

Welch, G.F., Himonides, E., Papageorgi, I., Saunders, J., Rinta, T., Stewart, C., Preti, C., Lani, J., Vraka, M., & Hill, J. (2009). The National Singing Programme for primary schools in England: an initial baseline study. *Music Education Research, 11* (1). 1-22.

## RESEARCH ARTICLE

# **The *National Singing Programme* for Primary schools in England: An initial baseline study**

G.F. Welch<sup>1</sup>, E. Himonides, I. Papageorgi, J. Saunders, T. Rinta, C. Stewart, C. Preti, J.Lani, M. Vraka,  
J. Hill

*Department of Arts and Humanities, Institute of Education, University of London, UK*

---

<sup>1</sup> Corresponding author. [g.welch@ioe.ac.uk](mailto:g.welch@ioe.ac.uk); [www.imerc.org](http://www.imerc.org)

## **Abstract**

The 'Sing Up' National Singing Programme for Primary schools in England was launched in November 2007 under the UK Government's 'Music Manifesto'. 'Sing Up' is a four-year programme whose overall aim is to raise the status of singing and increase opportunities for children throughout the country to enjoy singing as part of their everyday lives, in and out of school. As part of the Programme's research evaluation, a key focus has been to build an initial picture of singing in Primary schools across England. This information could then be used as a 'baseline' by which the programme's subsequent impact could be judged, including 'before' and 'after' measures of schools that receive particular 'Sing Up' input. This paper reports an overview of key outcomes of first five months of baseline profiling (October, 2007 to February 2008), embracing analyses of the singing behaviours of 3,472 children in 76 Primary schools. These findings are complimented by additional analyses of children's views on singing in and out of school; and the self-efficacy of their class teachers' (n=90), both as singers and as teachers of singing.

## **Key Words**

Children, singing, primary schools, National Singing Programme

## Introduction

It is common for a diverse range of singing abilities to be exhibited by children on entry to compulsory schooling, both in relation to their performance of taught songs and songs drawn from within the cultural repertoire (*cf* Rutkowski, 1990, 1997; Welch, 1986, 1998, 2002; Welch *et al*, 1996, 1997, 1998), and also in their ability to invent songs (Davies, 1986, 1992, 1994; Marsh, 1995). Overall, singing competency is likely to be nurtured through exposure to frequent opportunities for vocal play within an environment that encourages vocal exploration and accurate imitation (Addo 1997; Young, 2002; Mang, 2003; Welch, 2005).

Two major USA and UK studies have drawn on developmental theories and longitudinal data collection to propose phased models of singing development (Rutkowski, 1997; Welch, 1998 - see endnote<sup>1</sup>). The USA data (Rutkowski, *op.cit.*) was generated through systematic evaluation of children's singing behaviours across a period of over fifteen years. The emergent nine-phase model (which went through several versions) suggests that children progress from speech-like chanting of the song text, to singing within a limited range ("speaking range singer") to the demonstration of an expanded vocal pitch range that is allied to skilled competency in vocal pitch matching. This model has an affinity with that of another USA-based longitudinal study (Davidson, 1994) that suggests that children's singing development is linked to a schematic processing of melodic contour.

Data from a three-year longitudinal study of 184 children in their first three years of formal education in ten UK Primary schools (Welch *et al*, 1996, 1997, 1998) provided detailed evidence of how singing behaviours are age, sex and task-sensitive. Over the three years, the participants as a collective appeared to demonstrate little overall improvement when required to match the sung pitches of the criterion songs (two songs that were specially taught by their class teachers and assessed individually each year). However, this vocal pitch matching singing behaviour was in marked contrast to their ability

to learn the words of the songs, which was extremely good, even in their first term of compulsory schooling at age 5. When the pitch elements of the target songs were deconstructed into simpler musical tasks, the same children demonstrated statistically significant year-on-year improvement, being much more competent in the matching of individual pitches, echoing melodic contours, or copying small melodic fragments. The sex differences that were evident in matching pitches in song singing within the UK longitudinal study - with girls more accurate than boys – were not evidenced in these three types of deconstructed tasks. Furthermore, recent neuropsychobiological data on pitch processing modules in the brain (Peretz & Coltheart, 2003) supports a hierarchical model in which melodic contour (*pace* Davidson, 1994; Rutkowski, 1997; Welch, 1998) is analysed before the processing of intervals and tonality (see Welch, 2005 for a review).

In line with these longitudinal findings, two recent studies suggest that gender stereotyping may be a factor in the lack of singing development in some young boys (Hall, 2005; Joyce, 2005). Australian research into five-year-old boys' singing (Hall, *op.cit.*) indicates that singing may be perceived as a “female” activity. UK research of nine- and ten-year-olds (Joyce, *op.cit.*) across three primary schools found that only one-third of boys enjoyed singing (compared with two-thirds of girls) and that boys believed that girls were better singers.

In addition to age, sex/gender and task, there are other contextual factors that appear to affect children's singing behaviours. For example, the UK longitudinal study data demonstrated a clear “school effect” (Welch 2000). When comparing individual school data, *all* the children in one inner-city school improved their singing skills over the three years, notwithstanding their poor socio-economic environment and generally low academic attainment in other areas of the curriculum. In contrast, relatively few children made progress in another school, despite having much higher socio-economic status and general educational attainment levels. A major factor in these differences appears to have been teacher expectation. Progress was most marked where the class teacher expected and worked consistently for singing improvement with all their pupils over a sustained period. Similar findings

concerning school effects on singing motivation, perceived self-identity as a singer and overall enjoyment of singing as a school activity are also reported by Joyce (2005). Overall, singing competency is likely to be nurtured through exposure to frequent opportunities for vocal play within an environment that encourages vocal exploration and accurate imitation (Young 2002; Mang 2003; Welch 2005).

Socio-cultural differences have been exemplified in an assessment of the singing behaviours of 120 Hong Kong children aged seven to nine years, drawn from diverse language groups. Using both the Rutkowski and Welch developmental profiles mentioned above, Mang (2003) reported statistically significant effects for sex (favouring girls) as well as mother-tongue. Chinese monolingual children performed consistently better than English bilingual children, even though the criterion song was in English. This was seen as a further indication (following Mang, 2002; Rutkowski & Chen-Haftek *op. cit.*) that Cantonese-speaking children achieve singing mastery earlier than their English counterparts, perhaps because the pitch centres for speech and singing of the former are more closely aligned.

Overall, the research literature suggests that singing competency appears to be closely related to the nature of the singing task, with many boys negatively affected by the task of singing a "school" song. Context and culture are important contributing factors to the degree of observed singing skill (*cf* Levinowitz, 1989; Rutkowski and Chen-Haftek, 2000; Mang, 2003 – see Welch, 2006 for a review) and are likely to underlie the various differences that have been reported in the research literature (above) related to sex, age, ethnicity and schools, both in the UK and elsewhere. This research literature provides the backcloth for a new study of children's singing development in England as part of the UK Government's National Singing Programme.

### **The National Singing Programme**

The National Singing Programme (2007) is part of a UK Government initiative to support the development of musical activities under the umbrella of its 'Music Manifesto', defined by the

Department of Culture, Media and Sport (DCMS) as '...a campaign for improvement in music education. It is about creating more music for more people.' Previously, in October 2006, the 2<sup>nd</sup> Report of the Music Manifesto group ('Making every child's music matter') had recommended that singing be provided for all early years and primary children by 2012.

In the introduction to this report, Marc Jaffrey, the 'Music Manifesto Champion' wrote 'Singing has the potential to involve children and young people in music on a scale that we have not witnessed before. It is the most elemental form of music making, and is within the grasp of all of us, whatever our ability. It is a powerful community activity binding individuals and community together.' In response, the UK Government's then Secretary of State for Education and Skills, Alan Johnson, together with the then Culture Minister, David Lammy, announced the launch of an additional £10m funding package in January 2007 to support school singing, both in and out of school hours, through a major national singing campaign for primary schools, led by the British composer and broadcaster Howard Goodall in a new role as the 'Singing Ambassador' for England (DfES Press Notice, 16<sup>th</sup> January 2007 - [http://www.dfes.gov.uk/pns/DisplayPN.cgi?pn\\_id=2007\\_0009](http://www.dfes.gov.uk/pns/DisplayPN.cgi?pn_id=2007_0009)).

Subsequently, following a tendering process, two Government Departments (DCMS, DfES) jointly appointed a consortium of Youth Music, The Sage Gateshead, Faber Music, and advertising agency Abbot Mead Vickers to lead on the actual provision of the National Singing Programme in 2007-2008. Included in the intentions of the Programme are that 'children experience high-quality singing, both within and without their daily school curriculum, on a daily basis' and that 'Every school has a teacher committed to facilitating high quality singing and vocal work for the whole school'.

The four-year 'Sing Up' National Singing Programme was launched in November 2007 and a team from the Institute of Education, University of London, led by the first author, were appointed to undertake a research evaluation of key elements of the Programme. Two prime foci were: (i) to undertake an initial baseline audit of singing in randomly selected schools – started just before the

official launch – and (ii) to link this baseline data collection to contextualise subsequent pre- and post-impact evaluations of particular 'Sing Up' Programme interventions with children and adults (teacher, parents and other professionals involved in promoting singing in community contexts).

This paper reports an overview of key outcomes of first five months of baseline profiling research (October, 2007 to February 2008<sup>2</sup>) with regard to participant children's singing and other vocal behaviours. These findings are complimented by data from other aspects of the research evaluation concerning children's views on singing in and out of school, as well as their class teachers' perceptions of their own abilities as singers and in the teaching of singing.

## **Research Methodology**

The research protocol for the assessment of children's singing and other vocal behaviour (i) drew on established models on singing development from the literature (see introduction and below) and (ii) focused on a geographical spread of schools across the country, including five major city conurbations: the South-East (London), South-West (Bristol), Midlands (Birmingham), North-East (Newcastle) and North-West (Manchester), supplemented by small numbers of schools in other parts of the country in urban, suburban and rural settings, as well as several Cathedral Choir Schools. Contacts were made with Local Authority music advisors and university music education colleagues for advice on possible participant schools<sup>3</sup>, seeking to draw on local knowledge to ensure that a diverse range of school singing 'cultures' were included and accessed.

Within each school, participant children were drawn from two contrasting age groups, 7-year-olds and 10-year-olds, representing the youngest and oldest children in the upper Primary school age phase of Primary schools in England. Previous research (e.g. Welch 1998; 2006a, 2006b; 2007) had

---

<sup>2</sup> A pilot of the singing development assessment protocol and questionnaire surveys were undertaken in two London schools in September 2007.

<sup>3</sup> See Acknowledgements.

demonstrated that clear developmental differences in singing behaviour by age and sex were likely to be evidenced by the selection of these two age groups. Other recent findings from research into the acoustics of children's singing voices (Sergeant and Welch, in press) and children's vocal health in singing and speaking (Rinta and Welch, 2008; Williams *et al*, 2005) similarly supported such a developmental conception.

Furthermore, the previous research literature indicated that it would be helpful to assess several aspects of children's vocal behaviour in order to build a composite, rounded picture. The protocol, therefore, investigated (i) children's *habitual speech pitch centre* (by asking each participant to count backwards from ten and noting the pitch in relation to an adjacent piano keyboard), (ii) *comfortable singing range*<sup>4</sup> (by imitative singing of a musical song fragment at various pitches, transposed upwards and downwards on the keyboard), (iii) *singing behaviour of two well-known song items* (either 'Twinkle, Twinkle' and 'Happy Birthday' or one or other items that the particular child knew well – on advice from the teacher – if these two standard songs were unknown) (see Figure 1). The habitual speech pitch centre data provided (a) background information on the relative size and of the voice source mechanism, as this pitch centre is normally two or three semitones above the lowest sung pitch (Harries *et al*, 1996), and (b) a reference point for the comfortable singing range, which normally extends an octave and a half (or more) above this lowest sung pitch (Cooksey and Welch, 1998).

---

Insert Figure 1 about here

---

A member of the research team visited the children in their schools where their singing and related vocal behaviours were assessed individually in a quiet space. In addition, headteachers and class teachers arranged for the completion of two questionnaire surveys: the first by the class teachers of the Year 3 and Year 6 pupils on (a) their own singing self-efficacy (i.e. how they perceived themselves in

<sup>4</sup> Comfortable singing range, rather than singing range limits, is considered to be a more valid measure of children's customary singing behaviour with regard to song items in their local culture (Welch, 1979).

terms of singing competency<sup>5</sup>) and (b) their self-assessment of their abilities to teach singing to children. In addition, each pupil completed their own set of survey questions. These explored the children's attitudes to singing at school and elsewhere, using a seven-point Likert-type scale. Children answered by drawing a circle around one of seven 'smiley' faces that represented the degree to which they agreed with the focus statement (see Figure 2). In accordance with the ethical guidance of the British Educational Research Association (BERA), all participation was voluntary for pupils and teachers, allowing for participant withdrawal at any time and with resultant data to be anonymised in any subsequent reporting.

---

Insert Figure 2 about here

---

Developmental singing competency for the two focus songs was assessed against two established rating scales (Rutkowski, 1997; Welch, 1998). Previous research (Mang, 2006, cited earlier) had demonstrated that the two scales could be used alongside each other to investigate complimentary aspects of singing development. Collectively, the scales offer a holistic perspective of a child's current singing behaviour. The Rutkowski (1997) scale is a measure of singing voice development, whereas the Welch (1998) scale assesses vocal pitch-matching development (see endnote).

### **National Singing Programme initial baseline study: Overview of the main research findings**

Across the first five months of baseline profiling (October, 2007 to February 2008), 76 schools were visited across England and data gathered from 3,472 children and 90 class teachers. Although the prime focus was on Year 3 (average age 7.58 years, s.d. 0.28 years) and Year 6 (average age 10.52

---

<sup>5</sup> 'Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments' (Bandura 1977, 3).

years, s.d. 0.42 years) (total n=2,952; 85%), a relatively small number of children (n= 520; 15%) in Years 2, 4 and 5 were also included for assessment if they were in the same classes as the prime focus age groups (i.e. in classes where there were mixed age groups). The geographical spread is illustrated in Table 1, showing the numbers of individual pupils assessed in each location.

---

Insert Table 1 about here

---

Approximately equal numbers of female (n=1,637) and male (n=1,835) children were assessed (see Table 2). An analysis of pupil ethnicity (provided by the schools) indicated that 73% of pupils were classified as 'white', alongside 13% 'Asian', 7% 'black' and 7% with other ethnic backgrounds.

#### *Children's Spoken Pitch Centres*

An analysis of children's spoken pitch suggested that, for the vast majority (76%), this lies within the region a<sup>3</sup> to ('middle C'), with the latter pitch c<sup>4</sup> being the most common (for 26% of participants). The oldest age group children tended to have slightly lower pitches speaking voices, as might be expected because the underlying vocal mechanism has grown to be slightly larger by the age of 10 (see Figure 3; see Titze, 1994 for a review).

---

Insert Figure 3 [a & b] about here

---

The spoken pitch centres for the two sexes were virtually identical. Similarly, with regard to ethnicity, 'white' and 'black' children exhibited almost identical spoken pitch centres. Pupils with an 'Asian' background had a slightly wider spread of pitches (up to e<sup>4</sup>), but with the majority similarly located to other ethnic groups around c<sup>4</sup> ('middle C').

### *Children's Comfortable Singing Ranges*

Children's *comfortable singing ranges* by age group were similar at the extremes, but differed in terms of the most common pitches that they shared (see Figure 4). The most common comfortable range exhibited by 75% of the youngest age group (aged 7+) was a tenth from g<sup>3</sup> to b<sup>3</sup>. In contrast, the most common comfortable singing range for the oldest age group (75%, aged 10+) was wider at an octave and a half from f<sup>3</sup> to c<sup>5</sup>. This older group's comfortable singing range is very similar to that reported in a summary of Primary-aged children in the research literature almost three decades ago (namely, a<sup>3</sup> to c<sup>5</sup>, see Welch, 1979).

The main change in the intervening thirty years appears to be at the bottom end of the comfortable sung pitch range, which has lowered. Given that vocal pitch behaviour is closely correlated to the size of the vocal instrument – the larger the vibrating mechanism (vocal folds), the lower the resultant vocal pitch – it is conjectured that this relative shift downwards at the lower end of the vocal pitch range may be related to changes in children's diet and increased body weight<sup>6</sup> in the intervening period. However, whilst it has long been recognised that there is considerable individual variety in children's vocal pitch ranges, the common comfortable singing ranges by age group reported here are not necessarily reflected in the pitch ranges of the available published song repertoire (e.g. Plumridge, 1972).

---

<sup>6</sup> A recent major survey reported that at least 1 in 10 school-aged children worldwide are overweight (Lobstein, Baur & Uauy, 2004).

---

Insert Figure 4 about here

---

### *Children's Singing Competency*

There were two complimentary measures of children's singing competency, one focused on a measure of singing voice development (Rutkowski, 1997) and the other on vocal pitch-matching development (Welch, 1998) (see endnote for details on each scale). On both measures, the mean ratings for older children (Year 6,  $\bar{x}$  3.6 and 3.1 respectively) were significantly higher than for their younger peers (Year 3,  $\bar{x}$  3.3 and 2.8). The evidence of an overall trend towards increased singing competency with age (see Figure 5a) that is in line with findings in the previous literature (e.g. Welch 2006a). Within the data, girls have significantly higher scores than boys on each scale and within each age group, again in line with earlier studies<sup>7</sup>. For each age group and variable (sex and ethnicity) on both scales, there is a range of scores. Relatively small numbers of children were rated at the lowest levels (9% [Rutkowski ratings 1 and 1.5] and 9% [Welch rating 1] at age 7+; reducing to 6% [Rutkowski] and 6% [Welch] at age 10+). The majority of each age group were rated as demonstrating intermediate levels of singing competency (75% [Rutkowski ratings 2 to 4] and 68% [Welch ratings 2 and 3] at 7+; 65% [Rutkowski] and 56% [Welch] at 10+). A smaller proportion of children achieved the highest competency ratings and

---

<sup>7</sup> A multivariate analysis of variance was conducted to investigate the effects of gender and year group and their interaction on pupils' score on the two singing assessment scales (Rutkowski and Welch). Pupils' mean scores on the two songs for each of the scales separately were used as dependent variables. Results indicated a significant main effect for both gender [F(2,2947) = 38.68,  $p < .0001$ , partial eta squared = .026] and year group [F(2,2947) = 41.29,  $p < .0001$ , partial eta squared = .027], but no significant interaction effects.

When the results for the dependent variables were considered separately, statistically significant differences were observed in both singing assessment scales in relation to gender [Rutkowski: F(1,2948) = 72.36,  $p < .0001$ , partial eta squared = .024; Welch: F(1,2948) = 74.85,  $p < .0001$ , partial eta squared = .025]. An observation of mean scores indicated that female students score higher compared to male students on both scales (Rutkowski: male  $\bar{x}$  = 3.28, female  $\bar{x}$  = 3.60; Welch: male  $\bar{x}$  = 2.81, female  $\bar{x}$  = 3.09). Statistically significant differences were also observed between Year 3 and Year 6 pupils in both singing assessment scales [Rutkowski: F(1,2948) = 81.98,  $p < .0001$ , partial eta squared = .027; Welch: F(1,2948) = 61.66,  $p < .0001$ , partial eta squared = .020]. Observation of the mean scores indicated that older children (year 6) performed consistently better compared to younger students (Rutkowski: Year 3  $\bar{x}$  = 3.26, Year 6  $\bar{x}$  = 3.60; Welch: Year 3  $\bar{x}$  = 2.81, year Y  $\bar{x}$  = 3.07).

this proportion increased with age (16% [Rutkowski ratings 4.5 and 5] and 23% [Welch rating 4] at 7+, rising to 29% [Rutkowski] and 38% [Welch] at 10+) (see Figure 5b).

---

Insert Figures 5a and 5b about here

---

### *School differences*

It is possible to create a picture of overall singing competency within a particular school by converting each individual child's singing development ratings across the two assessment scales to a percentage of the maximum possible scores across the two songs, then aggregating the rating data for all the Year 3 and Year 6 pupils. For example, if a child achieved the highest ranking on each of scale (Rutkowski and Welch) for both focus songs, this would generate a 100% overall competency ranking. Using this procedure, it is possible to rank all 76 baseline survey participant schools and to see if there are any particular school population characteristics that might be seen as important variables in children's observed singing competencies.

An overview of the top and bottom quartiles in the scoring (the top and bottom 15 schools from the 76) reveals a wide variety of demographic components, with no particular feature more strongly represented than any another (Table 3).

The highest ranked school achieved 99.44%, demonstrating a very high overall level of singing competency by its pupils. As these particular survey participants were male cathedral choristers, previously selected at cathedral audition for their basic singing competency and then further developed in a professional performance context, such a high score is to be expected. Nevertheless, the other fourteen schools in this upper quartile also had relatively high scores overall, ranging from 77.24% to

83.87%, suggesting a good collective singing competency. These were all state maintained primary schools from a wide variety of geographical locations across England, embracing inner city, suburban and rural locations, a mix of ethnic backgrounds, and with male and female participants in varied proportions. No one type of school demographic predominated.

Similarly, schools in the lowest quartile (with total scores ranging from 38.68% to 59.60%) demonstrated correspondingly varied pupil demographics, often being located in the same parts of the country and under the same Local Authorities (sometimes as near neighbours) as those schools in the upper quartile.

Whilst the variability in the schools data requires further investigation, it demonstrates that children who sing competently may be found in any type of school. This implies, perhaps, that school policy and leadership may be more crucial than pupils' backgrounds and school locality in determining whether children achieve their singing potential. In this regard, the questionnaire survey data (below) are also illuminative.

---

Insert Table 3 about here

---

### *Teachers' self-ratings*

The teacher questionnaire was in four sections. The first focused on teachers' perceptions of themselves in terms of their singing competency (i.e. self-efficacy as a singer, e.g. 'If I can't sing something at first, I keep trying until I can'). The remaining three sections surveyed different aspects of their professional knowledge: knowledge of learners (e.g. 'I understand vocal development'; 'I take account of how children use singing to define their culture'), knowledge of singing pedagogy (e.g. 'I am able to differentiate teaching strategies to meet individual and group needs in singing') and knowledge

of musics (e.g. 'I am able to make informed and appropriate repertoire choices'). Subsequent data analyses suggested that there was a slight (non-significant) tendency for singing self-efficacy to increase with age, with the older female teachers regarding themselves as more competent singers<sup>8</sup>. However, compared to the three different types of professional knowledge related to the teaching of singing to children, all teachers (irrespective of age) rated their singing self-efficacy as significantly higher (Figure 6)<sup>9</sup>. Their mean ratings for the different types of knowledge were just above the mid-point on the seven-point scale (each mean being close to 4.6), suggesting that a significant proportion of teachers were less than comfortable with their professional competences in the teaching of singing.

---

Insert Figure 6 about here

---

### *Children's attitudes to singing*

All children completed a 45-question survey of their attitudes to different aspects of singing in school, at home and elsewhere. The data analyses reveal significant age and sex differences<sup>10</sup>. On average, (i) younger children were more positive about singing than older children and (ii) girls tend to be more positive about singing than boys in each age group (Figure 7). These findings are somewhat surprising when set against the earlier data on children's increasing singing competency with age.

---

<sup>8</sup> A multivariate analysis of variance revealed that there were no significant effects for age (looking across age groups 20-29, 30-39, 40-49, 50+), or teacher sex, or interaction between these two variables in teachers' questionnaire responses. Teacher sex was unevenly distributed, being 85% female.

<sup>9</sup> As there were an uneven number of questions across the different sections of the teacher questionnaire, the average means per question were first calculated and then t-tests conducted. The analyses revealed highly significant differences between the ratings for self-efficacy compared to knowledge of learners ( $t(89) = -4.68, p < .001$ ), knowledge of singing pedagogy ( $t(89) = -4.00, p < .001$ ), and knowledge of musics ( $t(89) = -4.03, p < .001$ ) (see also Figure 6 for box plots).

<sup>10</sup> Taken across the whole participant population, including all year groups, a multivariate analysis of variance indicated that there were significant differences between male and female participants in their attitudes towards singing ( $F(6, 3337) = 231.796, p < .0001$ , partial eta squared = .294). There were also significant age differences ( $F(6, 3337) = 127.79, p < .0001$ , partial eta squared = .189). A separate ANOVA for sex and age that focused only on the Year 3 ( $n=1352$ ) and Year 6 ( $n=1523$ ) pupils confirmed the impact of these variables (sex:  $F(3, 2871) = 384.53, p < .0001$ , partial eta squared = .118; age:  $F(3, 2871) = 150.847, p < .0001$ , partial eta squared = .050), but with no interaction between them.

Overall, there is an inverse relationship between children's singing development and their attitudes to singing. Whilst the older children are more competent singers, both girls and boys are less positive about singing.

---

Insert Figure 7 about here

---

In order to explore this finding in more detail, a further statistical analysis was undertaken of children's responses within the 45 questions to see if there were any particular groupings evident in the way that the children had answered<sup>11</sup>. Six clusterings emerged, embracing (1) enjoyment of singing and high self-efficacy, (2) positive attitudes to singing at school, (3) engagement with singing at a personal level, (4) engagement with singing through family and social activities, (5) low confidence and poor self-efficacy in singing; and (6) positive engagement with music making. Sex differences were

<sup>11</sup> A principal components analysis was conducted on the 45 questions in order to investigate whether children's attitudes to singing could be summarised in subgroups on the basis of their responses. The suitability of the data for factor analysis was first investigated with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity (Field, 2000). Both of these tests confirmed the suitability of the data (the KMO measure was .938 and Bartlett's Test of Sphericity was statistically significant,  $p < .0001$ ). The Varimax Rotation method was selected to ensure that the extracted components were uncorrelated and to aid interpretation of the extracted factors.

Six components were extracted, explaining 41.8% of the variance. The factors were interpreted as follows: (1) Enjoyment of singing and high singing self-efficacy; (2) Positive attitudes towards singing at school; (3) Engagement with singing at a personal level; (4) Engagement with singing through family and social activities; (5) Low confidence and poor self-efficacy in singing; and (6) Positive engagement with music making. Multivariate analysis of variance was conducted on the six extracted components to investigate the possible effects of sex and age and their interaction on pupils' attitudes to singing. With regard to sex, female pupils scored higher on most of the positive components, such as 'enjoyment of singing and high self-efficacy' ( $F(6,3337) = 163.99$ ,  $p < .0001$ , partial eta squared = .047; males  $\bar{X} = -.21$ , females  $\bar{X} = .23$ ), 'positive attitudes towards singing at school' ( $F(6,3337) = 170.99$ ,  $p < .0001$ , partial eta squared = .049; males  $\bar{X} = -.20$ , females  $\bar{X} = .22$ ), and 'engagement with singing at a personal level' ( $F(6,3337) = 467.89$ ,  $p < .0001$ , partial eta squared = .123; males  $\bar{X} = -.31$ , females  $\bar{X} = .20$ ). Male students scored higher on 'positive engagement with music making' ( $F(6,3337) = 177.60$ ,  $p < .0001$ , partial eta squared = .05; males  $\bar{X} = .21$ , females  $\bar{X} = -.24$ ). They also scored higher on the negative component 'low confidence and poor self-efficacy in singing' ( $F(6,3337) = 4.39$ ,  $p < .05$ , partial eta squared = .001; males  $\bar{X} = .03$ , females  $\bar{X} = -.04$ ). With regard to age, year group differences were observed in five out of six components; the exception was 'low confidence and poor self-efficacy in singing' which was relatively stable across age groups. Younger pupils score higher in 'enjoyment of singing and high self-efficacy' ( $F(6,3337) = 76.07$ ,  $p < .0001$ , partial eta squared = .022; younger  $\bar{X} = .16$ , older  $\bar{X} = -.13$ ), 'positive attitudes towards singing at school' ( $F(6,3337) = 259.00$ ,  $p < .0001$ , partial eta squared = .072; younger  $\bar{X} = .29$ , older  $\bar{X} = -.23$ ), 'engagement with singing through family and social activities' ( $F(6,3337) = 102.96$ ,  $p < .0001$ , partial eta squared = .030; younger  $\bar{X} = .19$ , older  $\bar{X} = -.15$ ) and 'positive engagement with music making' ( $F(6,3337) = 34.05$ ,  $p < .0001$ , partial eta squared = .010; younger  $\bar{X} = .11$ , older  $\bar{X} = -.09$ ). In contrast, older pupils scored higher in 'engagement with singing at a personal level' ( $F(6,3337) = 239.64$ ,  $p < .0001$ , partial eta squared = .067; younger  $\bar{X} = -.28$ , older  $\bar{X} = .23$ ).

evidenced in all six factors. Overall, females tended to be more positive than males towards singing and more self-confident (Factors 1, 2, 3, and 4). Males tended to have lower confidence about singing and poorer singing self-efficacy (Factor 5). Yet, in terms of the more creative aspect of the curriculum, males had a higher positive engagement than females with music making (Factor 6).

Nevertheless, for both males and females, the majority of responses tended to be less positive for children in the oldest age group, but with a few exceptions. In general, older children of both sexes reported less enjoyment and engagement with singing compared with their younger peers, whether in school or at home with the family. This was particularly marked for the boys<sup>12</sup>. Similarly, in line with other research literature, these older children were less positive about the creative process of music making. However, older children of both sexes were more positive about singing at a personal level (see Figure 8), particularly the boys, indicating that it was singing associated with both school and social activities that had become less attractive.

---

Insert Figure 8 about here

---

Overall, younger children appear to have a more positive attitude towards singing and to be more confident. They enjoy the social engagement of singing at school, at home and with friends. As children become older, the data suggests that their engagement with singing changes in quality. It becomes more of a personal activity rather than social for both sexes, especially males. Older children use singing to express themselves individually at a time when other literature suggests that they are forming stronger musical identities and musical preferences (e.g. MacDonald *et al*, 2002; Welch, 2005).

---

<sup>12</sup> Interactions between sex and age were observed in two components. These were 'enjoyment of singing and high self-efficacy' ( $F(6,3337) = 15.18, p < .0001, \text{partial eta squared} = .005$ ) and 'engagement with singing at a personal level' ( $F(6,3337) = 18.95, p < .0001, \text{partial eta squared} = .006$ ).

## Summary

In summary, this initial baseline data survey of singing in 76 Primary schools in England provides a snapshot of current behaviours and attitudes. Although further and more detail statistical analyses are necessary, there are some emergent themes:

- As children age, the individual assessment data using two different measures suggest that there is an increase in measured singing competency;
- In terms of their attitudes to singing, younger children tend to be more positive in general; older children are less positive.
- At each age group, girls are more positive than boys.
- As children become older, they have less positive attitudes towards singing in school, socially and in the home, but engage with singing more at a personal (private) level.
- Although boys' answers suggest that they are less positive than girls about singing, the majority of boys appear to be intrinsically motivated to engage with singing at a personal level as they get older, suggesting that it may be something about school singing that creates increased negativity.
- Overall, the school data suggest that some schools are better at fostering singing development in their pupils. Skilled singers in such schools come from diverse backgrounds. There is no one particular demographic feature of a 'singing' school that emerges from this initial baseline.
- Although older teachers tended to be more slightly more comfortable about their own singing and promoting singing, the differences were not statistically significant. Teachers appear to be more confident about their own singing abilities compared with their abilities to promote singing development in children.

In general, the findings from this initial survey are in line with those in the earlier research literature, such as related to age and sex differences in the development of children's song singing

competency (see Welch, 2006). This is the first time, however, that individual singing behaviour data have been collected from such a large number of children, as well as related data on attitudes to singing from both pupils and their teachers. Children's comfortable singing ranges appear to be similar to those reported thirty years ago (*cf* Welch, 1979), although with additional vocal pitches emerging at the lower end of the ranges. Evidence has also emerged of clear school differences, but with no one pupil demographic profile being associated with a high proportion of competent singers. This suggests that it may be school leadership and policy that are significant in the successful promotion of children's singing development. These school differences need to be explored in more detail in subsequent data collection over the next three years. Opportunity will also be taken to extend the baseline data to other age groups and to collate this as part of the emergent evidence about the impact of the new National Singing Programme for Primary schools in England.

## **Acknowledgements**

The research team wish to thank Maurice Walsh, Senior Vocal Tutor with Manchester Music Service; Ula Weber of Ex Cathedra; Dr Penelope Harnett, University of West of England; Dr Liz Mellor, York St John University; and Sarah Kekus and Edward Milner of The Sage Gateshead for their invaluable support in identifying participant schools. We are also extremely grateful to all the 76 schools (pupils, teachers and headteachers) across the country for their time and commitment to participation in this initial baseline singing research activity.

## **References**

- Addo, A. (1997). Children's idiomatic expressions of cultural knowledge. *International Journal of Music Education*, 30, 15-25.
- Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ: Prentice-Hall.

- Cooksey, J., & Welch, G.F. (1998). Adolescence, singing development and National Curricula design. *British Journal of Music Education*, 15(1), 99-119.
- Davidson, L. (1994). Songsinging by young and old: a developmental approach to music. In R. Aiello with J. Sloboda (Eds.), *Musical Perceptions* (pp. 99-130). New York: Oxford University Press.
- Davies, C. (1986). Say it till a song comes: reflections on songs invented by children 3-13. *British Journal of Music Education*, 3(3), 279-293.
- Davies, C. (1992). Listen to my song: a study of songs invented by children aged 5 to 7 years. *British Journal of Music Education*, 9(1), 19-48.
- Davies, C. (1994). The listening teacher: An approach to the collection and study of invented songs of children aged 5 to 7. In H. Lees (Ed.), *Musical connections: Tradition and change* (pp. 120-127). Auckland, NZ: International Society for Music Education.
- Hall, C. (2005). Gender and boys' singing in early childhood. *British Journal of Music Education*, 22(1), 5-20.
- Harries, M.L.L., Griffin, M., Walker, J. & Hawkins, S. (1996). Changes in the male voice during puberty: Speaking and singing voice parameters. *Logopedics Phoniatics Vocology*, 21(2), 95-100.
- Joyce, H. (2005). *The effects of sex, age and environment on attitudes to singing in Key Stage 2*. Unpublished master's dissertation, Institute of Education, University of London.
- Levinowitz, L. (1989). An investigation of preschool children's comparative capability to sing songs with and without words. *Bulletin of the Council for Research in Music Education*, 100, 14-19.
- Lobstein, T., L. Baur, and R. Uauy (2004). Obesity in children and young people: a crisis in public health. *Obesity Reviews*, 5(Suppl 1): 4-104.
- MacDonald, R. A. R., Hargreaves, D. J. and Miell, D. (2002), *Musical identities*. Oxford: Oxford

University Press.

- Mang, E. (2002). An investigation of vocal pitch behaviours of Hong Kong children. *Bulletin of the Council for Research in Music Education*, 153/4, 128-134.
- Mang, E. (2003). Singing competency of monolingual and bilingual children in Hong Kong. In L.C.R. Yip, C.C. Leung, & W.T. Lau (Eds.), *Curriculum Innovation in Music* (pp. 237-242). Hong Kong: Hong Kong Institute of Education.
- Mang, E. (2006). The effects of age, gender and language on children's singing competency, *British Journal of Music Education*, 23: 161-174.
- Marsh, K. (1995). Children's Singing Games: Composition in the Playground. *Research Studies in Music Education*, 4(1), 2-11.
- Peretz, I., & Coltheart, M. (2003). Modularity and music processing. *Nature Neuroscience*, 6(7), 688-691.
- Plumridge, J.M. (1972). *The Range and Pitch Levels of Children's Voices, in relation to Published Material for Children's Voices*. Unpublished Diss. Dip. Adv. Study of Ed, University of Reading.
- Rinta, T., and G.F. Welch. (2008). Should Singing Activities Be Included in Speech and Voice Therapy for Prepubertal Children? *Journal of Voice*, 22(1), 100-112.
- Rutkowski, J. (1990). The measurement and evaluation of children's singing voice development. *The Quarterly*, 1(1-2), 81-95
- Rutkowski, J. (1997). The nature of children's singing voices: Characteristics and assessment. In: B.A. Roberts (Ed.), *The Phenomenon of Singing* (pp. 201-209). St. John's, NF: Memorial University Press.
- Rutkowski, J. & Chen-Haftek, L. (2000, July). *The singing voice within every child: A cross-cultural*

*comparison of first graders' use of singing voice.* Paper presented to the ISME Early Childhood Conference, Kingston, Canada.

Sergeant, D.C., and G.F. Welch. (in press). Age-related changes in Long-Term Average Spectra of children's voices. *Journal of Voice*. [Published online 15 July 2007]

Titze, I. (1994). *Principles of voice production*. Englewood Cliffs, N.J: Prentice-Hall.

Welch, G.F. (1979). Vocal range and poor pitch singing. *Psychology of Music*, 7(2): 13-31.

Welch, G. F. (1986). A developmental view of children's singing. *British Journal of Music Education*, 3(3), 295-303.

Welch, G. F. (1998). Early childhood musical development. *Research Studies in Music Education*, 11: 27-41.

Welch, G. F. (2000). Singing development in early childhood: the effects of culture and education on the realisation of potential. In P.J. White (Ed.), *Child Voice* (pp. 27-44). Stockholm: Royal Institute of Technology.

Welch, G. F. (2002). Early Childhood Musical Development. In L. Bresler & C. Thompson (Eds.), *The Arts in Children's Lives: Context, Culture and Curriculum*. (pp. 113-128). Dordrecht, NL: Kluwer

Welch, G.F. (2005). Singing as Communication. In: D. Miell, R. MacDonald, & D. Hargreaves (Eds.), *Musical Communication*. (pp. 239-259). New York: Oxford University Press.

Welch, G.F. (2006a). Singing and Vocal Development. In: G. McPherson (Ed.) *The Child as Musician: a handbook of musical development*. (pp. 311-329). New York: Oxford University Press.

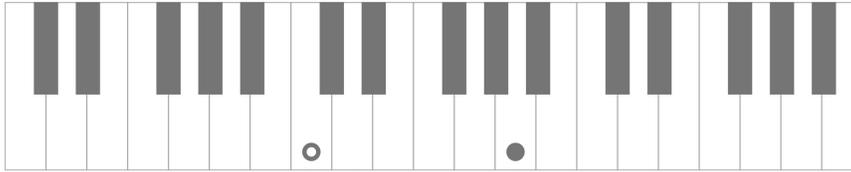
Welch, G.F. (2006b). The musical development and education of young children. In: B. Spodek & O. Saracho (Eds.), *Handbook of Research on the Education of Young Children*. (pp. 251-267). Mahwah, N.J.: Lawrence Erlbaum Associates Inc.

- Welch, G.F. (2007). Om sångutveckling [Singing as a developmental behaviour]. In: G. Fagius, (ed.). Barn och Sång. Hur, vad och varför sjunger vi med barn? (pp. 55-66). [Children and singing. How, what and why are we singing with children] Lund: Studentlitteratur AB.
- Welch, G. F., Sergeant, D. C., & White, P. (1996). The singing competences of five-year-old developing singers. *Bulletin of the Council for Research in Music Education*, 127, 155-162.
- Welch, G. F., Sergeant, D. C., & White, P. (1997). Age, sex and vocal task as factors in singing 'in-tune' during the first years of schooling. *Bulletin of the Council for Research in Music Education*, 133, 153-160.
- Welch, G. F., Sergeant, D. C., & White, P. (1998). The role of linguistic dominance in the acquisition of song. *Research Studies in Music Education*, 10, 67-74.
- Williams, J., Welch, G.F. & Howard, D.M. (2005). An exploratory baseline study of boy chorister vocal behaviour and development in an intensive professional context. *Logopedics Phoniatics Vocology*, 30(3/4): 158-162.
- Young, S. (2002). Young children's spontaneous vocalizations in free play: Observations of two- to three-year-olds in a day care setting. *Bulletin of the Council for Research in Music Education*, 152, 43-53.

National Singing Programme: Child singing assessment framework (as at 6 Sept 2007 gfw)

School Code:  Child Code:  Date:

initials:  d.o.b.:    Ethnicity:  yrgrp:



**speech**

below a3  a#3  a3  b3  c4  d4  e4  f#4  f4  g4  a4

**singing**

d#3  e3  f#3  f3  g#3  g3  a#3  a3  b3  c#4  c4  d#4  d4  e4  f#4  f4  g#4  g4  a#4  a4  b4  c#5  c5  d#5  d5  e5  f#5  f5  g#5  g5  a5  above a5

**song 1**

Type song name IF NOT **Twinkle, Twinkle**:

\* 

1	1.5	2	2.5	3	3.5	4	4.5	5
---	-----	---	-----	---	-----	---	-----	---

\*\* 

1	2	3	4
---	---	---	---

**song 2**

Type song name IF NOT **Happy Birthday**:

\* 

1	1.5	2	2.5	3	3.5	4	4.5	5
---	-----	---	-----	---	-----	---	-----	---

\*\* 

1	2	3	4
---	---	---	---

- \*Rutkowski (1997) Singing Voice Development Measure (SVDM)      \*\*Welch (1998) A revised model of vocal pitch-matching development (VPMD)
- 1 "Pre-singer" does not sing but chants the song text.
  - 1.5 "Inconsistent Speaking Range Singer" sometimes chants, sometimes sustains tones and exhibits some sensitivity to pitch, but remains in the speaking voice range (usually a3 to c4).
  - 2 "Speaking Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually a3 to c4).
  - 2.5 "Inconsistent Limited Range singer" waivers between speaking and singing voices and uses a limited range when in singing voice (usually up to f4).
  - 3 "Limited Range Singer" exhibits consistent use of initial singing range (usually d4 to f4).
  - 3.5 "Inconsistent Initial Range Singer" sometimes only exhibits use of limited singing range, but other times exhibits use of initial singing range (usually d4 to a4).
  - 4 "Initial Range Singer" exhibits consistent use of initial singing range(usually d4 to a4).
  - 4.5 "Inconsistent Singer" sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: bb4 and above).
  - 5 "Singer" exhibits use of extended singing range (sings beyond the register lift: bb4 and above).
- 1 The words of the song appear to be the initial centre of interest rather than the melody, singing is often described as 'chant-like', employing a restricted pitch range and melodic phrases. In infant vocal pitch exploration, descending patterns predominate.
  - 2 There is a growing awareness that vocal pitch can be a conscious process and that changes in vocal pitch are controllable. Sung melodic outline begins to follow the general (macro) contours of the target melody or key constituent phrases. Tonality is essentially phrase based. Self-invented and 'schematic' songs 'borrow' elements from the child's musical culture. Vocal pitch range used in 'song' singing expands.
  - 3 Melodic shape and intervals are mostly accurate, but some changes in tonality may occur, perhaps linked to inappropriate register usage. Overall, however, the number of different reference pitches is much reduced.
  - 4 No significant melodic or pitch errors in relation to relatively simple songs from the singer's musical culture.

Figure 1: Pupil singing assessment profile individual record sheet

**3.7 Me and Singing (based on Joyce, 2005)**

Name: \_\_\_\_\_

School: \_\_\_\_\_

Year Group: \_\_\_\_\_

Age: \_\_\_\_\_

boy 

girl 

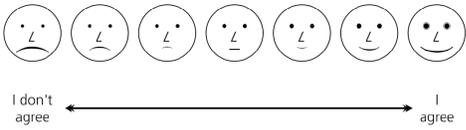
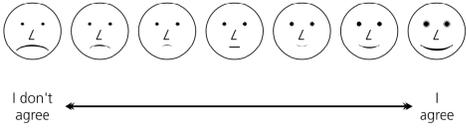
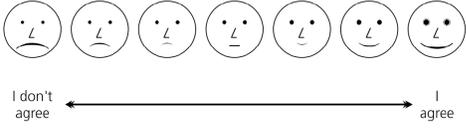
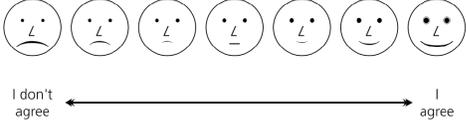
1	I sing at school	
2	Singing at school will make me a better singer	
3	I think that we should sing more at school	
4	I have sung in a performance at school	

Figure 2: The opening page of the survey on pupils' attitudes to singing in school and elsewhere

Table 1: National Singing Programme baseline survey – school locations and numbers of individual pupils assessed at each location

Research Sites	Total
BRISTOL	46
CAMBRIDGE	182
COVENTRY	44
DERBY	151
NORFOLK	57
DURHAM	45
EALING	53
ELY	30
ESSEX	340
FULHAM	43
GATESHEAD	325
GLOUCESTER	131
HAMMERSMITH AND FULHAM	42
HARINGEY	50
HEREFORD	17
HERTFORDSHIRE	18
KENT	58
LAMBETH	50
LEICESTERSHIRE	9
LICHFIELD	46
MANCHESTER	472
NEWCASTLE	211
NORWICH	87
OXFORD	45
PETERBOROUGH	97
SOMERSET	40
LONDON CATHEDRAL 1	36
SUFFOLK	57
TOWER HAMLETS	371
TRURO	35
YORK	110
YORKSHIRE	118
BIRMINGHAM	38
LONDON CATHEDRAL 2	18

Table 2: Participant numbers by Primary school Year Group (Year 2/6y+; Year 6/10y+) and sex

<b>Year-Group</b>	<b>female</b>	<b>male</b>	<b>Grand Total</b>	<b>%</b>
Year 2	68	77	145	4.2
Year 3	701	768	1469	42.3
Year 4	45	47	92	2.6
Year 5	114	169	283	8.2
Year 6	709	774	1483	42.7
<b>Grand Total</b>	<b>1637</b>	<b>1835</b>	<b>3472</b>	<b>100.0</b>

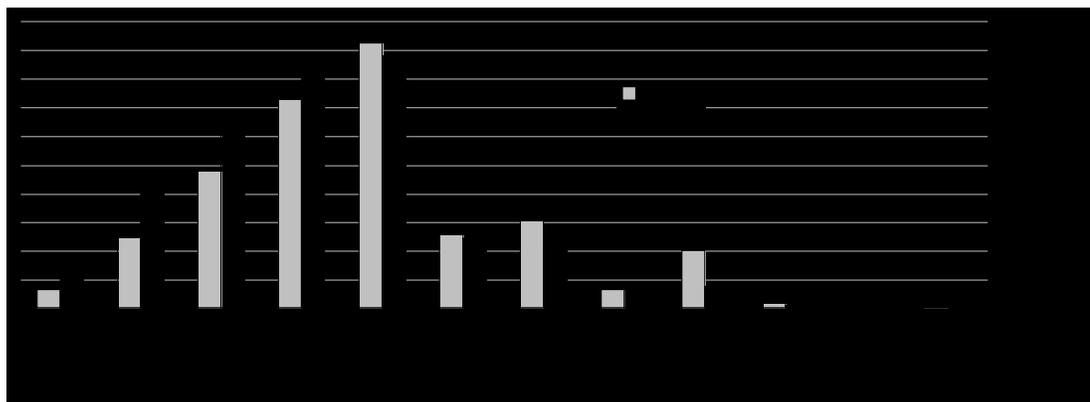
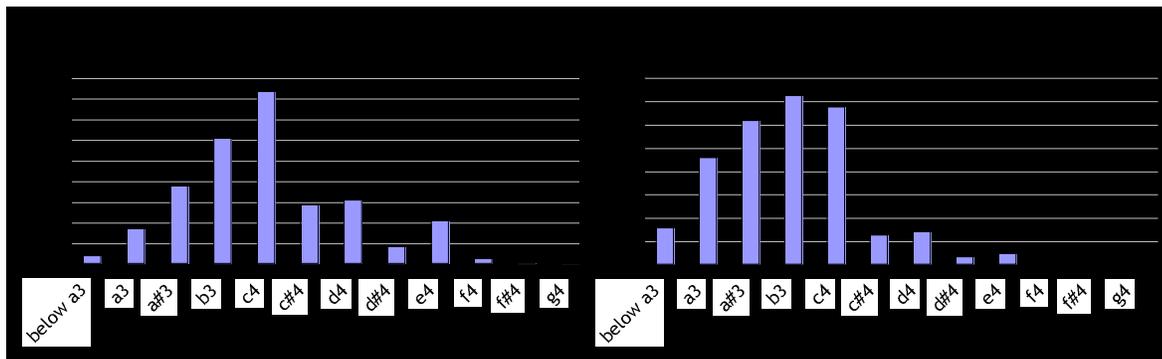


Figure 3: Histograms of children's spoken pitch centres by (a) Year 3 (aged 7y+) and Year 6 (aged 10y+) and (b) sex

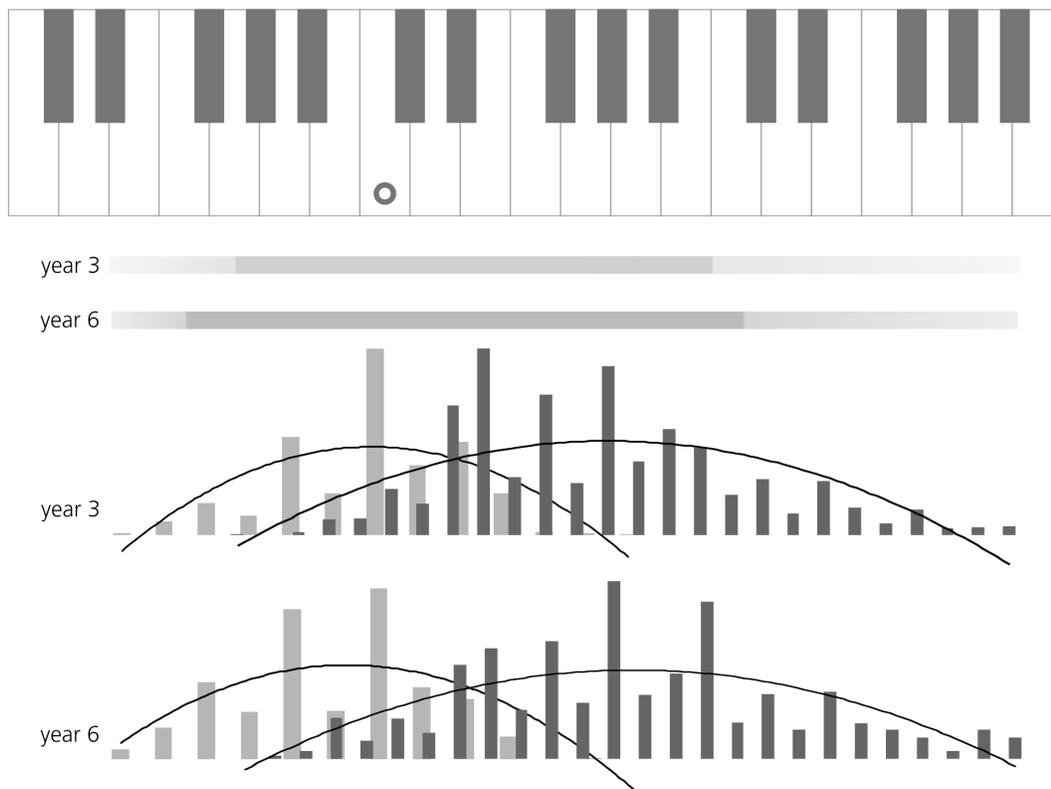


Figure 4: Pupils' comfortable singing ranges

Note: The horizontal line underneath the keyboard indicates the range extremes across the two pupil populations Year 3 (7y+, n=1,469) and Year 6 (10y+, n=1483). The darker colouring in these lines indicates the comfortable singing range of the majority (75%) of the population for the age group. Trendlines for the relative distribution of upper and lower pitches are shown in the lower part of the figure by age group. 'Middle C' (c<sup>4</sup>) is marked with a circle on the keyboard for reference.

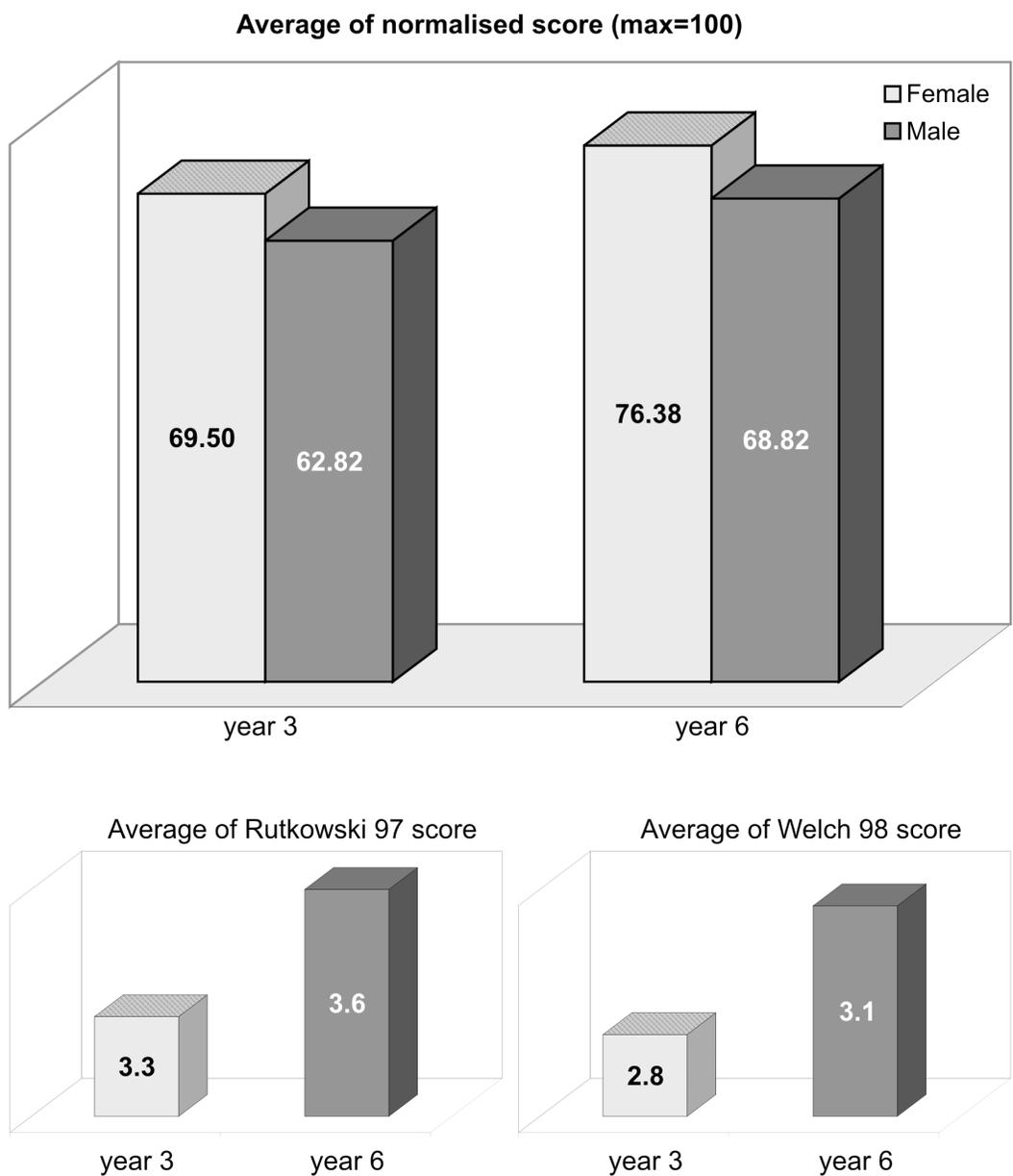


Figure 5a: Mean ratings of children’s singing competencies – by age group Year 3 (7y+, n=1,469) and Year 6 (10y+, n=1483), using raw scores on the two singing assessment scales (Rutkowski, 1997; Welch, 1998 – see endnote for details – lower part of figure) and by sex using a normalised score that combines the two assessment scales and in which 100% equates to the highest combined levels of

development

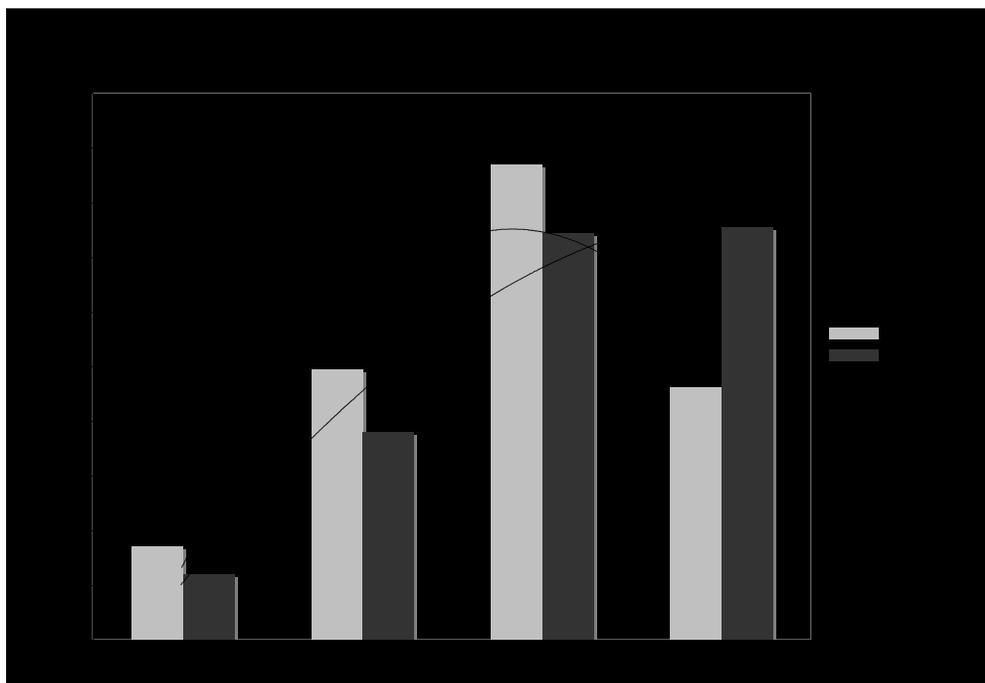
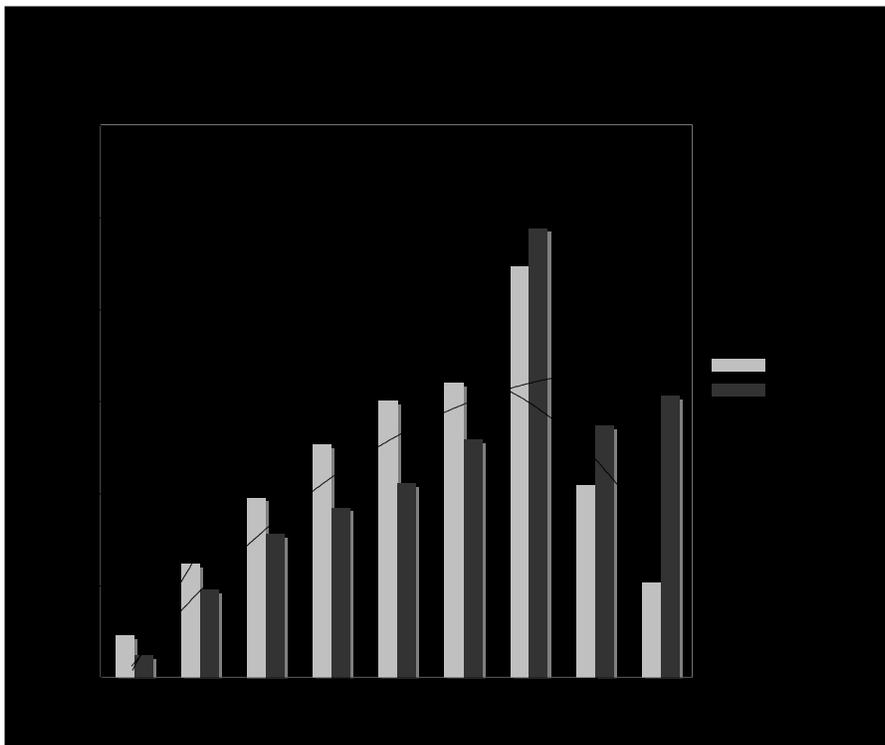


Figure 5b: The percentage of children at each level for each age group Year 3 (7y+, n=1,469) and Year 6 (10y+, n=1483) across the two assessment scales (Rutkowski, 1997; Welch, 1998 – see endnote for details), with trend lines added

	school	score	population (%)						% of total is FEMALE
			Other	Asian	Black	Chinese	Mixed	White	
top 15	CATHEDRAL	99.44	0.00	0.00	5.56	0.00	0.00	94.44	0.00
	YORKSHIRE	83.87	0.00	1.54	0.00	0.00	4.62	93.85	56.92
	ESSEX	83.59	0.00	0.00	0.00	0.00	0.00	100.00	35.42
	FULHAM	83.37	0.00	20.93	27.91	0.00	6.98	44.19	48.84
	YORK	83.17	0.00	0.00	0.00	0.00	3.33	96.67	43.33
	CAMBRIDGE	83.13	2.08	27.08	4.17	0.00	0.00	66.67	60.42
	CAMBRIDGE	81.96	0.00	1.89	1.89	1.89	3.77	90.57	47.17
	YORKSHIRE	80.61	0.00	3.77	0.00	0.00	7.55	88.68	43.40
	SOMERSET	80.38	0.00	2.50	0.00	0.00	0.00	97.50	47.50
	SUFFOLK	80.33	0.00	1.75	1.75	0.00	0.00	96.49	36.84
	NEWCASTLE	78.70	0.00	9.26	1.85	0.00	0.00	88.89	46.30
	ESSEX	78.24	0.00	0.00	0.00	0.00	0.00	100.00	52.94
	TOWER HAMLETS	78.07	4.17	58.33	6.25	4.17	0.00	27.08	56.25
	DISS	77.89	0.00	0.00	3.51	0.00	3.51	92.98	57.89
	MANCHESTER	77.24	0.00	5.13	2.56	0.00	7.69	84.62	46.15
bottom 15	NEWCASTLE	59.60	2.00	42.00	36.00	0.00	0.00	20.00	44.00
	DERBY	58.86	0.00	75.76	0.00	0.00	0.00	24.24	42.42
	MANCHESTER	58.39	0.00	5.45	5.45	1.82	0.00	87.27	47.27
	ESSEX	58.36	0.00	0.00	4.44	0.00	2.22	93.33	55.56
	YORK	57.60	0.00	0.00	0.00	0.00	0.00	100.00	39.58
	HEREFORD	56.62	5.88	0.00	0.00	0.00	0.00	94.12	52.94
	TOWER HAMLETS	55.88	0.00	97.73	0.00	0.00	0.00	2.27	43.18
	ESSEX	55.08	0.00	4.08	0.00	2.04	0.00	93.88	65.31
	NEWCASTLE	54.04	0.00	1.64	0.00	0.00	0.00	98.36	45.90
	LEICESTERSHIRE	54.03	0.00	0.00	0.00	0.00	0.00	100.00	66.67
	TOWER HAMLETS	54.02	0.00	95.24	4.76	0.00	0.00	0.00	52.38
	MANCHESTER	53.93	1.56	56.25	20.31	3.13	3.13	15.63	45.31
	DERBY	53.87	1.64	0.00	0.00	0.00	0.00	98.36	50.82
	GATESHEAD	49.63	0.00	0.00	5.88	0.00	0.00	94.12	35.29
	HERTFORDSHIRE	38.68	0.00	0.00	0.00	0.00	5.56	94.44	50.00

Table 3: Aggregate singing assessment ratings for children within each school as a collective; 100% possible maximum score for upper and lower quartiles (30 schools)

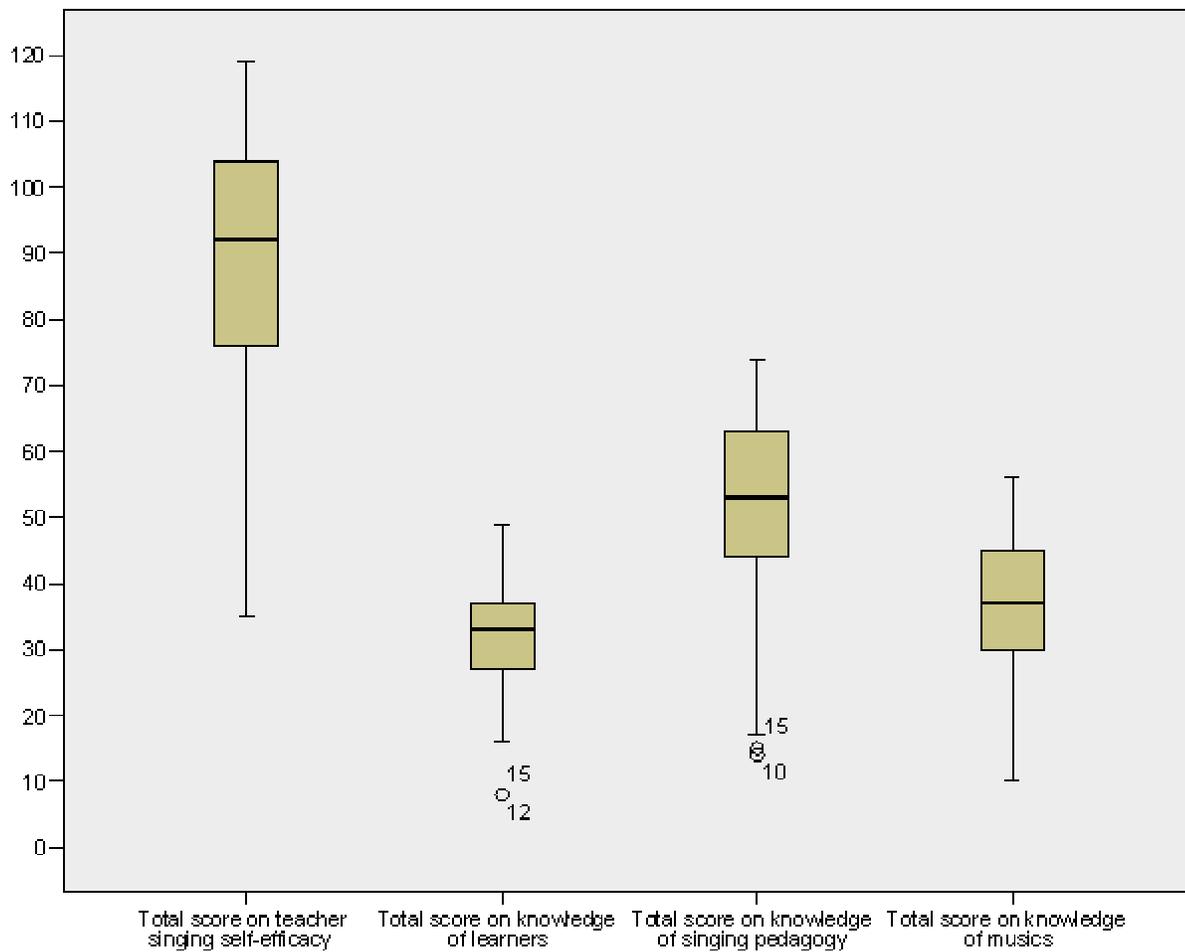


Figure 6: Box plots, showing 25<sup>th</sup> percentile through to the 75<sup>th</sup> percentile and median, for teachers' (n=92) survey responses concerning their singing self-efficacy and three types of professional knowledge (knowledge of learners, knowledge of singing pedagogy and knowledge of musics [singing repertoire])

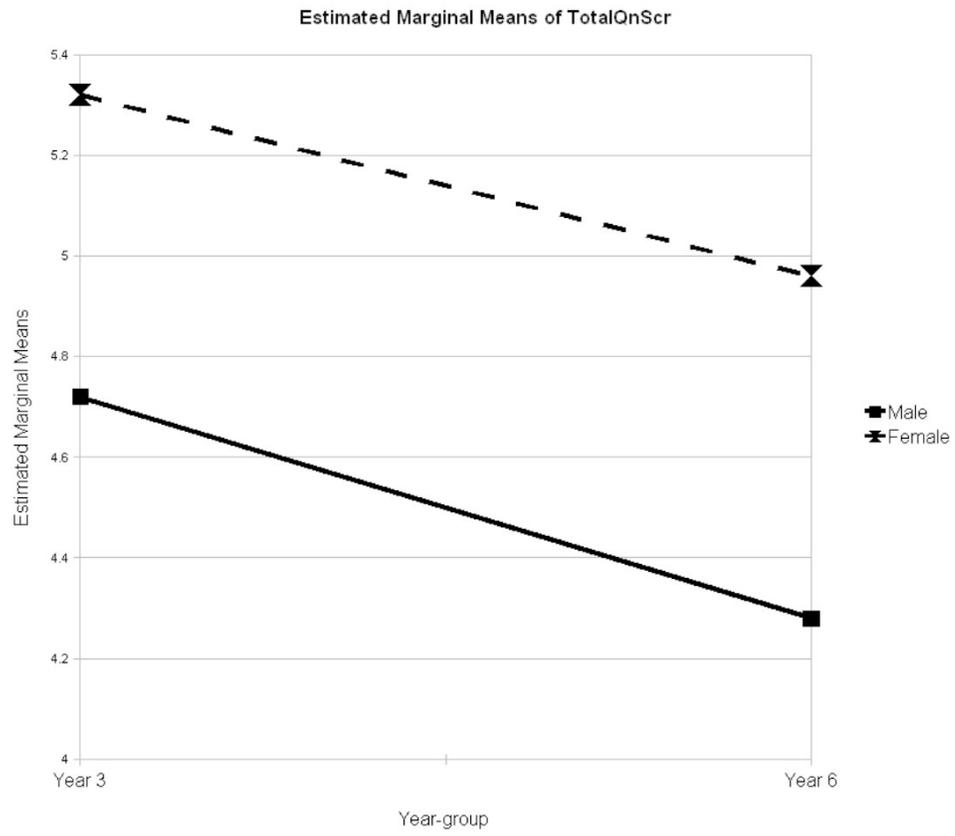


Figure 7: Mean responses of pupils concerning their attitudes to singing by sex and age group (Year 3/7y+ and Year 6/10y+)

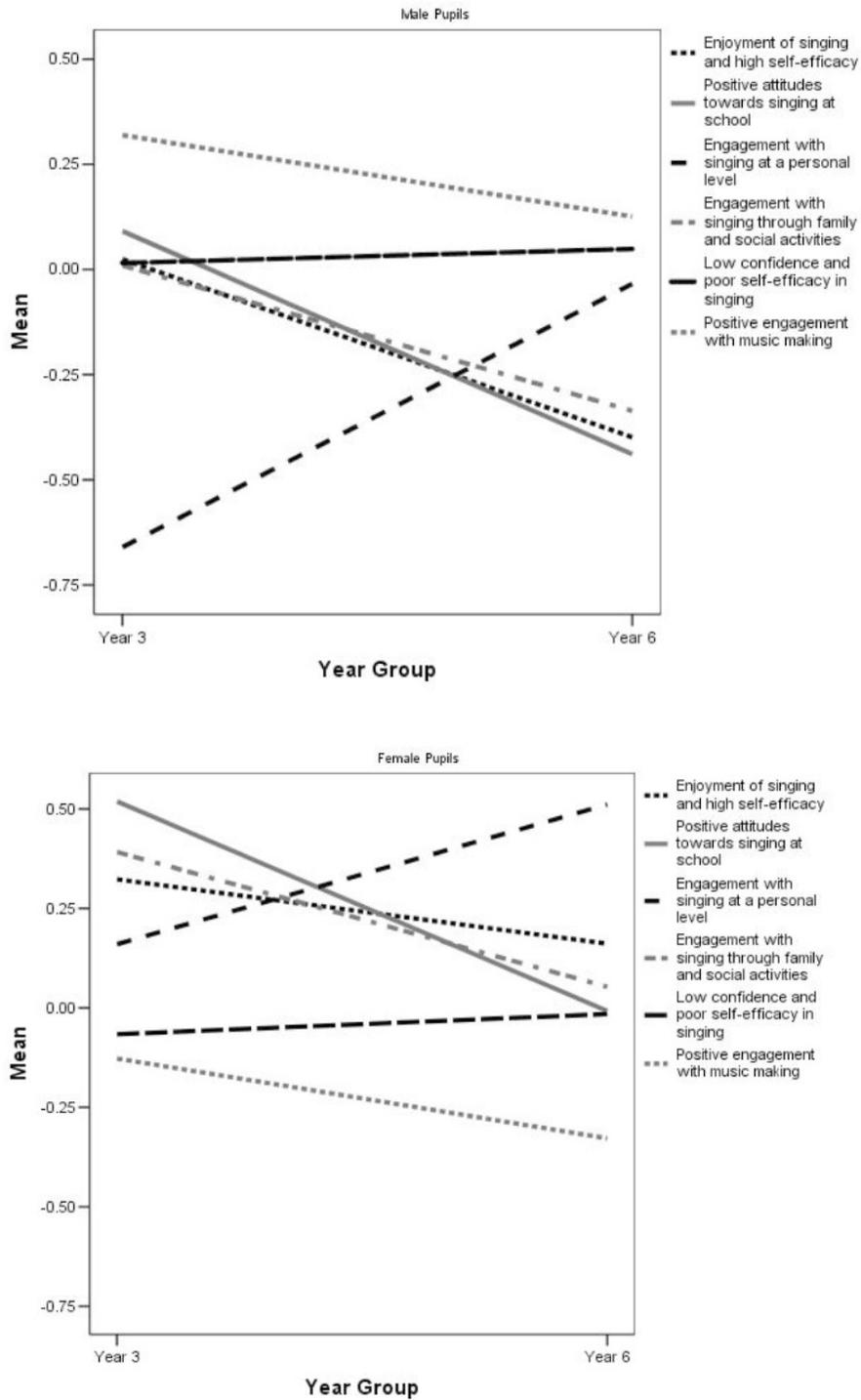


Figure 8: Principal component analyses of 45 questions with six components extracted for two age groups (Year 3/7y+ and Year 6/10y+) and for each sex.



<sup>i</sup> **Rutkowski (1997) *Singing Voice Development Measure (SVDM)***

- 1 “Pre-singer” does not sing but chants the song text.
- 1.5 “Inconsistent Speaking Range Singer” sometimes chants, sometimes sustains tones and exhibits some sensitivity to pitch, but remains in the speaking voice range (usually a<sup>3</sup> to c<sup>4</sup> [note: the pitch labels have been altered to bring them in line with modern conventions in which middle C = c<sup>4</sup>, 256 Hz]).
- 2 “Speaking Range Singer” sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually a<sup>3</sup> to c<sup>4</sup>).
- 2.5 “Inconsistent Limited Range singer” waivers between speaking and singing voices and uses a limited range when in singing voice (usually up to f<sup>4</sup>).
- 3 “Limited Range Singer” exhibits consistent use of initial singing range (usually d<sup>4</sup> to f<sup>4</sup>).
- 3.5 “Inconsistent Initial Range Singer” sometimes only exhibits use of limited singing range, but other times exhibits use of initial singing range (usually d<sup>4</sup> to a<sup>4</sup>).
- 4 “Initial Range Singer” exhibits consistent use of initial singing range (usually d<sup>4</sup> to a<sup>4</sup>).
- 4.5 “Inconsistent Singer” sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: b<sup>b4</sup> and above).
- 5 “Singer” exhibits use of extended singing range (sings beyond the register lift: b<sup>b4</sup> and above).

**Welch (1998) *A revised model of vocal pitch-matching development (VPMD)***

- Phase 1 The words of the song appear to be the initial centre of interest rather than the melody, singing is often described as ‘chant-like’, employing a restricted pitch range and melodic phrases. In infant vocal pitch exploration, descending patterns predominate.
- Phase 2 There is a growing awareness that vocal pitch can be a conscious process and that changes in vocal pitch are controllable. Sung melodic outline begins to follow the general (macro) contours of the target melody or key constituent phrases. Tonality is essentially phrase based. Self-invented and ‘schematic’ songs ‘borrow’ elements from the child’s musical culture. Vocal pitch range used in ‘song’ singing expands.
- Phase 3 Melodic shape and intervals are mostly accurate, but some changes in tonality may occur, perhaps linked to inappropriate register usage. Overall, however, the number of different reference pitches is much reduced.
- Phase 4 No significant melodic or pitch errors in relation to relatively simple songs from the singer’s musical culture.