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Perceptions of the Singing

Voice

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Conference Papers

Adolescent Voice and Self Image
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Is my voice me? Using research into adolescent voice and identity
The Third International Research in Music Education Conference (RIME)
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University of Exeter, School of Education and Lifelong Learning

Perceptions of Vocal Timbres
British Voice Association June 2004 *Van Lawrence Prize* Day Conference
Royal Academy of Music, London

Learning to listen: an exploration into the ways singers perceive vocal timbre
The Fourth International Research in Music Education Conference (RIME)
April 2005
University of Exeter, School of Education and Lifelong Learning

Adolescent Singing Voice
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'Adolescent Singers and Perceptions of Vocal Identity'
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Summary

This study takes a multi-disciplinary approach to examine the layers of meaning given to vocal timbre when singers talk about their voices.

Three different approaches are taken for the Phase I exploration; semi-structured interviews with solo, choral, amateur and professional singers, questionnaires for school students and singing teachers featuring recordings of different vocal genres and diaries of the vocal experiences of professional singers.

Three aspects of vocal identity are discussed: reflection and construction of the voice and expression using the voice. A taxonomy of vocal development is created. The classification of metaphors describing vocal timbre provides a framework for discussion leading to Phase II. The concepts of space and movement are identified within the diary data of the professional singers.

Phase II focuses on data collected during the preparation of a specific recording task. The sample consists of 22 amateur solo singers, aged between 11 and 65 years from a variety of backgrounds and musical experience. Diary and interview discourse are classified and the importance of acoustic responses in the narratives of the more experienced singers is noted.

The reactions of singers to hearing the recording made of them singing highlight the differences between internally and externally perceived vocal timbres. Features indicate a tendency for the internally perceived timbre to be lower, richer and more mature than the sound heard externally. The different use of metaphor illustrates the levels of vocal perception taking place. The prominence of space and metaphor concepts is found in the discourse of more experienced performers in both Phase I and Phase II.

This study has implications for singers and teachers of singing. It offers a framework of metaphorical descriptions to facilitate the shared understanding of terms referring to vocal timbres and it suggests that the aural mismatch of sound and the role of auditory memory are important subjects for further investigation.

Contents   Page

4. Literature Review

5. Vocal Identity: exploring the relationship between the singer and the voice

6. Auditory Vocal Perception: the mismatch of internal and external experience in the singer

7. Use of Metaphor: evidence for and an explanation of auditory vocal perception

8. Concepts of Space and Movement: the distinguishing features between amateur and professional singers

9. Conclusions

Perceptions of the Singing Voice

Auditory vocal perception: examining the layers of conscious and unconscious actions in singers

Singing is primarily a perceptual phenomena; it is tailored for human perception. (Sundberg, 1999: 195)

Unfortunately, timbre as the label for a perceptual quality has been used in so many ways that it has become ...vague and confusing.
(Handel & Erickson, 2004: 587)

I propose that to perceive is not merely to have sensations, or to receive sensory impressions, it is to have sensations that one understands. (Noë, 2004: 33)

...we should remember that the auditory knowledge for voice quality (identifying, as such, the voice of a famous personage) is surely quite impressive, but so far relatively unstudied. (Crowder, 1993: 140)

1. Introduction

1.1 The challenge of auditory perception and vocal timbre
      1.11 A brief critique of previous research

1.2 Levels of perception in singers

1.3 Articulation of vocal timbre through language: a process and a tool for collecting evidence

1.4 The scope and aims of the thesis
      1.41 Research Questions

1. Introduction

1.1 The challenge of auditory perception and vocal timbre

Undertaking a study of vocal timbre presents three major challenges. The first is one concerning evidence: the singing voice has been well recorded since the beginnings of the twentieth century but these 'documents' can be viewed from many differing perspectives, historical, cultural, scientific, musical and stylistic. These perspectives are often transient as is the sound of the singing voice and the response to this sound is often subjective. Capturing the essence of vocal timbre and what it means to both singer and audience is therefore problematic but still worth investigation.

The second major difficulty is one of methodology: how is it possible to study such an ephemeral sound sensation that can produce multiple responses? It is now a simple matter of downloading the appropriate software and seeing a spectrographic analysis on a PC screen. This enables voice scientists to analyse the various sound patterns created by the voice. However, the auditory sensations monitored internally by the listener, whether singer or audience, are not so easy to analyse. In order to study the concept of vocal timbre it is preferable to view the whole phenomenon, exploring its many different guises and multiple perceptual responses, as well as its constituent sound waves.

The third difficulty is an epistemological one: just as a colour in a painter's palette has many different interpretations, so a vocal colour can take place in multiple musical and cultural contexts. To clarify the boundaries within which

this thesis proposes to explore vocal timbre is essential; it does not include the vocal timbres of singers from outside the Western classical genre, nor does it include vocal dysphonia or the variety of vocal noise produced due to ill health or modes of utterance.

The study of vocal timbre is an opportunity to investigate the relationship between the perceptual organisation that takes place within the body and mind of the singer. The 'evidence' in this study will be the narratives of the singers; this will enable the study of vocal timbre to include the many different interpretations that each individual may offer. The methodology will involve the analysis and discussion of the various meanings given to vocal timbre and possible explanations for these meanings. Thus, the knowledge acquired will at least include a variety of interpretations and the opportunity to study these interpretations from the perspective of the singer producing the sound.

The perception of the singing voice is under-researched compared to work in this area with the speaking voice. How exactly do singers perceive their vocal sound? Are there different levels on which vocal perception can be seen to operate? This is an important area and it has relevance for singers and teachers who are developing unique sounds and who are involved in high levels of acoustic monitoring. Both the 'beginner' singing student, and the professional singer require the development of high-level skills to produce the optimum vocal colours in order to interpret the music they wish to communicate. In much pedagogical literature the auditory perceptual processes are rarely mentioned as an area where technical understanding can be advanced. The ability of the singer to 'hear' is often simply assumed.

Researching the singing voice involves more than just an investigation of the musical and vocal aspects of human experience. The specific position of the voice within the human body and its place in the development of human communication offers insight into different levels of perception. The many layers of perceiving vocal sound need to be examined; of all musicians, singers offer a rich data source for the study of the 'bodymind' approach to musical understanding.

While music is received through the immediacy of the senses, the words found to define the aural experience come after. The aim of this thesis is to examine the kind of language used by singers to describe the singing experience, and so to clarify the perceptual actions taking place and the implicit feedback this gives to singers. The singing voice is highly complex and to study it, in close detail, it needs to be examined from all angles. It is a musical instrument that follows the laws of acoustics; having a source of vibration, air flow and resonating chambers. It is also situated inside a physical body, which is part of the whole person, with emotions, feelings, intelligences and social interactions. It communicates through speech, language and music, with all the cultural connotations that these imply. The self-monitoring of all these facilities involves the brain and the body, the kinaesthetic sensations and the aural ability to feedback helpful information to the singer.

Understanding the physical nature of vocal production and its interaction with the body is fundamental to a study of singing. The lungs that provide the airflow are also the life support-machine of human existence; the vocal folds are capable

of all manner of complex emotional sounds, as well as acting as a valve to prevent choking. The framework of the body gives the instrument a living sound box in which to resonate and the singer cannot remove the voice from that case: the voice is within the body, and is also within the mind. By investigating the subtleties of singing through the experience of vocal changes both physical and psychological it is possible to identify some of the different ways in which singers and their audiences perceive vocal timbre.

The voice produces a sound by air flowing from the lungs through the vibrating vocal folds, and this sound is intensified and resonated by the pharynx and the articulatory muscles. The adjustments of these complex manoeuvres are affected by several important factors: psychological, physical, kinaesthetic, environmental and acoustic. Understanding the interaction between these various modalities will be part of investigation.

The sounds that singers hear coming from their voice are not the same as others hear them, since they sing with the physical apparatus and feel the sound through sensations and with reference to aural memories. The externally perceived sounds can be analysed through visual displays and spectrograms, but these do not represent all the internal imaginings that take place within the brain. While these techniques add important dimensions to our understanding of the voice during phonation because vocal amplitude and certain voice qualities are easily identifiable, individual timbre is more subtle and difficult to discern using this kind of analysis. Timbre like colour is affected by the context in which it is 'viewed' or heard. It is fundamental to a singer's development to have an acute

sense of the vocal colours available and a singer often needs another pair of ears, a teacher or a coach to 'hear' the sound externally, to moderate the internal sounds a singer experiences with the output.

1.11 A brief critique of previous research

The literature concerned with the singing voice tends to fall into two areas: singers and singing teachers actively involved in singing education who write about their experiences in practical ways; and voice scientists and researchers who adopt a more analytical approach but who often talk about the voice in terms of speaking and vocal disorders. There are some who work in both areas and whose approach manages to include the musical and expressive aspects of singing as well as the analysis of the physical functions taking place.

Bunch (1995) observes the ways in which the mind affects the sound, through the breathing patterns, the force of utterance and the general posture of the singer, suggesting that the voice reflects self-esteem. Mathieson (2001) also observes that paralinguistic features of voice change with emotion and she links timbre with feeling.

> Changes in tension in the vocal folds and the vocal tract...in turn affect vocal features. Shades of feeling are reflected in the voice and are inextricably linked with the verbal message and may override it. These features are recognised as timbre, tone of voice or vocal quality.
> (Mathieson, 2001: 6)

Positive and negative feelings can both generate tension, which can affect the jaw, lips and tongue. The complexities of the vocal apparatus and the bones and muscles that support it allow for all manner of different vocal qualities. The

voice is a flexible instrument of communication, however the subtleties of paralinguistic features of the voice have yet to undergo thorough scientific investigation (Pettersen & Westgaard, 2004).

Health of the voice

Medical science has understandably focused on the disorders of the voice; there is much to be learned from the findings of such practitioners but these must be seen in the context in which the studies take place. While health problems undermine the optimum use of the voice, sometimes in subtle ways - children with arthritis, for example, have been found to have poor lung capacity (Knook et al., 1999) - this study is not an investigation into the perceptions of singers with vocal disorders. However it must be acknowledged that normal physical development, particularly hormonal changes during puberty and the menopause, can produce a noticeable difference in vocal quality for the singer (La, 2005).

Research into the growing larynx (Kahane, 1978, Gackle, 1991 and Cooksey, 1992) has been significant in shedding light on aspects of vocal change but any healthy singing voice is liable to experience changes in timbre as it matures. The relationship between timbre and vocal change (pubertal and menopausal) has not been fully investigated. Aspects of an individual singer's timbre can remain constant over time, even during prolonged vocal changes. Postural habits that affect the system are still little understood; although the larynx is held in suspension, the frame of bones surrounding the mechanism can be quite flexible and can even be distorted by muscle movement (Vilkman *et al.,* 1996; Bunch, 1995).

The medical world has also focused on speech aspects of vocalisation, again due to the importance this has for life skills and healthy communication. However, speaking is highly complex, the sounds of speech are affected by what precedes and follows:

> A given speech sound is not represented by a fixed acoustic pattern in the speech wave; instead the speech sound's acoustic pattern varies in a complex manner according to the preceding and following sounds. (Moore, 1997: 272)

This suggests that while individual phonemes can be analysed the perception of speech also needs to be studied in context. This is also true for the singing sound; the sounds preceding and following a sung vowel will affect the perception of that vowel.

While medical science has clarified many aspects of the functioning of the voice, the ephemeral sensations have been under-researched. The kinaesthetic aspects of singing are well documented anecdotally and historically (Hines, 1992) and these experiences have given rise to a plethora of vocal advice locating sound sensations all over the body with very little scientific verification. Garcia, as Henrich (2006) points out, was the first to use a mirror in the larynx to investigate the nature of the vocal fold vibration in 1855, and this has transformed the study of the voice. However, this focus on larynx has perhaps meant that other aspects of vocal production – for example, breath control and the psychological impulse to sing – have had less research attention.

The new technologies within brain science have led to a fresh understanding of what takes place in the mind of singers when they perform. The recent work of

the cognitive neuroscientists (Brown *et al.*, 2004: Peretz *et al.*, 2004) confirms the complex functioning of the brain that is engaged depending on the status of the performing experience; a single note or notes, sung with meaning and/or with text can stimulate or be stimulated in different brain areas. The multiplicity of neural patterns taking place when singing indicates the need for multiple approaches when studying the phenomenon. Whenever the study of the mind interfaces with the study of the body questions arise as to how much conscious and unconscious actions are involved in the process. These also imply a sense of self and self-image, and investigations into the emotional impact of singing on singers leads to questions regarding personality and character.

There are many books on singing that suggest a strong emotional link with the voice but few studies appear to have been done using specific personality profiles linked to singers. Kemp (1996) did however use singers in his work on musicians' temperament using the Myers Briggs profiles, and found that singers tended to be warm-hearted and sensitive but suggested that singers required a particular form of 'outgoing sensitivity'. He discusses the more body-orientated modes of performance in singers and their orientation to towards the limbic system of functioning and a less cerebral approach. Kemp suggests that singers appear to be amongst the most integrated of all musicians in terms of personality development and argues the case for a more central place for singing in the curriculum. An argument could also be made for the use of singers in research studies into consciousness, the study of the self and the mapping techniques between the brain and body, as singers are in a unique position with an internally produced musical sound. This research focus is underdeveloped at the moment

and even auditory studies into vocal perception have involved, almost exclusively, speech sounds.

The concept of the 'bodymind' has recently given a broader dimension to the study of the singing voice. The idea, which originated with Pert (1998) has been taken up by Thurman and Welch (2000), and has led to a more synthetic approach to the study of the singing voice. It suggests the essential interaction between body and mind that singers experience and is a more holistic approach to voice research.

The role of the self is a fruitful area for investigation but making psychological judgements of personality based on the quality of a person's voice is not easy, and paralinguistic features can be misunderstood and misinterpreted (Mathieson, 2001). This study remains primarily a study of vocal quality, it is a study of the *singing* voice: and will explore the singing voice situated in musical performance. The aspect of personality that will be examined in more detail will be 'vocal identity', the relationship the singer has with their voice.

The particular focus in this study will be the perceptions of vocal timbre in singers and what the expression of these perceptions might indicate is taking place at a psychological level. Musical and cultural influences will be included where relevant and the thesis will explore the personal experiences of the performers and the different levels of perceptual awareness taking place during singing rehearsal and performance.

1.2 Levels of perception in singers

Different aspects of perception within the singing voice are some of the parameters in this study. There are both conscious and unconscious perceptual processes that take place at neurological, psychological, physical and emotional levels during a singing performance.

Miller (1986: 199) points out that no neurological mechanisms exist to provide direct perceptual awareness of vocal fold status during singing. The voice box itself is almost independent of conscious thought; it is through the other muscular processes that singers gain a sense of what it is like to sing. He suggests that the singer must operate on two levels of consciousness, keeping the technical craft of singing in the background while 'projecting musical and textual insights'.

Recent research into the activity of 'mirror neurons' suggests that performers of physical activity share identical brain activity patterns to those just watching the performance (Winston, 2003: 143). Can this be true of singers and audiences? Can this help to explain what is happening when 'vocal perception' is taking place? This implies some kind of physical processing taking place during what might at first appear to be a purely auditory response and this will be examined further in the thesis.

Sundberg (1987) discusses the way singers perceive sounds. He also points out that the listener perceives the singer in different ways:

> It seems revealing of the way in which we perceive voice sounds that our processing of the acoustic voice signals, which is mostly unconscious, often results in a description in production terms; as we listen, we tend to

imagine how the voice organ producing the sound is being used. We seem to identify with the speaker or singer in this sense. (Sundberg, 1987: 157)

Oren Brown (1996) also indicates this level of awareness, particularly relevant for the singing teacher, whereby the listener feels through empathy what the singer is experiencing. However, while this aspect of empathy is often discussed informally amongst the singing profession, there is little empirical evidence available for examination.

When listeners are describing voices according to how it feels, they are making a kinaesthetic as well as an auditory response. These different ways of experiencing vocal sound need to be examined more closely, from the perspective of the singer and of the listener.

1.3 Articulation of vocal timbre through language: a process and a tool for collecting evidence

Singers uniquely use words as well as music to communicate. The colour of different languages affects the colour of the sung sound. The voice normally communicates words in speech and the singer has to overcome habits of speech as well as learning other languages and adapting to different performing styles and audience expectations. Genres of music often demand a different singing timbre and accent, e.g. Music Theatre has its own distinct style compared to Jazz, Folk or Opera. This will influence the design of Phase II research, in the decision to ask the singers to sing songs in contrasting genres and language.

The vowel sounds singers use help create the singer's formant and timbre, which will be explored with reference to Sundberg's (1987) research later. Word pronunciation and how the singer perceives this process is one example of where subtle changes in diction can provide valuable information about vocal timbre. Vowels have to be modified at various parts of the vocal register if words are to be clearly heard by an audience. These subtleties that a singer controls (or not) provide an insight into the layers of perception experienced when vocalising and listening.

The problem of describing sound - a linguistic concept with a cognitive approach to a sensory response - is not underestimated. Formulating mental concepts of sensory experiences and then finding, through cognitive pathways, the words that articulate that experience involves complex interactions. This study sets about constructing an empirical model to allow singers to talk about their singing as effectively as possible in order to gain data rich in psychological evidence.

1.4 The scope and aims of the thesis

The thesis will examine vocal perception from the perspective of solo and choral, amateur and professional singers working within the genres of Western art song and music theatre tradition. The participants will be singers with healthy singing voices, in other words there will be no intentional examination of vocal problems. The thesis will examine principally the psychological processes of vocal perception but it will also include the educational implications of any

findings. An understanding of the perception of the singing voice requires consideration of the following questions.

1.41 Research questions

How do singers *think* about their voice?

How do singers *hear* their voice?

How do singers *feel* their voice?

How do *others hear* the singing voice?

The first research question is addressed in Phase I with semi-structured interviews that also provide some data on the second and third questions. The listening questionnaires in Phase I give data on the fourth question. The diary studies of Phase I address the first three questions in more detail. These are explored in Chapter three.

The multi-disciplinary approach of this study benefits from an ongoing literature review, as the data are explored, allowing unexpected findings to be linked to previous published research in a 'grounded theory' approach. Thus while chapter four covers much of the literature review, references to research literature will be integrated throughout the thesis. In order to distinguish between quotes from the literature and quotes from the data, all data references will be in italics.

Phase II continues the examination of the four research questions and chapters five, six, seven and eight explore the themes that arise from the data analysis, linking them with the literature to explore these themes in greater depth. These areas are: aspects of self and vocal identity, the mismatch between the internal and external auditory experience, the use of metaphor to illuminate ways of

perceiving sound, and in particular the use of space and movement metaphors by experienced singers.

Chapter nine will provide the conclusions of the research and suggest the implications of the findings for singing pedagogy. Suggestions for future research will be given.

Figure 1.1 gives an outline of the thesis.

Figure 1.1 Outline of thesis

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1. Introduction
How do singers *think* about their voice?
How do singers *hear* their voice?
How do singers *feel* their voice?
How do others hear *the singing voice?*

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2. Research methodology
Real world research   Grounded theory
Research framework (Phase I and Phase II)

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3. Phase I: exploring the perceptions of timbre
Semi-structured interviews with amateur and professional, choral and solo singers
Listening Questionnaires with singing teachers and school students
Diary study with full time professional opera singers

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4. Literature Review
A developmental perspective on vocal identity
Multi-disciplinary perspectives on singing
A holistic approach to vocal timbre and perception

Examination of four main themes arising from Phase I and Phase II

5. Vocal Identity: exploring the relationship between the singer and the voice

6. Auditory Vocal Perception: the mismatch of internal and external experience in the singer

7. Use of Metaphor: evidence for and an explanation of auditory vocal perception

8.Concepts of Space and Movement: the distinguishing features between amateur and professional singers

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9. Conclusions

2. Research Methodology

2.1 Real World Research Methodology
    2.11 Grounded theory

2.2 Research framework

2.3 Coding for thesis
    2.31 Taxonomy
    2.32 Ethics

2.4 Summary

2. Research Methodology

This chapter begins with an examination of the validity of 'real world' research in this context and indicates the need for exploratory research methods arising out of grounded theory ideas. The basic framework of the research is explained and the benefits of the multiple methods used; the coding used in the thesis is set out giving details of the classifications adopted. The argument for taxonomy is given and the distinctions between amateur and professional singers are highlighted. Finally the matter of ethics is addressed.

2.1 Real world research methodology

'Real world research' is a term that describes studies done outside the laboratory, using situations that occur in real time and in real contexts. Robson (1993: 86) suggests that generalizing results to the real world is made easier if research is conducted in a natural setting. This was a priority in the design of the study because there have been few studies exploring the singer in the context of day-to-day vocalising. Therefore singers were asked to talk about their voices as they were preparing for exams or concert performances, as they were having singing lessons or practising at home.

Robson (1993: 150) warns of the dangers of using a one-group/one test design and points out that multiple sources of data over time offer some form of triangulation. The collection of 'real world' data also happens in context, which makes any conclusions more relevant. He suggests that this approach offers

balance, adaptive-ness and rigour. This is also the aim of this study. By analysing data from a variety of singers, solo, choral, amateur and professional musicians of all ages and both genders, the range of data is balanced within the confines of the Western musical tradition. The variety of methods, interviews, diaries, questionnaires and the use of recording feedback, which are adaptive to different 'real world' musical situations of the singers, allows more effective triangulation to take place.

2.11 Grounded theory

The grounded theory approach was selected as the most suitable model for this type of empirical work, because its distinguishing characteristics (as defined by Charmaz, 1995: 28) are sympathetic to the exploratory and complex nature of the research topic:

1. Simultaneous involvement in data collection and analysis phases of research

2. Creation of analytic codes and categories developed from data not from pre-conceived hypotheses

3. The development of middle range theories to explain behaviour and processes

4. Writing analytic notes to explain and fill out categories

5. Theoretical sampling

6. Delay of literature review.

Grounded theory methods seemed particularly applicable to these exploratory and empirical investigations. They suited the 'real world' nature of the study and allowed the research to have open-ended parameters. The initial literature review was helpful in highlighting the boundaries of existing research studies and in this thesis the review was more ongoing than delayed in the true sense of grounded theory research. The creation of the codes and categories can be seen to develop from the data as the analysis from Phase I influences the subsequent analysis of the Phase II data.

Conducting research in laboratory conditions can create demand characteristics, where the subjects tend to do what they think the researcher wants them to do (Mason, 1996). It was made very clear, when asking singers to talk about their voice, that any aspect of singing was relevant to the research and questions were kept as open as possible. While this research grew out of an interest in adolescent vocal development and identity (Monks, 2001), the semi-structured nature of the Phase I interviews was designed to produce more exploratory themes This was reflected in the data gathered from the original Phase I interviews, where some singers spoke about vocal timbre and others did not mention timbre directly at all. These data were also analysed from a number of differing perspectives to identify any possible patterns or clusters of evidence that might emerge.

After analysis of the Phase I interviews it became clear that the participants for Phase II would have to be chosen to represent a particular group of singers, in order to make the results relevant and specific. Meltzoff (1998) discusses the difficulties of sampling volunteers and cites Rosenthal and Rosnow (1991) who

looked in detail at the types most likely to volunteer for research. They found that volunteers were more likely to be female, well educated, higher social class, more intelligent, more approval motivated and more sociable. The majority of singers for the Phase II were women but the professional singers who featured in the Phase I diary studies were male. With a small number of participants, the data cannot be used as evidence across the whole population, but this study does offer an in-depth analysis of singers as they go about their daily practice. This offers a valuable contribution to vocal research as the singers responded to hearing their voice, some of them for the first time, on a recording. It was not possible to sample for representative-ness in the population but it was possible to examine the data to test various possible theories as advocated in grounded theory research methods.

2.2 Research framework

Table 2 showing the methods of data collection

Phase I	Phase II
Semi-structured interviews with solo and choral amateur singers	
Interviews and personal correspondence with music critics and other singers	Interviews and personal correspondence with music critics and other singers
Listening questionnaires with singing teachers	
Listening questionnaires with school students	
Diary studies with three professional singers	Diary studies with three professional singers
	Empirical study (i) Diary studies with amateur solo singers while preparing three varied songs
	Empirical study (ii) Recording made of each individual singer's selection of songs
	Empirical study (iii) Post recording interview with each individual singer
	Empirical study (iv) Listening questionnaire using 10 random tracks from (ii) with 5 non-singing listener panel

A conceptual framework developed gradually out of the data collected from the Phase I interviews. Singers were asked 'Tell me about your voice' and the semi-structured interviews flowed from there. This approach was taken from McGuire (1999: 230) who conducted interviews in a similar fashion when examining perceptions of self in adolescents. From the analysis and classification of the discourse, vocal timbre and a sense of self emerged as fruitful areas for study, although both appeared to be very difficult to verbalise directly.

How do singers *think* about their voice?

This was explored in the first part of Phase I with the subsequent questions arising from the data that was analysed:

How do singers *hear* their voice?

How do singers *feel their voice?*

The investigation into vocal timbre continued with a series of listening questionnaires, in order to identify the different use of language when listeners are describing vocal sound. This sought to answer the fourth research question.

How do *others hear* the singing voice?

Finally, the perspective of professional singers was sought by using a diary study and then from these data, the themes that emerged were used to give structure to the Phase II empirical investigation. These themes were:

- vocal identity

- auditory vocal perception

- use of metaphor

- concepts of space and movement.

In Phase I singers were used from both a choral tradition and solo performance practice. The listening tests used listeners with a varied age range and musical expertise: the first group were singing teachers and the second group were school students. With Phase II, the singers used were solo amateur performers of varied experience. A taxonomy of singers (Table 2.2) evolved as a direct response to the data gathered in the Phase I; this created a tool for coding the data in both studies.

The Phase I methods were interviews and listening questionnaires, but it became clear that an empirical study would be fruitful as the research progressed. The need for a focus for the discourse was identified which would provide a framework for the data collection and allow the singers to talk more specifically about the voice. For Phase II, the singers were asked to keep a diary: they were recorded singing contrasting songs and asked to respond to the sound of their own voices after the recordings were played back in the final interview.

Robson (1999: 224) warns of the dangers of observer drift when undertaking classification of data, for example, the researcher may be unaware of subtle changes in the questions posed during interviews taken over a period of time. Efforts were made to ensure that any possible changes in the data collection and analysis were carefully identified and noted. This was a predictable aspect of grounded theory methodology and it allowed for emerging focus points to be developed and examined within the data. For example, after the first few recordings it became apparent that hearing the voice externally, via a CD, was challenging the singers' self-perceptions about their unique vocal timbre. This aspect became part of the study as it developed.

The benefits of using multiple methods for data gathering, such as diary, interview and questionnaire, are that some degree of triangulation can take place (Mason, 1996). In action research (Kopala & Suzuki, 1999), problem finding is as important as problem solving. An inductive aspect of qualitative methods involves the researcher using initial observations to form the basis for further

research (Hart, 1998: 192) Having identified the perception of timbre as a phenomenon to be explored it can be 'bracketed' (Kopala & Suzuki, 1999: 5-9), in order to look at it from all sides. Both the interviews and listening questionnaires in the Phase I produced valuable data and identified perception of timbre for further investigation. It was also apparent that further data would be needed from singers with a more intimate and 'day to day' knowledge of the singing experience. The diary study from three professional singers helped to provide this.

The following table 2.1 indicates the coding used for the thesis and individual chapters will repeat sections of the coding for clarification.

2.3 Coding for thesis

Table 2.1 Coding of data for reference

Phase I	
Data	*Code*
Interviews with solo and choral singers [PISAi] [PISBi]	PI: *Phase I* S: *Singer* A: *individual singer code* i: *interview*
Listening Questionnaires With Singing Teachers [PIT1q] [PIT2q]	PI: *Phase I* T: *Teacher* 1: *individual teacher code* q: *questionnaire*
Listening Questionnaires with school students [PIsq]	PI: Phase I s: school student q: questionnaire
Diaries from professional singers [PIpsd-one]	PI: *Phase I* ps: *professional singer* d: *diary* *one: two: three*
Phase II	
Diaries from amateur solo singers [PIIS1d] [PIIS2d]	PII: *Phase II* S: *Singer* 1: *individual singer code* d: *diary*
Recordings of 3 songs [PIIS1Rs-one]	PII: *Phase II* S: *Singer* 1: *individual singer code* R: *recording* s: *song* *one: two: three*
Interviews post recording after play back [PIIS1i] [PIIS2i]	PII: *Phase II* S: *Singer* 1: *individual singer code* i: *interview*
Listener Study 5 amateur non-singing musicians [La-PII1rs-one] i.e. Listener a with Phase II singer 1 with recording song one	L: *Listener* a: *individual listener code* PII: *Phase II* S: *Singer* 1: *individual singer code* R: *recording* s: *song* *one: two: three*

2.31 Taxonomy

Bunch & Chapman (2000) devised a taxonomy based on the audiences the singers attracted; from village halls to international opera houses, with the purpose of clarifying a singer's status for effective parallel research work. Their aim was to provide some means of cross-referencing the samples used across the ever-expanding research on singers. Many studies have taken place without a clear picture of the kind of singers being used. While the subjective element can never be removed from work with singers it is helpful to be able to identify whether the singers are top class international singers or willing amateurs. In this study it is possible to identify the level of singers in the sample but as most of them fall into a limited field of expertise as identified by the Bunch and Chapman taxonomy, a new taxonomy was devised.

This taxonomy is constructed from the data gathered from the initial set of singers, in order to show a sense of self in relationship with the singing voice and the possible acquisition and loss of 'vocal identity' over time. Using the Bunch & Chapman (2000) taxonomy of singers as a guide, the categories were modified so that instead of using the activity of the singer as the principal means of discrimination, the focus became the self-perceptions of the singer and the possible different levels these create.

It was important to indicate that aspects of identity within amateur and professional singers could be seen as relevant to both categories, hence the same levels can apply to each with a letter to indicate professional (P) and amateur (A); codes were also added to identify choral (c) and solo (s) singers. This

taxonomy (Table 2.2) will provide comparative links between the Phase I and

Phase II data and enable future data to be referenced to levels of vocal identity.

Table 2.2 Taxonomy of vocal identity

1. Pre-acquisition of vocal identity 1.2 No singing experience 1.3 Some singing experience but no structured singing 1.4 Experience of some structured singing but no sense of self as a singer		
2. Acquisition of vocal/singing identity 2.1 Initial training 2.2 First performing experience 2.3 Growing sense of self as singer		
3. Secure sense of singer identity 3.1 Confidence in technical ability 3.2 Confidence in communicating 　　musically 3.3 A history of performance success 3.4 A growing sense of commitment to 　　study the singing voice 3.5 A sense of personal distinctness 3.6 A sense of personal continuity 3.7 A sense of personal autonomy	A - Amateur P - Professional	c- choral s - solo
4. Pre-loss of vocal identity 4.1 Anxiety about loss of performance skills 4.2 Anxiety about ageing effects 4.3 Anxiety about loss of career		
5. Loss of vocal identity 5.1 Desperation – acceptance of fate 5.2 Resolve to improve singing condition – search for new paths		

2.32 Ethics

At each stage of the research, every participant was informed about the nature

and purpose of the research, and each consented to take part. They were all

assured of anonymity within the writing up of the data and any references that

might enable individuals to be identified have been removed. For Phase II, each singer signed a consent form for taking part, and the singers under 18 years were asked for parental consent. Each singer agreed to take part in the diary, recording and interview but the timing of each stage was dictated by their personal choice and every effort was made to ensure that the participants were happy to be taking part. Any references to teachers or individual names mentioned were omitted from the transcriptions. The professional singers involved were acknowledged if they so wished, but some chose to remain anonymous. The interviews with children and young people were conducted in rooms with window access, by the researcher who is a qualified and government registered teacher and therefore has Criminal Records Bureau (CRB) clearance. Participants were informed that they had the right to switch off the recording equipment at any time and could also refuse permission for the diaries and interview transcriptions to be used if they were unhappy with anything that had been said.

Some of the interviews were conducted with people known personally to the researcher as teacher. These singers were coded with the teacher code of the researcher in order to identify any patterns that emerged from the data that could be considered contaminated by the personal relationship between interviewee and researcher. No pressure was put on any singer to take part in the research. Letters of explanation were given to all students and the singers took them home to consider whether they wished to take part, in consultation with the parents.

2.4 Summary

This chapter has outlined the research methodology of this study, demonstrating the appropriateness of real world research methods, grounded theory and discourse analysis for this topic of investigation. It has summarized the methods used in Phase I and Phase II and provided a table of coding and the taxonomy used throughout the thesis. More detailed discussions of the methods are included in chapter 3 (Phase I) and chapter 5 (Phase II). In the following chapter the data from Phase I are explored, highlighting the themes that emerged leading into the literature review of chapter four and the subsequent investigations of Phase II.

3. Phase I: exploring the perceptions of vocal timbre

3.1 Introduction

3.2 Methods used in Phase I
     3.21 Interviews with solo and choral singers
     3.22 Listening questionnaires with singing teachers and school students
     3.23 Diary studies with professional singers

3.3 Data analysis: initial interviews
     3.31 Using language to describe timbre of the voice
     3.32 Conscious and unconscious control of the voice
     3.33 Monitoring the singing voice

3.4 Examining vocal identity in individual singer: Phase I
     3.41 Aspects of self: the singer as a 'whole'
     3.42 The singer constructed by the social environment

3.5 Data analysis: Listening questionnaires
     3.51 Analysis of language

3.6 Data analysis: Diaries of professional singers
     3.61 Diary One
     3.62 Diary Two
     3.63 Diary Three

3.7 Summary of Phase I

3. Phase I: exploring perceptions of vocal timbre

3.1 Introduction

This chapter explores the perceptions of singing timbre from the perspective of the singer. It includes:

- Singers' perception of self and singing voice and the relationship between personality and vocal quality.

- Possible models of self found in research literature and their relevance if any, to singers.

- An exploration of the differences between amateur and professional singers, solo and choral singers.

- The relevance to teaching and vocal education.

The first section examines the data from the initial interviews with amateur choral and solo singers, the second section identifies the patterns from the listening questionnaires and the third section explores the themes found in the diary data from three professional singers.

3.2 Methods used in Phase I

Phase I consisted of semi-structured interviews, listening questionnaires and diary studies. These methods were established as the research questions were explored, as being the most effective way of building up data. Interviews took place over several months and were followed by the teacher questionnaires and the pupil questionnaires. When the data from these were collected the need for specific information on day-to-day singing was recognised and diary studies with

professional singers took place subsequently. Table 3.1 is given here as a

reminder of the coding discussed in chapter two.

Table 3.1 showing the coding used in Phase I data analysis

Phase I	
Data	*Code*
Interviews with solo and choral singers [PISAi] [PISBi]	PI: *Phase I* S: *Singer* A: *individual singer code* i: *interview*
Listening Questionnaires With Singing Teachers [PIT1q] [PIT2q]	PI: *Phase I* T: *Teacher* 1: *individual teacher code* q: *questionnaire*
Listening Questionnaires with school students [PIsq]	PI: *Phase I* s: *school student* q: *questionnaire*
Diaries from professional singers [PIpsd-one]	PI: *Phase I* ps: *professional singer* d: *diary* one: two: three

3.21 Interviews with solo and choral singers

The exploration of the singer's relationship with the singing voice formed the

basis of the first enquiries. A number of singers were approached: some singers

expressed interest in the research and agreed to be interviewed as a result of

informal conversations at vocal conferences. Colleagues from work and others

(professional singers) were approached to give a different and balanced

perspective to the data. The majority came from a choir who, with the permission

of the director, were given letters explaining the purpose of the research and

asking them to contact the researcher if they were interested in taking part in the

study. The researcher used a small unobtrusive tape recorder and conducted the

interviews in the private homes of the individuals who volunteered. The interviews lasted approximately ¾ hour.

Fifteen interviews took place with singers from solo and choral, amateur and professional backgrounds. Two interviews were with singing teachers; one brought her son, also her pupil, and there was written correspondence with two professional singers. There were also telephone conversations with two music critics (from two national broadsheets) to gain some insight into their perspective on the singing voice. Music critics describe vocal sound in language suitable for lay readers as well as specialists and they were able to help clarify the researcher's thoughts on articulating timbre.

These data were analysed for evidence of attributes of self-identity and perceptions of vocal timbre. The interviews took place between April 2002 and April 2003 except for singer O which took place two years later; the singers who participated provided a cross-section of different genders, ages and vocal experience. Common features relating to perceptions of singing were highlighted amongst this diverse group of people: the interviews began with a request, 'Tell me about your voice and your experience of singing?' and the interviews followed a semi-structured pattern. This enabled investigation of aspects of self within the data but also identified the difficulties encountered when putting vocal experience into words.

The interviews were transcribed and, when words were emphasized in the spoken text, underlines have been used to illustrate this in the written evidence. Where

short phrases were made a comma is used and where a longer pause took place an ellipsis is used. All data within the body of this text appear in italics with the words of the interviewer in bold italics. Literature references are in normal type and indented.

The following table 3.2 illustrates the cross section of the Phase I participants.

Table 3.2 Phase I: interview summary

Singer	Age (approx) /gender	Solo/choral	Vocal experience	Musical experience	Contact/ Taxonomy code
A	24/male	Solo	Amateur lead soloist but no lessons	Music theatre School/college	Interview 2.2
B	36/male	Solo and choral	Just started lessons because wanted to sing	Popular ballads	Interview 2.1
C	73/male	Choral	Began singing in thirties, sings in small local choir	Popular light choral	Interview 2.3
D	52/female	Choral	Began singing at 43, sings in large local choral society, just started singing lessons	Serious classical choral e.g.Part Bach	Interview 2.1
E	29/female	Solo and choral	Keen to sing, exploring different vocal experiences, choral and therapeutic	Popular songs/ethnic music	Interview 1.2
F	50/female	Choral	Sung in choirs all her life	Popular to classical choral	Interview 4.1
G	58/male	Choral	Ex choral treble sung in choirs ever since childhood	Religious choral	Interview 4.1
H	56/male	Solo and choral	Amateur folk singer who sings for his own amusement	Sixties pop and folk rock	Interview 2.1
I	48/female	Solo and choral	Professionally trained singer and teacher, sings with professional choir and performs as soloist	Classical, jazz, folk, gospel, choral	Interview 4.1
J	60/female	Solo	Top professional singer now arts administrator and teacher	Opera, recital oratorio, recording artist	Interview 3.7
K	58/female	Solo	Professional singer and teacher	Opera, recital. Oratorio	Interview 3.7
L	18/male	Solo and choral	Lead singer in school musical, lessons from mother (above- K)	Classical and modern pop	Interview 2.3
M	60/female	Solo	Top professional at Royal Opera House etc.	Opera and recital, recording artist	Letter 3.7
N	36/male	Solo	Professional singer with English Touring Opera	Opera	Email 3.7
O	73/male	Solo and choral	Choral singer just started individual singing lessons	Classical	Interview 2.3

3.22 Listening questionnaires

Listening questionnaires with singing teachers

Although much communication occurs non-linguistically, through gestures and the expressive qualities in the speaking voice, words can cause confusion and be misinterpreted when teachers, coaches, directors etc. communicate with singers and vice versa. Teaching situations demand a different linguistic repertoire from the words used in a clinical situation, a competitive festival or a dress rehearsal. Some teachers tend to rely on an intuitive use of language while others follow a particular method; both approaches are based on the assumption that the language is understood and the auditory experience is shared. There has been little previous research on aspects of listening in the teaching situation despite the importance of this topic to voice professionals. Also very little research has been done on the words used to describe the singing experience both by singers themselves and by listeners.

These studies were set up to provide more substantial evidence on the words that describe vocal timbre and to create a framework for exploring the interview data in more depth. Clusters of words used by different types of listeners, the informed experienced teachers and the less experienced young people, were used to identify patterns from which further exploration of vocal perception could take place. The format of the listening tests consisted of an A4 sheet with 10 blank boxes (Table 3.3). The singing teachers gave written responses on hearing ten female singers from professional recordings of Handel arias. Handel arias were chosen as performances have changed over recent years with different vocal

qualities seen as favourable, some performances were more in the romantic opera style while other followed an early music 'authentic instrument' style, thus giving some contrasting vocal timbres within the boundary of a specific composer. The singers, who were not identified on the form, so as to avoid preconceptions on the part of the listener, were:

1) Lorraine Hunt
2) Claron McFaddon
3) Joan Sutherland
4) Janet Baker
5) Linda Russell
6) Elly Ameling
7) Valerie Masterson
8) Kathleen Ferrier
9) Marilyn Horne
10) Natalie Stutzmann.

Table 3.3 Form (reduced) for Listening questionnaires with singing teachers

Thank you for taking part in this research investigation into the language used when describing singing. You will hear ten singers performing Handel, 7 sopranos and 3 contraltos, 8 in English and 2 in Italian. Please jot down any words that come to mind when hearing these voices, they don't have to be conventional descriptions.

1.	*Oh, that I on wings (Theodora)*
2.	*Oh let the merry bells (L'Allegro)*
3.	*Let the bright seraphim (Samson)*
4.	*Oh had I Jubal's lyre (Judas M.)*
5.	*I know that my Redeemer (Messiah)*
6.	*I know that my Redeemer (Messiah)*
7.	*Venus fair lady (Julius Caesar)*
8.	*Return O God of Hosts (Samson)*
9.	*Vivi tiranno (Rodelinda)*
10.	*Fammi combattere (Orlando)*

It was anticipated that the singing teachers, with finely tuned aural discrimination with regard to the singing voice, would articulate, in more detail, the subtle

differences between vocal timbres. By giving them restricted vocal parameters, all female singers performing Handel arias, the teachers could focus on the singing sound rather than getting side-tracked by musical style. The selection was given initially to an experienced singing teacher to identify any possible difficulties and was judged to be a balanced sample of recordings. Each vocalisation on the recording lasted approximately one minute (avoiding long instrumental introductions where possible), so that the whole questionnaire could take place within a convenient time frame.

Listening questionnaires with school students

Having gained substantial data from experts in the field of singing, it was useful to identify any similarities or differences in the responses of a younger group of listeners. Adolescents listen to a great deal of vocal music of varying genres and have strong opinions on the music they enjoy (MacDonald *et al.*, 2002). This group seemed to be a useful comparison and so a similar study took place in class music lessons at an independent secondary school with adolescents, aged 11-16 years, responding to ten recordings of popular music singers. The secondary school students heard 5 male and 5 female singers of the popular song tradition. The singers were alternately male and female, chosen for their distinct vocal colour. Kathleen Battle, singing jazz, was chosen to see how the students responded to a full operatic sound without being prejudiced by the style of the music. The subjects were asked to write down anything they thought of while hearing the singers, and it was explained that any form of description or response would be welcome. The recordings came from commercial CDs with both familiar and unfamiliar vocal tracks: current chart singles were not included

because the aim was not to collect data on contemporary music tastes or personal preferences that might be influenced by passing fashions. The format of the questionnaire was similar to that of the singing teachers (see table 3.3). The singers, who were again not identified on the form in order to discourage preconceptions, were:

1) Paul Simon *Boy in the Bubble*
2) Bjork *Army of me*
3) Bob Dylan *Blowin' in the wind*
4) Kathleen Battle *Hush*
5) Beck *Loser*
6) Shirley Bassey *Goldfinger*
7) Tom Jones *What's new pussycat?*
8) Corrs *What can I do?*
9) Nat King Cole *When I fall in love*
10) Sandie Shaw *Always something there to remind me*

It was anticipated that the younger listeners would have a smaller vocabulary to describe vocal timbre, however this was not the case.

3.23 Diary studies

Having established a substantial list of words to describe vocal timbre and examined the initial interview data in more detail, it became clear that evidence from full time professional singers would make a good comparative study with the amateur singers. Professional singers leading busy lives on tour around the country would not be easy to interview so a different type of study was considered. A diary study would offer the flexibility and privacy that an interview would not have.

Diary studies are a useful tool, although there are dangers of under-reporting or over-reporting, and material is obviously self-selected (Breakwell & Wood, 2000). In this case these concerns did not apply, as the aim was to explore what the singers felt important about their singing and vocal timbre so their selection of topics to write about was informative in itself.

In many ways the study of singing overcomes some of the problems identified by psychologists when the separation of body and mind is artificially engineered (Kempen, 1998). The singers, while using discourse, were also describing rather than denying the sensory experience and it also allowed for the expression of the social dimensions of singing. Little research has been done using discourse analysis with people involved in this kind of physical expression of the self, which is fundamental in singing, apart from the innovative work in music psychology (Davidson, 2002).

Letters were written to major opera companies in the UK and some singers from Opera North responded to the request for a singer's diary. The singers concerned were approached and given notebooks to fill in, over a period of one month. The company was preparing a varied programme within the time span of the diaries, taking eight short operas on a UK tour. Two singers agreed to write down anything that came to mind, but they were asked to think particularly about their own vocal timbre and what possible effect the music, language, performing/rehearsing situation had on the voice. A third singer from a West Country chamber opera group also kept a diary.

The responses that emerged from the diaries revealed different aspects of vocal experience. This feedback helped to move the research questions into more specific areas of study. At this Phase I stage the research question linked a sense of self with the vocal sound; "Is my voice me?" How do singers perceive the vocal quality/timbre of their voice and does the language they use articulate that perceptual experience? Once all the data from Phase I were analysed, the design for the empirical investigations of Phase II were formalised.

3.3 Data analysis: initial interviews with choral and solo singers

The interviews of Phase I followed on from an open-ended request 'Tell me about your singing voice'. The discourse followed freely and punctuation has been added in transcription for clarification. One of the first themes to emerge was the physical nature of the singing voice.

It was this new phenomena kind of coming out of my mouth. I certainly remember that, the voice being quite thin but I don't really remember that much, it happened and perhaps I wasn't really singing during the time that it happened... perhaps it was after... it took a couple of years and I wasn't really performing at all, I sort of seem to have a fairly, quite a, sort of tenor, sometimes it felt really strange and sometimes it didn't so... it was less than stimulating [laugh] *you didn't quite know where it was...*[PISAi]

Every so often, sort of being able to produce, sort of very, very loud dramatic sounds but not having any control over it and actually to feel the whole...to feel the diaphragm vibrating at the back or something but there again that happened very seldom and I would wake up the next day with a completely hoarse voice and thought I'd damaged it but I can remember doing that to impress people or to irritate people, mm and then yeah...[PISAi]

This singer had a strong recall of vocal changes that had happened 6 years previously: he talked about a loss of control and also about the physical sensations as well as using his voice to have 'power' to irritate or impress.

> *I think it's all to do with resonance and getting the voice in the right place and getting rid of all the tension... feelings that you can't, feelings of anxiety, about what it's going to sound like, because I do find, one thing I find, just coming in quietly in choir you've all got to come in at the same time and sometimes you come in and actually the sound doesn't come through and there's a split second delay* [PISDi]

One of the choral singers illustrated sensitivity to a lack of technical skills.

> *I would still like to sing but I think that I can't because sometimes there is so much tension left in my throat that it can't and the voice just expires there are so many tears behind* [PISEi]

Another showed a heightened awareness of the emotional involvement in the voice and the debilitating effects that had on her ability to produce a physical sound.

> *my throat opened up my diaphragm started to work everything just started to work as it should do and it was just so wonderful and I wanted to share it*
> [PISIi]
>
> *it's a soprano but it's much bigger, it's got a lot of colour in it and a lot of range cos I've got a mezzo range as well* [PISIi]

These comments illustrate the awareness of physical sensations in singing mentioned by a number of the singers. However, it is worth noting that a third of the choral singers interviewed did not talk about the voice in a physical way. One outcomes of Phase I was therefore the decision to investigate this topic further with solo singers, who might be a more fruitful source of data for this purpose. While singing is a physical experience the words to describe the sensations are often difficult to find. In the teaching situation the teacher and

student have to rely on a shared understanding of appropriate terms but this does not always happen.

3.31 Using language to describe timbre of the voice

Much of what a teacher suggests in a singing lesson involves psychological responses, training the brain as well as the body. The use of metaphor, the matching of physical sensations with auditory sounds and visual imagery, are all part of the teacher's art in extending the perceptual skills of the singer and developing a technique with which to communicate (Callaghan, 1999). The music critic Hilary Finch points out her own dilemma of finding the right metaphor to describe a particular sound:

> *As a critic I try to convey to the reader what I think it sounds like, I can use technical language which I don't think is appropriate or I resort to images and metaphor. How do you describe the beginning of 'Mondnacht'?* (personal communication: 2003)

The task of the singing teacher is one of great complexity. Although sung sound can be explained in terms of acoustics, the sound is produced by physical movements within the singer, and there are few clear concepts to describe the relationship between the physical and acoustical nature of singing. By analysing the words singers and teachers use from the perspective of the individual, insights may be gained into the interaction between the sound and the singer and, even though the sound can be analysed objectively with modern technology (Nair, 1999), the value of gaining further understanding of what the sound feels like to the singer is immense.

The use of qualitative data to investigate vocal timbre advocated by Lowther (2004) has been inherently valuable in pinpointing children's perceptions of sound qualities. Children in her study were able to articulate specific ideas about timbre and this suggests that from an early age, perception of timbre is a meaningful auditory experience and a significant skill to be learnt. Timbre may be a tantalising subject to articulate but it is an important element of musical and vocal communication and qualitative research is a useful tool for investigation. The questionnaire listening study was a means to identify the difficulties of articulating timbre. In Phase II, the challenges of monitoring vocal sound made and heard internally, but expressed and amplified externally are analysed, alongside an audience's perception of vocal timbre (see 7.5).

3.32 Conscious and unconscious control of the voice

The singers in the interviews described how singing felt to them, but this was essentially aspects of singing of which they were conscious. The unconscious aspects of singing were more difficult to examine within the data.

> *I'm quite happy to blend but I'd rather not have people listening to me warble...well, I'd find that very embarrassing, well, I don't think the voice is good enough either.* [PISFi]

Here the singer implies by using the word 'warble' that she has judged her voice as not being good enough to sing on her own, but she also suggests that it is the opinions of others that she is wary of. She also emphasized the word *blend* and this could mean she was happier singing with others and that she preferred being part of a group rather than being heard as an individual voice. Several of the singers revealed in the emphasis they gave to words or the animation they spoke

of certain experiences that singing could engender more feelings than words alone could express. Singer E spoke of her '*singalong at school*' with more liveliness than anything else; Singer C spoke with great emphasis of '*punch*' when referring to a chorus of a musical; Singer B became almost inaudible when speaking at the voice change at 14 years old: all these expressive changes in the speaking tone reflect something of psychological processes at work.

Vocal education involves physical and technical explanations but these alone are often not sufficient to convey the subtleties of musical performance. Singing has to remain, on some levels, within consciousness in order to maintain control but sometimes it can be instinctive without consciousness. The hope is that a singer achieves the ultimate relationship with their voice, one where the auditory and the perceptual skills of the singer enable them to predict and control the sound they wish to produce.

> When I do this, when I conceive of this timbre, when I sense these responses in my body, this specific sound will then result – sound I recognise through acoustic monitoring. (Miller, 1986: 200)

Monitoring the voice is part of these perceptual skills and this involves both internal and external auditory monitoring. This can be seen as illustrating a real or hypothetical boundary between the singer and the voice, an element of the singer's identity that can be clarified by investigating 'consciousness' studies. The past few decades have seen a huge rise in the literature on the self and consciousness. The vocabulary has passed into the popular press and the psyche of many people. Part of the discourse of the singers in this study needs to be viewed from this understanding. There are however, valid reasons for investigating the self and consciousness with respect to singers and some of the

literature is helpful in identifying common patterns of self-perception, as will be demonstrated in the next section.

3.33 Monitoring the singing voice: how can 'self and consciousness' literature help to clarify the relationship between the singer and the voice?

One common aspect of 'self' studies appears to be a notion of boundary (Carter, 2002). 'Distinctiveness, Continuity and Autonomy' are used to describe the different aspects of the 'self'.

> We express a sense of personal distinctiveness, a sense of personal continuity, a sense of personal autonomy (Apter, 1989:75, cited in Harré, 1998: 6)

The notion of distinctiveness suggests a 'self' that is aware of its own singular identity; continuity of 'self' and the autonomy of 'self' suggests an ability to work within the 'self' and to control relationships with others.

There are many different suggestions in the literature for framing the study of the self. It was William James (1890) who first identified the 'I-self' and it can still be a useful description when analysing data:

> Components of the I self included (1) self-awareness, an appreciation for one's internal states, needs, thoughts, and emotions; (2) self-agency, the sense of the authorship over one's thoughts and actions; (3) self-continuity, the sense that one remains the same person over time; and (4) self-coherence, a stable sense of the self as a single, coherent, bounded entity. Components of the Me-self included the "material me," the social me," and the "spiritual me."(cited in: Harter, 1999: 6)

Awareness, agency, continuity and coherence can be used as identifiable aspects of self and can be differentiated from the 'Me-self' attributes of physical/material feelings, social feelings and spiritual feelings. These aspects of agency, awareness and continuity are found in the data alongside the physical, social and

spiritual feeling; however, a singer's perception of himself or herself is not the same as their perception of the voice.

There are parallels with some of the ideas of James (1890) who spoke of the attributes of self-awareness, self-agency and self-continuity. This can be seen in the following quotes. Self-awareness: *When I'm tense I've got no voice* [PISEi], *Not when I feel afraid* [PISEi]. Self-agency: *I've always wanted it to be bigger and better* [PISBi], *I've just got to sing* [PISEi]. Self-continuity: *Happy being part of the background* [PISCi], *I don't think you can teach an old dog new tricks* [PISGi], *I've never even considered that I have a good voice after it broke* [PISGi].

The themes that arose from the Phase I data were reflection, construction and expression of the voice. In Phase I the singers interviewed were happy to reflect on their singing voice:

> *It was this new phenomena kind of coming out of my mouth* [PISAi]
> *I've always loved singing* [PISBi]
> *I have a good voice, one of the better voices in the choir* [PISCi]
> *I've never been convinced of my ability or that anyone would want to see me or listen to me* [PISEi]
> *Strong in certain places not in others* [PISFi]
> *I felt I didn't have the ear to hear it* [PISHi]
> *I could produce a more or less in tune sound* [PISHi]
> *I knew I was quite good but not world class* [PISIi]

The singers also indicated levels of control over the voice and a sense that they could 'construct' the sound; that suggests some technical ability. Some also made the positive choice of not being heard; while this appears to be contradictory, it still indicates that the singer 'owns' the voice and has a sense of agency.

> *I can remember doing that to impress people or to irritate them* [PISAi]
> *I've been able to raise my pitch up and to prove a point* [PISBi]

Don't want to be heard, so I started to sing lower [PISFi]

There were also comments about the role of performance when singing, the need

to express self through the voice, whether to an audience or whether to oneself.

> *I know why people perform* [PISAi]
> *I couldn't not do it* [PISIi]
> *I've felt emotion; music can stir your soul* [PISBi]
> *I find it extremely uplifting* [PISEi]
> *It's just to amuse myself-find my own character* [PISHi]
> *I've given myself permission to do what I want to do in my own way* [PISIi]

From these data and the literature on the 'self' the pattern of three perspectives

on vocal identity began to emerge:

- Reflection on the singing voice

- Construction of the singing voice

- Expression through the singing voice.

Reflection is an indication of more cognitive processes taking place and more

thoughtful responses; construction is a more physical response and expression is

more concerned with affect and emotional responses.

These ideas can be useful in terms of building a model of the singer's perception

of the voice and will be used in Phase II when the singers participating in the

empirical study will be asked to focus on how they sound both internally as

recorded in the diaries and externally when they are interviewed after hearing the

recording made of their singing.

> A shift to external listening may produce remarkable improvement in the
> outward projection of text and music. (Miller, 1986: 200)

Miller warns that 'self-awareness and self-esteem are not communication'

(Miller, 1986: 201) and it is important to have clearly focussed ideas when

discussing the complexities of the self and the singer. If singers need to conceive

their sound before singing, the mental preparation for performance is as important as the physical.

> The mind must be able to conceive a sound that results from certain muscular co-ordinations and emotional responses, produced by efficient use of the vocal instrument. (Miller, 1986: 206)

The voice must be capable of unifying the physical and psychological responses in singing but remain true to the unique sound of the instrument. Miller points out the dangers of manufacturing a voice:

> The sound I make is very much a part of me; even if it is faulty, it is mine. To let someone attempt to alter it is to allow invasion of a very central part of my person. Even though the singer may intellectually recognise that the current sound is manufactured and not the result of natural physical co-ordination, hesitance about changing the vocal production may remain. Frankly discussing this frequent psychological barrier may hasten its removal so that technical work may proceed on a basis of mutual understanding. (Miller, 1986: 207)

Singer O spoke about his realisation that after years of singing in choral situations, he had to find his distinct sound, take control of it and begin the journey towards self-realisation through the voice:

> *My teacher often spoke of the difficulties people who sing in choirs have, when they come to sing solo voice, because of the necessary group discipline the conductor has to exercise over the choir...and so when I started singing songs she said "You're in charge now", which was wonderful, and there were many occasions when I stopped myself and said that's not right, I want to do that again.* [PISOi]

Here the singer illustrates aspects of distinctiveness and autonomy, he reflects on the sound and tries to construct it when the voice does not express what he wants, illustrating how the many aspects of vocal identity are all tied together.

The following examples from the initial interviews reveal the diversity of experience with respect to monitoring the voice and illustrate the personal involvement the singers have with making sound through singing.

3.4 Examining vocal identity in individual singers: Phase I

<u>*Singer A:*</u>

A young man with some experience of lead roles in school/college music theatre but no formal training, used language that was fairly simple and immediate to describe his own voice,

> *sort of squeaking, loudest voice, completely hoarse, very, very loud dramatic sounds, stylised vibrato, smoker's voice, sing a bit flat* [PISAi]

In voices of others, he admired a good range, showed awareness for the subtleties of lieder and he distinguished between '*sincere*' and '*superficial*' performances. He also spoke of wanting to emulate particular singers and copy their vocal sound: this can lead to problems if the singer is not willing to accept their own sound but wishes to sound like someone else.

<u>*Singer B:*</u>

A young father of teenage children with no singing experience, who had just started lessons in order to gain confidence with encouragement from his new partner, believed he had a good voice and he talked about the voice in terms of control. This reflected his training in the Royal Air Force. He was used to belting out sound: assertiveness, loudness and carrying power were seen as important. However, he started talking about flavour and spice, the voice, in this case, unusually described in terms of food, and this suggests that he was beginning to understand the emotional intensity of producing sound. He had a naturally rich speaking voice, but his siblings had told him that he was *'tone deaf'* when a child and this was something that he became angry about at the end of the interview.

Often in these Phase I interviews, early recollections of vocal experiences provoked strong emotional responses, as in this case.

Singer C:

A choral singer in his seventies had only discovered his singing voice in middle years. He had recently experienced vocal problems and was seeing a speech therapist. He almost exclusively saw singing in the choir as a social experience, *'enjoyment rather than expertise'* [PISCi] and he saw the tenors and basses in terms of personalities. Because he had developed a *'catch'* in his breathing this singer had started to think about the voice. He did not seem to view singing as happening with his voice in a personal way. When he was asked to think about resonance by the choirmaster, he confessed that he had tried but found it difficult. He seemed happy to lose his vocal identity within the group though he was aware of his value in the choir; he also spoke about the uplifting nature of the experience. He preferred lighter music but was prepared to try 'serious' music. He never sang around the house, in fact his wife had never heard him sing. He hardly described the sound of his voice at all apart from being a *'high first tenor'*: that label seemed sufficient for his own vocal identity.

Singer D:

A mother of young adults who had recently discovered that she enjoyed singing also saw the choral singing experience from a social point of view. She had taken lessons with a local teacher and was keen to improve her voice, she was a devoted committee member of the local choral society and she also wanted to develop her solo voice. She had sung in school but had stopped singing until she

resumed again at 43 years of age. She talked a lot about *'confidence, resonance and physical sensations and the pleasure of singing'* [PISDi] In describing the voices of other singers she liked *'pure sounds with only a bit of vibrato, with no wobble and not tinny'*[PISDi]. In some ways, possibly because she had left it to later in life, the vocal identity she wanted was not her own. She wanted to sound like her teacher. She knew the things she did not want it to be, but she did not really know her own voice sufficiently well. She saw her problem as being one of confidence and could not necessarily accept that her voice had matured, had aged with her and therefore would need time to change the habits developed from years of speaking and not singing.

Singer E:

One of the interviewees revealed that she had had severe problems with an abused childhood in a dysfunctional family. Yet she saw herself as a singer albeit one that was on a therapeutic journey. She had taken part in various choral workshops using Indian chant as well as Western choral music. Her emotional and psychological problems were complex and any discussion of her voice brought her close to tears. In terms of language, she used words like, *'expire, it sounds nice but it's not the notes it's supposed to be, strangled, faint, strange'*. She went on to describe her voice as *'not nice at all'* and she had a *'fear of being heard'* [PISEi]. So the description of her voice in language terms reflected her life experiences; it was a fascinating case as she explained that she had virtually stopped speaking as a child. Although she was now able to pursue a teaching career in modern languages, these early life experiences had left her with a great yearning to sing.

Singer F:

Another singer [PISFi] was a mother of young adults, a keen choral singer from school age and a member of several choirs, small and large. She had only stopped when she had had her young family but she missed singing in a choir and talked about the loss of a spiritual part of her when she was not singing. She also talked of the physical _'chill'_ and the social _'big buzz'_. She was an alto and a good reader, confessed a wish to have lessons to improve her breathing, but seemed quite happy with her singing on the whole. She wanted to blend, and did not believe she had a talent for solo work. Singing was an important part of her life and she listened and concentrated in rehearsals. She liked musical and mental challenges but wanted to stop singing if it started sounding _'grotty'_.

Singer G:

A choral singer [PISGi] an ex choir-school treble and father of grown up children, expressed a real sense of loss after his voice had changed and talked about the voice in terms of pitch and clarity, _'getting to hit the right note'_. He was aware of voices around him and thought about other voices in terms of what he did not like, _'nasal, tight'_, and claimed he was ultra critical. This awareness of other voices and the effect that auditory experience has on the singing of the listener-singer is featured in the Phase II data as well. It was almost as if his vocal identity for his own and that of other voices, was the _'pure centred cathedral treble sound'_ of one colour and therefore limited to fewer adjectives. As a result the voices he described were ones that do not meet this standard. He could also talk about the rock music that his son listened to with a level of critical

objectivity. While it did not appear to be a vocal identity that had adapted and developed successfully, he liked the music of other traditions, jazz, blues, and opera. He talked about the music he liked as being, '*harmonious, blending*' but also in a curious way '*smiling*'. His narrative was an example of the complexities of a changing vocal identity over a long period of time.

Singer H:

A closet folk singer [PISHi], was the father of teenage boys, who enjoyed hymn singing though he did not sing regularly in a choir. He enjoyed a wide range of music but had had problems with his speaking voice, sinusitis, and congestion. He was a teacher and he talked about his own voice as weak, lacking penetration and character, but blamed no one and was honest and unassuming about his own vocal abilities. He liked voices that were '*uninhibited, convincing, distinctive and musical*'. '*I ought to develop my own*' he said and he had a good aural sensitivity for other voices. This was an example of a singer who knew the sounds he liked and could discriminate between them with aural sophistication but lacked the technical skills to achieve the same level of competence himself.

Singer I:

One of the interviewees was a singing teacher [PISIi], a mother of young adults, whose personal traumas of singing in a dysfunctional family and her experience of psycho-analysis and counselling coloured her discourse. Now principally a choral singer she was still having lessons and searching for her own voice. In the last six months she felt she had found it and she described, in great detail, the highs and lows of her career. There seemed to be an obvious relationship

between her voice and her personality. It was difficult to assess how much of her discourse had been influenced by the amount of counselling she had had, but there seemed to be plenty of evidence to suggest that her singing voice sound was rejected by her father and was suppressed until her recent experience with some new teachers brought about its release. She used words like '*tight, release, colour*'.

Often these vocal descriptions appear to reflect personality and experience; the singers who talked about getting older and losing their voices indicate perhaps a general concern with the ageing process. Some choral singers were unaware of timbre and vocal qualities but that was also true of some of the solo singers interviewed. The need for more research into the levels of perceptions of timbre in singers became apparent as the diversity of responses grew. Each singer had their own personal anecdotes to relate, but gradually general themes began to emerge which could be explored in more detail.

Looking at these data as a whole suggests that the language singers use to describe their singing experience reflects something of their identity. Singers working together in choirs are happy to be part of a whole group sound rather than wanting to achieve a unique distinctiveness, so the choral singers often talk about blending the sound. Yet the inexperienced singers wanted to develop character and distinctiveness, as if they were still unsure about their vocal personality and were trying to establish control over their sound, some form of vocal construction. The solo singers talked more about colour and resonance in

the voice, suggesting that they were aware of the particular vocal qualities they were able to achieve and wanted to <u>express</u> their feelings.

Most of the singers discussed the pleasure they gained from singing, whether it was a socially enhanced activity, a physical thrill, or a musically stimulated experience. Singing was seen as an important part of their lives even if they had frustrations about their own abilities. Singers B, C, H and D had all come to singing later in life, and singer E had spent all her life trying to find her singing voice. Those for whom singing had been an integral part of their lives still spoke passionately about their love of singing, as well as being critical about their abilities. Taking the words that these singers used can reveal further insights into the perceptions of singers. Some use of language is conscious; but at other times it would appear to be more intuitive. The diversity of experience illustrated in these initial interviews reveals the complex layers of vocal identity that can emerge from the data. However, making generalisations or attempting to quantify these data is problematic and while they formed a useful part of the exploration of research questions, looking at vocal identity was not a sufficiently structured tool and modifications were needed for Phase II (see 5.11).

In Phase I interview data the following characteristics emerged when analysing the data for the relationship between the singer, their vocal identity and the singing voice:

- A sense of self-voice-reflection.
- A sense of self-voice-construction.
- A sense of self-voice-expression.

Analysis of language in Phase I data, while fruitful, indicated a need for a more specific focus that acknowledges the role of the self in singing without getting distracted by the complexities of personality. The singer's perception of timbre involves a framework of 'self' as well as aspects of auditory and kinaesthetic awareness. Timbre can be seen as the vocal quality of the individual and the language singers use to describe that sound should provide indications of their levels of perceptual skills. In Phase II the focus on timbre and voice quality reveals more details about a singer's vocal identity (see 5.2, 5.3, 5.4). However, it is important not to lose sight of the holistic aims of the thesis.

3.41 Aspects of self: the singer as a 'whole'

Neuroscience has investigated the physicality of the brain and mental processes that appear to take place, and links between the body and the mind have been shown (Damasio, 2000) in terms of emotions (Pert, 1998). The concept of the person as a whole and of human experience as a 'gestalt' is one perspective from which it is possible to view the singer and singing. The essence of our human-ness and the idea of layers of consciousness have suggested the notion of self as a phenomenon, and though not everyone agrees with this view, the holistic approach is adopted in this study. Strawson (1999) sees the 'self' as a single mental thing 'distinct from all other things and a subject of experience' (Gallagher and Shear, 1999: xvii) but he also concludes that we can be a number of mental selves, rather than the 'self' being seen as whole. As the many debates indicate, the different interpretations of self, consciousness and identity are open to continued investigation and argument.

> The many different approaches that can be pursued in addressing the question of self appear to yield a multitude of conceptions of the self, the cognitive self, the conceptual self, the dialogical self, the ecological self, the embodied self, the emergent self, the empirical self, the existential self, the extended self, the fictional self, the interpersonal self, the material self, the narrative self, the physical self and so on (Gallagher and Shear, 1999: xviii).

Attempting to untangle the complex relationship between all these senses of 'self' is too ambitious for this study but there is the need to be aware of the implications when questions are asked such as, 'How do you feel about your voice?' or 'What do you feel when you are singing?' Responses can be emotive and/or physical (Killian, 1997: 531) but analysing these responses for underlying patterns can also reveal something about a singer's sense of self. Shotter suggests, through his model of social construction of the 'self', that the 'momentary relational spaces occurring between ourselves and an other or otherness in our surroundings' indicate something about us as individuals; "'it' has its being in the 'movement' of our voices as we speak our words" (Shotter, 1997: 3). If social psychologists can search for the inner psyche in the 'movement' of a voice, it would seem to support the view that the voice reflects some inner identity.

It can be argued that singers use the 'performance' experience to create themselves as singers and can still feel they are singers after they no longer perform. In one of the interviews with a singing teacher, her identity as a singer was still strong despite the fact she had stopped performing twenty years ago.

> *I still feel very much that I'm a singer, although I'm not at all, but um, the wonderful thing is I can scream at my dogs, or do anything and it doesn't matter whereas before, oh my god, because I did lose a huge job once, because I'd done just that.* [PISJi]

While there are dangers in assumptions about vocal perceptions and the singer's sense of self, exclusively in terms of the discourse collected, it is a useful source of data and one that has been rarely used in empirical investigations.

Changes in vocal sound, due to pubertal growth, can form the focus for such investigations. Killian (1997) looked at perceptions of voice change and analysed the kind of language used, in particular the positive and negative responses to open ended questions. She asked why the voice change was so memorable for some but not for others and makes it clear that singers react very differently to vocal change. Vocal changes can mean that singers are more aware of vocal feedback due to the physical and auditory changes. By looking at the variety of responses from singers and the explanations they express about vocal change, features of vocal timbre can be examined more precisely (Monks, 2001: 46).

3.42 The singer constructed by the social environment

Patterns can be found that make sense of our lives after the event. It is possible, in retrospect, to find meaning in situations. The social constructionist view is that people are a series of selves, a predominant idea of the post-modern world,

> ...social saturation brings with it a general loss in our assumption of true and knowable selves. As we absorb multiple voices, we find each 'truth' relativised in our simultaneous consciousness of compelling alternatives. We come to be aware that each truth about ourselves is a construction of the moment, true only for a given time and within certain relationships. (Gergen, 1991: 16)

However, whether the singer is a multiple series of selves, or a whole self, within the discourse of the singer, there will be an element of the individual constructing a meaning from the perceptual experience and this will be acknowledged where

appropriate. While this study seeks to tie together the mind/body phenomenon with an overall structure, it is also important to separate out the mind/body aspects in order to investigate them more thoroughly (Baumeister, 1995). Both paths are valid in extending knowledge and understanding, and analytical discussion need not be confused with the real, highly integrated forms of human experience. By looking at the singing voice in performing singers, it is hoped to illustrate the complexity of the singing self in relationship to the musical and communicative experience. As well as investigating the three aspects of vocal identity that emerged from the Phase I data, reflection, construction and expression of the voice other perspectives, physical, cognitive, emotional and auditory, will be included. The setting up of an empirical study in Phase II will enable these themes to be explored in more detail.

The next question that emerged from this grounded theory approach to the data required more specific emphasis on the kinds of language used to describe vocal timbre. This involved the setting up of listening questionnaires.

3.5 Data Analysis: listening questionnaires with teachers and students

This part of Phase I addresses the fourth research question:

How do *others hear* the singing voice?

3.51 Analysis of language

After some initial analysis of the language used by singers in the Phase I interviews, detailed investigations of the words used by individuals to describe

vocal timbre were set up using the two questionnaire studies described in chapter two. The aim was to explore in more detail the words and concepts specific to vocal timbre and to identify any groups of words as they emerged from the data. In order to get a broad spectrum of words across several generations, two groups of 'listeners' were targeted. The first group was singing teachers and the second, school students.

Both teachers and school children wrote perceptively about the singers they heard: the teachers used more technical language than the children, as might be expected, but in terms of overall responses revealed many similarities. The focus on colour and sensory words was predominant with the teachers choosing more colour words and the children using more sensory words. However, there were sometimes remarkably different reactions to the same vocal sound, revealing personal preferences and individual listening criteria. For example, the first singer in the listening questionnaire for teachers provoked the following responses: some teachers describing the sound as *cold*, others as *warm*, some as *passionless*, others as *sensual*.

The language used by both groups was analysed for common themes and five were identified for classification: Musical/style, Vocal technique, Timbre, Diction and Personal (Charts 3.1 & 3.2) The largest number of responses came within the Timbre category and the results in that group were analysed again using Titze's (1994) suggestions of Effort, Comfort, Energy, Colour, and Sensory words (Chart 3.4).

Chart 3.1 showing proportion of teachers' responses
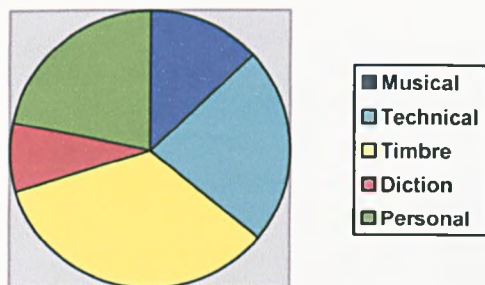
Chart 3.2 showing proportion of students' responses
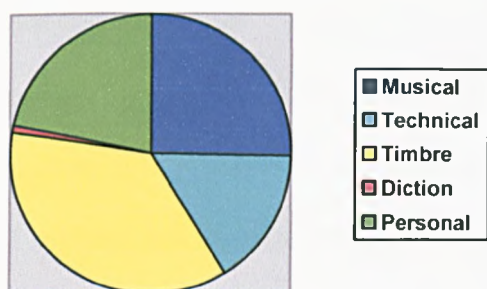
Chart 3.3 comparing proportion of student and teacher responses (not including Diction)
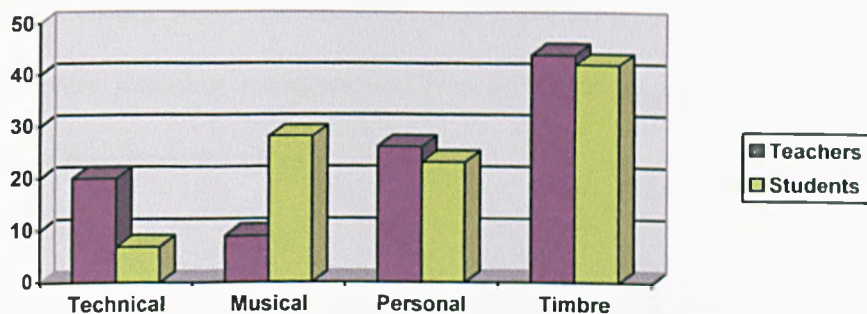
Chart 3.4 comparing proportion of student and teacher responses in timbre word categories (Titze, 1994)
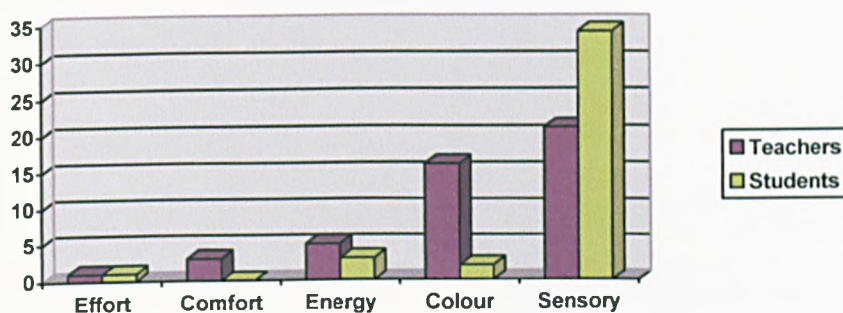
Chart 3.3 shows that while teachers tended to use more technical words when describing voices, the school students used more musical terms of reference. The personal response to the voices was very similar as was the proportion of timbre words used. Leaving aside diction, which hardly featured in the response from the students, it is possible to note differences between the singing teachers and school students but the percentages of response shows a remarkable similarity in the references to timbre (Chart 3.3). Both groups were asked to write down their response to the singing sound and timbre emerged as the most interesting aspect to investigate more fully. Chart 3.4 indicates that teachers used more comfort, energy and colour words but students used more sensory words. Even with two very different listening exercises and two different groups of listeners, similar patterns of response emerge.

On a subsequent analysis (Table 3.5), using a similar model of emotional language by Shaver *et al.*, 1987 (cited in Juslin & Sloboda, 2001: 80), the Effort words could be subdivided into words that related to vocal 'power', which was seen to be a positive thing on the whole, and a 'strained', more negative unpleasant vocal sound. The Comfort words related to calmness or an easy vocal production, the Energy words divided into agility words or dynamic words.

Colour (Table 3.6) obviously used colour terms but seemed to also have words relating to gender and character when describing vocal qualities. Sensory words (Table 3.6) divided neatly into two: affective words where the sound produced a purely emotional response in the listeners and an effective response that produced a physical link with the emotion, an empathetic feeling in the listener. Technical terms divided into positive and negative responses, as did Personal, though some words appeared to be more neutral. Musical words fitted into categories of musical terms or musical qualities. The following tables (3.5 & 3.6) show these subdivisions more clearly, though it must be said that some words could be placed in several sections e.g. *laidback* under *easy* and *relaxing* under *calm.*

Table 3.5 showing the subdivisions of Effort, Comfort, Energy, Technical, Musical and Personal comments collected across the Phase I data

Effort		
Powerful	*Strained*	*Weak*
Belt	Forced	Ungrounded
Controlled	Harsh	
Strong	Painful	
Fervent	Hard	
Exaggerated	Strident	
	Laboured	

Comfort		
Calm	*Easy*	*Uncomfortable*
Peaceful	Free	Uncomfortable
Laidback	Natural	
Languorous	Reasonable	
	Relaxing	
	Rounded	
	Therapeutic	
	Normal	
	Nice	

Energy	
Agility	*Dynamic*
Bouncy	Bold
Bubbly	Beefy
Flowing	Direct
Jumpy	Effervescent
	Intense
	Soaring
	Stimulating
	Lively
	Restrained

Technical	
Positive	*Negative*
Assured	Breathy
Clarity	Manufactured
Commanding	Narrow
Covered	Nasal
Disciplined	Synthesized
Even	Unsteady
Flexible	Wobbly
Florid	
Fluid	
Resonant	
Secure	
Steady	
Supported	
Sustained	
Well placed	

Musical	
Musical terms	*Qualities*
Alto	Deep
Folky	High
Funky	Low
Bass	Loud
Jazzy	Legato
Lyric	Quiet
Trumpety	Rhythmic
Mezzo	Sharp
Oboe-like	Toneless
Operatic	Vibrato
Pop style	Tuneful
Soprano	
Soul	
Tenor	

Personal		
Positive	*Negative*	*Neutral*
Beautiful	Boring	Feminine
Cheerful	Conventional	Crooning
Confident	Ragged	Innocent
Convincing	Plain	Idiosyncratic
Elegant	Superficial	Masculine
Fun	Shallow	Mature
Generous	Uninteresting	Old
Great		Old-fashioned
Jolly		Recognisable
Joyful		Sad
Pretty		Solemn
Sincere		Strange
Soulful		Sweet
Spiritual		Young
Unique		Silvery
Uplifting		
Versatile		

Table 3.6 showing the Colour and Sensory words collected from the Phase I data

Colour		
Gender	*Colour*	*Character*
Male	Black	Clear
Female	Brown	Faded out
Androgynous	Bluesy	Flat
Asexual	Coffee & Cream	Flinty
Choir-boyish	White	Fresh
	Golden	Fruity
		Gleaming
		Glimmering
		Hazy
		Light
		Dark
		Shade
		Metallic
		Monochrome
		Peachy
		Pearly
		Plummy
		Rich
		Velvety
		Shimmering
		Spice
		Angelic
		Dramatic
		Dull

Sensory	
Affective	*Effective*
Anxious	Smooth
Droopy	Soft
Over-ripe	Shouting
Delicate	Twangy
Emotional	Wailing
Raw	Whiny
Enticing	Woofy
Expansive	Swooping
Expressive	Thick
Vibrant	Thin
Sensual	Tight
Warm	Swallowed
Floated	Moaning
Fullness	Piercing
Gentle	Pure
Greasy	Screaming
Sexy	Rough
Lifeless	Quivery
Liquid .	Hooty
Lugubrious	Husky
Annoying	Indistinct
Melancholy	Scratchy
Mysterious	Booming
	Chesty
	Coarse
	Edgy
	Cold
	Constructed
	Ringing
	Restricted
	Shuddering
	Crusty
	Gravelly
	Heavy
	Hollow
	Croaky

As has been suggested some of these words fit into more than one category: 'peachy' could describe the texture of peach skin or could be a colour reference or even a taste sensation. The word list as a whole illustrates the huge diversity of descriptions of the singing voice that both the teachers of singing and school students used. The following summary chart arising from analysis of the word list is a useful indication of the way that language can be grouped to highlight particular uses of words. It is not sufficient to assume that effort words have

negative connotations, since some use of effort words will imply weakness while others will suggest power, and effort will affect timbre.

Chapters 6 and 7 will explore in more detail the difference between describing one's own voice and the voice of another. This table summarizes the examination of previous tables of words and will be referred to again in chapters seven and eight, although it must be made clear that these are the words used to describe the voice quality and timbre when listening to a singing voice that is not one's own.

Table 3.7 summarising the word categories from the Phase I listening questionnaires: Charts 3.1-3.6.

Effort	Comfort
➤ Powerful ➤ Strained ➤ Weak	➤ Calm ➤ Easy ➤ Uncomfortable
Energy	**Technical**
➤ Agility ➤ Dynamic	➤ Positive ➤ Negative
Musical	**Personal**
➤ Musical terms ➤ Qualities	➤ Positive ➤ Negative ➤ Neutral
Colour	**Sensory**
➤ Gender ➤ Colour ➤ Character	➤ Affective ➤ Effective

So far in Phase I amateur singers have been interviewed and provided data relating to the singing voice, exploring how singers think, hear and feel the voice. Listening questionnaires have provided word lists that reveal, to some extent, how others hear the singing voice. However, the study needed to extend the field of exploration to those singers using their voices on a daily, professional basis. It was important to investigate whether other concepts of vocal timbre and

experience would emerge different from those already uncovered. This formed the third part of Phase I, the diary study of three professional singers.

3.6 Data Analysis: diaries of professional singers

Asking the singers in the Phase I interviews to talk about any aspect of their voice and the singing experience led to some formulation about singers' self perceptions but the responses were not specific enough. Some singers were in a static relationship with their voice, possibly due to their own personal satisfaction or as a result of a lack of vocal challenge in their singing lives at that point in time.

The initial interviews were semi-structured to allow for investigation into aspects of vocal identity in singers and to look for emerging patterns. The questionnaires enabled more in depth study of timbre as perceived by an audience, but there was also a need to examine more closely timbre as heard and felt by established singers working with their voices on a full-time professional basis. It was therefore decided to ask professional singers to contribute to the data.

Various opera companies were approached requesting singers willing to keep a diary of their vocal experiences over a month whilst preparing for, or performing recitals or music theatre/opera (as detailed in chapter two). No specific approach was suggested although the study was named 'Perceptions of Vocal Timbre'. Singers were not interviewed beforehand, in case questions betrayed any conscious or unconscious direction of the researcher. The three singers who responded acknowledged afterwards that without the stimulus of a diary they

would not necessarily have given the matter of vocal timbre much thought; however, they wrote about timbre in great detail and depth.

The intimate nature of the diary as opposed to a spoken interview was surprising: singers appeared honest about their feelings concerning the voice and it was a privilege to be allowed to use such personal documents in this research. The comments of the singers in the diaries are more specifically focused on timbre and the singer's relationship with the singing voice. The three diary studies are explored in detail here with the individual themes bulleted at the beginning of each discussion. When looking at the focus points of space and movement that emerged from these data the need to examine these further with Phase II in chapter eight was identified. The approximate size of the diaries is given in brackets.

3.61 Diary One (2100 words)

This is a professional chorus member, bass-baritone of considerable professional experience in West End musicals and Opera.

Factors frequently mentioned include:

- o Medical conditions – Colds/coughs/hearing loss
- o Acoustic and kinaesthetic monitoring was constant
- o Placing and approaching the voice
- o Awareness of limitations – lack of warming up and vocal maintenance
- o Feeling involved in the production – the sounds of orchestra and the chorus around him
- o Strong commitment to the music and the message
- o Gruelling nature of rehearsals but the exhilaration of performance
- o Affected by people and mood
- o Awareness of hearing and feeling buzz and ring in voice

In Diary One the singer comments,

> *I don't normally think about my voice in such close detail, rather taking it for granted that it will deliver the goods whenever I use it!! I occasionally remove myself from this cavalier attitude to my instrument and only when it gives me a reminder by not sounding as I think and feel it ought to do I indulge it with some TLC.*

He often relates feeling tired to the state of his voice and the need for physical rest.

> *Today I'm feeling tired, drained by the cold and quite a heavy work schedule, as I sit writing this I feel my voice could do with a good rest- rehearsals this afternoon were quite an effort vocally ...*
> *Might get a break from using the voice this weekend, reminds me of when I was doing 8 shows a week, Sunday was a blessed relief, I knew I'd been working the voice by the last show Saturday night and felt physically in need of not singing for about 36 hours. That break at the weekend always refreshed me vocally.*

He makes the connection between hearing the voice and feeling it:

> *I've been feeling a slight disconnection from my voice through the effects of not hearing myself 'properly'. I guess this may be to do with not feeling the usual resonance from my head.*

He talks about the voice in a space-specific way but also makes the point that it is part of his whole being.

> *There are times when I feel the voice to be big and full, usually when I'm relaxed and can get all the notes placed in what I feel to be the correct position to 'ring' and I feel fully in charge of my being.*
> *There are times when I feel dissatisfied with what I hear and feel my voice doing, when I don't approach notes correctly or the voice seems to me to lack 'bloom' when I'm feeling unsure of myself and not 'centred'. I guess I sing better when I'm totally at one with my feeling and my voice.*
>
> *Voice feeling in better shape the cough seems almost to have gone and I feel brighter in myself, the feeling of well-being makes a huge difference to how I feel when I'm singing, although I don't want to sound precious about it I do agree with the view that a singer's whole body is their instrument and every outside (external) and internal event/feeling has an influence on the vocal mechanism. If I'm feeling down I find singing much harder- in good spirits it's like flying.*

The sense of movement when the voice is feeling right is echoed in comments from the other diary singers. Placing and approaching the sounds seem to be a common theme with this singer.

I need to renew my acquaintance with the placing and space to get a satisfactory F, thankfully it's on a closed vowel so I'll just have to check my approach and placing.

The above makes me realise that the adage 'Use it or lose it' is appropriate here. I have to make more use of my top to keep it in good order.

I'm aware in myself that tuning of the voice is as much a mental perception as a physical one because I find I have to think of the correct 'placing' of the voice i.e. how much space I need to give it and how much support with the breath before I actually sing the notes, if I don't listen to myself carefully enough I might be slightly under the note yet feel I am in tune!

He talks about the pleasure of singing with an open voice;

-- dress went well for me vocally, I must say I enjoy the moment towards the climax of the opera when I can sing a couple of open throated 'ahs' on about a D', it feels like my voice could go up and up but in reality I have to modify the vowels to go higher without doing myself damage.

I enjoy the sensation of top notes ringing in my head when they are well placed, it gives me a buzz both in mind and body!

Just thinking about range and how there's also a certain pleasure, also in plumbing the depths of the voice and feeling those low vibrations without falsely weighting the voice.

He also gets pleasure from singing with others around him but is aware of the

difficulties in hearing the voice when surrounded by complex sounds.

I find the opera - interesting in that being a wordless chorus I feel we're to try and create differing vocal colours on the vowels and by humming.

I have some difficulty in intonation, the texture of the sound makes it tricky in places to pitch some notes, I find I listen a great deal to the sounds around me to find my orientation. Fold back doesn't always help.

The importance of hearing to a singer is very apparent.

Made a start on production today, it's a chorus that seems to be for me quite low in places i.e. I don't feel to be making much sound because all I can hear is those around me, I'm picking up all the higher voices, it just feels like hard work, wading through treacle to me!!! This is possibly because I can't hear myself to know what I'm doing! I feel the need to be able to hear myself so I can control and shape my voice.

When preparing for a solo he becomes more aware of specific features that need attention.

> *Did some work today on [my solo] to get the top more easily, at first I was dissatisfied, my approach to the top was far too much from underneath the note, I know I need to think over the top of the note and look down on it mentally, I find imagery can be a useful tool for me to use, in mental preparation and always wanting my head full of sound.*

> *It (the F) sounded to me tight and not free however I was able after a little thought to get it working more freely! (I really must warm up more regularly! -to keep the top ringing.)*

The attitude of others around the singer, during production can have serious effects on the voice.

> *The last seven days have been a slog with production calls on [opera production]. I find the attitude of some of my colleagues difficult to accept, negativity and it makes me feel down and the work I try to do in some way reduced in value, my voice feels small and insignificant at the moment, reflecting how I am feeling and vice-versa.*

> *Constant repetition of some of the bits of production having to energise both body and voice, it's a chore, I feel dulled and I hear my voice as dull, I need some excitement to give my voice a lift.*

Occasionally he speaks more at a distance from the vocal experience, they are valuable comments but different in tone to the rest of the diary, with more considered comments on the singing process.

> *Looking back over what I've written in this journal so far makes me aware of how I seem to enjoy the physical sensation and emotional buzz of singing. I'm enjoying music, its notes may not be very difficult but the buzz for me comes in with the lush harmonies and how my vocal sound is part of that, a very small part!*

> *I'm taken by the thought that the action of an opera, the character one has to portray, the orchestral textures, even the look of the piece to some degree influence how I, as a singer, produce my voice, to create the desired effects of characters etc. and how by changing timbre can colour my own performance.*

> *As a singer I seem to be very wrapped up with 'the voice' although I usually pay very little attention to its care and maintenance.*

In some of the operas the chorus have little to do but singing still gives musical

and vocal satisfaction

> *...our contribution is very minor, an opening humming chorus for the men off-stage which I find very satisfying because its an opportunity to feel the resonance in my voice and place the sound in the mask of the face.*

> *We have a second off-stage chorus that requires careful intonation and I enjoy moving by semitones, feeling each note is in the correct place.*

At the end of the diary he gives more reflective comments on timbre, revealing a

perceptive approach to the whole singing experience.

> *I feel that vocal timbre is created by a great many variable factors to do with the individual physiology, physiognomy, psychology and environment that a singer exists in.*

> *My sense of timbre is based on what I hear coming back to me through my ears, having just imagined the sound in my head, then physically made a space in my throat and mouth caused air to pass through the vocal chords, the vibrations of which resonates in the mouth, head mask of the face and to some degree the chest cavity, then goes into the atmosphere and is reflected back at me from various objects through sound waves for me to perceive as good, bad or indifferent sounds.*

> *Timbre is also through the sound waves and text or vocal colour in the voice, an emotional expression of great intensity verbalised.*

> *My guess is that timbre comes in such varied forms because of the physics of sound involved in vocal production and the individual characteristics of the singers.*

This singer perceives his vocal timbre in great detail. He makes many references

to the space and place of the sound and there is much emphasis on his ability to

hear. He expresses himself very clearly and manages to explain the science of

singing, as he sees it, in very simple but accurate terms. He mentions when his

hearing is compromised, through colds and blocked passages but also when it is

affected by the set, the fold back arrangement on the stage. Much of the detail in

these data will be referred to again in chapter eight because of the importance the

professional singer attaches to space, movement and aural perception.

3.62 Diary Two (1600 words)

This is a professional chorus singer, baritone, who also covers for small parts. An academic turned performer with many years experience in opera and married to singing teacher.

Factors frequently mentioned include

- o Specific environmental problems of heat and dust / asthma and allergies
- o Medical conditions – bad cough/ acid reflux/hearing loss
- o Worries over re-audition/concerns about employment
- o Awareness of acoustic space, effect of set and position on stage
- o Self-critical
- o Keen to prove himself vocally
- o Affected by people and mood
- o Tired and often low with work schedule but rises to performance
- o Affected by subtle changes in pitch
- o Awareness of hearing sound right in head

The singer seems to be aware of auditory and spatial dimensions, these are aspects reflected in the other diaries.

> *Slight cold coming on, the organ seemed very slightly flatter than A 440, hence a bit confused about level of pitch and where the sound resonated, even the music, as easy as it is seemed less familiar, voice felt slightly less 'open' and a bit more 'pingy' than usual. However, well received!*

> *Sore pharynx and blocked up ears made singing awkward. Voice pretty tired during a sing-through. The emotional intensity of the music made this all the more frustrating!*

> *Warming up am. Re-audition pieces, voice a bit 'tight' as my ears still blocked. However was chorus work pm in good voice in spite of ears. Some lack of freedom in prolonged 'aah' vowels in –*

His work for the re-audition focuses his thoughts on the voice but also reflects the tension of being a voice professional and needing to keep a job.

The sets and costumes have an important effect on the voice:

Dryish cough and ears still blocked, voice heavy and sluggish. On stage with [fellow chorus member], acoustic seemed slightly drier than usual, due to the set? - that didn't help.

Chesty cough, voice quite rough in cover call, some mild stress-related asthma- but soon warmed up, felt pretty tired at stage and orch. eve.

I find that although there are reflective surfaces on stage, being stuck slightly in the corner down stage R. makes the resonance seem rather trapped – hence thinking about openness and support very important, still got nasty tickly cough.

... cover call in much better voice, although with quite a bit of catarrh on my chest, the acoustic in the Assembly Rooms is very resonant and quite flattering. Very tired as I didn't sleep well last night and was unwell yesterday

The singer is experiencing real health concerns but manages to continue to perform:

Very bad chesty cough and great tiredness, made voice seem about 1/3 lower. Nevertheless, coped well with [opera] cover call after 2 gruelling chorus rehearsals.

When describing his voice as seeming to be a third lower, this singer gives a very clear demonstration of the changes that can occur in vocal perception depending on health and physical changes due to coughs and colds.

Still very chesty, yet it is surprising how well one can rise to an occasion, I seemed in good voice for the [opera] cover run and it went well

I am very tired and stressed up today the effects of coughing in my voice were very apparent. Coaching session early pm with MP v. helpful though it was obvious that I couldn't really sing properly.

Basically same experience both days, voice good and clear in [opera 1] but bad attacks and coughing and nervous asthma and retching in [opera 2]. Latter possibly due to heat and dust, heavy hot coat, scarf around neck and warm ...I'm getting nervous about re-audition on ...!

Sometimes the comments are very personal but it reveals how much the diary has become an intimate communication.

To doctor's, a.m. I have the beginnings of an arthritic hip it seems (oh joy) - decided I might not be asthmatic so I am stopping the inhaler. He

had given me some penicillin for my persistent cough and some medicine to counter acid reflux which might possibly be the cause of my – free retching. He has a patient (who might be our friend T) who has seen DH (ENT specialist and laryngologist to ON) He apparently said that any singer who is supporting the voice properly is bound to have some acid reflux! Intriguing and alarming idea!
Rehearsal with MC for re-audition didn't go too badly. In Fauré 'Clair de lune' some pitch problems towards end, I felt a bit tense worrying about the audition, passing mot etc. In evening [stage and piano] in good voice, no coughing Wow!!

He decides after some heart-searching to go ahead with the re-audition and does

very well in spite of all the health problems.

The dreaded re-audition day! Warming up with L helped a lot though I did quite a bit of nervous retching, an infuriatingly slow journey to Leeds!
Very relaxed in audition Fauré went v. well. I got an openness a freedom of tone and an appropriate range of tone colour. Also some of the 'line' which I used to get in the past. RM said "lovely !" when I finished! They all laughed at the Sentry's song. MC was very complimentary. G pointed out to me that, even if they pull me to shreds in the 'post-mortem' no-one can take away the satisfaction I experienced today!
Chat in Newcastle about re-audition -Mostly v. complimentary
It's good to be able to feel the voice really open, free and well supported.

What is interesting here is that this singer has all the nerves leading up to the

audition and on the journey but when in the audition situation is able to control

his nerves: signs of a real performer and a very useful skill to have acquired as a

professional singer. His discourse is also full of references to his ability to hear

clearly and to feel the voice working well in 'open' space. Again these data will

be referred to in chapter eight.

3.63 Diary Three (1800 words)

This is a young tenor performing in semi-professional chamber opera settings

and studying for a diploma.

Factors frequently mentioned include

o Affected by medical conditions/hay fever etc
o Aware of tessitura
o Thinks about resonance and feeling sound in head
o Difference of solo and chorus singing
o Hearing loss
o Loss of pleasure from singing when under the weather
o Talks about voice running well

This singer is younger and having singing lessons towards a diploma, hence he comments on the performance of the opera he is preparing for and the songs he is studying. He is suffering from hay-fever which, along with the medication gives rise to some vocal problems.

> *Didn't have time for any warm up, but voice didn't feel that bad. I'm suffering a bit with hay-fever (or the antihistamines) and so there is a feeling of instability at the top and it sounds a little 'whispy'.*

> *5.00 – 6.30 working on diploma material and Warlock songs. Having done quite a bit of singing today, I am thinking I might sing the Fauré at the higher pitch (up a semi-tone I think) as it is 'feeling' quite low and a bit of an effort to scoop down and keep everything smooth.*

> *Lower and middle of register still fine, but the top is still suffering a bit as it was at the rehearsal earlier. While singing the Warlock (probably more suited to a tenor), the top felt a little tickly and prickly, but found that throwing open the soft pallet meant that the top Fs in the 'Cradle Song' were OK. However, I went back to the Warlock at the end of the session and the top was feeling really cut off and quite tight. The tessitura probably is too high, and this must have contributed to the tiredness.*

He also performs with a small choral group so he makes comparisons between this and his solo singing experience;

> *Voice, or more precisely throat, is feeling quite tickly still and a little dry. Warmed up for an afternoon concert and my throat was feeling a little gluey. Drank plenty of water and tried not to clear my throat.*

> *The voice actually felt fine, despite the fact that we were singing outside (which is always a bit more difficult). As I sing the tenor line in the group, the sensations had while singing are always slightly different to those experienced while singing baritone as so much of the singing seems to be on the edge, so to speak, of my voice. This means that the internal sound is much less resonant, and feels a lot less thinner and less substantial than usual.*

He also refers to hearing and feeling the physical areas of the voice, he can relate his own feelings in relation to the voice.

> *Bottom notes fine, but can feel the hay-fever affecting the ring at the top of the register. It is also feeling much less comfortable.*

> *9.00 pm more practice in the evening (diploma) and there was no F in me at all (although the top G was fine in Warlock's 'Passing By', but that is off the break and so although higher, strangely easier to sing. Feeling quite bunged up, which deadens the sound in my head, and also feeling a bit lousy generally. All of this affects the voice, and the actually experience of singing so that it feels quite a chore and hard going.*

> *Bottom of register now affected (usually the top goes first, then the bottom if things persist over the coming days). However, most of the soreness has gone, and so there was no discomfort when singing.*

He comments here about a possible mismatch between his hearing and the actual sound:

> *The stuffiness and irritation caused by the hayfever obviously makes the actual sensation of singing less pleasurable, and I get the impression sometimes of notes not sounding quite right (owing to the distortion caused by the catarrh etc I guess).*

> *The lack of ping, or resonance, is still a bit of a problem and the voice does tire more quickly. Started off with the higher end of the repertoire for the diploma, but then decided to drop to the lower stuff. Unfortunately, the brightness was there at the bottom to begin with, but as I continued it gradually felt better and returned.*

This indicates some sense of movement and the voice travelling:

> *There is still a feeling of the sound production being laboured, that sensation of soaring and sound travel is missing. It feels like hard work at the moment, but hoping that the recent unsettled weather will lower the pollen count.*

The lower pollen count seems to alleviate a lot of the problems, again the environmental factors have a considerable effect on singers and the way they perceive the voice:

> *This was one of those nights when everything is running as smoothly as it can, and the more I sang the more it purred along, like a well oiled machine as the saying goes.*

> *Still not taking the anti-histamines and the tautness around the soft pallet does seem much better. Head is clear, and so the ring is also clear (which lets me know that the sound should be travelling properly).*

Again the singer, who is using his voice all the time, is able to distinguish fine adjustments to the vocal mechanism.

The experience of singing with others has a really positive effect on his perceptions of his own voice. The sense of pleasure in singing is apparent.

> *Did a short warm up at home and everything felt loose and relaxed. A bit of waiting around before we went on, but once we started everything felt fine. It was a good room to sing in, very giving acoustically and warm feeling, quite pingy (voice not the room). Singing tenor, so not the usually vibrating in the head, but still feeling resonant if less so on the higher tessitura.*

He speaks about the '*very giving*' acoustic space: this singer is really aware of his external aural environment as well as the impact it has on his internal perceptions.

> *Felt really clear and expansive in terms of sound travelling. Have been practicing with allowing the voice to sit on the top of my rib cage (visualizing this anyway) and then noticing the difference in physical sensations on throat and body.*

> *Top Gs in 'My Spirit Sang All Day', which we sang as an encore, felt really firm and completely 'outside my body'. Like being hollow, full of space and hearing the note outside of me, almost as if I were a casually listener-in.*

He refers to the sound of the voice '*travelling*': the sense of space and movement are ideas shared by the other diary singers and ones that did not come out of the initial interviews:

> *Everything affects the voice, and this lack of enthusiasm led to a laboured feeling. The sound wasn't really travelling, or didn't seem to, felt quite leaden and heavy.*

The singers in the diaries seem to come to a performance, ready and willing it to go well, the sense of the singer finding the 'raison d'être' on the stage is apparent.

> *Opening night. Voice felt fine and seemed to travel quite well. There is still a bit of reluctance at the top on the break (the F or so), but above that (G at the end) is OK. Everything had that smooth feeling, no grating in the throat as the sound was being produced. Quite a pleasurable experience and felt that the sound travelled quite well. It's only a small venue, so never too much of a strain to feel that everything is OK.* [PIpsd-three]

Each of the three singers so far show many similarities in the way they talk about the singing experience, although the language conveys subtle differences in their perceptions.

The following Charts 3.5-3.8 shows the remarkable consistency in the three diaries with regard to the common themes that emerged. When the diary data were analysed four aspects emerged, these came from the data, one of the strengths of a grounded theory approach being the lack of imposed hypotheses. The patterns that emerged from the interviews and questionnaires were not applied to these data. Feeling, sound, space and movement were the themes that appeared to dominate the diary narratives; feeling the voice both physically and emotionally, comments relating to the specific sound of the singing voice, how the singers experienced a sense of space and movement when singing. Comments relating to feeling, sound, space and movement were counted and again, as in the interview data, were put into percentage ratios so that the different size of the diary narratives did not affect the balance of the analysis. Following the grounded theory approach the data were examined for common themes and were

not subject to an arbitrary analysis based on the outcomes of the previous data
found in Phase I.

Chart 3.5 showing percentage of responses in Diary One
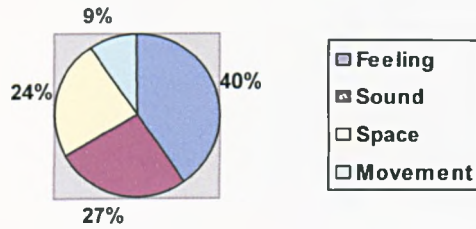
Chart 3.6 showing percentage of responses in Diary Two
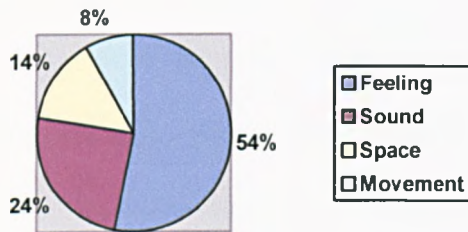
Chart 3.7 showing percentage of responses in Diary Three
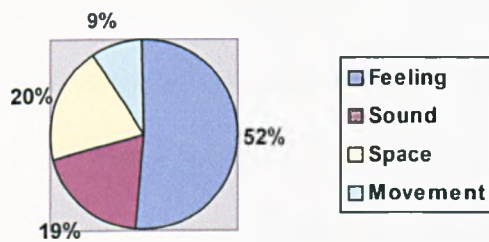
Chart 3.8 showing comparison between percentages of diary responses
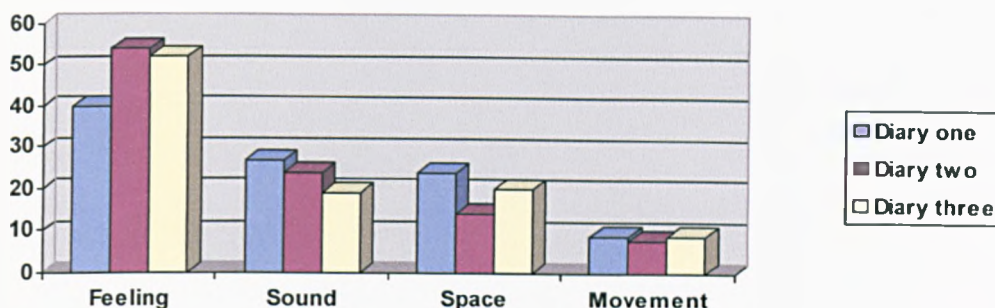
The patterns that emerged were remarkably similar though individual differences were also apparent. The two aspects that emerged from the professionals that had not emerged from the other studies in Phase I were space and movement. The professional singers seemed able to talk about the voice in these terms but when the Phase I interview data was re-examined this was not reflected in the majority of interviews with amateur singers. This may be due to the nature of the narrative discourse; diary studies take place over time and allow for more self-reflection. These aspects of singing that emerge most strongly will be explored in Phase II. Thus the grounded theory approach enables the research to move into areas of voice that were not anticipated at the beginning of the study. The exploratory nature of Phase I leads to more searching questions for Phase II and provides specific focus points for the subsequent analysis.

3.7 Summary of Phase I

Three distinctive patterns emerged from Phase I.

1. The semi-structured interviews in response to the request "Tell me about your singing?" produced a pattern for exploring vocal identity.

    a. Self-voice-reflection

    b. Self-voice-construction

    c. Self-voice-expression

These will be examined again with the data from Phase II when the themes of vocal identity are discussed in chapter 5.

2. The listening questionnaires produced word lists relating to the way *others* hear the singing voice. The metaphors that arose are a useful tool for examining vocal perception, both in singers themselves and in audiences. These will be referred to in chapter 7 with reference to the data collected in Phase II.

3. The themes which arose from the diary data of the professional singers were:

    a. Feeling

    b. Sound

    c. Space

    d. Movement.

These will be re-examined in chapter eight when aspects of space and movement and the difference between amateur and professional singers vocal perception will be discussed. The following chapter presents a more substantial literature review and refines the research questions in the light of the Phase I data, linking them to the various areas of enquiry in a multi-disciplined approach.

4. Literature Review

4.1 Introduction
  4.11 A developmental perspective
  4.12 Vocal identity
  4.13 Conclusions from the developmental perspective

4.2 Multi-disciplinary perspectives
  4.21 Cognitive neuroscience
  4.22 Auditory and acoustic science
  4.23 Physical science and vocology
  4.24 Kinaesthetic, visual and emotional perspectives
  4.25 Sociological studies
  4.26 Conclusions from the multi-disciplinary perspectives

4.3 A holistic approach to vocal timbre and perception
  4.31 Physical mechanisms of vocal quality
  4.32 Articulating a shared auditory experience
  4.33 Timbre and emotion
  4.34 Social aspects: intrinsic musicianship
  4.35 Social aspects: acquired musical skills
  4.36 Philosophical aspects of action perception

4.4 Summary

4. Literature Review

4.1 Introduction

This chapter while principally a literature review also includes some data because the discourse of singers grounds the literature in the real world domain. The separation of literature and data would be problematic in a study of this nature that seeks to root the research questions in the active and interactive world of singers who are performing regularly. While academic rigour is essential, the performing world of musicians has its own parameters and there is a danger that the literature can appear to have little to do with the reality of live performance. Once again the data are given in italics for ease of identification.

The chapter begins with a survey of the literature exploring a developmental perspective on vocal perception and vocal identity. It is important to maintain the holistic view of the singer; in Phase I and Phase II of the study there is a wide age range and the developmental perspective should not be ignored as age-related aspects of vocal development are not always clearly identified in the singing pedagogy literature (Monks, 1999). This brief developmental review assesses whether chronological age of the singer is an accurate indication of their level of vocal ability or their sense of vocal identity.

The different academic disciplines that are relevant to this study of vocal perception are reviewed as part of the multi-disciplinary approach of the thesis. A further review concludes the chapter with particular reference to the holistic approach to the perception of vocal timbre, its relationship with the

communication of emotion and the dynamic between intrinsic and learnt musical perceptions.

A grounded theory approach: using data linked to the literature review

Having adopted a grounded theory approach this chapter includes the data taken from an interview with Singer O that took place two years after the other Phase I interviews.

> ...a grounded theory analysis starts with the data and remains close to the data. (Charmaz, 1995: 28)

This singer felt unable to participate in the diary and recording parts of the Phase II investigation, but wanted to contribute his thoughts on discovering his own voice rather late in life (in his seventies).

> *I'm not troubled by the notion of going through chaotic processes and sort of making use of and finding there is an authentication of self at the end of these chaotic processes. I've been through them, I know them, I have sufficient faith in myself to understand the process of authentication...* [PISOi]

His comments have particular relevance to the research questions, though he was unaware of this in the interview; he speaks about having '*sufficient faith*' in himself and this suggests a secure sense of personal identity though he is searching for an identity as a singer. He spoke almost without interruption, but where he was given a prompt it is acknowledged in the quotations from the recorded interview. Singer O's experiences will be interwoven with the literature in the following discussion, as they illustrate ideas pertinent to the rest of the study.

4.11 A developmental perspective on vocal perception and vocal identity

The singers taking part in both Phase I and Phase II range from 11 years to 73 years of age. This study was not designed to be a longitudinal study, but given the spread of participant ages, it is worth giving a brief summary of current research ideas concerning life-transition in relation to the singing voice and exploring the possible implications of maturation on the singer's development. In chapter three, literature on self and identity were discussed with reference to the 'sense of self' in a singer. This has been described as vocal identity, though the term 'identity' is a problematic one.

> ...'identity' a concept favoured by philosophers... has drifted right across the semantic landscape to come to mean more or less its opposite. Someone's 'identity' in much contemporary writing is not their singularity as a unique person but the group, class or type to which they belong. (Harré, 1998: 6)

In music psychology, musical identity is sometimes taken to mean an individual's sense of music and self and sometimes alternatively seen as a collective description of a group identity as in adolescent musician studies (Macdonald *et al.*, 2002). Sharing a musical identity in a group situation is a valid area for research; the danger arises when this specific use of the word 'identity' is then used to describe an individual's sense of musical identity. In this study the emphasis is on the unique identity each singer feels links the voice to their personality. The singer identifies with the vocal sound he or she produces (or not, as in some cases), but there is little sense that vocal identity belongs to some larger group affiliation. Identity is used in very personal terms; occasionally it will be noted that a singer identifies with the sound or the

experience of another singer but in this study the individual rather than the social use of the term predominates.

4.12 Vocal identity related to four levels of physical age

The following levels are age related but singers are individuals whose vocal maturation will depend on many factors and circumstances. Though the headings are convenient, the transitory nature of these developmental levels of singers should be understood.

Early years

The work of Imberty (1996), Trevarthen (1999, 2002) and Trehub (2003) has highlighted the musical capabilities of the very young. White (1999, 2000) has examined more specifically the vocal qualities in children's speaking and singing voices and Campbell (1998) has demonstrated the imaginative meanings of children's songs. While the relationship between children's acquisition of speech and music is not yet fully understood (Saffran, 2003: 33), it is certainly true that the prosodic and rhythmic elements of speech are very close to singing. Even in the early years it would appear that the human brain is learning to reference aspects of timbre (Malloch *et al.*, 1997) and there is some evidence that children use emotional reference points when distinguishing changes of timbre (Lowther, 2004). If young children have a clear experience of the relationship between timbre and emotion, this suggests that the perception of timbre is a skill formed early on in musical development. An awareness of vocal timbre implies a discriminatory skill fundamental to the acquisition of vocal identity.

Adolescence

For some singers a sense of vocal identity is apparent before puberty (Monks, 2001). Young singers are keen to develop their voices although there has to be a balance between physical growth and vocal maturity. Combined with the development of mental capabilities to match newly acquired vocal skills, the interaction of these three aspects provides many challenges to both singer and teacher. Kroger (1996: 152) suggests that it is the individual's inability to satisfy itself, which drives development. Frustration seems to be an inherent part of adolescent vocal development (Monks, 2001: 95), however each new 'balance' brings a kind of recognition of how the world and the self have become more distinct and yet at the same time more related (Jaffe, 1998). This agrees with the findings of Chinn (1997: 647) who examined the vocal self-identification in the singing style of African-American adolescent females and found that some students resisted the teacher's attempts to make them sing in a tone quality that was at variance with their own culture.

Late adolescence is also the time for questions like 'Who am I?'; there is a sense of self-organisation, a sense of duty to the larger social order but also more awareness of self-ownership and authorship (Kroger, 1996: 177). Hence the importance of the quality of adolescent vocal experience as one defining factor in later singer experience. John Cooksey (1992, 1997, 1998) has been instrumental in suggesting the importance, for young males, of singing through the transition phase, as has Killian (1999). Several singers interviewed valued and highlighted the significance of their vocal experience while at school and the part it played in subsequent vocal experience.

We have talked much about the passaggio and I first came across this when I was in my prep school aged 8 or 9 and I was asked to sing something in a lesson I discover this <u>horrible</u> break in my voice around C and D and this stayed with me all through until my teacher started to teach me how to produce my voice in the proper way [PISOi]

There is a sixty-year gap between this well remembered experience and Singer O taking singing lessons for the first time in his seventies. This power of recall suggests that it was an emotive and significant incident: several other studies feature singers who have remembered, with strong emotional feelings, vocal episodes from childhood (Burland & Davidson, 2002).

Midlife

The middle years can be seen as a period of stability in which singers are sometimes less aware of their vocal sound once it has been established and 'settled down'. Some of the mid-life singers in both Phase I and Phase II seemed to be oblivious of any vocal changes that might be taking place.

We're often invited to do that [think about resonance] *but I can't say the thought lasts long* [PISCi]

This suggests stability in vocal identity but others experienced the vocal concerns that could possibly lie in the future; '*I was worried about getting older and the voice getting that tinny quality,*' [PISDi]

> While midlife style addresses the surfaces of identity, it begs the question of what lies beyond. The mature imagination must, in other words, maintain a convincing narrative of self in a continuous present and find a place for other more disturbing, aspects of the ageing self as well. (Biggs, 1999: 109)

Ageing can have disturbing effects on vocal identity and Hendry & Kloep (2002) discuss the importance of the midlife moratorium and the importance of leisure in relation to the success of the life course. The leisure activities they describe perform three different social functions; the solitary pursuit, the parallel leisure

where you meet people but carry on with your own activities, and the collaborative leisure where you perform with others, in team sports, choirs or similar group activities. It is interesting to note which choral and solo singers in the Phase I show signs of these patterns of behaviour.

> **The solitary pursuit:**

Most of the singers follow singing even in a choral situation as a solitary pursuit, which again implies a strong link with a personal identity. Singer B spoke of *'I've always wanted to do some singing, more for myself than anything else'*: Singer H wondered if he could find *'my own character, the character of my voice'* and he tended to sing in choir without being noticed, *'I'm pretty sure no one else can hear me'*. Singer K spoke of being *'not even aware of listening to the voices anymore, I'm not blending as a voice blending, I'm blending feelings.'* She goes on to say it is the blending of colours and emotion, not sound, that is important to her, as if she has divorced the timbre of the voice from her vocal identity as a singer in a choral situation. She is singing as a soloist within the choral sound.

> **The parallel leisure:**

Some singers seemed to adopt a more parallel approach to singing in a choir: *'I don't think of myself as a musician and if I stand next to someone and they sing something slightly different I immediately stop 'cos I think it's me that's wrong'* [PISDi]. Singer G is also aware of the singers around him and tends to be critical of his own sound and stops if he is going wrong. This also indicates a lack of

confidence in their own abilities; they are happy to be in the choir even if they do not always sing.

> **The collaborative leisure:**

Some of the singers spoke about the collaborative pleasures of singing in a choir: Singer C spoke of the *'meeting and chatting'* of people, as did Singer F, who said it was *'a social thing, because it's very supportive'*. These singers are joining in the group participation on a social level but this singer is engaged with the co-operative music making; *'you can really soar and you've got other voices and I particularly like singing against another part.'* [PISDi] The social implications for a singer's vocal personality of solo or choral performance are complex: the advantage of a multi-disciplinary approach allows these factors to be taken into consideration when viewing the singing voice.

> **The dangers of stagnation:**

While Hendry and Kloep (2002) point out that few totally new life skills are required in the mid-life phase they also point to the dangers of stagnation:

> ...there is a risk that in mid-life that the individual ceases to be alert to the possibilities and properties of change. Then if societal shifts do occur and become part of the social fabric, this will leave the individual 'suddenly' de-skilled, feeling a loss of security, and at risk of 'unhappy' stagnation because they have opted out of any future considerations of learning about, and adapting to, these innovations. (Hendry & Kloep, 2002: 111)

Some mid-life singers who were approached for this study, explained that they felt their voices were stable and well-established and thus were unable to contribute to the research. They were 'happy' with their sound and did not feel

any need to think about it. This was true of both choral and solo singers in Phase I.

Choral singers can enjoy being in a choir, losing their self identity within the crowd (Grotevant, 1992) and at the same time, experience high levels of anxiety as they prepare for performance (Beck *et al.*, 2000). If some members of the choir are experiencing levels of anxiety, this suggests that not all singers in a choir will be in a state of 'stagnation'; some may be extending their skills, keen to improve and wanting to give their best for a performance; others may be sitting at the back not getting too involved. Solo singers can also feel a sense of stagnation when they are performing in the same show night after night, or they may be preparing different recitals or roles which are providing a challenge. Even with a very repetitive schedule however, a singer can adopt a pro-active approach, seeking to improve and adapt their skills. While this mid-life phase provides more likelihood of stagnation through the settled regime that often accompanies middle age the next phase provides more challenges for the singer as physical ability and cultural expectations begin to affect the singer's sense of identity.

Maturity

The need to understand that the 'problems' of old age are not necessarily age-related is crucial (Carp, 1969). In discussing the 'mature imagination', Biggs (1999: 168) comes to the following conclusions; that there has been a movement away from specified age-stages towards continual transitions and that the structuring of the mature imagination varies over personal and historical time.

While the ages of the participants in this study were coded for analytical purposes (Table 3.1) the results appeared to confirm that specifying age stages produces no obvious patterns for discussion in terms of vocal identity; singers develop at different rates and start training at different points in time.

Elements of self-perception surface in this phase as they do in adolescence. The impact of physical ageing and also society's attitude can lead to the discrimination of 'ageism'; it is important to stress that mature identity is neither a reworking of a previous phase of life nor an invention. Bond (1993) discusses the centrality of self-perceptions to the quality of life in old age.

> Central to the analysis of subjective experience are individuals' perceptions and feelings about their own self and their place in relationship to others. Self-perception is in a very real sense fundamental because so many perceptions relate directly or indirectly to the self, from the woman who interprets her daughter's visits as a judgement on her own value, to the contribution of health and vigour to a person's self-concept, even the position of being old in a society where crimes appear to be increasingly perpetuated on older people.
> (Bond *et al.*, 1993: 126)

It is worth pointing out that old age is in the eye of the beholder: a group of school children in Norway regarded a person as old from 30 –90 years (Hendry & Kloep, 2002: 129). There are no clear maturational markers as there are in puberty, and the current de-standardisation of the life course has made this even more difficult to define. Some singers start to sing at an early age, others are 'beginners' in later life, and there are examples of this in the Phase I data examined in the initial interviews in chapter three.

There are distinctions to be made between hidden and apparent identities and Biggs' notion of the layering of self-experience with a 'masquerade' negotiation between depth and surface elements (Biggs, 1999) is a useful model for exploring vocal identity. The notion of 'masquerade' is an interesting one, as there are examples on the operatic stage of singers wishing to be seen as having eternal youth both in the plot (Janáček's *The Makropulos Affair*) and in the singers themselves (Hines, 1992).

Layers of self identity

Biggs also suggests a model for the mature imagination that features layering of the psyche which allows for 'harmony between deeper, personal layers of psyche' and external socially acceptable possibilities of self-expression; and also a protective space within the psyche where new elements of self-expression can be explored (Biggs, 1999: 169). This allows for a safe place for experimentation while achieving a balance between personal expression and the social and physical limitations of ageing. However this notion of layering may be relevant to all ages, not just to those of mature years and the idea of layers of meaning, when studying experience in general, encourages the search for deeper understanding (White, 2001).

4.13 Conclusions from the developmental perspective of vocal identity and perception

While 'vocal identity' and life-transition are rather unwieldy as models for investigating vocal timbre, the developmental literature reviewed offers some useful insights into the relationship between perceptions of vocal timbre and

identity as explored in chapter three. Singers can begin their 'singing' life at any age and making assumptions based on chronological age are problematic.

> *I'd like to go back to my very first lesson, I've been singing with various choirs for many, many years, I must reveal the fact that I am 73 years and I've been singing since the age of 8 and most of my singing years have been frighteningly frustrating because I knew there was something about my voice however much I tried to produce my voice correctly there was something about it that was limiting a happy free range of expression with it. In one of the choirs I sang I was often asked to sing solo and this was always a terrifying process because I never knew whether my voice was going to let me down or not.* [PISOi]

Here is a singer who illustrates that the vocal journey can begin at any age. While it is useful to view vocal development from a chronological perspective, this example illustrates the need for teachers to work with a singer from the point at which they are ready to sing. This singer has spent over 50 years feeling frustrated that his voice is not sufficient for the level of expression he was trying to achieve. His concern that he did not want his voice to let him down highlights the strong sense of identity with a voice that has, for so long, been unable to respond the way he wished. His age is irrelevant except that his physical abilities will need to adapt to his mental vocal image and vice versa. The instrument will have aged but the musculature will respond, in time, with sensitive exercise.

A developmental model is problematic when examining vocal identity, as the temptation to conform to chronological stages can be counterproductive. The idea of levels of vocal identity allows for the different starting points of singers through tuition and vocal development. The taxonomy (Table 2.2) allows for this perspective rather than a purely chronological one. Thus the first three research questions can apply to singers of any age:

How do singers *think* about their voice?

How do singers *hear* their voice?

How do singers *feel* their voice?

Having explored the literature from a developmental perspective it is important to review the different disciplines that contribute to understanding vocal perception.

4.2 Multi-disciplinary perspectives

The multi-dimensional aspects of singing clearly emerged from the examination of singers' sense of vocal identity in chapter 3. Reflecting, constructing, expressing with the singing voice link into the academic disciplines outlined below and while this thesis is primarily a psychological study of the singing voice these approaches help to focus the literature review in different domains.

- Cognitive neuroscience: reflection on the voice: **how do singers think about their voice?**
- Auditory and acoustic science: reflection on the sound of the voice: **how do singers hear their voice?**
- Physical science and vocology: constructing the voice: **how do singers feel their voice?**
- Kinaesthetic, visual and emotional perspectives: constructing and expressing the voice: **how do singers feel their voice?**
- Sociological studies: **how do others hear the singing voice?**

This discussion outlines these five different approaches to studying vocal perception, and aims to integrate them to generate a holistic understanding, suitable for investigation of vocal perception in a 'real world' context. Each academic discipline has its own parameters and terminology, and these differences need to be clearly understood in interpreting the diverse perspectives on singer experience.

4.21 Cognitive neuroscience

Perceptual studies with a cognitive and neurological basis emphasize the possible types of 'coding' involved in perception and the areas in the brain where these may take place. Looking at the neurological aspects of perception, it would seem that speech is decoded by perceptual apparatus related to the peculiar acoustical composition of speech sounds, particularly their rapid temporal transitions (Marin & Perry, 1999). Recent findings seem to suggest that there might be a different area of the brain that singers use for word recognition and production (Peretz *et al.*, 2004, Brown *et al.*, 2004). These findings are ground breaking but still tentative and the researchers are uncertain as to their significance. Some of the work will be of value to singers but the outcomes are very much at the exploratory stage.

Some singers think a great deal about the voice and find this approach very beneficial to their vocal development, other singers seem to be less intellectual in their approach. Ristad (1982) celebrates the non-cognitive or 'impulsive' (Seashore, 1938: 172), approach to performing: she suggests all sorts of 'right brain' ideas, even turning the music vertically so that singers do not read the music in a conventional way. This approach has its roots in Kinesiology (Hannaford, 1995); the ideas of brain-gym and non-cognitive pathways to learning are being explored in the realms of general, as well as music education. Perhaps singers use more techniques that cross the right and left hemispheres of the brain because of the dual nature of the singing communication; words and music. This singer certainly feels an almost intuitive experience though at the same time he thinks a great deal about his voice.

I became convinced very early on that a lot of what [my teacher] was telling me...because of these paradoxical utterances... that they were just the sort of utterances that resonate at a very, almost inaccessible level but they make contact and so this a process of very deep education and something I intuitively absorbed which now provides me with a much greater confidence than I ever had before in use of the voice and interpretation of language. [PISOi]

Pantev *et al.* (2003) examined the neuroplastic alterations that take place in the auditory and somatosensory representational cortex of musicians and found that the brain seems particularly sensitive to musical tones as the same effects were not found when pure sinusoidal tones were used as stimuli. They also found that in pianists, plastic changes were specific to the fingers frequently used and stimulated; a parallel in singers could be the particular co-ordination of breath and laryngeal mechanisms. Their findings suggest that it is active music making that influences functional cortical organisation.

Musical education and training is reflected in the organisation of auditory and somatosensory representational cortex in musicians. (Pantev *et al.*, 2003: 393)

While Drake & Bertrand (2003) advocate the position that some temporal processes may be universal because of the limitations on memory space and processing time in the perceptual system, no one has as yet identified any possible universals in timbre processing. Liégeois-Chauvel *et al.* (2003) looked at the way the different brain hemispheres responded to auditory information and discovered that neurons in the right auditory cortex were more sharply tuned to frequency than neurons in the homologous region of the left hemisphere and that left auditory neurons were specifically sensitive to the temporal features of auditory information (Liégeois-Chauvel *et al.*, 2003: 163). This suggests that some hemisphere-specific functions are identifiable.

Griffiths (2003) considers whether the neural processing of complex sounds could be hierarchical but as yet this area has had little substantial evidence. The current trend of cognitive neuroscience in music is directed to more specific examination of the relationship between auditory and cognitive levels of processing.

4.22 Auditory and acoustic science

Perceptual studies with an acoustic and auditory basis emphasize the analysis of the sound itself and the way the ear/brain makes sense of the sound patterns on a temporal plane. Aspects of temporal perception influence the hearing of timbre; the timbre of a sound is not just dependent on pitch but also on *time-varying* signals. The complex pattern of timbre depends on changing relations among the frequencies, amplitudes and phases of the partials; the idiosyncratic musical character of a voice arises from its complex time-varying signal (McAdams *et al.*, 1993). Looking at the complexities of auditory analysis, particularly non-verbal responses, suggests that musicians have the ability to perceive continuous elements at the same time as discrete differences. This ability would appear to be fundamental to perceiving vocal timbre, and this study seeks to explore this further.

Looking at the data from Phase I, some distinctive patterns emerge in the auditory response of singers. There are a considerable number of references to hearing the sound, but often the hearing is described as a kinaesthetic sensation rather than a reference to the auditory acoustic experience of vocal timbre. The sound is sensed in spatial terms and even pitch takes on a kinaesthetic

perspective. Singers do not hear their voice in the same way as the audience receive the sound and yet singers perceive the experience as a sound they have 'heard'.

> *It was this hearing the voice I suppose which made me feel that I was not doing the right thing in staying with this choir because I never...whenever we started a new piece - I always knew what sound it was going to be, what intrigues me is the way different sounds are possible and if you are really on the edge of risk all the time, you can subtly manipulate these sounds.* [PISOi]

Singers talk about hearing their voice but the internal experience of 'hearing' is transmitted and filtered through the body and is felt as well as heard. Auditory and acoustic literature will also be reviewed in subsequent chapters relating to the data findings on internal and external mismatch of vocal perception in chapters six, seven and eight.

4.23 Physical science and vocology

Vocology studies look at the workings of the larynx and the parts of the instrument that can be measured. Perceptual approaches with an emphasis on the physical structures of the voice form a part of this discipline. There have been important developments in voice science from the early writings in the field (Husler & Rodd-Marling, 1965; Hewlett, 1970). More recently there have been movements advocating more awareness in singers about the accuracy of their 'body-mapping'; the ability to be aware of the functions and activities of the muscles when singing (Conable, 1998). The well defined focus of vocology, 'the science and practice of vocal habilitation and treatment of voice disorders' (Titze, 1994: xxiii) has led to the tendency to view the voice from a medical perspective.

However, feeling the voice suggests not only the bodily feelings involved in producing a sound but also the emotional feelings involved in singing. To study the many layers of this question uses all the psychological perspectives available and further clarification is needed in order to gain a deeper understanding of the singing experience.

4.24 Kinaesthetic, visual and emotional perspectives

Singer O speaks of the experiences of learning to find his voice, he uses the word 'extraordinary' several times in the course of the interview, he also refers to a sense of 'lift off' or what Csikszentmihalyi (1990) would call 'flow':

> *This brings me to the extraordinary feeling... when you achieve lift-off you know what I mean, when something happens, you are no longer grounded, you are beginning to create something when all senses of the expected disappear and it all becomes pure, pure experience of something that could never ever have been planned, its more than just the notes on the page...* [PISOi]

When talking about the revelatory nature of learning to use his voice and discover new sounds he even uses the word 'resonate' and there are parallels in the diary notes of many of the singers, with this sense of the sound resonating, ringing around the body and the mind. Damasio (2000) and Pert (1998) would support the close relationship between the mind and body experiences in singing. As the voice is part of the body but also the expression of the mind this dynamic interaction is part of the vocal phenomena. If singing is to be studied holistically then psychological matters need to be addressed.

Perceptual studies from a psychological perspective emphasize the different experiences of the phenomena and the different levels of meaning in the language employed to describe them. Mitchell *et al.* (2003) highlighted the

problems associated with exploring the mind of the listener, pointing out that language in singing pedagogy is destined to remain subjective. Their research looked particularly at the 18 terms used by 15 participants when defining 'open throat'. They concluded that more integration was needed between voice research and singing pedagogy to clarify the meanings of terms used. Language, though used subjectively, can still be used to demonstrate aspects of perception; the personal nature of the narrative illuminates the different personal perceptions taking place. For example, this singer describes the perceptual strategies offered by his teacher to achieve the appropriate vocal sound:

> *for almost the whole of the first year [my teacher] was trying to make me produce my voice in the right way and she did this by the most extraordinary methods where I felt I was in a sea of opposites all the time, for example, if you are trying to singing in a higher register think low in order to maintain an open tube.* [PISOi]

The 'enactive' model favoured by Noë (2004), seems to suit the characteristics of vocal perception, as the singer is actively engaged in the process and making subtle accommodations to the sound as a result of the perceptual input. Vocal perception is an embodied action that does not take place purely in the brain. This is a challenge to the cognitive neuroscience approach that sometimes disregards the role of the body in perceptual actions and the vocology approach that can ignore the psychological input. However, the psychological viewpoint on its own is not sufficient; singing has a sociological dimension because it is inherently a process of communication.

4.25 Sociological studies

Perceptual studies include a sociological dimension and this needs to be taken into account when looking at the overall picture of vocal perception, particularly in performance situations, between the singer and the listener. DeNora (2003) discusses the different types of listener as identified by Adorno in the middle of the 20th century.

Types of listeners

Adorno (1976, cited in De Nora, 2003: 85) describes the following 'types' of musical conduct:

1) **The expert** – a fully conscious listener
2) **The good listener** – not necessarily fully aware of musical form but understands music beyond the cultural fashions of the time
3) **The culture consumer** – well-informed but a product of cultural tastes
4) **The emotional listener** – easily moved to tears, often using the music as a vessel for their own feelings
5) **The resentment listener** – who is the opposite of the emotional listener, who disallows any sense of emotional involvement
6) **The jazz listener** – who is equally unromantic in his conception of music as the resentment listener
7) **The entertainment listener** – the type the music industry targets
8) **The musically indifferent, the unmusical and the anti-musical listener** – who Adorno suggests has been put off music in early childhood.

There is a hierarchy implied in the list but it is a fascinating perspective from which to examine auditory response. Adorno's list is from the perspective of an audience, i.e. non-performing listeners, however performers and singers have the added complication of hearing the sound inside the body as well as perceiving a sung sound through the ear. The work of Adorno and De Nora has relevance, however, as critical responses to singers' voices have to be seen in the context in which they are given. An examiner will respond differently to a peer, an

adjudicator to an audience member and it is important to recognise that singers and audience do not share identical aural skills.

Social implications in the reactions from others to a singer are complex; they involve more than one level of response. Untangling these reactions is not the main focus of this study but it is worth being aware that singers exist in the social situation. Borrowing an idea from Ricks (2002) the singer can be seen as 'heir', influenced by the singers of the past, as well as being a creator of their own sound. The singer can be faced with many vocal models and the attraction to adopt another vocal identity other than one's own is very real, particularly for inexperienced singers.

Singers have diverse musicianship skills and different abilities to discern nuances of timbre and vocal quality in vowels and consonants. These are often as a result of individual life experiences. The ethnological studies of Cross (2003) and Huron (2003) would suggest that musical perception is an evolutionary skill which has developed in response to cultural and social practice.

> The roots of music, and language are the same, in the form of pre-musical and pre-linguistic communicative and expressive auditory gestures involving shapes of duration, stress, contour, timbre, and grouping. We still communicate with infants and higher mammals in this manner. These elementary shapes appear to lie at the basis of expressive utterance in language and musical expression. (Lerdahl, 2003: 427)

Different cultural practices, the way singing and music are used in healing and spiritual explorations around the world are often in contrast to the conventional Western European attitude to singing (Hamel, 1978).

Historical perspectives

While there are studies of musicians in social settings in musical performance, for example, there appears to be little empirical research from a historical point of view. This is perhaps understandable given the difficulties one would encounter getting data but the historical factor must be considered in any study involved with aspects of musical performance. Even over the last 50 years subtle differences have taken place in performance practice. The sound of singing has changed in subtle ways and if recordings of the 1920's were compared with ones from 1950 and 2000, it would be obvious to a listener even when any acknowledged differences in recording quality have been taken into account (Redway, 2005).

Feminist perspectives

Gender is an obvious factor in singing; books have been written specifically about the differing vocal experiences of male and female voices (Miller, 2000). The research into the English choral tradition research (Howard *et al.*, 2000) also indicates the importance of differing cultural and historic expectations of male and female singers in cathedral music.

The arguments of feminist academics have highlighted the cultural influences on female and male singers and their identities (Dunn & Jones, 1994; Whiteley, 2000; Oddey, 1999). This has not only introduced new perspectives on women in music but has also brought about a reappraisal of all cultural influences on music making.

> Women's involvement in domestic music making in the 18th century
> ...congruent with private rather than public spheres, association of

women with nature and the body has made singing a more acceptable activity than some other instruments more associated with technology. (Dibben, 2002: 121)

Singing has been seen as a suitable occupation for women but in the world of rock music it has been unusual to see female singers perform certain genres such as heavy metal. The role of culture and gender in influencing singing and music needs to be constantly re-appraised. Many singers will have auditory role models though some will be more creative and exploratory.

Different stylistic perspectives

Performers who are significantly involved in particular styles of music, such as jazz, folk, opera, gospel, etc., will have an auditory memory of previous exponents of that genre. Rock singers cannot fail to be influenced by former stars; they will have grown up with the sound of their favourite 'idols' and this applies to singers as well as other instrumentalists (Martin, 2002). Similarly opera singers developing a role will have heard their peers singing the role while they were part of the chorus, and they will have the sound of famous recordings somewhere in their auditory memory. Lieder singers too have a legacy of recordings to draw on for comparison. This suggests that listening to timbre in voices involves aspects of a cultural and stylistic legacy, as illustrated in this example.

If a European listener considers the voice of an Indian singer forced and nasal, he seldom takes into consideration that to an Indian listener the European style of singing can seem 'unnatural'. (Blaukopf, 1982: 265)

Recent publications by the Associated Board of the Royal Schools of Music of performer's guides to music of the Baroque, Classical and Romantic periods (Burton, 2002) have included essays on different singing styles, illustrative of an

increased awareness in cultural and historical performance practice. There are obvious musical considerations, the amount of ornamentation etc., however, possible changes in timbre are often overlooked.

Timbre and its cultural implications

Although the idea that the 'concept of timbre' is the result of cultural conditioning has been discussed before (Miller, 1986: 205), there have been few studies that have really examined it in detail, especially in relationship with the singer's vocal perception and the role of diction. *The Grain of the Voice* (Barthes, 1977) is the most significant essay on this subject and while it is often quoted, little empirical research has followed up the identification by Barthes of cultural expectations on vocal timbre.

> Such a culture, defined by the growth of the number of listeners and the disappearance of practitioners (no more amateurs), wants art, wants...what in music *can be said*...by the Institution. (Barthes, 1977: 185)

Barthes, in comparing two very different singing styles, lieder and a popular singing style, highlights the perception of timbre in very specific terms, analysing the sound of consonants and vowels of the singers. He argues that the grain of the voice is not timbre alone and he is one of few writers prepared to analyse vocal qualities, though he does so from a philosopher's perspective. Some understanding of the philosophical roots of various academic arguments is helpful.

4.26 Conclusions from the multi-disciplinary perspectives on vocal identity and perception

The cognitive neuroscience approach examines the brain's response to the perception of sound as it happens, the physical and vocology approach examines the workings of the larynx while sound is being made, the auditory and acoustic approach examines sound as it unfolds but only in fractions of its movement and the sociological approach studies sound as part of the cultural and musical environment. The psychological approach, in particular, the kinaesthetic and emotional perception of sound, often includes aspects of other disciplines hence, psycho-motor, psycho-acoustic etc. The huge complexity of these different approaches to perception will be apparent as the study progresses; studying sound from the psychological perspective of the singer requires an understanding of all these approaches with an interaction of physical and mental perceptions of infinite number and subtlety. Seashore (1938: 172) classified musicians as 'the sensuous, the intellectual, the sentimental, the impulsive and the motor.' Such classifications are not so far removed from the areas explored within the data.

4.3 A holistic approach to vocal timbre and perception

The data collected in Phase I revealed the holistic nature of singing and the need to approach a literature review which explores references to the physical generation of sung sound and the way ideas of this acoustic experience are shared and articulated in an holistic way. This approach to singing, to vocal timbre in particular, is problematic as different perceptual voice profiles can often label timbre in contrasting ways. This section will explore the relationship

between vocal timbre and emotion as revealed in the perception of the sung sound and the implications of innate musical skills and the learned, cultural musical skills to the perceptual process.

4.31 Physical mechanisms of vocal quality

With reference to the singing voice, there are three important areas that affect the quality or timbre; the action of the larynx, the energy from the flow of air in breathing and the shaping of the vocal tract which communicates through language. In the larynx the muscle contraction energy takes place in two spheres of activity; the closer-opener muscles (lateral crico-arytenoid: inter-arytenoid: posterior crico-arytenoid: LCA: IA: PCA); and the shortener-lengthener muscles (thryoarytenoid: crycothyroid: TA: CT).

All these facets of physical properties vary from singer to singer but there are certain vocal qualities that are associated with patterns of co-ordination. The findings of Thurman *et al.* (2000) are summarised in the table below:

Table 4.1 showing the different vocal qualities that can occur within the singing voice

DESCRIPTION OF PHYSICAL PROPERTIES	OTHER FACTORS	DESCRIPTION OF VOCAL QUALITIES
Incomplete Vocal Fold Closure	Breath flow Closer/opener Muscles	Breathy
Optimal Vocal Fold Closure	Breath flow Closer/opener Muscles	Clear and rich
Intense Hard Vocal Fold Closure	Breath flow Closer/opener Muscles	Pressed and edgy
Shortener muscles	Breath flow	Vocal fry/pulsated quality Lowest pitch range
More shortener then lengthener	Breath flow	Thicker more full bodied Lower range of pitch
More lengthener than shortener	Breath flow	Thinner, lighter Higher range of pitch
Lengthener muscles	Breath flow	Thinnest, lightest Highest pitch range
Generally Increased Vocal Tract Dimensions		Over dark, throaty, sob like, woofy, bottled -up
Optimum Dimensions range		Balanced Resonance 'Darker, fuller' becoming 'Brighter, brilliant'
Generally Decreased Dimensions		Over bright, narrow, squeezed, pinched

Thurman also identifies 'style-specific' qualities, such as speech quality, twang, opera quality and belt quality ((Thurman *et al.*, 2000: 520) and these confirm the cultural and social influences on timbre, discussed briefly under the literature from sociological studies of the previous section (4.25).

Breath and air-flow

The properties of breath flow to larynx and vocal tract are crucial in creating

vocal timbre. Air pressure above and below the vibrating vocal folds produces

different vocal qualities (Sundberg, 1987) The shaping of the vocal tract allows

for the formations of vowels and consonants which form part of communication

but the timbre of sound is also produced by subtle movements in the pharyngeal

space (Titze *et al.*, 2003, Toivanen *et al.*, 2006). The understanding of these

acoustic experiences is influenced by auditory memories and also by physical

condition (Knook *et al.*, 1999). Thurman suggests that singers and listeners

perceive the pitch and volume of the voice, but the diversity of life experience

produces its own unique vocal qualities; singers conform to the pitch and stylistic

expectations of the cultural heritage. However the singer and listener are unaware

of the discrete pitches of overtone frequencies.

> They do not cross the bodymind's threshold of conscious auditory
> awareness. Entire spectral envelopes are processed, however, in the
> human auditory system. They generate a conscious perception of sound
> quality or timbre. (Thurman *et al.*, 2000: 410)

McAdams's review of studies into identification of timbre in musical instruments

suggests that the attack portion of a sound event, as well as the patterns of change

in the sustain portion that signal the nature of the spectral envelope, are the most

important in perception of timbre (McAdams, 1993: 174). This could correspond

with the 'coup de glotte' of Italian bel canto traditions though not everyone

advocates the use of this technique (Herbert-Caesuri, 1996: 267). Individuals are

conscious of part of their own auditory awareness and assume that others can

'hear' the same sound.[1]

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[1] Singing teaching should involve sharing the students in an understanding of conscious auditory
experience but teachers must also be aware of the unconscious auditory processes at work.

4.32 Articulating a shared auditory experience

The problems of documenting and labelling voice qualities are usefully summarised by Thurman *et al.* (2000: 516), see Table 4.2. They suggest words are borrowed from descriptions of other phenomena and that this adds to the confusion when discussing timbre. While admitting that these problems may never be resolved they also point to advances in voice science where voice qualities are matched with science based terminologies. The breath-flow to larynx and vocal tract acoustic influences, are two of the crucial areas of creating voice timbre that have already been identified above.

Table 4.2 showing the metaphors used in describing vocal qualities taken from Thurman *et al.* (2000)

BORROWED METAPHOR	EXAMPLES OF WORDS
Colour or Light and its Absence	Bright or brighter, brilliant, shaded, colourless, luminous, lustrous, dark or darker
Density or Pressure Variation	Firm, solid, clear, thin, thick, transparent, diffuse, airy, flowing, pressed, tense, hard
Spatial Dimensions	Shallow, narrow, squeezed, pinched, open, deep, expansive, full
Object Shape and Texture and Object Intrusion	Sharp, edgy, dull, pointed, smooth, round, rough, coarse, grating, piercing, penetrating
Temperature	Warm, cool, tepid, mellow
Growth and Maturation	Young, mature, ripe
Taste	Sweet, luscious, full bodied, rich,
Weight	Light, heavy
Comparison of Voice Qualities and Musical Instrument Qualities	Reedy, flutey, brassy

The other words that tend to be used to describe voices are onomatopoeic and have evolved and established themselves as they sound like the qualities they

describe e.g. buzzy, raspy, whiney etc. In chapter three over two hundred and fifty words were analysed from the Phase I data showing that these theoretical perspectives are readily confirmed in practice. Chapters seven and eight will explore in more detail the relationship between the descriptions of sounds and implicit perceptual processes. The links between voice quality and emotion complicate the analysis even further but the association is an important one, as revealed in the self-voice-expression aspect of vocal identity found in Phase I. The literature examined so far has touched on the emotional aspects of singing in general but the link with timbre needs further investigation..

4.33 Timbre and emotion

When Singer O was asked, 'What would you say about hearing the voice?' he spoke about the strong musical experiences he had had. Strong Emotional Musical (SEM) experiences are currently under investigation (Gabrielsson & Lindstrom, 2003) using the discourse of a large number of participants. In the experience of singer O, he could recall vividly three occasions where this intensity of feeling was apparent and related to the singing involved.

> *I have always loved and been terrified by what I call high-risk singing where every voice counts in a small choir and the very first time I felt an individual voice within was in the B minor Mass I found it intensely moving...*
> *The other time I found it actually was I have three possibly four, real huge musical landmarks in my life one was when I was in the stage chorus of RVW Pilgrim's Progress in Cambridge...it was a huge emotional tour de force absolutely extraordinary the second was when I sang with Nadia Boulanger conducting with Menuhin in the orchestra Fauré's Requiem.* [PISOi]

He even speaks of being 'brainwashed' as part of this strong musical experience.

It is worth noting that it was the discovery of a new world of sounds that were

available for him to sing, that started him having singing lessons though he was

initially very afraid to take the first step.

> *I was really very dispirited indeed because I thought to have lessons*
> *would be extremely nerve wracking and upsetting and distressing and I*
> *would feel so embarrassed at my attempts at singing.* [PISOi]

Singing seems to involve huge emotional resources, either to perform or to take

one-to-one tuition. The strength of feeling about the voice revealed in the

discourse of the majority of the singers taking part in this study suggests a link

between vocalising and expressing emotions.

When Persson (2001) looked into the subjective world of the performer and the

phenomenology of emotion in musical performance, he included aspects of

motivation and generation as well as the conceptualising and constructing of

'musical meaning'. In the area of music psychology, more measurable, cognitive

aspects of musical performance have sidelined researching 'emotion' because of

the difficulties involved. Though new interest in the subject of music and

emotion is taking place (Juslin & Sloboda, 2001), the relationship between the

two experiences was identified by Seashore (1938). Seashore was also one of the

first to compare the different timbres of singers using spectrograms but again

only recently has this been fully explored (Howard *et al., 2004)*.

Though the relationship between music and emotion is complex and difficult to

untangle, singers and speakers often betray emotional feeling through the timbre

of the voice, consciously and unconsciously. There is a growing awareness of the

"core" expressivity embedded in human vocalisation by musicians who are not

necessarily singers. Both Tomes (2004) and Rosen (2002) speak about making

the piano 'sing'. There is some exploratory research with instrumentalists in this area (Juslin, 2001), however there is little in voice research that follows this exploration of expressivity. It tends to be seen as a peripheral aspect of singing to voice scientists, and yet an integral part of the singer's 'art' for performers and practitioners (Miller, 1996, Hemsley, 1998). Hence the value of including as many perspectives as possible when researching the singing voice.

Studies into perceptions of vocal qualities in the current research field of vocology need to make the experiments as valid as possible and often the sounds are created synthetically with listeners being asked to make decisions based on specific criteria. Titze *et al.* (2003) conducted a study into the perceptions of twang and yawn using synthetically produced vowel sounds, but listeners were not asked to rate the naturalness of the sound. This work extends understanding but it has to continue alongside 'real world' research into the singing experience; even if qualitative data cannot replicate the 'objective' rigour of the voice scientists, it provides the singers with an opportunity to give their perspective, and adds to knowledge with a holistic view.

Much of the research is speech based (Zellner Keller, 2005). There are important differences as well as similarities, between speech and singing: the fundamental difference being a musical dimension, although the prosodic elements of speech have pitch, rhythm and dynamics. Equally we can distinguish between pure vocalising and communicating real words and feelings; where the difference is a cognitive and linguistic dimension.

> If you listen to singers vocalising, as they are asked to do in some instrumental works, using no words at all, the effect (though it can be lovely) is quite different from that of a song or other sung text. And this is

true, I maintain, even when we do not understand the words we are listening to. Genuine language, even when we do not know what it means, sounds different from cod language, real words from nonsense words. (Fenton, 2002: 117)

A third situation can also arise, where music and words are combined but feeling is not communicated. Song, opera, music theatre are all music but with the added dimension of word, lyric, libretto, book, text. Each expression requires a performer to communicate with an audience; Wade (1997) discussing the actor's voice has this observation to make.

> Precision of word is what fascinates me and represents the real challenge for actors. It is the journey between finding the articulatory truth of someone else's shaped thought in a carefully worded line and finding the reference point to a truth of our own. There is a definition of self when you actually achieve this. (Wade, 1997: 138)

The artistic observer points to the strong relationship between voice and self that is often overlooked by the scientific community; the empirical studies in Phase II should help to investigate this further. Notions of vocal timbre, both from the singer and listener's perspective, are more suited to qualitative analysis within a dynamic multi-dimensional approach; though it is worth noting that speech scientists have also observed the lack of research in this area.

> To our knowledge, no study has systematically explored the relationship between prosodic parameters and stable psychological attributes. (Zellner Keller, 2005:73)

The tendency to observe what is easily observable means that all too often the studies of the voice deal with a tiny fraction of the whole vocal phenomenon.

> As listeners, we have no problem in mirroring the voice from the acoustic wave form. In terms of our laboratory analysis capabilities, no analysis technique or computer program comes anywhere close to behaving like a listener, and we can only mirror quite small slices of reality of the voice by these means. Progress in the future may well arise from making use the ever-increasing knowledge of human perception processes in our acoustic waveform analyses; nature sets the best example. (Howard, 2005: 112)

The work of Sundberg (1987) and Titze (1994) has made it clear that the singer, during phonation, experiences the sound on many levels. The sung sound is filtered in different ways as the vibrations move around the outer acoustic space of the performing space, a room or theatre; and the muscle/nerve sensations of the internal acoustic space, head resonance and bone conduction. Layers of meaning, emotion, communication and imagination are essential areas of study when researching the singing voice. When singers talk about the way they 'feel' the voice, the physical and emotional aspects of perception are implied.

> No intelligent singer can conceive of a phrase independent of the literary concept that accompanies it. (Miller, 1986: 204)

> Words that act as symbols cannot be intelligently sung without mental imagery. (Miller, 1986: 204)

The contribution of this study is in the investigation of layers of perception in singing, with the aim of clarifying any identifiable patterns that can be used as a basis for future research, by exploring the psychological responses to vocal sound within the singer as they perform, as they listen and perceive the sensations. The way the body and the brain transmits, receives, analyses and conceptualises sound is reflected in the articulation of singers' discourse. The narrative data complements existing studies (Batty *et al.*, 2002: Titze *et al.,* 2003) where vocal sound is analysed using spectrographic analysis, but the emphasis here is on the real world of performing singers, not the laboratory.

Work in the laboratory and with new technology has discovered new pathways and perspectives on vocal analysis, for example voice activated computers have led to the investigation of sound synthesis. This recent technology can help singers to understand more about the acoustic processes taking place. Scientists

have tried to define what is the unique sound of a singer but acknowledge the great difficulties of doing so even with a complex analysis/synthesis system (Kim, 2003). There are a huge number of terms employed in voice studios and suggestions for standardisation offered by Nair (1999) involve the testing of auditory perceptions with visual spectra by the use of CDRoms in the teaching situation. Many teachers, however, have to use words and gestures to teach and have no facilities to explore the benefits of new technology.

Perceptual experiments based on synthetic sound can illustrate the similarities between unnatural and natural spectra and the ear's ability to detect the difference (Sundberg, 1999). Sundberg has done the principal amount of research in this area and he points out that there is little else besides, although considerable developments in the understanding of vocal mechanisms have occurred since 1999, with the aid of new technology and computer imaging. Recent research suggests links between disciplines enhance knowledge and understanding and reviews of the complex central nervous system's control of the laryngeal muscles (Ludlow, 2005) will be examined in more depth in chapter six.

The case for examining the voice in a real world context with its inevitable sociological implication has already been made (4.25); cultural expectations of the present and also the historic perspective are implicit in any discussion concerned with vocal skills. The following two sections highlight the evidence for both intrinsic and acquired musical skills and the relevance these have to the research questions.

4.34 Social aspects of vocal communication: intrinsic musicianship

The absence of musical expression in communication becomes very obvious in a dull performance.

> The subtleties of expression-the surface details-are closer to the feeling for the colour of words, and to the expression in the face and the eyes. An inexpressive face and inexpressive eyes result in singing lacking subtlety and refinement of expression. How many singers or would-be singers, have I met whose faces and whose eyes are full of vitality and expression while in normal conversation but lose all that vitality the moment they start to vocalise. (Hemsley, 1998: 78)

The relationship between communicating emotion and singing emotion are complex and often the singer can be unaware of the mismatch between their inner desire to communicate and what is apparent to the listener. The different responses that are evoked in an audience are highlighted in the Phase I questionnaires (see chapter three) and the listening study in Phase II. The discrepancies between singer and audience vocal perception will be analysed further in chapter seven, but it is worth examining briefly the possible intrinsic aspects of vocal communication.

There has been considerable interest in the significance of the singing voice in the musical development of the human species (Mithen, 2005). The question of whether vocal skills are inherent or acquired is often debated but there is some evidence for a musical component that is intrinsic in human discourse from birth. Trevarthen's (2002) notion of Intrinsic Musical Pulse suggests an internal musicality: IMP comprises

> ...a rhythmic time sense, which is able to detect regularities in musical elements, a sensitivity towards the acoustic elements of the qualities of the human voice, and the ability to perceive 'narrative' structures in vocal or musical performance.' (MacDonald et al., 2002: 6)

The Phase I questionnaires confirm that adolescents are very aware of differentiating features in vocal quality, and it would appear that vocal timbre in speech and singing are involved in developing new relationships.

> It is known that the psychological abilities for recognition of the indexical features of facial appearance, vocal qualities and language are enhanced at two periods of life, in toddlers and in early adolescence. In these periods the brain, and perhaps particularly the right cerebral hemisphere, seems most actively seeking for formative experiences that enable new relationships to be formed and new habits gained. (Trevarthen, 2002: 32)

The importance of these findings lies in the confirmation that the human animal has a fundamental, inherent ability to perceive the subtle differences involved in vocal communication, speech and singing (see also Papousek & Papousek, 1996) However, it is not necessarily universal; DeNora (2000: 151) discusses the way music can be neutral for some while for others it can be very profound, giving people a sense of 'living the tune'. If music is fundamental to human development, what evidence is available to suggest that it affected evolutionary growth?

> The brain is not the only part of the body that has been modified for speech. Exquisite control of breathing is needed and this meant changes in the muscles of the diaphragm and chest. We have to be able to breathe automatically, as do all land mammals, but then to override the mechanism when speaking, which requires cortical control over the muscles. The larynx is also much lower in humans than in related primates, which makes possible a greater variety of sounds, and the base of the skull is a different shape. (Blackmore, 1999: 90)

Controlling air-flow and lowering the larynx to allow for more subtlety of sound in speech are similar to the process of producing song. Music may have played a significant part in our early cognitive evolution (Cross, 1999), and it is not improbable to suggest that music and singing distinguishes humans from animals (Skoyles, 2000). The idea, however, that the voice was used in a kind of

primitive song before speech, is unfortunately, not able to be proven. The acquisition of skill in vocal communication is more measurable.

4.35 Social aspects of vocal communication: acquired musical skills

Learning musical skills involves the acquisition of cultural as well as musical values; singers need to learn how to perform lieder, jazz, opera, folk styles and still communicate to an audience. Sometimes these cultural expectations can inhibit the performer and the audience and it is often very apparent when vocal communication is false or faulty, whether in the field of singing or speaking. The artificial nature of many telephone conversations in call centres and the deliberate vocal grooming that takes place in the business world, have been examined by Cameron (2000). She views the world of vocal communication from the perspective of a sociologist, looking at the way voices are used to define social situations, to enhance or diminish business practices. While this may appear to be unrelated to the world of song it suggests very clearly that the perception of vocal sound has become an important dimension in our modern age, when communication skills are seen as increasingly important in the work place.

Clearly the investigation of 'Vocal Perception' has resonance in the world outside singing, with vocal coaches increasingly being used in commercial business courses. However, in the musical world there are many technically brilliant singers who leave an audience cold, who have somehow failed to convey the human emotions involved. To counteract this, singers are turning to

performance coaches and life-style psychologists to enhance their professional skills (Bunch Dayme, 2005). The world of sport has used these mental skills for some years and their application is becoming increasingly common in opera and music theatre.

Whether vocal perception is something embedded or whether it is acquired, looking at singers in the 'real world' domain is fundamental to the thesis and Phase II continues this exploration. Finally a philosophical view of perception needs to be clarified as this underpins the implicit approach in this study.

4.36 Vocal identity and vocal timbre: the philosophical perspective of action perception

Noë (2004) and Clarke (2005) advocate a more dynamic approach to listening and perceptual studies. Noë argues that

> Experience isn't determined by neural states set up by patterns of stimulation alone; the qualitative character of experience depends on the perceiver's mastery and exercise of sensorimotor skills. (Noë, 2004: 213)

Noë is referring specifically to visual perception here but Clarke (2005) also suggests an active dynamic is relevant within musical perceptions.[2]

> Actions lead to, enhance, and direct perception, and are in turn the result of, and response to, perception. Resonance is not passive: it is a perceiving organism's active, exploratory engagement with its environment. (Clarke, 2005: 19)

The emphasis on 'action perception' is found in the evidence presented in subsequent chapters. The data from Phase II are the result of active engagement

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[2] Although there are degrees of change found in the brain of performing musicians, which suggest an enhancement of brain capacity as a result of this kind of 'action perception'; it could be potentially dangerous for the teaching profession to force everyone to take up music because it appears to make people more intelligent. It has been proposed that an inter-disciplinary team of scientists and experts from the fields of music psychology, neuroscience and musicians would be necessary 'to evaluate the subtle differences in musical achievements' (Pantev *et al.*, 2003:393).

with singing and listening tasks. Viewing perception as an 'active' process is part of the holistic approach.

There are links between the physical and emotional aspects of singing and the problems of articulating these experiences can be seen in the shared context of performing and learning situations. 'Active' perception can also have a bearing on the way others 'hear' the singing voice, and this will be examined when the responses from the listener study in Phase II are compared to the participants' own perceptions. Emotional aspects of vocal perception are found in 'real world' domains of vocal communication, and examining such perceptions in context is fundamental to this investigation.

4.4 Summary

In Phase I the data revealed aspects of vocal perception enabling an initial exploration of the research questions. The literature reviewed in this chapter has sought to define the parameters of the thesis more specifically in preparation for Phase II data analysis.

The literature examined from a developmental perspective reveals

- o Vocal timbre is affected by age, physical and hormonal change
- o Vocal identity is not necessarily related to chronological age
- o Psychological influences on vocal identity can be age related but can also react and interact within social circumstances

The literature review has also established that the singing voice has been extensively researched in the field of acoustics, vocology and some areas of psychology and sociology but there has not always been a transmission of knowledge across disciplines. Recent developments in cognitive neuroscience are leading to an increased understanding of brain activity during vocalisation. Speech scientists are able to offer useful perspectives on what takes place when singers sing in different languages and have also done considerable work on speech perception.

In Phase I aspects of reflection, construction and expression of the voice were explored with specific reference to literature from self and consciousness studies. In Phase II these aspects will continue to be investigated with more emphasis on the difference between the cognitive, acoustic, physical and emotional responses found in the data and the literature. The literature review will be ongoing as the analysis develops.

The holistic approach will continue to unify the various aspects of vocal identity and perception of vocal timbre as the thesis progresses by viewing the dynamic interaction that takes place and identifying the difficulties of examining the perception of the singing voice effectively.

Little research has been undertaken using singers in real world contexts and few empirical studies have sought to answer the questions:

How do singers *think* about their voice?

How do singers *hear* their voice?

How do singers *feel* their voice?

How do *others hear* the singing voice?

The literature examined in this review provides insight into the physical workings of the voice and the possible ways of measuring vocal sound acoustically. While understanding the physical mechanisms of the singing voice is important this alone does not represent the fully dynamic functions of the instrument at the point of communicating to an audience. The measurement of the acoustic properties of a sung sound is not sufficient in itself to explain adequately the complex communication of a musical performance. Neuroscientific research on pitch and rhythm processing in brain-damaged patients enhances the knowledge of vocal perception but needs to be extended and substantiated by multi-disciplinary studies. The artistic musings of performing musicians have validity in the context of the 'real world' performing situations and can shed light on the findings of more scientifically corroborated data. Although vocal skills and vocal perception appear in the literature from diverse multi-disciplinary perspectives, the literature search has identified the following question.

How can the singer's perception of the singing voice be investigated effectively?

Phase II will use the singing experience and narratives of singers themselves to examine vocal perception.