dropped an octave, but tone quality different from that of the boy soprano'? Perhaps

readers may reach their own conclusions concerning whether this timbre is a choral sound of artistic merit. The tracks presented on the CD will further enable listeners to make their own judgements. It is perhaps easier to define the sound by what it is not. It is not a strident new baritone voice that obliterates more subtle stage 3 qualities in CII parts. It is not an unchanged voice singing too low in its range and it is not a changing voice singing in falsetto. It is undoubtedly a relatively fragile voice – potentially a 'rose between the two thorns of roaring baritones and screeching trebles' in choirs that are not skilfully managed. Such a metaphor perhaps betrays the author's own subjectivity.

The next important research task must be to test this subjectivity against the perceptions of the target age group. The proposition that losses from singing can be reduced if the potentially unique musical contribution of voices in mid-change were more highly valued needs to be tested. If boys do not agree that this voice matches other aspects of their currently perceived physical and psychological identity, the proposition can hardly be supported. As the paper has shown, the voice is a fragile one that can be quite hard to manage. It is likely that some supportive salesmanship is going to be needed if boys at the age and stage to produce the voice are to be confident about exposing the identity it gives them.

Note

1. Created by the author and two colleagues and available free from the Apple app store, this tool measures speaking voice fundamental frequency and categorises the result by pubertal stage.

Notes on contributor

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