



1000 Boys' Voices

Digital Audio Database created by Professor Martin Ashley

Recorded between 2010 and 2013 as a record of the condition of the young male voice against which future trends might be assessed in decades and centuries to come.

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Digital Audio Base

Description and Purpose

1000 boys' voices is a digital audio database of the speaking and singing voices of boys aged between nine and fifteen, recorded between 2010 and 2013. The larger part of the database consists of a cross-sectional sample (see below) but some longitudinal samples of boys assessed four times annually are also included. Most of the recordings are of a speaking and singing protocol (described below) but some more extended samples of singing are also included. It is intended as a resource for researchers of the young male voice during the time of pubertal voice change. It was inspired by widespread speculation in the choral community that boys' voices are "breaking" earlier than has been traditionally the case. This is thought to be the consequence of the so-called secular trend in pubertal timing (a gradual drift to earlier onset and progression of puberty). The historical background to the database has been researched extensively by the author and a colleague from Leipzig, Dr Ann-Christine Mecke. The results of this study are published in *Research Reviews in Human Learning and Music* and indicate that the age of fourteen has been for two thousand years fairly consistently the time at which "boys are apt to change their voices" – until the present.

Analysis of the database indicates that twelve rather than fourteen is the more common age at the beginning of the twenty-first century. Given the possible significance of this as well as the relatively slow time period over which the secular trend operates, the intention of the database is that future researchers in decades or even centuries to come will have access to recordings of early twenty-first century voices. This, it is hoped, will enable an accurate diagnosis of trends in the timing of puberty and voice change, and associated changes in choral and solo singing technique and tone. The database is currently stored on 15 CDs and in hard drive at two separate locations. It will eventually be archived in the Edge Hill University Research Archive and will be available on request to bona-fide researchers.

Sample

The age range of nine to fifteen was deemed to be that which would capture nearly all stages of voice change. The main sample was cross-sectional and boys in this sample were recorded only once. These boys were drawn from cathedral or cathedral style choirs, secular boys' choirs and school choirs. A random sample of non-singing boys (speaking voice only recorded) was drawn from twenty-nine secondary schools representative of urban, suburban and rural populations, distributed across all four regions of England, Wales and the Isle of Man. This sample approximately reflected the balance of social class and ethnicity found in the schools. A smaller sub-sample of fifteen boys was seen regularly four times per annum for longitudinal study. Boys in the longitudinal sample were drawn from one cathedral choir, one all-male parish church choir, one secular boys' choir and professional music theatre. Twelve solo artists who had made commercial CDs were also included.

Included in the database are singers drawn from:

- The National Youth Choir of Great Britain (n = 5)
- The National Youth Choir of Scotland (n = 61)
- Five English cathedral choirs (n = 77)
- One English collegiate chapel choir (n = 15)
- One school chapel choir (n = 13)

- One Australian cathedral choir (n = 14)
- Two English all-male parish choirs (n = 16)
- One Regional “Changing Voice” Choir (n = 66)
- Thirty secondary schools (n = 576)
- Twelve young solo recording artists
- Two pre-war boy sopranos (interviewed about archive recordings)

Ethics

Ethical approval for the work was granted by the full Edge Hill University Ethics Committee. The protocol was derived from the BERA (British Educational Research Association) and the 1983 Helsinki Declaration on Human Experimentation. In order to ensure that full consideration was given to UN Convention on Rights of the Child, Article 12, requiring that children be facilitated to give fully informed consent, versions of the BERA guidelines and an illustrated description of the work to take place were prepared in language accessible to ten to fifteen year old boys. Letters to parents requesting that the research be discussed with the boy at home were circulated via the schools or choirs fully explaining the work and its purpose, assuring anonymity and advising of the right to withdraw and the right to review data. Boys were reminded of these rights on the day and given a further verbal explanation with opportunity for questions before work commenced. None opted to withdraw.

Recording Protocol

Two recording protocols were constructed, one for all boys and a further one for choir members and singers. All boys were asked to:

- Recite the day’s date and the date of their own birth
- Read approximately ninety seconds of the phonetic speech passage *Arthur the Rat*
- Count slowly and monotonously backwards from twenty
- Make a sound like a siren running down to the lowest pitch in their voice
- Engage in a short piece of casual conversation
- Indicate on a Visual Analogue Scale (VAS) their perceptions of hoarseness, cracking or embarrassment in their speaking voices (see below).

In addition to the spoken tasks, all the choir members/singers were asked to:

- Sing the words ‘You owe me five pounds’ to the tune of *Happy Birthday* in the singer’s choice of pitch range without a starting note given
- Perform ascending and descending glides throughout the pitch range from highest to lowest and lowest to highest notes as estimated by the singer
- Perform pitched scales, ascending and descending in G major and C major, sung unaccompanied for two octaves (G) or one octave (C), with extensions to highest and lowest clearly realisable pitches by keyboard matching.
- Perform a vocalise with a range of a sixth in various keys crossing potential passagio points
- Complete a VAS indication of their perception of both speaking and singing voice quality

Choir members were seen individually in a choir rehearsal room or similar space with a second adult known to the boy present in but not participating. Date of birth, age, standing height (cm) and weight (kg) were recorded and each boy gave a short interview about his singing, musical tastes, progress in the choir and how he felt about his voice. Non-singing

boys were seen in a school classroom in groups of three or four. Boys studied longitudinally completed the same recording profile at each assessment. Their standing height (cm), weight (kg), neck circumference (cm), lung capacity/peak flow (ml) and sound pressure level (dB) in a *messa di voce* at notes D4 and D5 were also recorded. These boys were recorded acoustically and also by electroglottography (see below).

The Visual Analogue Scale is commonly used in clinical work on the assessment of pain, where it has been shown to be effective with children as young as five. It is also used for the perceptual evaluation of dysphonia with similar reports of effectiveness for the singing voice and has been used successfully by other researchers for self-evaluation of voice quality during puberty. The polar statements of the speaking voice VAS were: “my speaking voice is absolutely fine” to “my speaking voice keeps cracking and sometimes embarrasses me”. For the singing voice, they were: “My singing voice is pure and the high notes are easy” to “I struggle to get the high notes and my voice sounds rough”.

Recording Method

The essential criterion for the main cross-sectional database was a clear, consistent high level, noise free audio signal that would drive such pitch analysis software as is currently available but also might be available to future researchers. In addition, the method used had to be practical for use in schools with relatively large samples and in conditions that were frequently less than ideal.

High quality audio with a sufficiently wide frequency response and high sample rate was aimed for in order to enable as wide as possible a range of measurements to be taken during analysis. All the equipment used was highly linear, deviating less than +/-2dB over the range of 20hz-40Khz, the limiting factor being the microphone. The equipment chosen did not impose any kind of bandpass filtering. A DPA 4007 omnidirectional reference microphone was chosen for its quality and forgiving nature; having an omnidirectional pattern it does not suffer from proximity effect, and its high SPL handling made it ideal for these recordings. All audio was captured in 24bit resolution and a 96KHz samplerate. No other dynamic processors or other changes to the signal were applied at this stage. The microphone was mounted on a Rycote Invision-7 shock mount, and with an SE Reflexion Filter to act as an acoustic barrier and a means of securing a relatively consistent distance between each subject and the microphone. The cable used was Van Damme Starquad terminated in Neutrix NC3XX connectors. The interface employed was the Sound Devices USBPre 2, chosen for its excellent microphone preamplifiers and conversion and linear response from 20Hz – 40KHz. The device is driverless and class compliant, and is simple to use due to the combined preamplifier, converter and USB interface.

All longitudinal recordings and two of the cross-sectional recordings in cathedrals were also made with a *Voce Vista* model 7050A electroglottograph (EGG) using the supplied fixed head microphone and neck electrodes attached to the alae of the thyroid cartilage. For one of the cathedral recordings and two of the longitudinal assessments a Laryngograph *Speech Studio* EGG was used alongside the *Voce Vista* equipment, there being two operators.

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