Clarinet sound identities in Australia: perceptions of the Melbourne and Sydney Symphony Orchestras

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A Thesis submitted in partial fulfilment of requirements for the degree of Master of Music Research (Performance)

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2011
Declaration

I, Emma Hunt, hereby declare that this submission is my own work and that it contains no material previously published or written by another person.

Ethical approval has been granted for the study presented in this thesis from The University Human Ethics Committee. Participants were required to read and to sign an information document. Informed consent was given individually prior to the collection of data.

I declare that the research presented here is my own original work and has not been submitted to any other institution for the award of a degree.

Signed: ______________________________________________Date: ___________
Abstract

Music listeners commonly speculate that the clarinet sections of the Melbourne and Sydney Symphony Orchestras’ produce different sound qualities. This is the first study to investigate these differences, as perceived by clarinettists involved with the two orchestras, and to examine the collective sound identities of each orchestra’s clarinet section. Five past and present clarinettists from each orchestra (n=10) participated in semi-structured interviews to discuss sound perception of the clarinet and of the respective clarinet sections. Clarinettists spontaneously defined sound differences between the two orchestras and ascribed practical and pedagogic reasons for the formation of these different sound identities. They reported that the Melbourne Symphony Orchestra has a dark, homogenous and technical sound, in comparison to the Sydney Symphony Orchestra’s bright, heterogeneous and extroverted sound. Perceived reasons for these differences were associated with tuning practices, musical equipment used and pedagogic influences.
Acknowledgments

First and foremost I would like to thank all of the participants in this study who graciously gave me some of their time. Their willingness to discuss their musical careers and their personal ideas about sound allowed me to bring my research into fruition and complete my thesis.

A huge thank you to my supervisor, Dr Helen Mitchell, for her dedication in assisting me with this study, and all of her insightful comments and ideas. Without her guidance this process would have been much more difficult, and a lot less fun!

Thank you to the University of Sydney for supporting me during my studies and for the invaluable access to resources.
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1 Introduction

Every musician forms their own distinct musical identity, with their individual ‘sound’ a prominent feature (Macdonald, Hargreaves, & Miell, 2002). In the case of ensembles, each musician’s individual musical identity influences the collective characteristics of that group’s ‘sound’. In the early classical music scene of Australia, the head of the Australian Broadcasting Commission (ABC), Bernard Heinz, pointed out that geographical and cultural differences between each capital city of Australia would produce diverse musical identities across the orchestral music industry (Brymer, 1987). He thus campaigned for the creation of six symphony orchestras, one to represent each state, commenting that ‘each state... [would have] its own sound, making each orchestra a fascinatingly different musical entity’ (Brymer, 1987, p. 143; Garrett, 2007). Australia’s oldest state orchestras, the Melbourne and Sydney Symphony Orchestras¹, have long been compared and contrasted due to their equivalent contributions to the Australian classical music scene (Buttrose, 1982). As Heinz suspected, listeners have commonly identified differences between the musical identities of the MSO and the SSO, predominantly related to the differences in the ‘sound’ produced by each orchestra respectively.

Musicians, audience members and listeners frequently discuss the different sounds and styles of the MSO and SSO, in reference to both the orchestra as a whole, as well as specific instrumental groups. One such instrumental group that is often discussed is the

¹ Henceforth referred to as the MSO (Melbourne Symphony Orchestra), and SSO (Sydney Symphony Orchestra).
clarinet section. Although no specific formal writing has been done on the differences between the two clarinet sections listeners frequently discuss several contrasting sound characteristics for each. They speculate that the Melbourne clarinettists have a ‘darker’ sound, while the Sydney clarinettists have a ‘brighter’ sound. This speculation provides the starting point for the current investigation.

To date, research has demonstrated that experienced musicians are able to more consistently respond to music perception tasks due to their increased exposure to musical sound. Not only can musicians differentiate between different musical sounds on a number of levels, they can also more accurately rate, categorise and subsequently describe the sound. This research contributes to this literature by assessing the ability of performers to describe their perceptions of sound and to explain the reasons for their descriptions.

1.1 Aims of this study

This study aims to discover the MSO and SSO clarinettists’ perceptions of their own orchestra’s and the opposing orchestra’s sound. It will examine any similarities/differences in perceived sound, subsequently confirming or denying the speculated sound differences, and compiling a list of verbal attributes for each clarinet section. This list will then allow for sound identities to be created for each section, describing the composite characteristics that make up each orchestras individual ‘voice’. The sound identities will also examine the equipment, pedagogic and training based influences that assisted in shaping these identities.
The findings of this investigation will contribute to the history of orchestral clarinet performance in Australia. It will ascertain whether the clarinettists corroborate the theory of the ‘dark’ MSO sound and ‘bright’ SSO sound and will discover the reasons why these sounds have developed in each section. In addition to this it will shed light on the sound ideals of the MSO and SSO clarinet sections, producing pertinent and timely information for clarinettists interested in applying for positions in these orchestras.
2 Literature Review

This literature review covers three key areas which form the basic foundations of this study: perception of musical sound, an overview of the clarinet, and the influence of training and pedagogy on musical sound.

2.1 Processing sound in music

It has long been recognised that listeners can differentiate between sounds, be it different human voices, instruments or everyday sounds. This ability is applicable to a variety of situations, such as recognising a friend’s voice in a crowded room, or picking out an instrumental solo in an orchestral work (Bregman, 1990). The ear streams different frequencies to contextualise the information received, resulting in the ability for one to be able to recognise what type of sound it is and also differentiate between sounds that emanate from a very similar, or the same, sound source (Bregman, 1990). These differences between sounds are considered variations in timbre, which in its simplest form has been defined as two tones of the same pitch and loudness that are still judged to be dissimilar in their individual sound characteristics (ANSI., 1973).

2.1.1 Recognising musical sound sources

Musical experience enhances listeners’ ability to differentiate musical sounds. Musical listeners can distinguish between timbre on a number of different levels, including differentiating between sound source, pitch and sound quality. Pitt (1994) examined the abilities of musicians (experienced listeners) and non-musicians (in-experienced listeners) to differentiate between pitch changes and sound source changes. After being acquainted with the stimuli listeners were asked to identify whether paired trumpet
and/or piano tones had no change, pitch change, sound source change or both parameters had changed. Musicians’ accuracy levels were above 92% across all examples, whilst non-musicians results varied in accuracy, as pitch changes and sound source changes were frequently confused. Musicians can more accurately differentiate between, and subsequently identify, changes in sound source and changes in pitch than non musicians.

Musicians’ ability to accurately differentiate musical sounds remains consistently higher than that of non-musicians when vocal stimuli are compared. Erickson (2002) investigated musical and non-musical listeners’ perception of the timbre of singers’ voices across a range of different pitches. Listeners rated the similarity in timbre between mezzo-soprano and soprano voices, across three conditions; the similarity of two differing pitches from the same voice, two of the same pitches from different voices, and two differing pitches from different voices. Erickson’s results corroborated Pitt’s (1994) findings, demonstrating that non-musical listeners rated the more dissimilarly pitched stimuli as having vastly dissimilar timbres. This indicates their reliance on pitch to differentiate sounds. Generally, the wider the interval between the pitches in a comparative pair are, the more varying the sound qualities will be, meaning that listeners find it difficult to determine the similarity of the sound source(s), even when it is the same (Handel & Erickson, 2004). Musicians’ pattern of results demonstrated a clearer understanding of timbre as their similarity/dissimilarity ratings were consistent with the changes in sound source, regardless of the changes in pitch. This demonstrated that musicians were able to reliably identify differences between two sound sources, in this case the soprano and mezzo soprano voice types.
Musicians’ ability to more accurately differentiate sound source remains consistent when the stimuli are presented in the context of a melody. Chartrand and Belin (2006) presented two different instrumental melodies to musical and non-musical listeners and compared their abilities to discriminate whether they were produced by the same or different instruments. Musically experienced listeners took longer to discriminate between the sound sources but were more accurate in their decisions. The authors suggested that the longer discrimination times may be due to more advanced cognitive strategies developed throughout the musicians’ musical training. The authors further hypothesised that musicians’ increased ability to assess timbre across changes in pitch conditions is a product of their familiarity with both pitch and timbre parameters. This familiarity enhances musicians’ capacity to more accurately rate the similarities/differences of the sounds, and to subsequently categorise them.

2.1.2 Distinguishing musical timbres

Musically experienced listeners demonstrate a superior ability to process more subtle musical stimuli (i.e. slight changes in pitch or timbre), and are often better equipped to respond to more complex musical listening tasks. Wapnick and Freeman (1980) used only musically experienced listeners to investigate the effect that subtle timbral variation has on the perception of sharpness/flatness, or pitch. Listeners were presented with a pair of digitally altered clarinet tones that may have been sharpened/flattened in pitch, darkened/brightened in timbre, or a combination of both. They were then asked to state whether the second tone heard in the pair was sharp, flat or the same as the first pitch. There were a significantly greater number of misidentifications for pairs that
included changes of timbre, demonstrating that changes of timbre influence a listener’s ability to correctly identify subtle changes in pitch. The pattern of errors in these results indicated listeners’ perceived dark timbre and flat pitch to be interrelated. This relationship was conveyed through frequent assumptions that a dark timbre was flat when it was preceded by a bright timbre, even when the pitch was in fact the same or sharper than the first note presented. This remained true in the reverse condition, where listeners’ perceived a link between ‘bright’ timbre and sharp pitch when the preceding tone was of a ‘dark’ timbre.

Several misidentifications were made between timbral variations in Wapnick’s (1980) empirical study, however it has been proven that when similar studies are conducted in the context of a musical song, the results improve significantly. In this context even non musical listeners demonstrate an ability to separate pitch and timbre parameters, as the musical notes are presented in a coherent musical phrase (Warrier, 2002). Non musicians and musicians alike have inherent tonal expectations in terms of melodic contour of a musical phrase, which enhances their ability to identify subtle pitch variations (e.g. sharp/flat) ignoring any timbral changes (e.g. dark/bright). That is, when digitally altered examples were presented in a tonal context (ie the pitches were compared within a piece of music) in Warrier’s (2002) study, listeners were more able to disregard dark/bright differences and judge only the pitch differences. Listeners’ tonal expectations assisted their judgements on sharpness/flatness, meaning that any subtle variation to the pitches became exaggerated.
Extensive musical experience equips musician listeners to not only identify changes of timbre, but to also evaluate the ‘quality’ of the timbre produced. Worthy (1996) assessed the ability of musicians to differentiate between different timbres of same instrument pairs (using clarinets, trumpets and trombones). Each instrument was recorded three times, playing identically pitched tones, however varying in sound quality between ‘good’, ‘mediocre’ and ‘poor’. Using these differences in sound quality as the variable conditions listeners were asked to state whether the pair of sounds heard were the same or different. The results showed that listeners were able to quite accurately state when the sounds were the same in quality (86% accuracy), when they were vastly different (i.e. when a good tone was compared to a poor tone; 77% accuracy), or when the tones were presented in a good/mediocre pairing (71% accuracy). The accuracy decreased significantly when the poor and mediocre tones were compared. In the second task of Worthy’s study listeners rated the quality of a single tone from good to poor on a nine point scale. Listeners produced widely varying judgements, contrasting to the considerably high level of accuracy demonstrated in the first task of this study. It may be that a portion of these inconsistencies can be explained through the lack of criteria prepared and presented to listeners before their quality ratings were made. Perhaps if listeners had received a common point of reference from which to make their judgements the results would have been significantly higher.

As experienced listeners, musicians form a reliable control group for studies into the perception of musical sound sources and timbre. It has been demonstrated that musicians can categorise sounds into groupings based on sound source, sound quality or sound characteristics, displaying a high level of perceptual skill in the area of sound
differentiation. Their increased experience and training equips them with a highly developed understanding of sound source, timbre, pitch and sound quality, meaning that they can readily assess sounds against their prior experience and produce more reliable judgements.

2.1.3 Labelling musical sound

Listeners can more accurately remember and identify musical sound sources with the assistance of descriptive verbal labels (Rogers, 2005). Rogers (2005) investigated the impact of training listeners to use designated descriptive labels for sound sources and tested their ability to accurately recognise the sound on subsequent presentations. Sound sources that were specifically labelled during training were most accurately identified, whilst sound sources that had not been specifically labelled were more susceptible to misidentification. This study established that associating verbal labels to musical sound sources enhances aural memory, resulting in listeners’ increased ability to recall the sound and subsequently recognise the source.

Accurate identification of musical sound sources is increased with practice and experience. The increased exposure to musical sound, and thus more complex aural understanding, explains why musicians are generally more capable of differentiating and identifying musical sounds than non-musicians – they have had more practice. Grey (1977) demonstrated that increased conscious experience of a musical sound, improves a listener’s ability to accurately identify the sound source. In this study all sounds were heard and verbally identified prior to beginning the task so that listeners (all musicians) had a firm understanding of what they were listening for, setting a control for the study.
The sounds were then heard once each in five different sets, with feedback as to the correct result given after each response. The results steadily increased throughout the duration of the study, from 60% correctly identified in the first set of sounds, to 84% in the final set, demonstrating that even minimal practise will vastly improve listeners’ success rates in identifying musical sound sources.

Kendall and Carterette (1993) investigated listener’s ability to label the sound characteristics of different woodwind instrument dyads (two instrumental sounds heard simultaneously). These verbal labels were then used to compare listeners’ perceptions of timbre similarities between the dyads. Listeners rated each dyad next to a list of verbal attributes compiled from musicological literature, effectively stating to what extent they thought characteristics such as ‘light’, ‘reedy’, ‘nasal’ and ‘rich’ were present in each dyad. It was found that listeners can accurately categorise sound dyads, as they consistently rated specific verbal attributes similarly when certain instruments were present in the dyad. For example, listeners perceived a dyad to be increasingly ‘reedy’ when a saxophone or oboe sound was present in the pair. Listeners consequently rated the dyad that contained the saxophone and oboe together as the most ‘reedy’ sound. Kendall and Carterette (1993) found that verbal descriptors were a useful way of categorising and rating musical sound qualities.

Darke (2005) investigated the ability of listeners to categorise musical sounds by rating them against a list of commonly used verbal descriptors. The results demonstrated that some sounds can be consistently categorised, however others are more difficult. Darke hypothesised that the sounds that were categorised most consistently could have
reflected that listeners had similar experience and understanding of the sound. This implies that listeners who have had equal amounts of exposure to a sound, and have experienced it in similar contexts (for example two clarinettists), will more aptly be able to consistently identify and categorise the sound and its qualities.

2.2 Evaluating sound in music performance

Listeners automatically evaluate sound in all authentic performance situations. Experimental settings tap into these evaluative processes to understand how people comprehend sound.

2.2.1 Rating musical sounds

Musical sounds can be assessed using several different evaluative systems. These include: the norm based system – directly comparing performances, for example choosing finalists in a competition; the criterion based system– using a set of pre-prepared criteria to rate performances, for example marking a performance exam; the experiential based system – based on individual expectations that have been developed through experience (Garnier, Henrich, Castellengo, Sotiropoulos, & Dubois, 2007; McPherson & Schubert, 2004). Listeners demonstrate that they frequently combine aspects of different evaluative systems to contextualise, and thus judge the performer they hear. This occurs as musical sounds are assessed based on their similarities and differences to a prototype of the sound that is stored in the listeners’ aural memory (experiential based). Simultaneously, listeners rate the sound against a set of criteria, be it a list of specific pre-determined criteria or personal criteria formulated through previous musical experiences (criterion based) (Garnier, et al., 2007; McPherson & Schubert, 2004).
Stanley, Brooker and Gilbert’s (2002) study investigated examiners’ reports of how they approach marking in authentic performance assessment situations. Examiners reported that their first judgements were made based on a holistic view, evaluating their enjoyment of the performance and subsequently making a global judgement. This method of assessment was relevant to all aspects of the performance, including the sound characteristics and qualities that the performer(s) produced. The examiners stated that past experiences of sound in relation to the performer, the instrument and the music that was being performed were subconsciously, and sometimes consciously, compared to form an immediate global judgement of the performer’s sound (experiential based assessment). The examiner then rated each specific criterion provided so that it would justify their global judgements, rather than using the sum of the individual criteria to arrive at their overall conclusion. This study proves that examiners bring their own expectations and criteria to examination situations. Consequently, selecting a panel of examiners in performance assessment situations will reduce any effects of personal bias and will produce the fairest examination results.

The selection of a panel of judges that have a similarly high level of expertise will ensure the highest possible consistency ratings across judges, both when specific criteria is set, and when it is not. This is because the personal expectations and criteria for each judge will be of a similar nature, due to their shared experiences as professional performers, teachers and assessors. Smith (2004) investigated consistency of intra-judge ratings in the context of an international string performance competition. The panellists, all string experts, were tasked to rate each performer on a scale of 0-4, from not
qualified for this competition to most outstanding, respectively. The panel produced an agreement rate of 64% across all ratings for each contestant. This level of reliability for the expert judges, who have been given neither common reference points nor specific criteria, is relatively high. The 36% disagreement rate however, demonstrates the subjective nature of music performance, and again confirms the necessity of using a panel of judges, rather than just one, to ensure any subconscious or conscious bias will be disregarded. The inclusion of specific pre-determined criteria combined with the use of an expert panel of judges may further enhance equality and reliability in music performance assessment.

Specific performance criteria sets have been developed by researchers to aid assessors to make consistent and fair judgements of musical performances. Abeles (1973) sought to create a list of clarinet performance criteria that would effectively guide the examiner as they produced their final judgements and marks. He compiled a list of 94 phrases used by instrumental teachers that described clarinet performance, and then asked participants to rate specific performances against each of the listed phrases. The list was then narrowed down to thirty statements that were deemed most coherently understood, with limited margin for misinterpretation, and would cover all aspects of performance. Abeles estimated that the completed adjudication scale would produce an intra-judge reliability of seventy percent. This demonstrates that a panel of judges will be able to more consistently assess a performance if they are given a tailored set of criteria with which to do so.
2.2.2 *Verbalising sound*

Communication of sound quality is important for performers, teachers, assessors, critics and listeners alike. It is not unusual for listeners to use verbal descriptions to assist them in differentiating sounds, and in subsequently developing judgements, and potentially feedback. Listeners’ level of expertise dictates not only their perceptual judgment but also the criteria with which they will judge the sound and the verbal descriptors that they will use to do so (Garnier, et al., 2007). Due to the abstract nature of this sensory experience metaphors are frequently used, with varying levels of frequency and common understanding (Schippers, 2006). Some descriptive terms for sound, such as ‘round’ and ‘rough’, have even become widely accepted and understood within musical communities, meaning that they are rarely recognised for the metaphors that they are (Garnier, et al., 2007). Due to the nature of individual communication a wide variety of openly metaphorical phrases are also used to assist in capturing the nature of sounds, techniques and/or expressions. This type of metaphor can be relatively general, such as to express a sense of serenity within the sound, or can be much more complex, with detailed cross-modal explanations, such as to play ‘as if there is a small bird sitting on your finger and you don’t want it to fly away’ (Schippers, 2006, p. 211).

Individual understanding and communication of musical sound is complex and often results in different people using numerous metaphorical and literal descriptive phrases to describe a similar quality or idea (Gaunt, 2007; Schippers, 2006). Therefore it is necessary to investigate the consistency of usage and meaning of verbal descriptors. Cavitt (1996) investigated listeners’ consistency by comparing the descriptor terms for brass sounds used in brass pedagogical literature with those used by school band
directors. The study found that numerous different descriptors were used, with varying levels of consistency. In a task where listeners are asked to describe sound in their own words it is not surprising that a large number of descriptors would be used, due to varying personal understanding and individualised terms of expression. Therefore the finding that some descriptors (five out of thirty-eight terms in total; full, centred, dark, pinched and thin) were used by over 30% of listeners is significant, and demonstrates a higher level of understanding for these terms. Cavitt suggested that this consistency may demonstrate the acceptance of some verbal descriptors, and their associated meanings, within standard musical vocabulary.

Not only can listeners categorise different musical sounds based on their sound source, they can also do this based on the composition of characteristics in the sound. This can be done through judgements in quality, as seen in Worthy’s (1996) study, (where listeners rated a single musical tone from good to poor) or through attributing key descriptive characteristics to sounds. Garnier et al. (2007) investigated verbal descriptors used to describe the singing voice by a group of experienced vocal teachers. The vocal teachers generated over 600 verbal descriptors whilst listening to the singing voices included in the study. Among these terms the authors found 30 that were not only used regularly, but were also used consistently to describe certain sound qualities, demonstrating consistent meaning across listeners (these included words such as bright, light, dark and round). This consistent understanding and usage of specific descriptors may be further evidence of standardised musical vocabulary, as proposed by Cavitt (1996).
A large variety of descriptors are often used when describing sound. This results in the necessity to group similar terms into polarised categories in order to recognise when listeners are referring to the same sound idea (Kendall & Carterette, 1993). For example, Kendall and Carterette’s (1993) grouping system found the terms round, warm, full and rich to have similar meanings, categorising them into one grouping, whilst brittle, nasal and crisp were included in an opposing category. These categories were developed after a series of studies in which listeners rated sounds against a list of verbal attributes, on a scale of 1-100. If a sound was polarised consistently at one end of the scale for a particular verbal attribute then this attribute was considered to be applicable to the sound. The descriptors for each sound were then analysed for consistency of usage and meaning across other sounds (i.e. considering whether they were polarised similarly across stimuli), before being categorised into specific groupings to describe different sound factors such as ‘power’, ‘reed’, ‘strident’ and ‘plangent’. Every individual communicates in their own unique style, hence it is inevitable that sounds are not verbalised using the exact same descriptors by every person. Through categorising verbal descriptors one can more accurately decipher each individual’s descriptions, discovering commonalities in the way they perceive and understand sounds.

2.3 The Clarinet

There are a number of practical factors that can influence musical sounds, such as the specific qualities of the instrument and the tuning practices used. For clarinettists the choice of mouthpiece and reed is equally as important as the choice of clarinet, with the mouthpiece especially having the ability to change ones sound entirely.
2.3.1 Mouthpieces

The choice of mouthpiece is wide and varied and can make a significant impact on the sound that is produced (Pino, 1980; Stein, 1958). Each mouthpiece is designed to contain a variety of different characteristics, with small changes to the shape and size of the opening in the mouthpiece creating great differences in the sounds that it can produce (Cox, 1995; Pino, 1980). The quest for a ‘perfect’ mouthpiece can follow clarinettists throughout their entire career, as they search for a mouthpiece that produces their ideal sound with the utmost ease. In conjunction with this clarinettists often seek to find a mouthpiece that will reduce issues with tuning, assisting them to play exactly in tune across the entire instrument (Stein, 1958). Specific mouthpieces are made to address different tuning practices internationally, most commonly producing mouthpieces at A442Hz and A440Hz, thought to address European and American pitch practices respectively (Vandoren, 2010b). Vandoren mouthpieces specifically address both of these tuning systems, with the ‘series 13 American pitch’ mouthpieces (also known as M series mouthpieces; styles include M30, M13, M13 lyre, M 15, 5RV) created to play at the flatter A440Hz in comparison to the rest of their mouthpieces which are designed to play at A442Hz (Vandoren, 2010b). Mouthpiece manufacturers have recognised the numerous and varying needs of clarinettists and have sort to address them through the creation of a large range of designs that address intonation, tone colour, ease of production, stability, clarity and projection amongst other qualities (Brymer, 1976; Smith, 2010; Vandoren, 2010b). This has resulted in the development of innumerable different mouthpiece models being produced by a large number of different manufacturers.
2.3.2 Reeds

Clarinetists search for the ‘perfect’ reed on a daily basis as a substandard reed will never do the performer justice (Pino, 1980). Clarinet reeds are made of natural cane, meaning every reed is different depending on the characteristics of the cane used. In addition to this, each reed is extremely changeable, with changes in temperature, moisture and air pressure resulting in distortion of the shape and density of the reed (Backus, 1978). With this variability comes large numbers of professional standard reeds being classed unusable by musicians for numerous reasons, including producing slightly too thick or thin sounds, a lack of clarity and a lack of ease (Backus, 1978; Pino, 1980).

For an experienced clarinettist to produce their ideal sound the mouthpiece and reed must have an optimal fit. The unpredictability of cane reeds means that this optimal fit can take some time to find on any given day. Backus (1978) investigated the conditions required for the mouthpiece and reed to combine and produce a ‘good’ sound and developed a synthetic reed that could fulfil these conditions consistently, eliminating the unpredictable element that cane reeds produce. These synthetic reeds have been developed by a number of manufacturers, however are yet to be widely used by professional orchestral clarinettists. This means that the difficult task of finding the ‘perfect’ reed still remains relevant to the majority of professional clarinettists today.

In order to give themselves the best chance of finding the optimal reed clarinetists must choose the highest quality of reeds to work with (Pino, 1980). Vandoren is one of the most popular brands of reeds used internationally, made obvious by the large number of
revered professionals that represent the company (Vandoren, 2010a). Within this brand there are three varying styles of reeds and over nine varying sizes that can be chosen (Vandoren, 2010c). These sizes represent the thickness of the cane, with standard sizes ranging from 1.5-5, from softest to hardest (Backus, 1978; Pino, 1980). These different reed sizes affect the characteristics of the sound that is produced. Generally speaking, the harder the reed, the ‘darker’ the tone colour and conversely, the softer the reed, the ‘brighter’ the tone colour (Intravaia & Resnick, 1968).

2.3.3 Tuning

Orchestral tuning practices have varied greatly throughout history, with standardised tuning only coming into practise in 1939, when A440Hz was pronounced ‘concert pitch’ (Haynes & Cooke, 2010). Despite the introduction of standard tuning practices there is still variation between orchestras, both on an international level and a national level, with tuning varying between approximately A440 - A450Hz internationally, and A440-A444Hz within Australia (Haynes & Cooke, 2010). A direct correlation between tuning and dark/bright tone colour has been identified, recognising that flatter tuning is associated with a darker sound, whilst sharper tuning is associated with a brighter sound (Wapnick & Freeman, 1980; Warrier, 2002). Considering these vast differences in pitch it is not surprising that different orchestral schools demonstrate their own varying sound qualities (Brymer, 1976).

The tuning practices in Australia originally followed England’s lead using A440Hz as concert pitch at the inception of the ABC orchestras in the 1970s. Over the course of
time the SSO have raised the concert pitch to be A441Hz. As far as I am aware there is no documentation of this change. The MSO still remains at the original A440Hz.

2.4 Pedagogy, and schools of clarinet sound

2.4.1 Pedagogy and training

The foundations of a musicians’ sound identity are often formed through pedagogic influences and training experiences (Howe, 1991). Through these educational encounters technique and performance related advice is provided which will shape the development of the student (Howe, 1991). Not only will students quite possibly aim for the same sound ideals as their admired pedagogues, they will seek to reach them using similar techniques.

This reverence and adopting of style and sound is interlinked with the formation of national styles. Prominent clarinettists’ are sought out as teachers, thus spreading their influence throughout the city, and/or country, and potentially leaving lasting impacts on the desired sound qualities (Brymer, 1976). In the twenty-first century musicians are increasingly exposed to different sounds and styles of music due to the expanding availability of recordings, as well as the frequent tour schedules that are now undertaken by major orchestras and soloists. This renders the accreditation of the national style to a particular clarinettist less prominent. However, there certainly still remain highly revered clarinettists who have undoubtedly made a large impact on the music scene, both within their country and on the international stage.
In order for clarinettists to obtain an orchestral position their sound and style will have been successfully developed and polished to a high standard (Cox, 1995; Davis, 2004). This sound and style will then morph slightly to fit the requirements of their position within the orchestra (Davis, 2004). The changes that occur depend on the position that the clarinettist has received in the orchestra; whether you are in the soloistic principal position or the more supportive role of second clarinet (Cox, 1995; Davis, 2004). The role of the principal clarinet often requires more soloistic playing with an emphasis on projection, the upper registers of the clarinet and the ability to blend perfectly with the principal players of the wind section. Whilst the second clarinet must still be aware of these things their focus is slightly different, with an emphasis on blending perfectly with the principal clarinet, clarity in the lower octaves of the clarinet and following the principals lead in stylistic decisions (Cox, 1995; Hannan, 2003). These shifts in focus reflect the differing sound objectives and thus slightly varying individual sound identities are formed.

2.4.2 National clarinet traditions

As with various compositional trends that develop within national schools, there are a number of national styles of clarinet playing that are identifiable. These traditions may have developed for a number of reasons. They may reflect the style of composition that is favoured locally at the time, be influenced by the type of instruments and mouthpieces favoured in that country, or be in reverence to, or perhaps rebellion against, the clarinet sounds that the clarinettists are most frequently exposed to (Brymer, 1976). With the long history of classical music in Europe it is not surprising that a
number of the most prominent national traditions can be heard there. A small sampling mentioned by Brymer (1976) include:

- The French School: Thought to be very virtuosic in their playing style, with a bright and immediate sound.
- The Italian School: Typically smaller sound with little projection, however very vocal like in sound and operatic in style.
- The English School: This has two distinct styles of playing, one that contains vibrato and is gentle and firm, and one that has no vibrato and is more hollow and spread. Both are considered very elegant, sweet and not dark.
- German/Austrian School: This is dark, broad, compact and extremely legato. It is very even across all registers.

The German/Austrian school of clarinet playing is one of the clearest examples of a national school. Over the centuries the clarinet was extensively developed before concluding with the two final models that are primarily used today, the German Oehler clarinet and the French Boehm system clarinet (Hoeprich, 2008). Of these two prototypes the German instrument is seen almost solely in Germany, with a slightly modified variation used in Austria, whilst the French instrument is used by the majority of clarinettists internationally (Hoeprich, 2008). The German/Austrian instruments contain a different fingering system, need different types of mouthpieces and have a longer and more cylindrical shaped bore (the shape and size of the inside of the clarinet), all of which leads to the production of a different sound. This sound is often described as being incredibly smooth, pure, broad and compact. The instrument and
mouthpieces are also thought to be more resistant resulting in increased difficulty in articulation and partially explaining the broader sound (Brymer, 1976; Hoeprich, 2008).

Whilst the choice of which instrument to use can be decided on by the individual, the difference in sound means that this decision is made primarily based on where the clarinettist is situated and where they hope to gain employment (Hoeprich, 2008). The ability to blend with the sounds around you is an essential quality of an orchestral clarinettist. Some authors have suggested that the differences in construction of the Oehler and Boehm clarinets result in different sounds, and are rarely used in combination as they are unable to perfectly blend together (Davis, 2004; Hoeprich, 2008). This is an extreme example of the perception of national schools of clarinet playing clashing and having an inability to work together.
3 Method

3.1 Participants

Past and present clarinettists from the MSO and SSO were identified via the internet and word of mouth sources. A number of clarinettists were sent information about the project and invited to participate via an initial contact email and follow up phone call. Following the clarinettists agreement to participate interviews were held in Melbourne and Sydney, as well as one phone interview.

Five clarinettists from both the MSO and SSO were interviewed (n=10), representing three different roles within the clarinet section of the orchestra (Cox, 1995).²

1 – Principal Clarinettist: The leader of the clarinet section and thus the decider of stylistic issues within the section. The principal clarinet part is generally higher sounding than the second clarinet part and usually contains the solo clarinet lines. The principal clarinet must listen primarily to the other principal wind players, i.e. bassoon, oboe and flute.

2 – Second Clarinettist: This clarinettist has the task of blending perfectly with the principal clarinettist, and always following their lead stylistically. They focus more on lower notes than the principal and, whilst always being aware of what the principal player does, must have their ear tuned more to the inner

² Note that there is often a fourth position, bass clarinet, within each orchestral clarinet section. No bass clarinet players were interviewed for this study due to the different sound qualities of this instrument. Similarly, the associate clarinettists were asked to only comment on their Bb and A clarinet sounds, not their Eb clarinet sound.
The group of participants included four principal clarinettists, two second clarinettists and four associate clarinettists. All participants undertook their primary clarinet training in Melbourne, Sydney or Canberra and had been employed as a clarinettist in a professional capacity for at least ten years. A large portion of this employment occurred in either Melbourne or Sydney. All participants have extensive experience in the fields of clarinet performance, assessment and teaching.

Clarinetists from the SSO will hence forth be referred to as S1-5 and clarinetists from the MSO as M1-5.

3.2 Interview Structure

A semi-structured interview protocol was developed to address six broad topic areas (Patton, 2002). The interview schedule opened with general questions about the educational and professional background of the participant. It then went on to focus on the perceptions of sound quality, exploring the participants ideal sound, descriptions of their own sound and their clarinet section’s sound, followed by descriptions of the opposing orchestra’s clarinet sound. These topic areas are outlined in Table 1.
Table 1: Topic areas in semi-structured interview and description of specific content covered in each

<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musical Education</td>
<td>Personal history</td>
</tr>
<tr>
<td></td>
<td>Years played</td>
</tr>
<tr>
<td></td>
<td>Study</td>
</tr>
<tr>
<td></td>
<td>Influential figures</td>
</tr>
<tr>
<td></td>
<td>Grants/scholarships/competitions</td>
</tr>
<tr>
<td>Professional Experience</td>
<td>Casual and fulltime musical positions held</td>
</tr>
<tr>
<td></td>
<td>Experience in SSO/MSO</td>
</tr>
<tr>
<td>Ideal Clarinet Sound</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>Influences</td>
</tr>
<tr>
<td></td>
<td>Techniques</td>
</tr>
<tr>
<td>Your Sound</td>
<td>Equipment – mouthpieces/reeds</td>
</tr>
<tr>
<td></td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>Goals</td>
</tr>
<tr>
<td></td>
<td>Your role in orchestra – second clarinet versus principal</td>
</tr>
<tr>
<td></td>
<td>Descriptions from others</td>
</tr>
<tr>
<td>Your Orchestra’s Sound</td>
<td>Collective description</td>
</tr>
<tr>
<td></td>
<td>Unifying features</td>
</tr>
<tr>
<td></td>
<td>What are you looking for when auditioning new players for the orchestra</td>
</tr>
<tr>
<td>Opposing Orchestra’s Sound</td>
<td>Collective description</td>
</tr>
<tr>
<td></td>
<td>Description by others</td>
</tr>
<tr>
<td></td>
<td>Association with the orchestra.</td>
</tr>
</tbody>
</table>

In each topic area, if the participant did not mention a particular theme, open ended prompt questions were used to initiate the discussion. An example of one such prompt question used was ‘how would you describe the role of the second clarinet in the
orchestra in contrast to that of the principal’. This prompt question was often necessary as participants failed to discuss the roles of each clarinettist when addressing the clarinet sound within their orchestra.

3.3 Interview Procedure

Interviews were held at a time and place convenient to the participant, taking place over a two month time period. The interviews consisted of a 30 – 60 minute semi-structured interview that was recorded using an iPod recording device. This was uploaded to computer and subsequently transferred into iTunes to be played back and transcribed.

3.4 Analysis

Interviews were transcribed and then studied in depth. Recurrent themes were identified (Smith, 1995) and a list of verbal descriptors for clarinet sound was collated. The descriptor terms were then coded into two categories: terms used to describe the MSO and terms used to describe the SSO. Recurrent themes were also coded into two similar categories: explanations and analysis of the MSO’s and SSO’s sound respectively. I compared the descriptors used in relation to each orchestra, as well as the explanations for these descriptors, and assessed similarities and/or differences in the perceived sound qualities.

Demographic profiles were created for each participant, detailing each clarinettist’s education, experience, influences and clarinet equipment used. These profiles allowed for direct comparisons to be made between the pedagogic and equipment based
elements of each musician’s sound identity, and subsequently of each clarinet section’s collective sound identity.
4 Results

Participants responded to questions relating to their personal histories as clarinet players, as well as perceptual questions about clarinet sound. Educational and performance based achievements were first discussed, compiling detailed histories of the musicians as individual clarinetists. Their career as an orchestral clarinetist was then discussed, focussing on their time in the MSO or SSO. Clarinetists were asked about their ideal sound, their own individual sound and the collective sound ideals within their orchestra and the opposing orchestra. In doing so they spontaneously reported differences between the sound qualities of the two orchestras and suggested possible reasons for these.

4.1 Perception of clarinet sound

During interviews clarinetists were asked to conceptualise the sensory experience of clarinet sound through the use of verbal descriptors. The clarinetists defined their sound ideas through the use of verbal descriptors, identifying a number of key characteristics of the sound identities of each orchestra. In addition to this, the clarinetists discussed the art of blending clarinet sounds within the section, describing their varying perceptions of how one collective sound is created when performing in the orchestra.

4.1.1 Descriptor terms for clarinet sound

A large portion of the interviews involved talking about individual and collective clarinet sounds. In doing so the clarinetists suggested 76 different terms/short phrases to describe the sound of the clarinet.
The descriptive words used to describe clarinet sound were grouped into six different categories that represented the main sound characteristics that the participants mentioned: dark spectrum, bright spectrum, unified, extrovert, technical and variable (heterogeneous) sounds. Expressive terms such as ‘loud’ and ‘nice’ were discounted, as well as terms that could be associated with numerous characteristics, such as ‘colourful’ and ‘clear’. The categorisation was based on Kendall and Carterette’s (1993) grouping system, whereby various descriptive terms were recognised as having similar meanings. Table 2 contains a list of words used in each grouping.

Table 2: Verbal description categories and the most common terms shared by clarinettists for each category.

<table>
<thead>
<tr>
<th>Category</th>
<th>Descriptor terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark</td>
<td>Dark, mellow, rich, broad, full</td>
</tr>
<tr>
<td>Bright</td>
<td>Bright, sweet, light, narrow</td>
</tr>
<tr>
<td>Unified</td>
<td>Homogenous, unified, tight, one sound, unanimous</td>
</tr>
<tr>
<td>Extrovert</td>
<td>Extrovert, virtuosic, outward, self confident</td>
</tr>
<tr>
<td>Technical</td>
<td>Straight laced, technical, defined, cleaner, disciplined</td>
</tr>
<tr>
<td>Varying (heterogeneous)</td>
<td>Flexible, can’t describe collectively, not unified, each member has a different sound.</td>
</tr>
</tbody>
</table>

Each clarinettist verbalised their own individual sound before discussing the collective sounds of each orchestra. In the MSO, three out of five clarinettists described their sound using terms that refer to dark characteristics such as ‘round’, ‘darkish’ and ‘full’. A fourth clarinettist was more ambiguous simply specifying ‘not bright’. Conversely, in the SSO four out of five clarinettists have described their individual sounds using bright characteristics such as ‘sweet’ and ‘bright’.
Clarinettists were then asked to verbally assess the collective sound of each orchestra. Figure 1 presents the total number of clarinettists (out of 10) who referred to each verbal descriptor category in relation to the MSO and SSOs’ collective sounds. Clarinettists reported that the MSO sound is considered to be dark, unified and technical in its qualities. In contrast to this the SSO sound is considered to be bright, extroverted and varying (heterogeneous). Some word categories were frequently mentioned for one orchestra but not the other.

![Bar Chart](image)

**Figure 1:** The number of clarinettists (out of 10) that mentioned each verbal description category (as defined in Table 2) in relation to each orchestra.

The three main sound qualities attributed to MSO were summed up by an SSO clarinettist through their comments about unity, discipline and dark tone quality:

They [MSO] have a more homogenous sound. They deliberately try to achieve a particular type of sound...They really had a very disciplined approach to sound, and very unanimous...The thing that generally struck me was the darkness of the sound. [S5]
Another SSO clarinettist compares the sounds of the MSO and SSO, further supporting the unity of the MSO and simultaneously confirming the bright and extroverted sound of the SSO:

The Melbourne Symphony’s always had a sort of homogenous woodwind section, whereas I think we’re a bit brighter, a bit more extrovert and a bit more virtuosic... [S3]

4.1.2 Clarinet sound in the orchestra

Clarinettists compared the positions of principal and second clarinet within the orchestra in regards to sound production and their role in the ensemble. It soon became evident that clarinettists from the MSO and the SSO had different opinions about the second clarinet’s responsibility in regards to blending, and thus their approaches to ensemble playing were also differing.

Clarinettists from the MSO agreed that it is important for the entire clarinet section to work together to blend. Clarinettists from the MSO commented that they ‘see it as a team effort’ and thus each clarinettist has equal responsibility in blending their sound with that of the clarinettist next to them. In contrast, clarinettists from the SSO believed that whilst the entire section must be aware of blending issues, it is primarily the second clarinettist’s responsibility to ensure that the sound is well blended. Clarinettists from the SSO expressed views such as:

Generally the second player has to try to blend, but I guess you can’t help but try and also blend with them because it’s natural to want to try and make the same sort of sound. It’s something that we don’t speak about in the clarinet section here... We don’t actually talk about the sound and what we’re trying to achieve. [S5]
Clarinettists commonly referred to the MSO and SSO’s different approaches to blending when discussing the collective sound qualities of each orchestra. Clarinettists from both orchestras would comment on the unified and homogenous qualities of the MSO’s clarinet section, and often referred to their deliberate and disciplined approach to this aspect of their sound. Clarinettists would make comments such as:

I think it [the MSO clarinet section] always blended quite well. I think there was no one with a tone that stuck out as being completely different; we tried to play on similar instruments with a similar approach. [M2]

In contrast to this, five clarinettists described the SSO as much more soloistic and extroverted in their approach. Four clarinettists defined this further, commenting that the sound is considered varying (heterogeneous) from player to player within the section [see Figure 1]. Clarinettists discussed the individualistic and varying sounds in the SSO section:

[SSO clarinettists] are totally different players, totally different in their approach to sound, totally different in the way they produce the sound and yet [they] sound great. [S1]

4.2 The clarinet

Clarinettists were asked about several technical issues to do with both the orchestra and their own individual playing. Through this line of questioning it was realised that the concert pitch of the MSO is one cycle lower than that of the SSO. Several clarinettists spontaneously suggested that this difference may contribute to the darker MSO sound as opposed to the brighter SSO sound.
Clarinetists were also asked about the brand and style of equipment that they have used for the majority of their careers. They were asked to discuss the clarinet itself, the mouthpiece and the reeds that they use, as well as to specify any specific reasons for using this equipment. Whilst all clarinetists interviewed used the same brand of clarinet (Buffet), and very similar models within this brand, a significant difference between the mouthpieces and reeds used by each clarinet section was evident.

4.2.1 Tuning

Clarinetists defined differences in the tuning practises between the two orchestras, noting that the MSO tunes to the slightly flatter A440Hz whilst the SSO tunes one cycle higher, to A441Hz. Clarinetists would often spontaneously comment on this difference, stating things such as:

The pitch here in Melbourne is flatter than Sydney. [M1]

The clarinetists believed that the SSO pitch had risen from A440Hz to A441Hz since the inception of the orchestra, whilst the MSO had maintained the same pitch. They hypothesised that the MSO maintained the original pitch due to the influence of a particular oboist (to which all instruments tune), Jeff Crellin, who has been the principal oboist of the MSO since 1977. Clarinetists would name this oboist and specifically attribute the A440Hz concert pitch to him, saying things such as:

Crellin, of course. He was Mr Flat Pitch, he has the A[tuning pitch] at 440... Well he wouldn’t compromise up! I think he’s had the biggest influence in this town with his A. [M1]

Some SSO clarinetists noticed the difference in tuning when they made guest appearances with the MSO, and agreed that a conscious adjustment was necessary in
order to comply with the MSO’s tuning practices. They specified that in conjunction to
this different tuning came different sound characteristics. One SSO clarinettist who has
performed with the MSO articulated the differences in tuning practices between the two
orchestras and his experience in relation to tuning:

I went down to play with the Melbourne Symphony about
two years ago, and I think I stuck out! I was a different
style... It was an interesting concept of intonation and never
pushing anything above 440Hz. They tune to 440Hz, we
tune to 441Hz, probably go up to 442Hz, but you know, it
sounds better. I found it difficult because I wasn’t used to the
sound that the flute made for example... I couldn’t hear her!
It was a very strange experience... I feel better back in SSO.
[S3]

Two SSO members suggested that the difference in tuning between the MSO and SSO
is one of the reasons for the dark/bright sound quality differences between them
respectively.

4.2.2 Reeds and Mouthpieces

In establishing profiles of the participants as clarinettists, they were each asked to
discuss the equipment that they have used for the majority of their careers, specifically
the brand and style of clarinet, mouthpiece and reeds. If relevant, participants were then
asked to further discuss the reasons behind their choice of equipment. All clarinettists
interviewed play on Buffet brand clarinets, however encompassing four different
models within this brand. All of these models are professional instruments and are very
similar in standard. In contrast to this similarity, clarinettists from the MSO all reported
using very similar styles of mouthpiece, whilst clarinettists from the SSO all used
different styles of mouthpiece, demonstrating a significant equipment-based difference
between the two clarinet sections.
In the MSO, four out of five clarinettists have used the series 13 Vandoren mouthpieces for the majority of their careers (designed to play with a flatter pitch, see 2.3.1 for further details). The 5th member also plays on a Vandoren brand mouthpiece, although a different style. Two out of three of the current clarinettists have used the series 13 mouthpieces for the majority of their career. In contrast to this no clarinettists in the SSO use the same mouthpiece, with the three current members of the SSO using completely different brands as well as styles. Clarinettists reported that they regularly trial different mouthpieces, but generally use the same mouthpiece for significant periods of time. Table 3 lists the mouthpieces and the brand and strength of reeds that MSO and SSO members have used for the majority of their playing career with the respective orchestras.
Table 3: Clarinettists’ equipment, including brand and model of clarinet, brand and style of mouthpiece and preferred reed used for the majority of their career.

<table>
<thead>
<tr>
<th>Orchestra</th>
<th>Clarinet</th>
<th>Mouthpiece</th>
<th>Vandoren Reeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSO</td>
<td>Buffet R13</td>
<td>Vandoren 5RV*</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Buffet Festivals</td>
<td>Vandoren B45. and M series*</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Buffet RC</td>
<td>Vandoren M13 lyre*</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Buffet Festivals</td>
<td>Vandoren M13 lyre*</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Buffet Festivals</td>
<td>Vandoren B45 lyre</td>
<td>3.5</td>
</tr>
<tr>
<td>SSO</td>
<td>Buffet S1</td>
<td>Old Wooden</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Buffet R13</td>
<td>Vandoren B45.</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Buffet Festivals</td>
<td>Viotti</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Buffet Festivals</td>
<td>Vandoren M30*</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Buffet Festivals</td>
<td>Zinner</td>
<td>3</td>
</tr>
</tbody>
</table>

* Vandoren series 13 mouthpieces that are designed to play at flatter A440Hz, rather than A442Hz which is what all other mouthpieces listed here are designed to tune to.

Clarinettists identified that each orchestra’s tuning practices influenced their choice of equipment. MSO members specifically recognised that their choice of mouthpiece is related to the pitch, as they needed to select equipment that would allow them to play flat enough. They would make comments such as:

I try to use the M series mouthpieces now because they play flatter. [M2]

In Sydney the first thing I notice is that the piano is a little bit up. They’re a little bit up, which is good, it makes it easy for you, but if you come here [Melbourne] I reckon you’d be on a flat mouthpiece. [M1]

Although all clarinettists interviewed use the same brand of reed, the standard professional Vandoren, they use a variety of sizes. The SSO clarinettists prefer the
softer size 3 and 3.5 reeds, whilst the MSO clarinettists prefer harder size 3.5 and 4 reeds. This is most evident when studying the three current members of each orchestra, with two out of three of the SSO clarinettists using size 3 reeds and two out of three of the MSO clarinettists using size 4 reeds (Table 3).

Four clarinettists from the MSO and one clarinettist from the SSO reported that there is a history of using very similar, if not the same equipment in the MSO clarinet section. In the current MSO section two clarinettists reported that they have deliberately used some of the same equipment for over ten years in order to perfectly blend their sounds.

One clarinettist from the MSO further discussed choosing new equipment with the section:

We’d all go and buy new instruments, the three of us [at MSO]. When a new shipment came in we’d get first pick and we’d go in and we’d have a bit of a listen to each other and I think [the] section leader, if he heard something that he didn’t quite approve of, he was not shy about coming forward... If one of us found something, a mouthpiece, or a different reed or something, we’d share it with the other. [M2]

MSO clarinettists also recognised that ‘A fair few students are playing on M13s [in Melbourne], probably more than students in other cities.’ Clarinettists from both orchestras recognised that pedagogy and training has an influence on equipment used.

One MSO clarinettist credits the use of a different technical set up amongst Sydney clarinettists (compared to students in Melbourne) to a specific member of the SSO, going so far as to say that a specific ‘style’ of clarinet playing has developed due to this SSO clarinettist’s influence.
4.3 Heritage and Training

Clarinettists’ concepts of the heritage of their sound identities were strongly associated with past members of each orchestra. Influential figures have made considerable impressions on the clarinet sections’ sounds through both direct pedagogic links, as well as through lasting impacts on the desired sound ideals. Clarinettists reported on other influences on clarinet sound also, repeatedly mentioning two internationally renowned clarinettists as having been instrumental in the development of sound ideals.

Whilst discussing influences on sound, differences between the MSO’s pattern of overseas study compared with the SSO’s pattern of overseas study became evident also. This impacts the sound identities created, through the clarinettists associations with different international schools of sound, both collectively and individually.

4.3.1 Orchestral Heritage

Six clarinettists reported a strong heritage or lineage generated by significant past members within each orchestras clarinet section. For the MSO this influence is derived from Isobel Carter and continues through one of her students who was also a member of the MSO, and a participant in this study, and for the SSO from Don Westlake. Clarinettists recognised that the Isobel Carter school in Melbourne was vastly different from the Don Westlake school in Sydney. Each of these clarinettists dictated ideas of musicality and sound, influencing the whole clarinet section, both at the time and in the future.
Clarinetists associated the differences in sound between Carter and Westlake with the differences in their pedagogic training. Isobel Carter studied in Germany and was described as having a typical ‘German’ sound; thick, dark and mellow. In contrast to this Don was ‘an absolute throw back to the English players that he learnt from’ [S1].

In addition to clarinetists recognising that Carter has a German sound, three clarinetists spontaneously commented that the MSO section has a German sound. Some MSO members specifically linked Isobel Carter’s sound to the continued clarinet tradition within the orchestra, referring to the dark and German sound qualities.

The way I understand that sort of Melbourne traditional MSO sound, which I think would also go back to Isobel Carter ... The sort of tonal concept is more German than English is how I understand it. By and large no vibrato, perhaps a more obvious striving for evenness between registers than those brought up in the English tradition... Always looking for something that people call dark. [M4]

**4.3.2 Influential Clarinetists**

Clarinetists most commonly discussed their primary sound influences as being connected to one or more of their clarinet teachers during their formative years. These influential figures assisted in the development of sound ideals, stylistic ideas and even influenced the choice of equipment used.

Figure 2 presents a ‘family tree’ style map of pedagogic links between MSO and SSO clarinetists (MSO represented in blue, SSO represented in red). The purpose of the figure is to demonstrate the pedagogic links and lineage between the clarinetists without revealing their identities.
The family tree presents direct pedagogic links between the MSO and SSO clarinet sections, as well as between individual members of each section. For the MSO, all five clarinetists interviewed are included, showing obvious shared pedagogic experiences. In total, seven out of the ten clarinetists interviewed are connected through pedagogy.

Two out of three of the current members of both the MSO and the SSO studied under the same teacher, M1. Clarinetists commended M1 for his brilliant and extroverted playing style and discussed his ‘dark’ sound, linking it directly to Isobel Carter’s sound and the German tradition.
While Don Westlake was recognised as an important influence on the SSO, he did not teach any of the participants.

4.3.3 International Study

The beginning of each interview focussed on the educational and training backgrounds of each clarinettist. This topic area covered early education, university education, overseas study (both formal and informal) and competitions won. Through this discussion it became clear that the overseas training of members of the MSO was quite different to that of the SSO members.

Three out of five MSO members studied for at least 18 months in the Austro-German tradition, and a fourth undertook a shorter period of study in Austria. In contrast only one out of six members of the SSO studied for a long period of time in one place (Vienna, 18 months) with the remainder undertaking short periods of study in varying places across Europe, the United Kingdom and America.
5 Discussion

5.1 Sound identities

Clarinettists from the MSO and SSO demonstrated their ability to readily articulate individual and collective clarinet sounds, compare and contrast these sounds and subsequently suggest reasons for perceived differences. They confirmed the original hypothesis; that the MSO and SSO clarinet sections produced different sounds, namely identifiable through the dark/bright differences in sound quality. Participants further extended these differences, reporting other contrasting sound characteristics and thus establishing distinct sound identities for each orchestra. After collating the verbal descriptors used during interviews, the results demonstrated that the sound identity of the MSO was characterised by a dark and homogenous sound that is approached from a technical standpoint. In comparison to this, the SSO’s sound identity is defined by opposing characteristics, as they produce a bright and extroverted collective sound, whilst simultaneously producing varying (heterogeneous) sounds individually.

This study involved listeners describing sound in their own words, without any prompt terms given. This resulted in the use of over 70 different descriptor terms to describe clarinet sound. Some verbal descriptors were used repeatedly, indicating the terminology that has become most frequently used and commonly understood within the clarinet community (Cavitt, 1996). The repeated use of specific descriptors, as well as the use of numerous terms that hold similar meanings, demonstrates that the clarinettists
were able to consistently and reliably describe each clarinet section’s sound (Cavitt, 1996; Garnier, et al., 2007).

The contrasts between the perceptions of the MSO and SSO sound become increasingly clearer when noting that some of the descriptors used are polar opposites (Kendall & Carterette, 1993). The MSO sound is consistently described as dark, whilst the SSO is described as bright, both of which are considered polar opposites in Kendall & Carterette’s (1993) grouping system. Likewise, the MSO is described as having a unified approach to sound, whilst the SSO produces varying sounds within the section. The final primary descriptors, technical and extroverted for the MSO and SSO respectively, can also be viewed as opposing characteristics in some aspects, for example the idea of the ‘straight laced’ and ‘technical’ approach from the MSO is significantly different to the ‘vitusoic’ and ‘extroverted’ SSO.

Previous studies have shown that increased experience and understanding of clarinet sound results in musicians’ ability to reliably differentiate between sounds, to accurately evaluate the quality of clarinet sound and to describe the sound similarly using verbal descriptors (Cavitt, 1996; Chartrand & Belin, 2006; Darke, 2005; Erickson, 2002; Pitt, 1994; Worthy, 1996). The clarinetists involved in this study are considered experts in their field due to their extensive experience as professional orchestral clarinetists, tertiary teachers and performance assessors. The direct and primary experience that the participants brought to the study ensured that any subtle differences in sound, as well as reasons for these differences, could be recognised and identified (Wapnick & Freeman, 1980; Warrier, 2002; Worthy, 1996). The high level of expertise across interviewed
clarinettists guaranteed that relevant assessments of clarinet sound would be made, as all clarinettists had similar personal expectations and criteria for orchestral clarinet sound (Smith, 2004). Similarly, the use of experienced participants produced a list of reliable and commonly understood verbal descriptors, as participants’ vocabulary was highly developed and refined (Garnier, et al., 2007).

5.2 **Explanations for orchestral sound identities**

Whilst assigning verbal descriptors to the MSO and SSO clarinet sounds participants spontaneously suggested explanations for the descriptions and for the differences between the two orchestras. Together, the verbal descriptors and the explanations form the sound identities for each orchestra. The characteristics of the MSO and SSO’s individual sound identities are listed in Figure 3. The explanations for the development of the verbal sound descriptors are fully detailed in the ensuing chapters.
<table>
<thead>
<tr>
<th>Verbal Descriptor</th>
<th>Explanations</th>
<th>Verbal Descriptor</th>
<th>Explanations</th>
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<tbody>
<tr>
<td>Dark</td>
<td>Tuning practices - A440Hz</td>
<td>Bright</td>
<td>Tuning practices - A441Hz</td>
</tr>
<tr>
<td></td>
<td>Mouthpiece selection - series 13 mouthpieces tuned to A440Hz</td>
<td></td>
<td>Mouthpiece selection – Majority use mouthpieces tuned to A442Hz</td>
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<tr>
<td></td>
<td>Majority use of size 4 reeds in current section</td>
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<td>Majority use of size 3 reeds in current section</td>
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<td></td>
<td>Isobel Carter heritage – German/dark.</td>
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<td></td>
<td>Majority studied in German/Austrian school, characterised by dark sound</td>
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<tr>
<td>Unified</td>
<td>Use of similar mouthpieces</td>
<td>Varying</td>
<td>Use of different mouthpieces</td>
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<td>(homogeneous)</td>
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<td>(heterogeneous)</td>
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<td></td>
<td>Shared blending responsibility</td>
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<td>Leaving blending responsibility with second clarinet</td>
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<td></td>
<td>Shared German/Austrian study experience</td>
<td></td>
<td>Varying international influence through study</td>
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<td></td>
<td>Isobel Carter pedagogic influence</td>
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<td>Technical</td>
<td>Shared blending responsibility</td>
<td>Extroverted</td>
<td>Pedagogic influence</td>
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<td>Leaving blending responsibility with second clarinet</td>
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Figure 3: The sound identities of the MSO and SSO clarinet sections as described by the clarinetists. Verbal descriptors for sound are matched to their explanations for the differences in sound.
5.2.1 The clarinet

During interview analysis it became evident that the dark/bright sound differences were partially related to technical conventions within each orchestra; namely the tuning practices and related issues. According to Wapnick and Freeman (1980), there is a perceived correlation between flatter pitch and dark timbre, and conversely between sharper pitch and bright timbre. The flatter MSO (A440Hz) will therefore have a darker sound than the sharper SSO (A441Hz), which will produce a brighter sound. Clarinettists often reported on the differences in tuning practices and the differences in dark/bright sound independently of each other, not necessarily relating the two. This corroborates the often unrecognised, yet frequently perceived correlation between flat-dark and sharp-bright timbres as discussed by Wapnick and Freeman (1980). Two clarinettists specifically recognised the relationship between the tuning and the dark/bright sound, further supporting this. The dark/bright sound qualities of the MSO and SSO could therefore potentially remain true for the entire orchestra; however this study refers only to the perceptions of the clarinettists in regards to their own sounds, and collective sounds of their section.

Clarinettists of the MSO have explained that the tuning practices of their orchestra relate directly to their choice of mouthpiece and reed. Four out of five MSO clarinettists found it necessary to perform on the series 13 Vandoren mouthpieces (tuned to A440Hz) in order to accommodate the flatter tuning. This choice by MSO clarinettists directly corresponds with a darker sound quality, as these mouthpieces are designed to play flatter, corroborating the link between flat-dark timbre (Wapnick & Freeman,
In conjunction with this two out of three of the current MSO members use Vandoren size 4 reeds, which also produce a darker tone colour due to the thicker cane needed to manufacture this strength reed (Intravaia & Resnick, 1968). Although this choice of reed may have had little to do with the clarinettists desire to produce a specifically darker tone colour, it has inadvertently worked to this effect.

The majority of MSO clarinettists interviewed use similar mouthpieces, supporting the reported idea that there is a history of using similar clarinet equipment within the section. This usage produces a practical explanation for the unified and homogenous sound characteristics that the majority of clarinettists identified in the MSO’s sound. All mouthpieces are designed to enhance different aspects of clarinet timbre, thus producing very different sounds (Brymer, 1976; Cox, 1995; Pino, 1980). Conversely, the use of similar mouthpieces will strongly increase clarinettists’ ability to blend their individual sounds and create a homogenous collective sound.

In contrast, clarinettists from the SSO all use different mouthpieces and no members of the SSO reported choosing mouthpieces specifically to cater to the tuning practices of the orchestra, nor to match their colleagues’ sounds. This perceived freedom of choice has lead to the use of a variety of mouthpieces, all of which inevitably have different sound characteristics due to their varying designs (Brymer, 1976; Cox, 1995; Pino, 1980). This use of different mouthpieces justifies the perceived varying and heterogeneous sound quality within the SSO section.
In the same way that flat tuning corresponds with a dark timbre, sharp tuning corresponds with a bright timbre (Wapnick & Freeman, 1980). The use of sharper mouthpieces (A442Hz) by four out of five clarinettists in the SSO has therefore contributed to the perceived bright sound quality. This is further supported by the use of size 3 reeds by the majority of current SSO members, which produce a brighter sound than the harder size 4 reeds used by the majority of current MSO members (Intravaia & Resnick, 1968).

5.2.2 The clarinet in the orchestra

It is generally understood that within the orchestral structure the principal clarinettist is charged with performing the solos and the main line, whilst the second clarinettist must blend with the principal, support them and follow them in aspects of sound and style (Cox, 1995; Hannan, 2003). When discussing these roles with participants, different priorities for each orchestra became evident. In the SSO the second clarinettist primarily undertakes the responsibility of blending. In contrast, the MSO clarinettists reported that it is a collective responsibility, with all members working together to ensure a thoroughly blended sound. This matches the clarinettists’ reports of the MSO’s unified collective sound. This unanimous approach to blending can be considered quite disciplined, and can thus contribute to the technical descriptor being used when discussing the MSO’s collective sound qualities. In contrast, the SSO’s reduced focus on collective blending matched clarinettists’ reports of a more variable and heterogeneous sound in the section. It can also be seen to contribute to the soloistic and extroverted descriptions of the SSO sound, as clarinettists take a more individualistic approach to sound, rather than collectively blending together.
5.2.3 Heritage and training

Clarinetists reported that specific past members of the MSO, and to a lesser extent, the SSO had made significant impacts on the traditional sound ideals of each orchestra’s clarinet section. Brymer (1976) commented that prominent clarinetists influence developing clarinetists through their performances, their teaching and their recordings. Their revered styles and sounds are adopted by the developing clarinettist, and then carried forth in their own performing and teaching, thus starting a ‘tradition’ that was inspired by the original prominent clarinettist. In the case of the MSO, Isobel Carter reportedly influenced the sound tradition in the clarinet section. Not only did clarinetists directly link her sound to the continued sound ideals held by MSO members, they described her sound using similar verbal descriptors to those used when describing their own sounds and the collective sounds of the section; dark, mellow, even.

As demonstrated in the family tree in Figure 2, Carter was a prominent pedagogic influence within the MSO clarinet section. She directly taught two clarinetists interviewed, and indirectly influenced the remaining three clarinetists interviewed through a ‘pedagogic lineage’ (i.e. they studied under someone who had studied with her etc). This orchestral lineage not only demonstrates the potential influence of Carter on the clarinet section, however also presents shared pedagogic and training experience, which contributes to the MSO’s unified sound.

A number of clarinetists reported that Carter studied in Germany and adopted many aspects of the German sound (Brymer, 1976). Interestingly four out of five MSO
clarinettists interviewed also studied in Germany/Austria. This shared experience of the German tradition, both passed on through Carter’s pedagogic and historical influence within the orchestra and developed through international study in Germany/Austria, contributes to the unified and homogenous sound qualities. These pedagogic experiences may also be related to the resounding dark sound quality of the MSO clarinet sound.

Clarinettists recognised that for the SSO, Don Westlake was an original influence on the desired sound ideals. Unlike the MSO tradition however, clarinettists did not specifically mention any lasting influences remaining in the sound ideals of the section today. While clarinettists talked about Westlake’s sound, they did not refer to any specific features that would leave a sound legacy.

In contrast to the MSO, the SSO does not have shared international education and training experiences. Most SSO clarinettists studied for only short periods of time in a number of different places internationally. This can be seen to contribute to the varying and heterogeneous sounds that are created in the SSO section, as all members were exposed to different international traditions and thus brought differing ideas and experiences into the ensemble.

5.2.4 Clarinettists’ shared pedagogic influence

Two out of three current members of each orchestra studied under the same clarinet teacher (M1). Despite this similarity, the members of the MSO and SSO have adopted different aspects of this teacher’s influence. M1 was described as having a dark and
‘German’ sound that was firmly grounded in Isobel Carter’s tradition. This teacher (M1) evidently contributed to the MSO clarinettists’ desired sound ideals, effectively promoting a dark sound.

Whilst the SSO clarinettists did not inherit this dark tone quality from M1, their extroverted sound may have been influenced through their tuition with M1, whom they described as being a brilliant soloist, with a lot of flare and excitement in his playing. Clarinettists described the SSO as extroverted and soloistic, demonstrating an aspect of pedagogic influence from M1 that was adopted in the SSO.

5.3 Future Directions

The primary strength of this study lies in the use of appropriate participants; those directly involved in producing the ‘sound’ under investigation. As these interviews confirmed that the clarinettists themselves perceive differences in the sound identities, it is now important to examine the perceptions of other listeners. Future studies should replicate these semi-structured interviews with a wider range of participants who are familiar with both orchestras (i.e. participants who have experience listening to the orchestras or performing in them). This will confirm whether these performers’ views achieve consensus from a wider range of listeners.

To extend the validity of these findings, an active perceptual test should investigate whether listeners (including performers themselves) can accurately differentiate between the two clarinet sections. The two clarinet sections should be recorded playing a number of the same excerpts of music, which should then be compared in descriptive
tasks. Listeners would not be informed of the aims of the study, nor of the specific orchestra sections so as to reduce bias and preconceived ideas of sound quality.

In the first task, listeners would hear and describe individual clarinet section excerpts. These descriptions could then be analysed to discover if listeners used specific verbal descriptors more frequently when describing each orchestra (i.e. were the MSO frequently described as being dark, and the SSO frequently described as being bright). The second task in the study would require listeners to compare sound excerpts by each section (or the same section) and state whether excerpts heard were performed by the same or different clarinet sections. These descriptive and comparative tasks would construct unbiased perceptions of the clarinet sound that is produced for each orchestra. They would effectively confirm and/or validate the clarinettists’ perceptions discussed in this thesis.
6 Conclusions

This thesis confirmed the commonly held perception that the MSO and SSO clarinet sections produce distinctly different collective sound qualities. The study has made valuable contributions to music research for musicians, performers and musicologists. It has discussed clarinettists’ perceptions of individual and collective clarinet sounds, and extended the scope of terminology used to describe clarinet sound. It has established a more comprehensive understanding of clarinet sound, linking numerous sound influences and detailing how they have aided in the formation of the sound identity of each orchestra. These findings have also contributed to the current knowledge of clarinet performance in Melbourne and Sydney, providing the origin of the clarinet sound in each orchestra.
7 References


direct, Neuroscience letters, 405*(3), 164-167.


APPENDIX A: ETHICS APPLICATION

The University of Sydney

Human Research Ethics Committee
Web: http://www.usyd.edu.au/ethics/human

Marietta Coutinho
Deputy Manager
Human Research Ethics Administration

Human Research Ethics Committee

Telephone: +61 2 9327 8176
Facsimile: +61 2 9327 8177
Email: mcoutinho@usyd.edu.au

Mailing Address:
Level 6
Jane Foss Russell Building – 002
The University of Sydney
NSW 2006 AUSTRALIA

Ref: DC/PR

3 November 2009

Dr Helen Mitchell
Sydney Conservatorium of Music - C41
The University of Sydney
Email: h.mitchell@usyd.edu.au

Dear Dr Mitchell

I am pleased to inform you that the Human Research Ethics Committee (HREC) at its meeting held on 6 October 2009 approved your protocol entitled “The Development of Clarinet Sounds: A study of the clarinet sections in the Melbourne Symphony Orchestra and Sydney Symphony Orchestra”.

Details of the approval are as follows:

Ref No.: 10-2009/12202
Approval Period: 20 October 2009 to 20 October 2010
Authorised Personnel: Dr Helen Mitchell
Emma Hunt

The HREC is a fully constituted Ethics Committee in accordance with the National Statement on Ethical Conduct in Research Involving Humans-March 2007 under Section 5.1.29

The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Research Involving Humans. We draw to your attention the requirement that a report on this research must be submitted every 12 months from the date of the approval or on completion of the project, whichever occurs first. Failure to submit reports will result in withdrawal of consent for the project to proceed.

Chief Investigator / Supervisor's responsibilities to ensure that:

(1) All serious and unexpected adverse events should be reported to the HREC as soon as possible.

(2) All unforeseen events that might affect continued ethical acceptability of the project should be reported to the HREC as soon as possible.
(3) The HREC must be notified as soon as possible of any changes to the protocol. All changes must be approved by the HREC before continuation of the research project. These include:-

- If any of the investigators change or leave the University.
- Any changes to the Participant Information Statement and/or Consent Form.

(4) All research participants are to be provided with a Participant Information Statement and Consent Form, unless otherwise agreed by the Committee. The Participant Information Statement and Consent Form are to be on University of Sydney letterhead and include the full title of the research project and telephone contacts for the researchers, unless otherwise agreed by the Committee and the following statement must appear on the bottom of the Participant Information Statement. Any person with concerns or complaints about the conduct of a research study can contact the Deputy Manager, University of Sydney, on (02) 8627 8176 (Telephone); (02) 8627 8177 (Facsimile) or human.ethics@unsw.edu.au (Email).

(5) Copies of all signed Consent Forms must be retained and made available to the HREC on request.

(6) It is your responsibility to provide a copy of this letter to any internal/external granting agencies if requested.

(7) The HREC approval is valid for four (4) years from the Approval Period stated in this letter. Investigators are requested to submit a progress report annually.

(8) A report and a copy of any published material should be provided at the completion of the Project.

Yours sincerely,

[Signature]

Professor D I Cook
Chairman
Human Research Ethics Committee

cc: Emma Hunt, Sydney Conservatorium of Music - C41
Email: ehm3648@uni.sydney.edu.au

End: Approved Participant Information Statement, updated
Approved Invitation Letter, updated
Approved Participant Consent Form
Approved Semi-Structured Interview Format
APPENDIX B: PARTICIPANT INFORMATION SHEET

PARTICIPANT INFORMATION STATEMENT

Research Project

Title: The development of clarinet sounds.

(1) What is the study about?
The study is investigating the clarinet sound produced by clarinetists in Australian Orchestras.

(2) Who is carrying out the study?
The study is being conducted by Emma Hunt, student, and will form the basis for the degree of master of Music at the University of Sydney, under the supervision of Dr Helen Mitchell, Lecturer at the Conservatorium of Music.

(3) What does the study involve?
You will be asked to participate in a semi-structured interview which will be recorded for later transcription. The interview will be focused on descriptions of sound. You will also be asked about your education and clarinet performance experience.
Following this you will be asked to play a short excerpt of music which will be recorded. This will be used for reference only and to match your sound to the description you have given in the interview.

(4) How much time will the study take?
The study will last between 45-60 minutes. Following this there will be minimal email contact to clarify any misunderstandings and allow you to read through your transcriptions and make corrections if necessary.

(5) Can I withdraw from the study?
Being in this study is completely voluntary - you are not under any obligation to consent and - if you do consent - you can withdraw at any time without affecting your relationship with the Conservatorium of Music, University of Sydney.
You may stop the interview at any time if you do not wish to continue, the audio tape will be erased and the information provided will not be used in the study.

(6) Will anyone else know the results?
All aspects of the study, including results, will be strictly confidential and only the researcher will have access to information on participants. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

(7) Will the study benefit me?
This study will benefit clarinetists and musicians interested in verabalising and teaching ideas of sound quality. It will also be beneficial to anyone interested in the history of the clarinet sections in the orchestras being studied.
You will be offered detailed information on the results when the study has been completed.

(8) Can I tell other people about the study?
The development of clarinet sounds

Participant Information Statement

Page 1 of 2
(9) **What if I require further information?**
When you have read this information, Emma Hunt will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact Emma Hunt on 0449 891 288 or ehunt3648@uni.sydney.edu.au

(10) **What if I have a complaint or concerns?**

Any person with concerns or complaints about the conduct of a research study can contact the Deputy Manager, Ethics Administration, University of Sydney on (02) 8627 8176 (Telephone); (02) 8627 8177 (Facsimile) or human.ethics@usyd.edu.au (Email).

*This information sheet is for you to keep.*
APPENDIX C: PARTICIPANT CONSENT FORM

PARTICIPANT CONSENT FORM

I, .................................................. [PRINT NAME], give consent to my participation in the research project.

TITLE: The development of clarinet sounds.

In giving my consent I acknowledge that:

1. The procedures required for the project and the time involved have been explained to me, and any questions I have about the project have been answered to my satisfaction.

2. I have read the Participant Information Statement and have been given the opportunity to discuss the information and my involvement in the project with the researcher(s).

3. I understand that I can withdraw from the study at any time, without affecting my relationship with the researcher(s) or the Conservatorium of Music, University of Sydney now or in the future.

4. I understand that my involvement is strictly confidential and no information about me will be used in any way that reveals my identity.

5. I understand that being in this study is completely voluntary – I am not under any obligation to consent.

6. I consent to: – i) Audio-taping  YES ☐ NO ☐

   ii) Receiving Feedback  YES ☐ NO ☐

If you answered YES to the "Receiving Feedback Question", please provide your details i.e. mailing address, email address:

Feedback Option  Address:

                      
                      
                      Email:

Signed: ___________________________ Date: ________

Name: ___________________________ Date: ________

The development of clarinet sounds  Participant Consent Form  Page 1 of 1