ENJOYING THE OPERATIC VOICE: A NEUROPSYCHOANALYTIC EXPLORATION OF THE OPERATIC RECEPTION EXPERIENCE

A thesis submitted for the degree of Doctor of Philosophy

by

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In memory of my mother

For my parents, who instilled in me a passion for words and music,
and my wife, Michelle, for her enduring patience during my quest to find my own voice.

Abstract

There has been a long-standing and mutually-informing association between psychoanalysis, literature and the arts. Surprisingly, given the oral/aural basis of the 'talking cure', music has largely been overlooked by psychoanalysis. On the other hand, neuroscientific research investigating music reception and production has been increasing steadily in range and scope over the years. However, in order to avoid confounding factors, empirical studies have focused primarily on non-vocal music. Operatic vocal music has not featured prominently in either field. Yet the multi-dimensional, multi-layered nature of opera, which fuses together a number of different arts, would appear to provide fertile soil for both disciplines. This thesis aims to fill that gap, providing a stepping stone for further research. The individual strengths of psychoanalysis and neuroscience are leveraged separately at first, according to a 'complementarist' approach, and then jointly as the inter-discipline of neuropsychoanalysis. By combining various theories of mind with current knowledge about music processing in the brain, a more comprehensive understanding of the reception experience can be achieved. As a result, a neuropsychoanalytic theory can be formulated to account for the operatic reception experience in subjective as well as objective terms. According to this theoretical formulation, the bittersweet enjoyment of operatic vocal music, which can literally move an operaphile to tears, lies in a number of subjective dynamics that are unique to the reception of opera, rather than in any distinct objective neural processes, which are common to the reception of all music. These subjective dynamics, which are recruited during neural processing, are triggered by the equally unique features of the operatic voice, in combination with a number of auxiliary elements that are specific to opera.

Key words: opera, vocal music, psychoanalysis, neuroscience, neuropsychoanalysis.

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Overture

This research was motivated by a lifelong passion for opera, as well as the consequent desire to understand why and how this genre of vocal music is capable of evoking an intense yet seemingly inexplicable emotional response. At the peak of its intensity, the ineffable *qualia* of this emotional response features what can only be described as a bittersweet transcendent experience that combines at once extreme bliss and sorrow. After the tension has developed surreptitiously, to a point at which it is no longer bearable, the intensity of the resulting emotional response may suddenly erupt, without notice, in the form of physical manifestations that can range from *frissons* and piloerection to a sense of anxiety, feeling 'choked up' and tearful. Although this type of emotional response may not be wholly restricted to the reception of opera, the *qualia* of the operatic reception experience is nonetheless unique because of the underlying subjective dynamics, as proposed and discussed in this thesis. The reason for this may lie in the equally unique features of the operatic voice, particularly in the higher vocal registers. These concepts have been covered by Michel Poizat (1992 [1986]) in his psychoanalytically-informed book *An Angel's Cry: Beyond the Pleasure Principle in Opera*, which ultimately inspired this research. Poizat's thoughtful and thought-provoking application of psychoanalytic theory to opera stands somewhat (although not entirely) alone in terms of the depth and breadth of material that is covered. Although perhaps less broad in its coverage, a comparably detailed contribution can be found in *Opera's Second Death* by Žižek and Dolar (2002). More recently, the book *A nuda voce: vocalità, inconscio, sessualità* by the Italian psychoanalyst and voice coach Laura Pigozzi (2008) provides a broadly-based psychoanalytic exploration of the singing voice, though primarily in terms of its production. The literature in applied psychoanalysis (i.e. non-clinical) has never been replete with material dealing with music, and even less in the case of opera. Possible reasons for this will be discussed in Chapter 2.

A further motivation in exploring the reception of the operatic voice has been the steadily growing interest over the years, on the part of neuroscientists, in research related to music and emotion. However, despite the increasing number and the impressive scope of empirical studies in this area, using a wide variety of methods and technologies ranging from psychological scales to neurophysiological measures, comparatively little attention has been paid to the reception of opera, or indeed to vocal music in general. This may be due to the scientific requirement of eliminating confounding issues, as will be discussed elsewhere. Although the results of these studies provide much insight into the neurofunctional and neurochemical processes involved in the reception and enjoyment of music, the origins and *qualia* of the resulting affective response are still for the most part elusive. Neuroscientific knowledge of this type has mutually informed, complemented and advanced other areas, such as the broader field of emotion, neuropathology and music therapy. In a similar way, a mutual reciprocity has developed over the years between neuroscience and psychoanalysis, mainly in a clinical context, giving birth to the relatively new but established inter-discipline of neuropsychoanalysis. The power of this approach lies in its ability to deal both separately and jointly with the subjective mind and the objective brain. Given the versatility of this approach, it has been adopted as the methodological framework for this research. In doing so, an attempt has been made to reconcile neuroscientific knowledge and psychoanalytic theory, providing a parallel account that focuses on inter-disciplinary meshing points, in order to explore a genre of vocal music that has been largely overlooked by both fields.

The aim of this research is to try to understand not only *how* operatic vocal music is processed and enjoyed, but also *why* it is enjoyed, in particular as regards the subjective experience of the intense affective response that it is capable of evoking in the operaphile. Specifically, this research explores the following three areas: 1) the origin and nature of the intense affective response that is evoked in some listeners by the operatic voice; 2) how and why the operatic voice is enjoyed; and 3) the notion that the enjoyment of the operatic voice has something erotic about it. By adopting this dual-pronged approach, the separate strengths of both fields in combination may provide a tool that is at least somewhat better equipped to tackle the complex, multi-dimensional aspects of the operatic reception experience as a whole, while focusing on the operatic voice. This is a long-standing methodological problem that was highlighted in Carolyn Abbate's (1992: 118) "Analysis" in *The New Grove Dictionary of Opera*:

> The central problem remains the necessity to cope with an art that mixes various languages (visual, verbal, musical); this problem has affected every writer on opera, and can be said to twist his or her own interpretative language. While opera combines three basic systems, an analytical methodology has yet to be developed that is capable of discussing these as they exist in an ideal experiential reality, as aspects of a single and simultaneously perceived entity. Virtually all operatic interpretation has been forced to dissect the operatic experience, focus

> separately upon the music, the text and the visual form of any operatic passage (i.e. 'while the text spoken is this, we see that on stage, and the music does this'). Opera analysis deals monophonically with what in performance is a visual-textual-musical polyphony. To be sure, analysis often seeks for a relationship between these systems, yet such a search is itself born of interpretation's inability directly to reflect or translate the complex simultaneities of opera. Analysing opera thus inevitably creates a fundamental schism, and its quest for relationships is perhaps driven by longing for a whole object that the act of analysis has itself unfused.

On a related but separate note, it may be worth mentioning an observation that emerged from time to time in the early stages of this research, while discussing some of its aspects at conferences. A potential flaw was perceived in successfully reconciling, or perhaps making a more evident and palpable connection between two disciplines that are sometimes considered to be quite separate and therefore essentially irreconcilable. The task bears a resemblance to that of the operatic singer, who must "reconcile the irreconcilable" (Scotto Di Carlo 2007b: 564), that is attempt to achieve intelligibility without compromising the production of beautiful sound. In the case of this research, the criteria relate to ensuring uniformity and coherence by adhering to a rigorous approach. It is hoped that these criteria have been largely met by adopting an intermediate 'complementarist' approach, that is dealing initially with the subject matter through the separate lenses of psychoanalysis and neuroscience, and then bringing both into focus through the unifying inter-discipline of neuropsychoanalysis. The analogy of a coin may be useful to clarify this approach. Whilst the two sides of a coin are perceived as forming part of a whole, they are essentially different, especially when viewed separately, in isolation. The unity of the coin is only recognisable when both of its sides are presented at once, as a whole object that can be handled at will. Therefore, dealing separately at first with psychoanalysis and neuroscience allows a closer look at each side – the other side – of the same multi-dimensional coin. This provides a clearer understanding of the distinctive features of the same coin, or what it is that constitutes the wholeness of the coin.

This thesis is articulated in four main chapters. The first chapter is introductory in nature, whilst Chapters 2 and 3 focus exclusively on psychoanalysis and neuroscience, respectively. This allows clarity in the exposition of technical material and concepts that are specific to each field. In addition, it allows this material to be developed within its own epistemological context, before relevant strands are woven together in Chapter 4. This initially 'complementarist' approach has the advantage of bringing transparency to the neuropsychoanalytic discussion in Chapter 4, avoiding the need to intersperse lengthy background explanations and justifications that would inevitably interrupt the flow of the discussion. The Conclusion provides a closing section for the thesis.

Chapter 1 lays the foundations of this thesis by stating the aims and scope of the research, as well as the limitations of its conceptual approach. A brief history of opera will be provided, followed by a discussion of the tension between words and music that has characterised opera since its beginnings. The relevance of this discussion lies in the significant role of language in psychoanalysis, as dealt with in Chapter 2, and the overlap identified by neuroscience between the processing of language and music, as covered in Chapter 3. On a related theme, considerations about the multi-layered nature of this art form and its constituent elements serve as a basis for the psychoanalytic notions that will be developed in Chapter 2 and amplified in Chapter 4. An overview of some elements of feminist and queer theory related to music and opera contributes to 'rounding out' the background information provided in this chapter, as well as informing some of the discussions in subsequent chapters. The concluding section will deal with the inter-disciplinary connection between psychoanalysis and neuroscience. This section explains the conceptual framework of the neuropsychoanalytic approach adopted in this thesis, thus serving as a preamble to the subsequent chapters.

Chapter 2 will consider the various dynamics at work within opera and in the reception experience exclusively through the lens of psychoanalysis. The ultimate aim of this chapter is that of attempting to establish *why* the operatic voice is enjoyed by the operaphile, as well as identifying possible factors that may contribute to the intense affective response that it can evoke. In order to do so, various theories of Sigmund Freud, Jacques Lacan and Donald Winnicott, amongst others, will be introduced, applied and discussed. The introductory overview that opens the chapter will be followed by a discussion of applied psychoanalysis, the various approaches that can be used, their advantages and limitations, and the particular approach that has been adopted in this thesis. As a logical progression, the issues of validity and validation of applied psychoanalysis will be examined, with considerations as to why psychoanalysis has never paid a great deal of attention to music in general, and opera in particular, compared to literary and figurative arts. Freud's (1961 [1936]: 430) self-proclaimed ignorance of and outward aversion to music will be analysed as a possible factor. The subsequent exploration of the significance of the voice and the gaze, as lost or partial objects, in the operatic reception experience will lead into a discussion of the synaesthetic-like effect that can result when the voice and the gaze overlap, especially although not exclusively, in the primary or privileged context of the opera house. The focus will then shift from the sensory to the sensual aspects of the reception experience, namely the function of desire and its circuitous path that drives the operaphile's quest to (re-)encounter the lost vocal object, fuelling an inherent eroticism that manifests as enjoyment in the form of the 'operatic orgasm', or vocal *jouissance*. The role of gender will also be taken into account. Resuming and amplifying the discussion that began in Chapter 1, the various 'layers' of opera will be considered in greater detail, in relation to the Lacanian orders of Symbolic, Imaginary and Real, including the nested, triadic nature of each order. Given the operaphile's ultimate focus on the singing voice, an attempt will then made to identify the position of the operatic voice in relation to the fetish and *objet petit a*. The chapter will close by looking at the intermediate space of illusion in opera and how this can function as a transitional experience for the operaphile, based on Winnicott's (1953) theories about transitional objects and phenomena. Consequently, the notion will be proposed that opera can provide a solacing experience for the operaphile because of an enduring link with the mother.

In Chapter 3 the focus shifts from psychoanalytic theory to the wide-ranging neuroscientific research on music, its reception, neural processing and enjoyment. Due to the requirement of eliminating confounding factors in empirical studies, opera and vocal music in general are largely absent from the material presented in this chapter. The research findings are nonetheless relevant to vocal music when one considers that the voice is looked upon by singers as an instrument. In other words, the voice can be said to function both *in* music and *as* music. Both of these functions will be addressed in this chapter by examining the overlap in the neural processing of language and music, as well as the progressively differential processing of lyrics and music in songs. Following an introductory overview, the origins of music and singing will be explored by drawing on various material, including theories of evolutionary psychology and biology relating to animals and human beings. Hypothesised purposes and functions of music and singing will be considered, such as the selection of mates, the regulation of affect and behaviour, cohesion in collaborative work, and bonding between mother and infant. The related themes of the role of culture, society, memory and language in the reception of music will also be examined. Moving on from this background material, the overlap between the neural processing of language and music will be addressed, as well as the innate capacities of human beings for both language and music and the processing of syntactical rules. In addition, this discussion will cover the role of Broca's area in the processing of music and language, including historical considerations relating to this area of the brain and its ongoing importance in neural research. Continuing to delve deeper into the brain, a description will be provided of the neural underpinnings of the music reception experience and its enjoyment, with a subsequent detailed examination of the constituent elements of music, their perception and processing. The vocal dimension will be introduced by looking at voice production and reception, as well as the similarities and differences between singing and speaking. As the enjoyment of music may lie in the affective response that it can evoke, the subject of music and emotion will be dealt with in terms of the distinctions between the conveyance, perception and induction of emotion. On a related theme, evidence will be reviewed concerning reported differences in the affective response to music with and without lyrics among male and female listeners. In closing the chapter, the notion will be proposed of a possible connection between the enjoyment of listening to music and sexual arousal/orgasm. In order to do so, a range of human sexuality research findings will be adduced.

In Chapter 4 the unifying inter-disciplinary lens of neuropsychoanalysis will bring into focus various themes that were dealt with separately in the previous chapters, according to an initially 'complementarist' approach. The aim of this chapter is that of bringing to bear at once the combined strengths of both constituent fields of neuropsychoanalysis on the operatic reception experience, in order to gain new insight into the nature of the operaphile's enjoyment of the operatic voice. It is hoped that the notions proposed in this chapter will provide a more rounded account of this experience in both subjective and objective terms. As a result, it is also hoped that this will mutually inform the fields of psychoanalysis and neuroscience, perhaps inspiring further empirical research that takes into account both the subjective and the objective aspects of music reception in general. This chapter will specifically address the three areas that this research aims to investigate: 1) *how* the operatic voice is enjoyed and possible reasons *why*; 2) the origin and nature of the intense affective response that is evoked in some listeners; and 3) whether enjoyment of the operatic voice has something erotic about it. Consequently, the bulk of this chapter will deal with these questions/research areas from a neuropsychoanalytic perspective. Following an introductory opening, relevant neuroscientific findings about music reception will be drawn together with pertinent psychoanalytic theory, in an attempt to understand in objective and subjective terms how and why the operatic voice is enjoyed. Leading on from this, previous material from both fields will be synthesised and discussed in order to investigate the origins and nature of the powerful emotional response that is evoked in operaphiles by the operatic voice. Having dealt with these topics, the discussion will move on to consider the role of eroticism in the operaphile's enjoyment of the operatic voice. In order to do so, current neuroscientific knowledge about music processing in the brain will be interpreted based on the significant role of the subjective mind. The chapter will conclude by proposing an original theoretical neuropsychoanalytic formulation that combines the essential subjective and objective dynamics of the operatic reception experience, in an attempt to account for the operaphile's enjoyment of the singing voice in opera – the vocal *jouissance* of the 'operatic orgasm'. This theoretical formulation encapsulates concepts discussed throughout the thesis. These concepts include the gradual undoing of language by the singing voice and the progressively separate neural processing of language and music, with the attendant differential release of dopamine, distinguishing the anticipatory and consummatory phases of listening to vocal music. The way in which hormones mediate emotional response and the connection with experiences of bonding. Factors that contribute to the eroticism of the reception experience and the listener's enjoyment in the form of vocal *jouissance*. The possible role of specialised neural circuits that evaluate rewards prior to their consummation and enjoyment. The proposed connection between all of these is a link with the mother as an enduring primary process presence in the transitional experience of opera, which can provide a source of solace. All of this leads to the tentative conclusion that the bittersweet enjoyment of the operatic reception experience lies more in a number of subjective dynamics that are unique to the reception of opera, rather than in any distinct neural processes, which are common to the reception of all music. These subjective dynamics are fuelled by the equally unique features of the operatic voice, particularly in the higher registers, as well as a number of auxiliary elements that are specific to opera.

Chapter 1 – Setting the Scene

Introduction

The paucity of psychoanalytic and neuroscientific material dealing specifically with the singing voice in opera, or other genres of vocal music may be viewed at first glance as a drawback of some significance in terms of supporting material in either of these disciplines. Indeed, reference to material dealing specifically with non-vocal music, such as the findings of the majority of neuroscientific studies described in chapter three, may even be regarded as antithetical or contradictory to the aims of this thesis. However, whilst this thesis will contribute to breaching the apparent gap both within and between the fields of psychoanalysis and neuroscience, a general premise should also be borne in mind about the singing voice. The premise concerns the distinction between singing and music, a consideration that goes beyond a mere question of terminology or semantics. As such, clarification of this point early on is of fundamental importance in order to ensure the transparency of discussions, as well as the perceived relevance and coherence of supporting material referenced throughout this thesis. Given that singers look upon their voices as an ‘instrument’, it follows then that this musical instrument, like any other, produces music. For the purpose of specific identification, this music is referred to respectively either as singing or vocal music – music by any other name. Consequently, the singing voice, the voice *in* music (in this case opera) is regarded as music in its own right, namely the voice *as* music. The singing voice represents one particular musical dimension that is both distinct from and integral to the heterogeneous musical whole of opera. As will be discussed later in different contexts, the singing voice as vocal music occupies subtly varying positions ranging from at-oneness with to detachment from the orchestral music of opera. This relatedness and un-relatedness also characterises the relationship that exists between the voice as music and the mediating role of the language of the lyrics through which the voice expresses itself. Because of this, the singing voice occupies a particular and privileged position in the musical and lyrical whole of opera. Through language and music in opera, the singing voice – the voice *in* music and the voice *as* music – is ultimately able to transcend both language and music, as will be explored in psychoanalytic terms in the next chapter.

1.1 Aims, Motivations and Scope of Research

According to the Italian philosopher Giambattista Vico (1668-1744), context is required in order to get at the truth, rather than reason alone operating in a void (Baruchello 2008: 98). Vico affirmed that culture (which may be interpreted as context for the purposes of this research) occupies a central role in any intellectual pursuit, including the sciences, given the extent of knowledge that is contained in such fields as poetry, art or religion. Unlike science, Vico claimed, these allow reason to be combined with involvement of the human body and the heart. Vico's statement "*verum ipsum factum*", namely that we can only fully understand what is made by human beings, applies to this research in that human sciences are used to explore the man-made cultural artefact of opera. Inversely, as Vico believed, the study of cultural artefacts provides insight about the human mind (Danesi 1993: 31-37), given that they are products and extensions of the mind itself. As will be discussed later, in the case of music, cultural artefacts are capable of affecting the anatomy and function of the brain (Mithen and Parsons 2008). If one accepts that "aesthetics starts where what cannot be said can be shown" (Ayerza 2000: 5), then the asemic (i.e. no semantic content) quality of music, namely that which cannot be said about music, but only performed or heard, may only be understood through aesthetic intuition.

It may be argued that art, unlike science, does not necessarily develop based on previous achievements and discoveries; great art embodies the paradoxical quality of being a reflection both of its own time and of the timeless (Plaut 1993: xii). As an art form, opera embodies this quality, assuming the role of mythology (Lévi-Strauss 2001 [1978]: 20-21), where the extremes of emotion that are portrayed and mediated by the subtleties of music appeal more to the heart than to reason and relate to eternally enduring human passions: "love and hate, forgiveness and vengeance, loyalty and betrayal, family bonds and family feuds" (Plaut 1993: xiii). Because of this, with its extremes of emotion both on and off stage, opera would appear to provide an ideal space in which to explore emotion scientifically, within the context of (Western) music, literature, poetry and art.

Taking into account all of the above, this research focuses on the listening/enjoyment experience relating to operatic vocal music – primarily, although not exclusively, operas of the eighteenth and nineteenth centuries. Specifically, this thesis aims to explore and identify in conceptual terms:

1) The origin and nature of the intense affective response evoked in some listeners by the operatic voice.

2) How and why the operatic voice is enjoyed.

3) The proposition that enjoyment of the operatic voice has something erotic about it.

The context of the listening experience encompasses recorded or live music that is either enjoyed privately by individuals or collectively as an audience attending a public performance. In the latter case, additional considerations beyond audition will necessarily be adduced and examined.

The motivations for this research include the following:

- An attempt to adopt a more 'holistic' and 'natural' conceptual approach to exploring emotions that are evoked or mediated by music (Sloboda 2008), especially in light of the paucity of neuroscientific research using real or natural music (Koelsch, Kilches et al. 2008), by considering theories of mind alongside current neuroscientific knowledge about the way in which music is processed in the brain.
- Contributing to bridge the gap that continues to exist between the sometimes oppositional 'scientific' (or 'objective' – both empirical and theoretical) and 'artistic' (or 'subjective') approaches to exploring music and emotion (Sloboda 2007: v-vi).
- The significant role of language in opera and psychoanalysis, as well as the overlap between the processing of language and music in the brain, which is becoming increasingly apparent based on the results of neuroscientific studies (e.g. Koelsch 2005b, 2006, 2009; Koelsch, Maess et al. 2000; Koelsch et al 2001; Koelsch, Gunter et al 2002; Koelsch, Gunter et al. 2005; Koelsch et al. 2006; Koelsch, Jentschke et al. 2007; Koelsch et al. 2010; Levitin and Menon 2003; Maess et al. 2001; Patel 2003, 2008a, 2008b; Patel et al. 1998; Sammler et al. 2010; Steinbeis and Koelsch 2008a, 2008b).
- The somewhat uniquely powerful affective response in some listeners to certain musical features of the operatic voice, most strikingly manifested physically as 'inexplicable' tearfulness, feeling 'choked up', or getting 'a lump in the throat' in response to the high points (higher registers) of the operatic voice (Poizat 1992 [1986]); or the phenomenon of piloerection,

> namely the *frissons* or goose pimples that often accompany the shivers of pleasure experienced by some listeners.

Neuroscientific research projects focusing on music and emotion, as well as related practical applications, such as music therapy, have been increasing in recent years. As evidenced by published material, numerous empirical studies have been and continue to be conducted internationally using a range of techniques and methodologies, including PET (Positron Emission Tomography) (e.g. Blood, Zatorre, et al. 1999; Blood and Zatorre 2001; Jeffries et al. 2003), fMRI (functional Magnetic Resonance Imaging) (e.g. Koelsch, Gunter et al. 2002; Koelsch et al. 2010; Levitin and Menon 2005; Menon and Levitin 2005; Sammler et al. (2010), EEG (electroencephalography) (e.g. Iwaki et al. 1997; Field at al. 1998; Schmidt and Trainor 2001; Tornek et al. 2003), MEG (magnetoencephalography) (e.g. Kujala et al. 1997; Koelsch, Maess et al. 2000; Maess et al. 2001; Schneider et al. 2002; Kuriki et al. 2006, 2007), as well as other physiological and psychological measurement methods. Whilst these studies provide useful information and insights into the way in which music is perceived, experienced and processed in the brain, they do not fully account for or consider how emotions are evoked (Juslin and Västfjäll 2008) or, perhaps more importantly for the purposes of this research, why listeners experience powerful emotions in response to music, beyond associative factors or the mood of the music itself (Patel 2008a: 309). Nor is there very much in these studies to explain why, for example, some opera listeners crave over and over again the bittersweet pleasure of feeling choked up and tearful in response to a particular voice or vocal register (Poizat 1992 [1986]). These lacunae may be usefully bridged by allying neuropsychophysiological (neuroscientific) knowledge about the brain with psychoanalytic theories about the mind, in an attempt at understanding not only *how* we perceive, respond to and enjoy music – and specifically opera in this case – but also *why* powerful affective responses may be evoked in listeners by the operatic voice alone (Zuccarini 2009a, 2009b, 2009c, 2010, 2011). Therefore, the advantage of this interdisciplinary neuropsychoanalytic approach lies in the mutually complementary benefits of marrying the field of psychoanalysis with that of neuroscience.

1.2 Research Limitations

As in any research, the approach adopted in this interdisciplinary conceptual exploration has a number of potential limitations. The multi-faceted nature of opera, which in staged productions includes a strong visual component in addition to the singing voice and orchestral music, can introduce a range of confounding issues. These additional elements that revolve around the voice will be discussed to the extent in which they may relate to the emotive response that is evoked in the listener/audience. As it is arguably the richness of the combined elements of opera that contributes to evoking intense emotion, it would likely be counter-productive to exclude any of them, in particular within the context of a conceptual exploration. Similarly, there is no straightforward way to separate emotion that is evoked by personal associations to the voice (or indeed to any of the other constituent elements of opera), as opposed to emotion that is evoked purely by the voice itself. Perhaps the two sometimes or often go hand in hand, or at least they may be related in some way. Consequently, any efforts at separating the two may ultimately prove to be impossible, as a subtractive or discrete approach can only really achieve a partial answer to what is essentially a diluted response. A discrete stimulus approach would perhaps be more appropriate for an empirical study. Nonetheless, an attempt has been made to focus primarily on the voice (or the voice as music) and its reception, giving equal weight to the listening experience in relation to either recordings or live performances.

Reliance on the published findings of empirical studies conducted by other researchers necessarily involves embracing the potential limitations and any errors inherent in those studies. Study parameters, including subjects and stimuli used, cannot be controlled or selected after the fact to meet the specific needs of this research. Therefore, the conceptual arguments and hypotheses presented in this thesis may benefit from being tested in future in appropriately constructed empirical studies.

Despite these potential limitations, this research features a novel approach combining theories of mind that may help to supplement and integrate the observed workings of the brain. The fundamental importance of language in psychoanalysis and the overlap between the processing of music and language in the brain make this research approach particularly relevant to exploring the dynamics at work in the operatic music-listening experience, the resulting emotive response and the nature of a listener's enjoyment.

1.3 A (Very) Concise History of Opera

Before embarking on the almost impossible task of drafting a concise history of the development of opera, which will necessarily be an incomplete account due to the vastness of the subject matter, it may be useful to attempt formulating a description of what is actually meant by 'opera'. It is not easy to provide a clear-cut definition of opera – much as it is difficult to define what is meant by music (Ball 2008: 160) – given the genre's multiple layers and 'sub-genres', such as *opera buffa*, *opera seria*, *bel canto*, *opéra comique*, grand opera, *verismo*, atonality, serialism, neo-classicism, and so forth. However, leaving aside detailed musicological considerations, which are not directly relevant here and would require a separate extensive discussion in themselves, *opera* is an Italian term meaning 'work'. It is an abbreviation of *opera in musica*, which is used internationally to refer to "a drama to be sung with instrumental accompaniment by one or more singers […]; recitative or spoken dialogue may separate set musical numbers" (Rosenthal and Warrack 1987: 360). The alternative Italian term for 'opera' is *melodramma*, which relates to the fusion of music and drama, but should not be confused with the Victorian 'melodrama' (Budden, s.a.). The key feature that distinguishes an opera from a musical or a play with music, for example, is the fact that the music "is integral and not incidental" (Kennedy, s.a.).

Performances combining drama and music are known to have existed in a number of ancient cultures, notably Greece in the case of the Western world (Lamarque 1988: 517). In the Middle Ages there were a number of works resembling operas, such as "Le Jeu de Robin et de Marion" by Adam de la Halle performed in 1282 in Naples, including various dramas associated with popular and religious festivities (ibid.). Nonetheless, opera is believed to have originated in late sixteenth-century Florence with the intellectuals, poets and musicians of the *Camerata fiorentina*, also known as the *Camerata de' Bardi*, after Count Giovanni Bardi del Vernio in whose home the members of the group met (ibid.: 126). The musician members of the *Camerata* included the astronomer Galileo's father, Vincenzo Galilei (c. 1520-1591), a humanist, composer and music theorist (ibid.: 294). His significant contribution paved the way for the transition between the Renaissance and Baroque periods in music, and he is also credited as being the theorist of the operatic genre, introducing monody (as in the recitative) to replace polyphony, which was by then considered outdated (ibid.: 126). Other musician members included Giulio Caccini (c. 1550-1618), Emilio De' Cavalieri (c. 1550-1602) and Jacopo Peri (1561-1633) (ibid.). Among the poet members of the *Camerata* were Ottavio Rinuccini (1562-1621), who is believed to have been the first librettist in the history of opera ("Dafne", 1597, music by Jacopo Corsi and Jacopo Peri, the latter hosting the first performance in his home) (ibid.: 190), as well as Girolamo

Mei (1519-1594), Gabriello Chiabrera (1552-1638) and Jacopo Corsi (1561-1604) (ibid.: 126). The *Camerata* was disillusioned with the state of music at the time and its members wished to revive the role they believed that music had had in Greek tragedy (ibid.). In the words of Vincenzo Galilei (1950 [1581]: 306-307, cited in Levarie 1984 [1966]: 417), written shortly before the birth of what is generally believed to be the first opera:

> Music exists primarily to express the passions with greater effectiveness and to communicate these passions with equal force to the minds of mortals […]. Hence the rules thus far observed by composers as inviolable laws are directly opposed to the perfection of true music. These rules may be excellent and necessary for the mere delight the ear takes in the variety of the harmonies, but for the expression of conceptions they are pestilent. They [the composers] aim at nothing but the delight of the ear [...] they have not a book among them [...] that speaks of how to express the conceptions of the mind and of how to impress them with the greatest possible effectiveness on the minds of the listeners. […] The last thing composers consider is the expression of the words with the passion that these require.

In order to achieve this ideal, emphasis was placed on ensuring that words set to music could be clearly understood by *parlar cantando* ('speaking while singing'), as described by Monteverdi (1567-1643), or *imitar col canto chi parla* ('imitating speech through song'), as expressed by Piero Strozzi (c. 1550-1609) (Poizat 1992 [1986]: 52).

Depending on one's definition of an opera, several could qualify as the first ever to have been performed: Corsi's and Peri's "Dafne" in 1597 (Lamarque 1988: 517; Porzio 1991: 10; Rosenthal and Warrack 1987: 78) or "Euridice" in 1600, or Monteverdi's "Orfeo" in 1607 (Brook 1996: 1), although it has been argued that "Orfeo" does not measure up to the requirements for it to be considered an actual opera (Kivy 1999). However, "Dafne" is generally considered to be the first opera, although the music has been lost (Rosenthal and Warrack 1987: 78). Based on immediately subsequent works, it is believed that this contained recitatives in which the words were emphasised, with only a light musical accompaniment (ibid.). In "Euridice" and "Rappresentazione di Anima e di Corpo" by De' Cavalieri, both performed in 1600, there was no longer an alternation between music and spoken dialogue, so these works can be considered actual operas (Lamarque 1988: 517). With Monteverdi's "Orfeo", the development of operatic structure was completed and the distinction between arias and recitatives was established, among other features common to operas in subsequent centuries (ibid.). Although Monteverdi was a prime exponent of the *Camerata*'s ideals, he nonetheless paved the way for these ideals to be overturned through his use of the chorus and *arioso* (i.e. a recitative that is melodic but is not an aria) (Poizat 1992 [1986]: 52). Thus Monteverdi's contribution was paradoxical: he established the central role of drama through intelligibility of the text, but at the same time he set the course for the operatic aria (ibid.).

Except where otherwise indicated, the summary account of the historical development of opera outlined below, from this point onwards until the end of the section, draws upon *La nuova enciclopedia della musica Garzanti* (Lamarque 1988: 517-519). Following its establishment in Italy, as described above, opera soon became popular throughout Europe. Italian *opera seria* held sway into the eighteenth century, until "Orfeo ed Euridice" in 1762. In their attempt to restore the central position of drama in opera, the librettist Ranieri de' Calzabigi (1714-195) and the composer Christoph Willibald von Gluck (1714-1787) were reacting to the increasingly dominant role of singers (often *castrati*) and the extremes of vocal embellishment that had gradually developed and taken hold. Although this 'reform' was only partially successful in terms of curbing the autocratic position of singers, the emphasis on drama re-emerged somewhat, as in the operas of Wolfgang Amadeus Mozart (1756-1791), amongst others. *Opera buffa* (comic opera) flourished during the eighteenth century, beginning in 1733 with "La serva padrona" by Giovanni Battista Pergolesi (1710-1736), and it followed a separate path to *opera seria*, incorporating structures such as duets and trios rather than just alternating arias and recitatives. By the end of the eighteenth century, *opera buffa* and its openness to innovation gained the upper hand, with operas such as Mozart's "Don Giovanni" (1787), paving the way to Romanticism.

French opera during the eighteenth century developed separately to Italian opera, and the *tragédie-lyrique* was relatively untouched by Gluck's 'reform', given the lack of vocal excesses as had occurred in Italian opera. Instead, the neoclassicism of French opera during the Revolutionary and Napoleonic periods, with composers such as Gaspare Spontini (1774-1851) and Luigi Cherubini (1760-1842), continued to emphasise drama as championed by Gluck. However, in addition, French opera also combined dance and further developed harmony and orchestration. After the

Napoleonic period, this eventually led to *grand-opéra*, which retained its popularity until 1870.

By the beginning of the nineteenth century, a divergence of paths occurred between Italian and German-language opera. In Italy, Gioachino Rossini (1792-1868) retained a leading role until 1830, lowering the final curtain on both *opera seria* and *opera buffa*. After him, Vincenzo Bellini (1801-1835) and Gaetano Donizetti (1797-1848) opened up the new era of Italian Romantic opera. The main differences that gradually became established included increasingly tragic endings, Mediaeval and more modern storylines, as well as popular melodies, while the emphasis on formality and perfection of *bel canto* (literally, 'beautiful singing') highlighting vocal technique (Rosenthal and Warrack 1987: 39) was used to reinforce dramatic elements. Giuseppe Verdi (1813-1901) was able to leverage the strong popular interest in opera with his masterly theatrical skill, imbuing passion into the dramatic action characterised by conflicts between characters, between love and duty, good and evil, and the liberating power of death.

Meanwhile, although German-language opera composers embraced Romanticism in the nineteenth century, they rejected Italian *bel canto* and eighteenth-century Rationalism in favour of national themes and German *Singspiel* (literally, 'song-play'), in which dialogue separated musical numbers (ibid.: 463). Romanticism became the dominant force with Carl Maria von Weber's (1786-1826) "Der Freischütz" (1821), whose intention was similar to that stated by Richard Wagner (1813-1883) in making German opera a *Gesamtkunstwerk* (literally, a 'unified work of art') (ibid.: 542, 192). In addition to the influence of French *grand-opéra*, Wagner's contribution to German Romantic opera involved creating a unified work of art, as mentioned above, through use of the *Leitmotiv* (literally, 'leading motive'), a musical figure representing characters, events or concepts (ibid.: 277), and by removing closed forms as well as distinctions between recitatives and arias. Wagner wrote his own libretti and used recurrent themes from the orchestra to develop the dramatic action.

In France, the composers Daniel Auber (1782-1871) and Giacomo Meyerbeer (1791-1864) were prime movers in the *grand-opéra* that developed after the Napoleonic period, although Rossini had contributed to this development with his opera "Guillaume Tell" (1829) when he moved from Italy to live in France. Further contributions to French *grand-opéra* were made from time to time by the Italian composers Donizetti and Verdi. After its initial association with a resurgence of *opéra-comique*, and despite the operas of Hector Berlioz (1803-1869) standing in apparent opposition to both *grand-opéra* and Italian opera, the responsiveness of French opera to the tastes of the middle classes eventually led to *grand-opéra* being replaced with a new form of bourgeois opera, prefigured in "Faust" (1859) by Charles Gounod (1818-1893) and "Carmen" (1875) by Georges Bizet (1838-1875). By the end of the 1800s, French opera featured a significant component of sentimentality, typified by composers such as Jules Massenet (1842-1912).

A national operatic tradition became established during the nineteenth century in Russia and other Slavic countries, starting with "A Life for the Tsar" (1836) by Mikhail Glinka (1804-1857) and also represented by the works of Alexander Borodin (1833-1887), Modest Mussorgsky (1839-1881) and Pyotr Ilyich Tchaikovsky (1840-1893). A typical feature of Slavic Romanticism was the use of legends and folk stories, as well as melodies and musical styles drawn from folk songs, such as in the works of Bedřich Smetana (1824-1884), Antonín Dvořák (1841-1904) and Leoš Janáček (1854-1928).

Towards the end of the nineteenth century, opera in Europe became firmly associated with the middle classes and bore the influence of Wagner. In Italy, this Wagnerian influence was mingled with remnants of *grand-opéra*, such as in the works by Amilcare Ponchielli (1834-1886) and Arrigo Boito (1842-1918). At the close of the nineteenth century and the beginning of the twentieth century, *verismo* (literally, 'realism') with its scenes drawn from everyday life became the dominant style, such as in the operas by Pietro Mascagni (1863-1945), Ruggero Leoncavallo (1857-1919), Umberto Giordano (1867-1948) and Giacomo Puccini (1858-1924). This style was inspired by French bourgeois opera, and the sentimentality of Puccini's operas provided the escapism that was sought by the middle-classes. In Germany, Richard Strauss (1864-1949) occupied a similar position to that of Puccini in Italy, but his work expressed the nostalgia of late Romanticism and a society on the brink of collapse.

In reaction to this bourgeois style in opera, a significant development was made in France by Claude Debussy (1862-1918) with his "Pelléas et Mélisande" (1902). This transformed harmony and melody in opera, in a similar way to the developments made in the German-language operas of Arnold Schönberg (1874-1951), such as "Moses und Aron" (1957, Act 3 was unfinished), and those of Alban Berg (1885-1935), such as "Wozzek" (1921). A gap had formed between opera and its audience, marking the artistic detachment of composers from the world, and opera no longer pandered to the whims of any social class. Therefore, the operas of twentieth-century composers, such as Béla Bartók (1881-1945), Igor Stravinsky (1882-1971), Sergey Prokofiev (1891-1953), Paul Hindemith (1895-1963), Benjamin Britten (1913-1976), Luigi Dallapiccola (1904-1975) and Goffredo Petrassi (1904-2003), were more like individual experiments in dealing with drama and music rather than forming part of any particular school or style. By the first half of the twentieth century, opera no longer reflected the expression of any particular society or social class.

1.4 The Historical Tension between Words and Music in Opera – *Prima la musica o le parole*?

Given the overlapping features of music and language, as discussed in various contexts in subsequent sections and chapters of this thesis, it is paradoxical that the seemingly perfect marriage of music and language in opera has been characterised by tension since the birth of this art form. In his book *Romantic Opera and Literary Form*, Peter Conrad (1977: 178) claims that "words and music are united by antagonism" and that "opera is the continuation of their warfare by other means". However, Conrad (ibid.: 177) also provides a more sedate analogy when he claims that opera is like a child in whom the contrasting features and traits of both parents are combined.

So, which should come first in opera, the music or the words? *Prima la musica o le parole?* This ancient debate over the respective standing of music and lyrics was taken up by the composer Antonio Salieri (1750-1825) and the librettist Giovanni Battista Casti (1724-1803) in their opera "Prima la musica e poi le parole" (First the Music and Then the Words), which was first performed in 1786 (Rosenthal and Warrack 1987: 398). The one-act comedy satirises the nature of opera itself by portraying the opposing positions of a composer and a poet (Porzio 1991: 139). Ironically, despite the implication of its title, the opera was not very successful beyond its first performance, perhaps because of the dullness of its music!

The same debate was resumed many years later at the first performance in 1942 of the opera "Capriccio" by the composer Richard Strauss (1864-1949), who wrote the libretto with Clemens Krauss (1893-1954) (Murray, s.a.). Interestingly, this *Konversationsstück für Musik*, or conversation piece for music, drew its inspiration from the libretto for Antonio Salieri's "Prima la musica e poi le parole" by Giovanni Battista Casti, who was a rival of Lorenzo Da Ponte (1749-1838), librettist to Wolfgang Amadeus Mozart, whose own rival was Antonio Salieri. As a further historical twist, the first performance of Salieri's "Prima la musica e poi le parole" took place on the same day as Mozart's "Der Schauspieldirektor" (The Impresario), although Mozart's librettist in this case was Gottlieb Stephanie (1741-1800) and not Da Ponte. "Capriccio" is a discussion about the nature of opera, the tension between poetry and music, in which Richard Strauss creates a fair contest by ensuring that the words are clearly audible. In so doing, which is not the case in all of his operas, he observes the seventh of his tongue-in-cheek 'Ten Golden Rules' for conductors, dating from about 1925: "It is not enough yourself to hear every word of the singer – which you know by heart anyway; the public also must be able to follow it without effort. If they don't understand what is happening they fall asleep" (Strauss 1949: 13). It may or may not be of significance that this rule, which Strauss listed in seventh place, was preceded by others such as: "2. Do not perspire when conducting; only the public ought to get warm"! Although the 'words-versus-music' debate was not resolved in "Capriccio", as Strauss proposes the solution of ambiguity by not choosing between the two (Koestenbaum 2001 [1993]: 193), there are several musical numbers in the opera that resonate with points discussed later in this research: "Tanz und Musik / steh'n im Bann des Rhythmus" (dance and music stem from rhythm), from which ensues a debate in the opera about the primary art being dance, language or music; "Eine Oper ist ein absurdes Ding" (opera is an absurd thing); and the "Affekt" of the singing voice (Murray, s.a.).

Stendhal was of the opinion that because of its wide range of inflections, the voice is incapable of expressing itself without some form of affect, whereby this function predominates over that of conveying words (Brook 1996: 477). However, given the nature of the text in (Italian) opera, language serves merely as a blank canvas on which music applies bright colours (ibid.). The words in music are of secondary importance, serving only as a "label to which emotion is attached", so that we are able to enjoy an opera that is sung well even when the words are in a language that we do not know and we only have a basic outline of the plot (ibid.: 477-478). This view resonates with an observation by W. H. Auden (1968: 96) who felt that music is much more emotionally persuasive than words, given "that a character in opera can switch from one state of feeling to another with an abruptness which in a spoken drama would be incredible". The versatility of operatic music was emphasised and explained by the composer and librettist Arrigo Boito (1842-1918), who remarked in a letter to Giuseppe Verdi (1813-1901) that "music is the most omnipotent of all the arts; it has a logic all of its own – both freer and more rapid than the logic of spoken thought, and much more eloquent" (cited in Budden 1981: 309). This remark was likely inspired by

Schopenhauer's (1966 [1844]: 448) claim that music is "an independent art; […] the most powerful of all the arts" and that "the effect of the tones is incomparably more powerful, more infallible and more rapid than that of the words", as music is capable of revealing profound information about the emotions expressed in the words, "the soul of the events and occurrences, the mere cloak and body of which are presented on the stage". Paradoxically, although the music in opera conceals somewhat the words that are being sung, at the same time it is capable of emphasising their expression with a "singular directness of feeling" (Donington 1990: 9-10). Perhaps this is because, as Schopenhauer (1966 [1844]: 448) claimed, music is capable of expressing "the *will itself*" and so "it acts directly on the will, i.e. the feelings, passions and emotions of the hearer". Hegel (1975 [1835]: 934) was of a similar opinion, affirming that "the text is the servant of the music", although he claimed that in combination with poetry, music can express feelings especially well. In a more critical tone, Hegel (ibid.: 1191) commented that for all its magnificence, opera is "utterly devoid of any intellectual connection". It may be worth noting that, according to Adorno (1977: 334), Hegel (and Kant) understood nothing about art and, in particular, Hegel's understanding of music was inadequate (Johnson 1991: 152). In philosophy and aesthetics since the eighteenth century, music has been located beyond linguistic signification, as a discourse of the unsayable (Scherzinger 1999: 95). From a deconstructive viewpoint, meaning may be found in that which cannot be integrated and is therefore not present in the discourse itself, or has been eliminated from the discourse, or is in excess of the discourse (ibid.: 96).

The omnipotence and eloquence of music can be exemplified by an experience described by Michel Poizat (1992 [1986]: 36) that is common to most opera listeners or scholars who attempt to follow the printed words in the libretto while listening to the voice and the music. As the endeavour progresses, Poizat explains, the listener gradually becomes immersed in the music and the beauty of the voice, eventually finding that attention is drawn away from the words. Poizat points out that this is especially true when enjoyment of the music is at its peak, precisely when the perfect fusion of words and music would be expected to occur, a point at which greater focus on the printed words would be required. The listener is torn, Poizat continues, between surrendering to enjoyment of the music and the voice or focusing on the printed words; the concentration required in the latter case invariably limits the enjoyment that is derived from the vocal music. Full intelligibility and comprehension of the text during the moments of greatest musical enjoyment in opera would appear to hinder or prevent the evocation of blissful emotion in listeners. As will be discussed within a psychoanalytic framework later on, some of the most powerful emotions that are experienced by listeners occur precisely when the words become unintelligible, namely when the voice becomes music and loses its connection with language, thereby destroying language (ibid.: 37).

The issue of intelligibility / unintelligibility of the words in opera is pertinent not only to the ideals of drama that initially led to the development of the genre itself, as described in the previous section, and to the tension between words and music that has persisted in varying degrees throughout the history of opera, but also to analyses that focus exclusively on the textual element of opera. These themes are addressed by Paul Robinson's (2002a: 30-51) essay "Reading Libretti and Misreading Opera", in his book *Opera, Sex and Other Vital Matters*, based on the fundamental premise that "opera cannot be read from its libretto" (ibid.: 30). In other words, libretti are not texts in the conventional sense of the term, as the language and meaning of opera are primarily musical (ibid.). Consequently, an exclusively textual literary reading of opera inevitably results in a misreading, in much the same way that interpreting the images of art based on an exclusively textual framework results in a distortion of the aesthetic object (ibid.: 31-33). According to Robinson (ibid.: 31), there are four elements that conspire to hinder the intelligibility of words in opera:

> (1) opera is in a foreign language; (2) opera is sung, and much that is sung by an operatic voice cannot be understood; (3) opera contains a good deal of ensemble singing – passages where two or more voices sing at the same time, sometimes to identical words, sometimes to different words – and if one operatic voice is often unintelligible, two or more almost always are; (4) operatic singers must compete with a full symphony orchestra – at least from the nineteenth century onward – and, as every opera-goer knows, the sheer volume of that orchestral sound further limits our ability to make out the words.

Given the relevance of the relationship between words and music in opera to the centrality of language in the psychoanalytic approach of this research, Robinson's (ibid.: 33-51) discussion of these four obstacles merits further detailed examination.

The first obstacle to the intelligibility of the words in opera, as discussed by Robinson (ibid.: 33-36), concerns the fact that opera is primarily, though not always, performed in a foreign language. He argues, however, that translated versions of operas by foreign composers were quite common since the nineteenth century in most European countries, as opposed to the predominance, for example, of Italian in operas written by non-Italian composers, such as Mozart in Vienna, or Handel in London during the eighteenth century. Therefore, he continues, performance of opera in a foreign language has returned as an obstacle for more recent generations of opera-goers. However, the availability of supertitles or surtitles, which were introduced for the first time in 1983 by the Canadian Opera Company for a production of "Elektra" (Dreifelds 2004) (ironically, an opera by Richard Strauss – see comments above), as well as side-by-side translations of libretti included with audio recordings, have helped considerably in overcoming language barriers. Nonetheless, as Robinson (2002a: 35) observes, even when an opera is performed in the listener's native language, perhaps in translation, intelligibility of the words is not necessarily improved, which would indicate the involvement of other factors beyond a lack in foreign language comprehension. Interestingly, on the subject of opera in translation, Robinson notes another point that supports eschewing a textual reading of opera, namely that spoken drama, unlike opera, is almost exclusively performed in the language of its audience. Once again, he affirms, the reasons for or against performing opera in translation are musical rather than textual. He illustrates this by explaining that the operatic composer writes the music to fit the words, and in particular the vowels of the libretto's original language.

However, in the case of a translated libretto, the accented beats in the music may not match the stressed syllables of the lyrics and, as a result, this affects the linguistic patterns which listeners are accustomed to hearing, thus hindering intelligibility and comprehension of the translated words (Scotto Di Carlo 2007b: 561). A brief example of this mismatch between accented musical beats and linguistic stress in a French translation of an Italian libretto is shown in Figure 1.1 below. Accented beats in the music are indicated by the symbol '>', while stressed syllables are indicated by an apostrophe. The example shows how the accented beats of the music match the Italian stressed syllables to a greater extent than is the case with the French translation (ibid.: 562).

Figure 1.1 Mismatch between musical beats and linguistic stress in a translated libretto (source: Scotto Di Carlo 2007b: 562)

Consequently, Robinson (2002a: 36) claims, the different pattern of vowels that occur in a translated version of a libretto can ultimately affect the musical texture. He concludes that this may provide one explanation for opera-goers choosing to listen to a work performed in its original (foreign) language, in which the words are semantically incomprehensible. However, as described in his explanation of the second obstacle to intelligibility of the words in opera, even in the absence of semantic incomprehensibility of a foreign language, there remains the issue of phonetic unintelligibility. This relates to difficulty perceiving and distinguishing the articulation of sounds making up words and word-boundaries, which will be explained below.

The second obstacle noted by Robinson (ibid.: 36-42) concerns the paradoxical fact that the very nature and techniques of operatic singing can result in unintelligibility of the lyrics. This aspect of the words-versus-music tension in opera is particularly relevant as a background for the psychoanalytic theory that will be discussed later in relation to language and the singing voice. Robinson (ibid.: 36) explains that the music written by composers requires singers to make use of special techniques that inevitably affect the intelligibility of the words that are articulated in song. He affirms, therefore, that the reasons for this unintelligibility are musical.

These complex operatic singing techniques include, among other things, concentrating acoustic energy in the so-called 'singer's formant' – which voice teachers describe as 'acoustic ping' or '*squillo*' – achieving voluntary control of the ventricular folds (false vocal cords), and the resulting cavity volume is responsible for the characteristic 3-4 kHz resonance (a male or female scream and the cries of an infant are within a similar range) (Huron 2008b). The singer's formant allows the trained voices of opera singers and actors to project and to carry without amplification; for males it is in the range of 2-3 kHz, whilst in females the range is 3-4 kHz (Scotto Di Carlo 2007a: 5). Another technique or feature of singing, known as *legato*, involves extending the duration of vowels compared to speech, which allows the melody to be carried, whilst consonants are under-articulated and shortened compared to speech, in order to minimise their obstructive effect on the melodic line (Scotto Di Carlo 2007b: 559). This can be exemplified physiologically by considering that vowels are produced as a result of air passing unobstructed through the vocal tract (Scotto Di Carlo 2007a: 1, 7), whereas consonant production involves an obstruction of this flow of air by the articulatory organs and vocal tract (ibid.: 7, 10), and the demands of operatic singing require a completely unobstructed vocal tract (ibid.: 10). Therefore, the shortening of consonants significantly decreases intelligibility of the words in opera (Scotto Di Carlo 2007b: 559). However, the intelligibility of vowels, more so than consonants, is affected proportionately by the higher frequencies or registers of the singing voice (Scotto Di Carlo 2007a: 7). Figure 1.2 below shows the relationship between operatic vocal ranges in relation to intelligibility zones. The bass vocal range is within the optimal intelligibility zone (letter A: 65 Hz [C2] to 349 Hz [F4]), whilst only a quarter of the soprano vocal range is within the same zone – only a fifth in the case of a coloratura soprano (Scotto Di Carlo 2007a: 2). The 'margin of tolerance' is indicated by letter B (349 Hz [F4] to 440 Hz [A4]), whilst the 'elective intelligibility zone' is indicated by letter C (440 Hz [A4] to 659 Hz [E5]), and letter D (> 659 Hz [E5]) indicates the 'absolute unintelligibility zone' (ibid.).

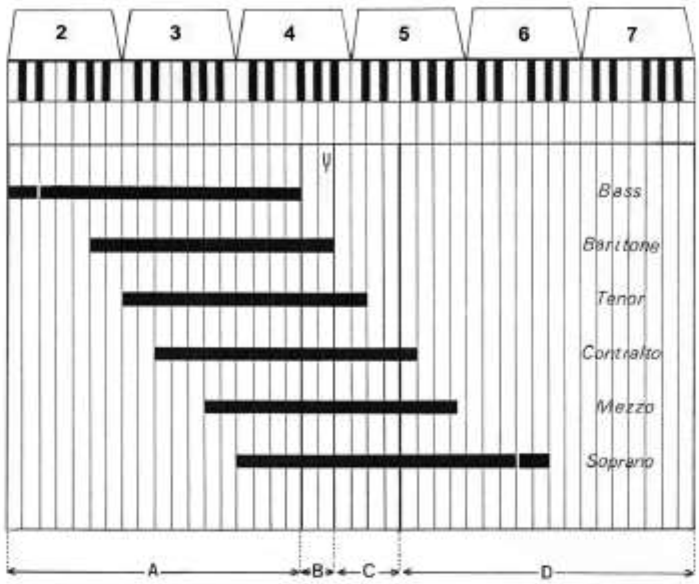


Figure 1.2 Vocal ranges and intelligibility zones

(source: Scotto Di Carlo 2007a: 2)

All of a singer's vowels can be distinguished by a listener when the *tessitura*, or comfortable range of the voice, is within the optimal intelligibility zone; vowel intelligibility decreases progressively through the next two zones, until vowels can no longer be distinguished above 659 Hz (high E) in the absolute unintelligibility zone (ibid.). In very broad terms, then, one technical aspect of operatic singing involves balancing a range of elements in order to achieve good diction without affecting the texture of the music or, stated another way, ensuring intelligibility without compromising the production of beautiful sound, namely to "reconcile the irreconcilable" (Scotto Di Carlo 2007b: 564).

As Robinson (2002a: 36-37) points out, the main characteristic of an operatic voice is its power and loudness – a requirement that became proportionally greater in relation to the increasing size of the orchestra during the nineteenth century. He mentions another feature that is specific to the operatic voice, and which further hinders intelligibility, namely the ability to span the range of two octaves. Although words may be intelligible in the lower and middle ranges, he explains, at the higher registers the volume and acoustic interference that are involved make comprehension impossible. Of particular relevance to the psychoanalytic theory that will be discussed later, Robinson (ibid.: 38) describes the paradoxical situation in which the highest registers of the voice are used in opera to express particularly intense emotion, when the words would be expected to matter most, yet at these points the words become unintelligible. A further technique in operatic singing mentioned by Robinson as hindering comprehension is known as *legato*, which allows the singer to change pitch or articulate syllables in the same pitch without interrupting (or as little as possible) the continuity of sound. This seamless phrasing, he explains (ibid.: 39), renders the voice similar to a musical instrument. Therefore, he continues, as the aim of singing is that of avoiding silence, or at least holding and extending vowels (this cannot be done with consonants) over a series of notes, such as the *bel canto* vocalise, the gaps that punctuate spoken articulation are missing or re-arranged. Robinson claims that, despite a singer's attempts at ensuring the intelligibility of the words, the stronger aim of using the voice as an instrument, that is achieving *legato* sound, works against the words to reveal "the real language of opera, the language of musical phrases" (ibid.).

However, Robinson (ibid.: 40-41) qualifies these factors that can hinder intelligibility by explaining that their effect is not uniform and varies across historical eras, different composers, between operas, even within the same opera, and in particular between male and female singers. In a historical context, he mentions that the words in seventeenth-century and eighteenth-century operas are more intelligible than those of the nineteenth-century because of the different requirements in terms of volume and high registers, as well as the elimination of recitative in the early nineteenth century. He quotes Handel's operas in the baroque period as examples where the format of arias separated by recitatives and much repetition facilitates intelligibility of the words. As regards intelligibility being affected by the gender of the singer, Robinson (ibid.: 41) affirms that male voices are generally easier to understand than female ones, with increasing levels of difficulty ranging from bass to soprano, so that more of the text can be perceived in operas with a predominance of male singers (such as those of Mussorgsky, late Wagner and Debussy), as opposed to those in which the female voice predominates (such as Puccini and Strauss).

Robinson (ibid.: 42) concludes his discussion of how singing itself hinders the intelligibility of the words in opera by reiterating the variability of this phenomenon across operas, passages, phrases, arias and recitatives, the gender and vocal register of the singer, as well as the range of the particular piece that is being sung. In relation to the intelligibility of the text, he illustrates the importance of a musical rather than a textual reading of opera by quoting a brief example from the end of “The Marriage of Figaro” (1786) by Mozart, where the words sung by the Count in the middle of a baritone register asking the Countess to forgive him are intelligible, whereas the Countess’s words of acceptance sung in the upper middle soprano register are not. In quoting this example, Robinson demonstrates that the Countess’s forgiveness is expressed within the language of music, rather than and beyond that of words, and the effect of this musical expression would be missed by an exclusively textual reading.

The third obstacle discussed by Robinson (ibid.: 42-44) as contributing to the tension between words and music in opera concerns ensemble singing, either by the chorus or in the various group configurations of the protagonists ranging from duets upwards and even including the chorus. As Robinson (ibid.: 43) explains, the ensemble is often found in opera at the high points of dramatic action, serving as a centrepiece, although as mentioned previously, the operatic paradox of the words being unintelligible when one would expect them to matter most applies in this case too. However, he distinguishes degrees of intelligibility depending on factors such as whether the same words are being sung by all of the singers concerned and, if not, the gender mix of the grouping, the intricacy of the music and the alternating prominence that is given to individual singers in the grouping. He quotes Rossini ensembles as being among the most intelligible through the use of repetition and by allowing individual parts to emerge from the group. Despite the varying degrees of intelligibility, Robinson (ibid.: 44) emphasises the importance of the musical rather than the textual logic of ensembles by quoting two distinct examples. In one example, which is perhaps more typical of opera, the words in the sextet of Donizetti's "Lucia di Lammermoor" (1835) are largely unintelligible, yet the piece is no less effective dramatically in musical terms. In the other example, which is perhaps less typical of opera, the ensemble at the end of the second act of Wagner's "Die Meistersinger von Nürnberg" (1868) portrays a riot, where the words are rendered unintelligible by the musical representation of a chaotic event. Despite the different contexts of each example, in both cases it is ultimately a musical logic that expresses and emphasises the dramatic narrative.

The fourth (and last) item in Robinson's (ibid.: 44-46) list of obstacles to the intelligibility of the lyrics in opera concerns the orchestral music. He notes that there is no case in which the orchestra improves the intelligibility of the words – just varying degrees to which composers choose to make heavier or lighter use of the contouring properties exerted by the orchestral sound, an example of the latter case being "Pelléas et Mélisande" (1902) by Debussy. Robinson (ibid.: 45) poses and responds to the hypothetical question as to the purpose of having an orchestra at all if it hinders the intelligibility of the words, as opposed to say just piano accompaniment or even just singing. He explains that the orchestra has many functions in opera, all of them musical, such as shaping the work overall, setting its mood, and so forth, and if there were no orchestra, opera "would become something that it is not" (ibid.). He goes on to explain that orchestral music in opera occupies a similar place to the high registers of the voice and ensemble pieces, in that it emerges most at the points where the words matter, in particular with the larger and more powerful orchestras of nineteenth-century opera. Robinson mentions that this increased size and power of orchestras was related to the larger size of opera houses, which consequently resulted in the greater volume and power of operatic voices. He points out, however, that despite the presence of more powerful voices, at full volume the orchestras of Verdi and Wagner were capable of overwhelming not only the words of a singer but even the massed output of a chorus.

Robinson (ibid.: 46) concludes that, despite all four of these elements posing a hindrance to comprehension of the words in a primarily textual reading, they are nonetheless essential to opera as a whole in musical terms. He emphasises that rather than trying to understand what is said by the text, consideration should be given to the way in which the text is handled in the music and woven into its structure – transformed into music. Lastly, in a manner that calls to mind Jacques Derrida's (1997 [1967]) *supplement*, whereby elements external to a work are nonetheless capable of adding to it, thereby transforming it (Richards 2008: 21, 144), Robinson (2002a: 47-49) discusses his analysis of the four obstacles to comprehension of the words by distinguishing and relating five listening contexts: the primary or privileged context of the opera house, followed by the supplementary contexts of listening to audio recordings, listening to audio recordings while reading the libretto (perhaps with a translation), reading the supertitles (usually a translation of the libretto) while attending a performance, and just reading the libretto (and, by extension, associated material, such as synopses, books and so forth). Another context springs to mind that he does not mention: the audiovisual recording (film, DVD, video, streamed broadcast either on a personal computer or a 'big screen' in a public location), which sometimes allows subtitles to be selected in one of several languages. His discussion of these five contexts further nuances the issue of intelligibility of the words, in which he affirms that the last option of just reading the libretto provides the most clarity but is the most impoverished in terms of experiencing opera to its fullest extent. He goes on to explain that audio recordings may render the words more distinct because the singers have individual microphones and the sound is mixed and enhanced, which does not occur in the opera house. He makes a similar comment about supertitles in the opera house, which he claims go beyond just providing a translation of the words that are being sung, by introducing a level of textual clarity that is not necessarily present in the work itself. This would also hold true for the additional audiovisual context suggested above, where the subtitles may have the effect of rendering the words more explicit (either in translation or not) than is the case in the sung work. He describes the listening context involving an audio recording while following the printed libretto, often including a translation on the facing page, as a parallel process of listening and seeing, which is experienced by the listener as a unitary process of hearing the words, which are actually being perceived visually.

Robinson (ibid.: 49) claims that although all of these readings influence and affect each other, as well as our perception of the work as a whole, when attending a performance in the opera house any prior knowledge of the language of the libretto fades from consciousness. However, this does not happen with the music. Any loss in narrative clarity, he continues, is compensated by a gain in emotive expression. In addition, he affirms, "while the words in opera sometimes count for little, they never count for nothing" and "they are part of our experience of opera even, as it were, when they are not", in that they stand for human subjectivity and volition that are central to opera (ibid.: 50-51).

1.5 The 'Layers' of Opera

As described earlier, various constituent elements of opera have been more or less prominent throughout its history: from the early operas consisting of recitatives situated somewhere between speaking and singing, with musical interludes, to the virtuoso arias of the late Baroque, to the musical numbers of the nineteenth-century Italian opera and, finally, to the abandonment of the aria by Wagner in favour of continuous melody. Despite this varying prominence of certain features, opera can be said to consist essentially of three interrelated elements, or 'layers'. These are: the narrative (the storyline and dramatic action set out in the text of the libretto), the music (the musical score played by the orchestra) and the singing (the vocal performance by the singers of the lyrics in the libretto according to the musical score). For the purposes of this research, the development of the various aspects of stage design is only of passing relevance and, as such, will not be discussed in any detail.

The narrative element in opera, as defined above, can be said to serve three basic functions. Firstly, it fulfils a fundamental requirement of providing material for the plot and dramatic action of the storyline. Secondly, it creates a space for the development of an appropriate dramatic structure and forward progression. It turns the story that is being told into something more than just a factual account, which as such would provide little dramatic impact on the stage. Thirdly, and perhaps most importantly, the way in which the narrative is put to use serves to justify the presence of the orchestra and singers. The narrative provides a carefully-crafted framework that allows musical variation of climax and anti-climax. But the narrative does even more than this: it justifies the operatic voice itself. The dramatic structure is put to the service of the music and, ultimately, to the voice.

However, as will be discussed later, the voice follows a trajectory both because of the dramatic action and despite it. The voice ultimately transcends the storyline, the visual elements and the music and follows its own trajectory to its final destination, even despite itself. The final destination is *jouissance*, i.e. an 'excess of enjoyment', a 'transcendent bliss', a Lacanian psychoanalytic term that will be explained in more detail in the next chapter with reference to the 'operatic orgasm' (Abel 1996). As Michel Poizat (1992 [1986]: 145) states in his psychoanalytic approach to opera, based on the theory of vocal *jouissance* in response to the soprano's 'cry' "the voice does not express the text – that is what theatre is for; the text expresses the voice".

Poizat illustrates this by explaining that, although the dramatic logic of the libretto may lead to the death of a female character (the soprano), causing her to cry out before she dies, it is the logic of the developing vocal *jouissance* that creates the dramatic conditions for the cry to occur, demanding a death. This would explain how the vocal component of an opera can remain unaffected even when the narrative structure of the storyline may appear to be illogical, far-fetched or even absurd – which is the case in many operas. As perceptively observed by W. H. Auden (1961), "No good opera plot can be sensible, for people do not sing when they are feeling sensible".

Abel (1996: 113) addresses this actual or perceived 'weakness' in operatic storylines by explaining that the position of opera in modern times is with the cultural elite and not potential revolutionaries. The political impact of storylines is largely lost on modern audiences, and parallels missed, leaving apparently disjointed plots in which the only readily appreciable elements that remain to impact us today are sexuality and the voice itself. However, both of these elements are actually removed from the text, from the action and even from the singer, as a disembodied vocal object (Poizat 1992 [1986]).

No matter how far-fetched an opera's storyline may appear to be, the moments of dramatic *jouissance* – as opposed to vocal *jouissance* – are mediated by the voice. They are possible *because* of the voice. As such, they occur both as a result of the dramatic development and despite it. These are the cathartic moments of extreme pathos, in which we experience pleasure in sorrow. The dramatic conditions are created by the "logic of vocal *jouissance* […] driving at the cry" (ibid.: 145), as will be discussed later. Although these moments provide a *raison d'être* for particular qualities in the music and singing, they do not shape the singing as much as they are *shaped by* the singing. When salient elements of the plot surface to produce a climax in the narrative, and we experience the pathos to its fullest extent, beyond the text and even the action being played out on stage, the dramatic *jouissance* of theatre becomes subservient to the music and ultimately to the voice. For operatic (i.e. vocal) *jouissance* can only be found in the voice (Abel 1996: 46).

The essential constituent elements of opera, as discussed throughout this thesis, are illustrated in Figure 1.3 below. The figure, which shows the various layers of opera and their dynamic interactions, is inspired by Lacan's use of the Borromean knot as a two-dimensional representation of three topological rings that form a Brunnian link. All three rings are interconnected, yet no two rings are linked to each other. It should be noted that the ‘flattening’ (“mise-à-plat”) that occurs in this two-dimensional representation of a topological figure is discussed extensively by Lacan (1974-1975) in *RSI*. He states that “[…] the imaginary always tends to be reduced to a flattening out” and that

> It is on this that there is founded all depiction, it being well understood that it is not because we may have crumpled these three rings of string that they are any less knotted in a Borromean way in the real, namely, with regard to the fact that each one of them, unknotted, frees the two others. This thing will always be true. How does it happen that we must have this flattening out in order to be able to depict any topology whatsoever? It is very certainly a question which reaches out towards that of the defectiveness that I qualified as mental, in so far as it is rooted in the body itself (ibid.: Seminar of 10 December 1974).

Lacan (ibid.: Seminar of 11 February 1975) also mentions the inherent problems in the “imaginary consistency” between knot theory and the practice of knots. Importantly, he adds that in its flattened representation, “this knot is not of its nature a flat knot, far from it” but that “it has to pass by way of the flattening-out to highlight the sameness of the knot, whatever may be the orientation that you give to each one” (ibid.: Seminar of 18 March 1975). These points should be borne in mind whenever the figure of the Borromean knot appears in this thesis.

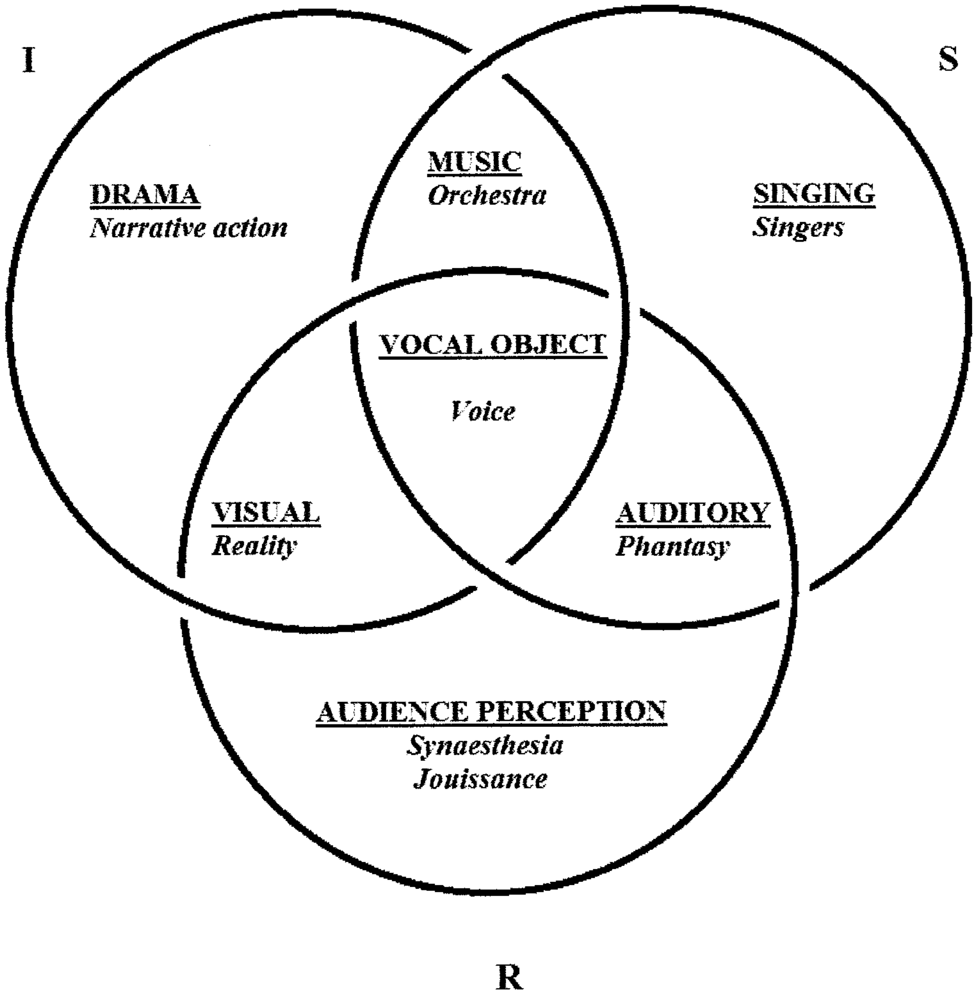


Figure 1.3 The 'layers' of opera and their dynamic interactions

The ring on the left relates to the major dramatic themes in the narrative, while the ring on the right relates to the singing, in particular to the soprano (and the higher voice ranges) as the locus of the listener's quest for vocal *jouissance*. The overlapping area between the two upper rings relates to the music played by the orchestra, which mediates the interaction between drama and singing towards vocal *jouissance*. The lower ring, which has overlapping areas with both of the upper rings, relates to the audience and the way it perceives and reacts to the drama, music and singing, namely a synaesthetic experience and ultimately (vocal) *jouissance*. The overlapping areas of the lower ring pertain to mediation of audience perception. The area on the left is related to visual perception, whilst the area on the right is related to auditory perception. Visual perception includes the dramatic action on the stage, the scenery, lighting, special effects and so forth. The visual aspect is indicated as reality in the context of dramatic fiction, as it refers to tangible objects rather than the ethereal vocal object. Auditory perception includes the singers' voices, in particular the soprano. This has been indicated as phantasy, in that it represents the listener's quest for the vocal object, which is ethereal. The orchestral music provides mediation both for the dramatic action and for the singing. The overlapping area between the auditory and visual elements produces a synaesthetic effect on the side of the audience. Lastly, the central area, where all three rings overlap, represents the vocal object mediated by all of the other elements. This is the object of the listener's quest for vocal *jouissance*. The capital letters shown outside the rings stand for the Lacanian orders of Symbolic (S), Imaginary (I) and Real (R), which will be dealt with in the next chapter.

1.6 Feminism, Queer Theory, Gender and Opera

Although in-depth coverage of feminism, queer theory and gender studies in general is beyond the scope of this thesis, these disciplines do nonetheless inform and relate to the contents of this research in several ways. Exploring the many facets of opera as an art-form inevitably requires an extended inter-disciplinary approach. Conversely, gender studies have influenced practically every discipline – musicology and psychoanalysis are no exceptions to this. In particular, for example, discussions in this thesis relating to the reception of the operatic voice by males and females, or the unique position and qualities of the *castrato* voice, undoubtedly benefit from gender-focused theories and viewpoints such as those provided by feminism and queer theory. Therefore, a brief – and hence necessarily incomplete – introductory overview of these disciplines is provided here.

In the introduction to the book *Siren Songs: Representations of Gender and Sexuality in Opera*, the editor Mary Ann Smart (2000: 3-16) gives a comprehensive developmental account of the way in which opera has been analysed and understood through the often differing lenses of feminism and queer theory. Smart (ibid.: 4) begins by referring to Susan McClary's statement in her foreword to the English translation of *Opera, or the Undoing of Women* by Catherine Clément (1988), that opera is a natural point of departure for feminist criticism of music, given the inherent historical opposition of masculine words and feminine music, as well as the fact that gender and sexuality are often in the operatic limelight. However, as Smart (2000: 4) observes, Clément's approach to the analysis of opera focuses on the text almost to the exclusion of the music. Indeed, Clément (1988: 10) considers the music a lure that ultimately conceals the violent fate of women in essentially misogynistic opera plots:

> The music makes one forget the plot, but the plot sets traps for the imaginary. The plot works quietly, plainly visible to all, but outside the code of the pleasures of opera. It is totally dull, always setting in play vague philosophical premises, ordinary banalities, life-love-death; it is all familiar and forgettable. But, beyond the romantic ideology, lines are being woven, tying up the characters and leading them to death for transgression – for transgression of familial rules, political rules, the things at stake in sexual and authoritarian power. That is what it is all about.

Whilst Clément’s approach may be useful in highlighting a certain type of historically-framed social discourse that emerges and recurs to a degree in a range of operatic works, its focus on the text artificially negates or ignores the centrality of music in opera. As observed by Paul Robinson (2002a: 30), mentioned earlier in this chapter, “opera cannot be read from its libretto”, because libretti are not texts as conventionally understood, given that the language and meaning of opera are primarily musical. As such, Robinson affirms (ibid.: 31-33), a predominantly textual reading of opera inevitably results in a misreading.

As Smart (2000: 5) points out, the requirement for feminism to consider the music in opera was highlighted by McClary and also taken up primarily by the musicologists Gary Tomlinson and Lawrence Kramer. Smart goes on to explain that various approaches were adopted by linking music with representations in a social framework, using convention and transgression as contrasting terms applied to musical elements, such as tonic/dominant, diatonic/chromatic, and so forth. She adds that a similar approach of contrasting binary terms standing for male and female, such as stable/changeable or dry/wet, was adopted by Suzanne Cusick (1993). However, Avital Ronell (1994) criticised these approaches that make use of binary pairs such as male/female, words/music, voice/orchestra, as they do not provide a deconstructive analysis, adding that in her view feminism often appears to operate through reverse sexism (Smart 2000: 251). Furthermore, the musicologist Carolyn Abbate (2004: 506) observed, quoting as an example Cusick’s work dealing with the materiality of sound as opposed to disembodied texts, that discussion of the actual performance of music has often been a missing element in the new musicology approach proposed by Joseph Kerman in the 1980s, focusing on musical works and their meanings:

> While Kerman's aim was to divert musicology towards criticism and hermeneutics and away from composer biography, archival history, and strict formalism, something important was foreclosed when old music criticism became new music criticism […] real music: the performances that were to remain in large part as marginal to criticism or hermeneutics as they had been to formalism (ibid.: 506).

Smart (2000: 5, 251) indicates the specifically Anglo-American context of these approaches linking music to social representations, clarifying in a note that they originated with the proponents of the so-called 'new musicology'. Among these, Susan McClary (2002 [1991]) made a (some would add the qualifier 'seemingly') ground-breaking contribution with her book *Feminine Endings: Music, Gender & Sexuality*. Although her book provided inspiration for many analyses drawing parallels between the function of the structures in music and those in society (Smart 2000: 6), it also attracted much criticism. For example, as Paula Higgins (1993: 175, 177) pointed out in her detailed assessment, one of the major shortcomings of McClary's book lay, ironically, in somewhat obscuring almost two decades of work that had been carried out in musicology by feminist scholars before her, such as Suzanne Cusick, Marcia Citron, Ruth Solie and many others who are relegated to the notes section of the book. In relation to and beyond this observation made by Higgins, there is surprisingly limited reference in McClary's book to feminist theorists who ultimately informed her views, such as Hélène Cixous, Luce Irigaray and Julia Kristeva, who are also relegated to the notes section of the book along with others such as Sandra Gilbert, Teresa de Lauretis, Elaine Showalter, Kaja Silverman and so on.

Although it is not possible to provide here a detailed discussion of all the criticisms raised by Higgins, two more points are worth mentioning as they are relevant to this thesis. Higgins (ibid.: 180) notes that McClary sees the rise of opera in the seventeenth century as the "stimulus for a new preoccupation by composers" with what McClary (2002 [1991]: 7) terms a "musical semeiotics of gender". As Higgins (1993: 180-181) remarks, McClary's evidence is flimsy despite seventeenth-century Italian opera being her area of expertise; for example, no comparison is made with gender constructions in Francesca Caccini's "La liberazione di Ruggiero dall'Isola d'Alcina", which was written by a woman in the seventeenth-century for a female patron. In addition, Higgins (ibid.: 183-184) observes that McClary focuses unduly on the way in which music impacts the body, through the desire that is aroused and channelled by music, thereby contributing to "the social organization of sexuality" (McClary 2002 [1991]: 9). In fact, throughout McClary's book, musical examples are rather simplistically equated with the sexual act to prove this point. Although some parallels can be drawn in this direct manner, it is perhaps the crudest way of doing so. Besides which, as Higgins (1993: 184) mentions, it would be reductionist in the extreme to account for music throughout history simply as a description of the sex act.

Feminist analyses of opera after McClary increasingly focused on more limited ranges of operatic repertoire, individual operas and even single arias within specific operas, following a somewhat more conventional musicological approach but paying particular attention to the voice itself and its performance (ibid.). Smart (2000: 7) notes that in *Opera; or, the Envoicing of Women*, Abbate (1993: 128-129) provides an opposite interpretation to that of Clément by affirming that opera can be viewed as displacing the voice from composer to female performers, reversing "the conventional opposition of male (speaking) subject and (female) observed subject". In other words, Abbate (1993: 235-236) claims that during the performance of an opera, the immediacy of the singing predominates over any single composer's voice and instead we perceive the singers as a number of embodied sources of sound actually creating the work that is being performed: "the phenomenological peculiarities of music's production urge us to imagine originating singers, voices not simply that of a single historical composer, hence potentially indeterminate or variable in gender". In the same work, Abbate (1993) addresses gender issues through the film "Mascara", dating from 1978, and its references to the operas "Salomé" by Richard Strauss and "Orfeo ed Euridice" by Gluck (McBride 2005). These operatic references, and the murder of a transvestite who is found out to be such by his male lover, provide useful material for Abbate (1993) to analyse issues such as the roles of female performers and male composers, as well as the metaphorically trans-sexual position in opera of *castrati*, males with 'female' voices, and the *Hosenrolle* or 'trouser roles', where females play male characters (McBride 2005), such as Octavian in "Der Rosenkavalier" by Richard Strauss, Romeo in "I Capuleti e i Montecchi" by Vincenzo Bellini, Cherubino in "Le nozze di Figaro" by Mozart, or Prince Orlofsky in "Die Fledermaus" by Johann Strauss II.

The *castrato* voice and also the *travesti* roles, that is male characters sung by females, or female characters sung by males (such as the nurse in "L'incoronazione di Poppea" by Claudio Monteverdi – although the gender role-reversal is less frequent in this direction), allow the operatic voice to be considered on its own terms, or at least in a different context than that of gender difference, beyond the usual male / female opposition or polarisation dialectic to one of trans-sexuality, that is *across* gender boundaries. As Michel Poizat (1992 [1986]: 113-119) mentions in a brief historical overview of the *castrato* voice starting from the Mozarabic church in ninth-century Spain, *castrati* were present in opera from its beginnings and, paradoxically, were assigned virile, heroic male roles such as kings and warriors, despite the high voices of these emasculated singers. Indeed, they were assigned these parts based on vocal prowess, rather than gender; *castrati* occupied a uniquely privileged trans-sexual position in being able to play either male or female roles. A number of studies have been written about this unique and unrepeatable voice, such as the comprehensive work *The World of the Castrati: The History of an Extraordinary Operatic Phenomenon* by Patrick Barbier (1998 [1989]); or *Eunuchs and Castrati: A Cultural History* by Piotr Scholz (2001); or *Unveiled Voices: Sexual Difference and the Castrato* by Joke Dame (2006). The association / overlap between castrati and *travesti* roles are explored in the book *Voicing Gender: Castrati, Travesti, and the Second Woman in Early-Nineteenth-Century Italian Opera* by Naomi André (2006). Poizat (1992 [1986]: 119-122) notes in his outline about *travesti* roles, that these increased as the popularity of the *castrato* declined, the difference being that *travesti* roles predominantly involve females playing 'breeches parts', or male characters.

In his essay "S/Z", Roland Barthes (1974 [1970]) analyses Balzac's novella *Sarrasine*, a story about a sculptor called Sarrasine – which, interestingly, is the French feminine form of 'Saracen', meaning an Arab or Muslim (André 2006: 21) – and his encounter in an opera house in Rome with La Zambinella, a *castrato* specialising in female roles (ibid.: 22). This "metaphor of a masculine persona embedded within a feminized signifier" (ibid: 21-22) is but one of numerous twists in the story, another being that Sarrasine is completely unaware of La Zambinella's actual gender until the end of the story, and even then he has difficulty accepting the fact. As will be explored later, Barthes' analysis and Balzac's story go beyond the male / female boundaries, prefiguring to some extent Judith Butler's (1990, 1993) "gender as performance", pointing to the relationship between the visual and the auditory (André 2006: 23), their underlying lack and split, their unreliability, that is their potential for dis(as)sociation in relation to reality. There is a connection and overlap not only with Lacan's *objet petit a* (discussed in the next chapter), but also with Kristeva's (1982) 'abject', as noted by Smart (2000: 9), where:

> [I]n copying woman, in assuming her position on the other side of the sexual barrier, the castrato will transgress morphology, grammar, discourse, and because of this abolition of meaning, Sarrasine will die (Barthes 1974 [1970]: 66).

The *castrato* draws the listener "toward the place where meaning collapses" (Kristeva 1982: 2) and "disturbs identity, system, order […] does not respect borders, positions, rules" (ibid.: 4). According to historical accounts, the *castrato*'s voice allowed listeners to experience the sublime, but at the same time this vocal object covered over a lack, for the *castrato* embodied lack itself; the passionate enjoyment, or *jouissance*, of listeners may have concealed a primal fear and horror, the abject, underlying this sublime experience of an emasculated male – so that the audience's cries of "*Evviva il coltello!*" (long live the knife) were an acknowledgement of the cut of the Real.

Moving on from the opposition between male / female, and the traversing of these gender boundaries by the *castrato* as well as *travesti* roles, queer theory in relation to opera does not situate homosexuality in the place of the feminine in the male / female equation of polarisation, rather it merges male and female by considering representation of the body and body as representation, mediating "the formation of identity" (Smart 2000: 10). A number of writers have dealt with this aspect of gender in relation to opera by drawing on material surrounding the fan's experience of opera, most famously Wayne Koestenbaum's (2001 [1993]) *The Queen's Throat - Opera, Homosexuality, and the Mystery of Desire* and Sam Abel's (1996) *Opera in the Flesh: Sexuality in Operatic Performance*, as well as Paul Robinson's (2002b) essay "The Opera Queen: A Voice from the Closet", Mitchell Morris's (1995) "Reading as an Opera Queen" and Terry Castle's (1995) essay "In Praise of Brigitte Fassbaender: Reflections on Diva Worship". Other thought-provoking, queer theory readings of opera can be found in *Unveiled Voices: Sexual Difference and the Castrato* by Joke Dame (2006) and *Eros and Orientalism in Britten's Operas* by Philip Brett (2006). A recurring theme, traces of which can be found in Barthes, is that of opera serving as a locus of difference, a safe haven from the conventions of gender and heterosexuality (Smart 2000: 10):

> [A] place of escape […] and intellectually, as a liberation from theory, from the responsibility to study a text systematically, to amass historical context, to be exhaustive.

Like Barthes' (1974 [1970]:110) description of La Zambinella's voice penetrating and being diffused throughout Sarrasine's body, eliminating boundaries, Koestenbaum (2001 [1993]: 43) describes in a similar way his experience of listening to the soprano Leontyne Price sing. However, for Koestenbaum the boundaries eliminated by the permeating, penetrating voice relate to those between the body of the singer and that of the listener, which allows the opera queen to assume a voice and a body through the diva (Smart 2000: 10). Although Koestenbaum (2001 [1993]) describes the experience from the viewpoint of the opera queen, the experience of the permeating voice removing boundaries is an experience that applies to any listener, straight or gay (Smart 2000: 10). In this way, the queer perspective of body and voice, of difference and sameness, of representation and performance, manages to go beyond the polarisation and boundaries of male / female to include every-body (ibid.).

1.7 Opera at the Nexus of Psychoanalysis and the Neurosciences (Neuropsychoanalysis)

In this last section, an attempt will be made to clarify and render explicit some of the complementary links and overlaps between the two broad sets of constituent fields of the interdisciplinary approach used in this research: psychoanalysis (e.g. Freudian, Lacanian, Winnicottian) and the neurosciences (e.g. neurology, neuroanatomy, neuropsychology) – namely neuropsychoanalysis, a relatively new discipline that has become established in its own right. As noted by Ouss-Ryngaert and Golse (2010: 306), the term 'neuropsychoanalysis' was coined a decade ago by Mark Solms (Kaplan-Solms and Solms 2000) based on research involving patients with brain injuries, which was informed by the theories of Luria on 'dynamic neuropsychology' and those of Freud concerning the unconscious. Ouss-Ryngaert and Golse (2010: 304) remark that during that decade, 90 articles and a large number of books have been published linking the fields of psychoanalysis and neuroscience. They explain that the field has expanded to include the exploration of conscious and unconscious processes and the ways in which these are related. According to Northoff et al. (2007), the relationship involves interaction between a first-person and a third-person perspective, namely the unconscious mind and the physical brain (Ouss-Ryngaert and Golse 2010: 306). Ouss-Ryngaert and Golse (ibid.) also point out that neuropsychoanalysis is probably "a descendant of 'complementarism', a way to study a single object from two perspectives, the neuroscientific and the psychoanalytic". The authors explain that ‘complementarism’ was a term devised by Devereux (1972) in an ethno-psychiatric context to describe a position in which two theoretical frameworks are used successively rather than simultaneously, which “is a necessary position, an inevitable methodology that allows one to study the same object from two different points of view without equating one to the other” (Ouss-Ryngaert and Golse 2010: 306). Although outside the scope of this thesis, it is interesting to note that Ouss-Ryngaert and Golse (ibid.) propose an epistemology for the relationship between psychoanalysis and neuroscience that includes phenomenology as a third framework, in addition to those of complementarism and neuropsychoanalysis mentioned above. The authors state that, in order to define genetic patterns, “the precise description of phenotypes is of primary importance” and should “include the value of one’s understanding and feeling of what happens in one’s mind and body” (ibid). (A phenotype refers to a set of observable characteristics of an individual or group as determined by its genotype and environment; a genotype relates to the genetic constitution of an individual.) In particular, the authors refer to the need for a scientific understanding of the infant’s inner world based on empirical data and not just “a theoretical reconstruction based on that of the adult” (ibid.).

Neuropsychoanalysis aims to achieve a unified theory based on a complementary application of “[t]he ‘subjective’ approach to mental science (psychoanalysis)” and “the ‘objective’ approach (the neurosciences)” (Solms and Turnbull 2002: 5). In this way, the interdisciplinary approach of both fields operating in unison allows theories about the mind to be reconciled with empirical findings about the way in which the brain functions, potentially bridging the mind / brain divide. Solms and Turnbull (ibid.) note that the divergence between these two approaches occurred over a century ago, as exemplified by publications such as *Studies on Hysteria* (1893-1895) by Breuer and Freud and *The Interpretation of Dreams* (1900) by Freud, given that the neurosciences at that time did not have the means to investigate human subjectivity, namely the intangible ‘inner world’ of the mind.

The classic case of Phineas Gage, dating from the 1840s, has been quoted by neuropsychoanalysts to show the connection or overlap between mind and brain. As described by Solms and Turnbull (2002: 2, 101), Phineas Gage was a railway foreman in the United States who suffered damage to the ventromesial quadrant in the left frontal lobe of his brain when an explosive charge that he was pressing into place with a tamping rod detonated, causing the tamping rod to penetrate his brain. Although the injury was not fatal, and Phineas Gage recovered well physically, Solms and Turnbull (ibid.: 3) explain that some years after having sustained the injury, his personality was reported by his doctor as having changed drastically. Whereas Phineas Gage had previously been responsible and respectful, after the injury to his brain he had become irreverent and outspoken, displaying at once stubbornness and vacillation. Indeed, his personality had changed so drastically that his friends no longer considered him to be the same Phineas Gage whom they had known previously. Solms and Turnbull (ibid.: 3-4) point out the significance of this case, and many other similar ones since then, where damage to the brain can cause profound changes in personality, often in predictable ways, such as the "frontal lobe personality" (ibid.: 4) that Gage clearly displayed. The significance of such cases lies in the link between brain function and personality, identity, subjectivity, namely the inner world of the mind. As noted by Solms and Turnbull (ibid.: 101), Gage suffered *unilateral* damage to the left frontal lobe of his brain, so he only displayed some of the features that Freud (1915b: 187) proposed "we may expect to find in processes belonging to the system Ucs. [Unconscious]", namely: "exemption from mutual contradiction, primary process (mobility of cathexis), timelessness, and replacement of external by psychical reality". However, the authors affirm that patients with *bilateral* damage in this area of the brain have been found to match Freud's criteria more closely, as reported by Kaplan-Solms and Solms (2000).

Solms and Turnbull (2002: 6) remark how the insights of psychoanalysis, with its long history of exploring subjectivity, that is the psyche, or the inner world and mental life of patients, can usefully inform the 'objective', biological, physical approach of the neurosciences. Yet at the same time, Solms and Turnbull continue, psychoanalysis can also benefit from the findings of neuroscience about brain function, in order to gain further understanding and, in some cases, clarify opposing psychoanalytic theories. In other words, as Solms and Turnbull (ibid: 78) explain, the convergence of separate knowledge about the subjective mind combined with knowledge about the physical brain, provides a powerful tool that strengthens and mutually informs the two disciplines of psychoanalysis and neuroscience, both individually and jointly as the inter-discipline of neuropsychoanalysis.

Despite the undoubted usefulness of investigating neural and mental functioning (as well as their overlaps) through pathology, that is when normal or usual function is suspended or ceases, for example as a result of an injury or a psychiatric condition, much insight can also be gained by re-examining normal function through another perspective, or taking an opposite 'additive' rather than 'subtractive' approach. In other words, useful knowledge can be obtained by looking at the gains rather than the losses in neural structure and function, as well as psychical mechanisms and capacities, through the influence exerted by cultural activities. One example of a gain in neural function, among a number mentioned in greater detail in Chapter 3, relates to an experiment conducted by Steven Mithen (a professor of cognitive neuroscience) and Lawrence Parsons (a professor of early prehistory), as detailed in their paper entitled "The Brain as Cultural Artefact" (Mithen and Parsons 2008). In their paper, the authors discuss various studies, many involving music, which have shown that cultural activities (in the widest sense of this expression) are capable of changing the anatomy and function of the brain. In addition, Mithen and Parsons (ibid.: 418-421) describe an experiment that they conducted themselves, the aim of which was to establish whether exposure to an unfamiliar cultural activity would result in identifiable neural changes. Singing was chosen as the unfamiliar cultural activity. After three initial singing lessons for the purpose of voice assessment and gaining a basic reading knowledge of written music, Mithen's brain was scanned using functional Magnetic Resonance Imaging (fMRI) while he performed ten singing exercises and sang part of a song, using musical scores for both tasks. After this first fMRI scan, Mithen had regular singing lessons and practice for one year. A second fMRI scan was then carried out of Mithen's brain while he performed the same tasks as for the first scan. The results of the two scans were compared in terms of brain function only, that is without examining whether there were any changes in brain structure. The findings showed that, after one year's training, there was significantly increased activity in areas of the brain that are known to be associated with singing and musical tasks in general. However, there was also significantly decreased activity in areas of the brain associated with auditory working memory, visual and spatial processing and the representation of verbal information. These decreases, according to the authors, were probably the result of less concentration being required to read and process the written notes in the musical score. Mithen and Parsons (ibid.: 421) concluded from their experiment that neural activity was modified as a result of acquiring a cultural skill and that "significant changes in neural activity can occur in the early stages of learning of singing in an adult". An important point raised in the paper by Mithen and Parsons (ibid.: 415) is that the brain not only provides "the biological basis of culture in terms of the capacity for making and manipulating artefacts, language, music, dance and complex social interactions", but in turn "both the anatomy and function of individual brains can be manipulated by cultural behaviour". In other words, the brain provides the biological capacity for culture, and in turn is influenced by cultural activities. It allows the body to perform whatever is required in order to participate in a cultural activity – anything from cognitive to sensorimotor tasks – the practice of which influences and changes brains in terms of structure and function, both collectively (evolution) and individually over time.

Although it was beyond the scope of their study, and hence not addressed by the authors, the parallel role of the mind in this two-way process is self-evident. An example will be provided that is in keeping with this thesis. A singer's brain allows her/him to develop and maintain the abilities required to participate in the cultural activity of singing, such as reading music, controlling relevant muscles to breathe appropriately and produce sounds in a specific way, and so forth. The repetition of these activities, and the acquisition of expertise, changes some of the structures and functions of the singer's brain. Similarly, the singer's mind (self-identity, self-awareness, comparative artistic self-worth and general mental life in relation to the activity of singing and beyond) is influenced by the cultural environment of the artistic community to which s/he belongs. However, by virtue of his/her individual, very personal, inner world and subjectivity, s/he in turn makes a unique contribution that influences his/her cultural environment, both collectively and perhaps by exerting a particular influence on some other individual(s). The process is circuitous, as it draws from and feeds back into itself. This example may render more explicit the connection between mind and brain, subjectivity and biology, which underpins this thesis.

Another useful conceptual example of the link between mind and brain can be drawn from a different field, that of evolutionary sexology. This example not only links mind and brain, but also song and sex. As such, it additionally provides support for the proposition in this thesis of the erotic nature of a listener's enjoyment of the operatic voice. In the paper "Evolutionary Sexology: The Hypothesis of Song and Sex" by John Money (1997: 399), the hypothesis is proposed that "[T]he first human language was a love song rather than a howl of warning". Money bases his hypothesis on the existence of various representational 'maps' that are present simultaneously in the mind and the brain, which he refers to jointly as the "mindbrain" (ibid.: 400) of human beings and animals. He focuses in particular on two examples of mindbrain maps:

> *Lovemap*: a developmental representation synchronously existent in the mind and the brain (the mindbrain) depicting the idealized lover, the

idealized love and sexual affair, and the idealized program, solo or partnered, of sexuoerotic activity projected in private imagery and ideation or in observable performance.

And

Speechmap: a developmental representation synchronously existent in the mind and the brain (the mindbrain) depicting the generic principles of linguistic dialogue, syntactical reasoning and numerical logic, and the idiom of one's own language or languages. In multilingualism, each language has a corresponding speechmap and can be translated from one to the other.

Money suggests that mindbrain maps are represented in the paleocortex in sub-human species, whilst in human beings they are also represented in the neocortex. According to Money, all mindbrain maps in human beings, such as the lovemap, the speechmap and the foodmap, amongst others, were emancipated in a distant past from the bio-robotic fixedness of the mindbrain maps in sub-human species. This emancipation, he claims, "was essential for, and coincident with the evolution of the speechmap for human language" (ibid.). In addition, as a result of this emancipation, mindbrain maps in human beings developed in a highly individual, personal and heterogeneous manner, as opposed to those in sub-human species that remain bio-robotically fixed and function as identical templates for behaviour across individuals of that species. Money claims that this would account for the wide range of idiosyncratic mating rituals and sexual fantasies in human beings, as exemplified by the heterogeneity of the perversions, or the paraphilias. Money (ibid.: 401) enumerates the development of further emancipations of significance that distinguish human beings from other species: the ability to walk erect, placing the nose and genital organs on different planes than those of quadrupeds, which are aroused by smell; the ability to copulate in various positions other than solely dorsoventral; independence from hormonal mating cycles; the predominance of eyes and skin rather than the nose in sexual attraction and arousal; and, of particular importance, the development of a versatile soundmap to include:

[C]rooning, cooing, humming, and chanting with rhythmic and syllabic intonation, melody, phrasing and mimicry of audible sounds, all of which are features of musical songmaps.

The significance of these musical songmaps, according to Money, is that they allowed the development of speech, unlike the non-musical soundmaps of sub-human species.

In other words, human language may have developed not only from the non-musical soundmap of vocal signals for warnings and so forth, but also from a musical songmap. As a result of this, he asserts, human language may have developed from an early love song without words, the purpose of which was an invitation to mate. Money suggests that without this capacity to sing, human beings may never have developed speech. As such, Money (ibid.) concludes, the songmap represents an evolutionary link between the lovemap and the speechmap:

> In the evolution of human language, the lovemap is related in the mindbrain to the language map (the speechmap) by way of the songmap. Evolution of the speechmap required a degree of mindbrain flexibility and versatility not present in the various mindbrain maps of the prelinguistic mammalian brain. Emancipation of the lovemap opened the way to a range of sexuoerotic diversity [...].

According to some psychoanalysts, such as Johanna Krout Tabin (2010: 373): "Neuroscience (or genetics) can only help us understand the how of brain mechanisms – not the why. The reasons for behaviour are the subject of psychoanalysis". This stance should perhaps be nuanced based on the separate epistemologies of the two fields, one being objective and the other subjective. In applying these fields separately to the music-reception experience, the why and the how of a listener's enjoyment are both accounted for but in different ways. Whereas neuroscience considers the activation of reward and pleasure circuits in the brain to be the source of pleasure and the motivation for listening to music, psychoanalysis looks to the unconscious dynamics involved in a listener's enjoyment of this activity. Combining these complementary qualities in the inter-discipline of neuropsychoanalysis – as conceived of in this thesis – provides a powerful means to investigate the overall music-reception experience, which involves the mind and the brain, the mental and the neurological, the psychical and the physiological.

As mentioned early on in this section, the two sets of fields constituting the inter-discipline of neuropsychoanalysis have pursued separate paths for a long time, with distinct paradigms and epistemologies. In addition, perhaps because of the relative newness of the discipline, there is arguably no established paradigm when adopting a neuropsychoanalytic line of enquiry. These considerations raise methodological challenges that require particular care to ensure a coherent and consistent approach. A structured solution hase been adopted in this thesis to address these points. In a complementarist manner, separate detailed chapters have been dedicated to psychoanalysis (Chapter 2) and neuroscience (Chapter 3). In this way, relevant themes specific to each discipline and related to operatic music are discussed within the context of that discipline. This aims to reduce obfuscation and increase coherence, ensuring clarity of exposition by limiting the scope of ideas presented at once. These elements are then drawn upon in a final neuropsychoanalytic discussion (chapter 4), which aims to find points of convergence between the two disciplines.

Conclusion

This introductory chapter laid the foundations for the neuropsychoanalytic framework of this thesis. The aims, motivations and scope of this conceptual research were detailed in the first section, whilst its inevitable limitations were described in the second section. The third section provided background information in the form of a concise history of opera and its development in various musical cultures. This was followed in the fourth section by a discussion of the long-standing tension that has existed between the music and the words in this musical genre. This is of relevance to the discussions concerning language in relation to psychoanalytic theory and neuroscientific findings in the next two chapters. The various ‘layers’ of opera were outlined in the fifth section. The constituent elements of opera will be discussed and developed in greater detail in the next chapter. The penultimate section covered relevant background considerations of feminist and queer theory relating to music and opera. Some of these considerations will inform subsequent discussions. The last section clarified and rendered explicit the way in which psychoanalysis and neuroscience mesh to form the complementary inter-discipline of neuropsychoanalysis, as conceived of in this thesis. In so doing, it provided an outline of the conceptual basis of this research, as well as serving as an introduction to the next two chapters, which respectively deal with opera and psychoanalysis, and music and neuroscience.

Chapter 2 – Opera and Psychoanalysis

Introduction

This chapter will explore opera exclusively from a psychoanalytic perspective. Various elements of psychoanalytic theory applied to the operatic music-listening experience will be introduced and discussed. In order to do so, the theories of Sigmund Freud, Jacques Lacan and Donald Winnicott, amongst others, will be drawn upon.

Following an introductory overview to open the chapter, the second section will examine various approaches in applied psychoanalysis, their advantages and limitations, as well as the specific approach used in this thesis. The validity and validation of applied psychoanalysis will also be considered, as well as possible reasons to account for the relative silence of psychoanalysts on the subject of music. The third section will discuss the two focal points of the opera listener/audience, namely the voice and the gaze. The discussion will be widened to include considerations as to how the voice and the gaze can merge to produce a synaesthetic effect, either in the opera house or while listening to recordings. The fourth section will move on from the sensory to the sensual aspects of opera and the way in which they contribute to the eroticism of the music-listening experience and, specifically, to enjoyment in the form of the 'operatic orgasm'. The role of gender in relation to the operatic orgasm will also be addressed. In dealing with the Lacanian orders of Symbolic, Imaginary and Real, section five continues and extends the discussion from the previous chapter about the layers of opera by analysing each layer in greater detail. The sixth section attempts to address where the operatic voice stands in relation to the fetish and the *objet petit a*. Lastly, the closing section of the chapter will make use of Winnicott's theories about transitional objects and phenomena in order to explain the way in which the element of illusion in opera can be said to create an intermediate 'space' that functions as a transitional experience and, ultimately, a source of solace.

2.1 Overview

In their article on the association between psychoanalysis and art in relation to patients' dreams, the psychoanalysts Pazzagli and Rossi Monti (2010: 732) remark that the application of psychoanalytic theory to art has a long history that began with Sigmund Freud himself, in his publications such as *Totem and Taboo* (1913 [1912-1913]) and *The Moses of Michelangelo* (1914). The reason for this association, the authors explain, derives from the link between art and subjectivity, namely the capacity of art and artists to express something about the inner world of human beings. Pazzagli and Rossi Monti (2010: 733) mention that this association has been very fruitful and has encompassed many different art-forms, based on which a psychoanalytically-informed theory of aesthetics has evolved.

The essence of this chapter, and perhaps of a psychoanalytic approach to exploring the reception of art in general, can be summed up appropriately in the words of Pazzagli and Rossi Monti (ibid.: 731):

> A work of art can be considered as a kind of window that allows one to look upon the imaginary world created by the artist. One can peer out of this window from the other side, permitting a look at the viewer […] who is caught in a web of associations that are yet to be explored.

Although the authors refer primarily to pictorial art and, specifically, to the way in which it can appear in analysands' dreams and associations during the process of psychoanalysis, their description applies equally well to musical works and in particular to opera. In the opera house, the audience gazes upon and listens in on a fictional world re-created on stage, the proscenium acting as a frame around (moving) *tableaux vivants*. In a similar way to the casual viewer in an art gallery, the initial position of the opera audience is like that of a bystander, voyeuristic, peering in, listening in, somewhat detached. Like the viewer in the art gallery, this initially detached, voyeuristic position can shift significantly when the work being performed resonates in some way with the audience. The word 'resonance' is fitting in relation to opera, as the audience consists of viewers, spectators who, significantly, are also *listeners*. In this regard, Pazzagli and Rossi Monti (2010: 731-732) mention that art historian Ernst Gombrich (1994 [1963]) described art as a tunnel-like hall of mirrors in which every sound and image is amplified and reflected. The resulting refraction, as the authors explain, acts like a kaleidoscope: many different images (and sounds) are produced that share the common feature of having been mediated by a transition through the work of art. Based on this conception, the authors describe art as a resonance chamber in which there is reverberation that occurs within the confines of a framework, in accordance to which relationships are set up. This resonance, the authors affirm, is to be found in the artist's inner world, in his/her position within the artistic community and also in the viewer – or, in this case, the audience/listener. This concept of a resonance chamber can be usefully applied to the space of opera as a work of art, the framework within which the refraction and reverberation occurs that sets up relationships with the audience/listener. The concepts of resonance and reverberation are particularly useful here. Unlike the case of the pictorial art viewer, the shift in position of the opera audience/listener, from that of an initial detached voyeurism to subsequent involvement and participation in the performance, is mediated by sound in the form of (vocal) music. The music consists of the output from the orchestra and, importantly, the singing voice – the voice *in* music and the voice *as* music. Nagel (2008) raises a couple of related points in terms of her own psychoanalytic exploration of opera. She states that although the "verbal elements must also be considered important data [...] the elements of *music itself* can be used as psychoanalytic data" given that "the relationship between music and psychoanalysis can also be illustrated with nonprogrammatic music" (ibid.: 523). Combining and extending these observations, the singing voice in opera can be said to occupy dynamically varying positions between that of a distinct vocal and verbal entity situated within an orchestral musical framework and that of an instrument that produces music. (Singers often refer to their voice as their instrument.) A significant feature of the singing voice in opera is its ability to transcend verbal language and sometimes even music itself.

However, as cogently stated by Pazzagli and Rossi Monti (2010: 734), a theory of resonance offers limited scope in a psychoanalytic exploration of art, given that it assumes a perfect psychical overlap between the inner world of the artist, as expressed in his/her art, and the responses evoked in the recipient of that art. The authors point out that this approach has been used mainly by Kleinians, who hold that a work of art is enjoyed through identification with the whole work of art as well as the whole of the creator's inner world as expressed in that work of art. In this respect, the authors mention Hanna Segal's (1952) conception of the enjoyment of art as the result of unconsciously reliving the creative experience of the artist. Pazzagli and Rossi Monti (2010: 735) add that "this isomorphic model, based on experiential mirroring", was at the heart of the objection raised by Gombrich (1994 [1963]) to this approach. According to this approach, the work of art is considered a parcel of affective content that a creator sends to a recipient, who then opens the parcel to experience the same emotions. The authors emphasise Gombrich's view that the form of a work of art is shaped by its structure, which acts as a delimiting framework for the content of the work of art. Consequently, a more fruitful line of enquiry would be perhaps to explore the mediating role of art in evoking and accessing emotions, or as Nagel (2008: 508) suggests in relation to music: "as a point of entry to affect and the unconscious". As noted by Nagel (ibid.: 509-510), a similar view had been expressed by the musicologist and psychoanalyst Max Graf (1873-1958), who believed that music "functioned for the listener as a way to gain access to the unconscious and as a way to develop increasing psychic balance between the unconscious, preconscious, and conscious levels of the psyche" (Abrams 1993: 301).

Despite the wide scope in the psychoanalytic investigation of art mentioned earlier, there is not a wealth of material that deals specifically with music, whether orchestral or vocal, as noted over time by several authors (e.g. Coriat 1945, Nagel 2008, Nass 1971, Rechardt 1985, Sterba 1965). A rough-and-ready example of this situation is effectively illustrated by conducting a simple search of the "Psychoanalytic Electronic Publishing" online archive of publications (PEP-WEB: 2010), which yields 4,765 results for the term 'music' and 2,401 results for the term 'opera', as opposed to 10,451 results for the term 'art'. (It should be borne in mind, of course, that these terms may only be referred to indirectly in many of the publications.) A possible reason for the relative paucity of material, as noted by Nagel (2008: 513), may be due to the technical divide between the two fields of psychoanalysis and music, which are only likely to be aligned when a researcher's particular constellation of knowledge, interests and abilities straddles both disciplines. This is particularly true when it comes to psychoanalytic material investigating the features and structure of music itself, which is less common in the literature than, for example, material exploring the effects of music on listeners (ibid.: 509), as in the case of this thesis. Yet, as mentioned by Nagel (ibid.: 510), the earliest psychoanalytic investigations of music date from the beginning of the 1900s, the first being about Wagner by Max Graf (1906), followed by Graf's (1910) analysis of the music of Mozart, Beethoven and Wagner in relation to Freud's (1900b) first topography of the preconscious, conscious and unconscious. The psychoanalytic conceptualisation of music gradually developed over time from a topographical to a structural view, that is from being considered a "regressive, nonpathological experience reaching directly to primary process and the unconscious", to being looked upon as "related to secondary processes, serving the mature ego, yet simultaneously coexisting with primitive pleasures" – although these positions have since been usefully combined (Nagel 2008: 511-512).

Interestingly for the purposes of this thesis, a number of authors establish links between psychoanalysis, music and language, as well as meaning and affect, such as Ehrenzweig (1953), Faber (1996), Feder (1993a, 1993b), Friedman (1960), Kohut (1957), Kohut and Levarie (1950), Langer (1953, 1956 [1942]), Nagel (2008), Noy

(1993), Perrotti (1945), Pfeifer (1922), Poizat (1992 [1986]), Pratt (1952), Rechardt (1985, 1987), Reik (1953), Rosolato (1974), Salomonsson (1989) and Stein (1999). By contrast, some of these authors and others also highlight how music and language are not related, such as Coriat (1945), Gramajo (1993), Kohut and Levarie (1950), Mosonyi (1935), Nass (1971), Pfeifer (1922), Rechardt (1985), Régnault (2010), Rose (1991), Salomonsson (1989), Spitz (1987). In addition, a number of psychoanalytic authors have identified an erotic or sexual component in the reception and enjoyment of music, such as Coriat (1945), Lach (1913), Mosonyi (1935), Pfeifer (1922), Teller (1917) and van der Chijs (1923). There is a relatively limited amount of psychoanalytic material that deals with opera, such as the work of Adorno (1994 [1955], 1998 [1963]), Gedo (1997), Levarie (1984 [1966]), Poizat (1992 [1986]), Rosolato (1974), Silverman (1988), Steinkoler (2006), Stewart (1996), Tambling (1997), Žižek (1994), Žižek and Dolar (2002), as opposed to a wealth of publications on the aesthetic appreciation of this art-form – although some of these are psychoanalytically-informed to varying degrees. The broad areas of the 'hard-core' psychoanalytic literature mentioned above dealing with music – other than that related to pathology involving music in some form – tend to reflect the prevailing theories at the time that the material was written. Examples include the effects of music, its structure and various elements, affect, language, meaning, the ambiguity of hearing versus seeing, regression, primary and secondary processes, the pleasure principle and repetition compulsion, narcissism, libido, the release of (sexual) tension, eroticism and pleasure, the mastery of sounds perceived as a threat, reality/unreality, relating inner and outer worlds, the mother / infant relationship and communication, duality, separation / individuation and the transitional experience. Many of these will be discussed in various contexts in this chapter. Notable by their absence from the above list of authors are Sigmund Freud and Jacques Lacan. Possible reasons for this will be discussed in the next section, which deals with the methods and issues related to applying psychoanalytic theory to music.

2.2 Applying Psychoanalysis to Music – Some Considerations

In "An Essay on Method in Applied Psychoanalysis", Francis Baudry (1984: 551) remarks, primarily in relation to literary texts, that psychoanalysis has often been inappropriately applied in the exploration of non-clinical fields, such as the arts. He mentions that most of the literature discussing methods in applied psychoanalysis (e.g. Esman 1998, Kohut 1960, Skura 1981, Schmidl 1972, Trilling 2008 [1948], Werman

1979) highlights the differences compared to a dyadic clinical setting and the limitations of there being no dynamic interaction with an analysand, no free association or response. Because of this distinction, he continues, some critics question the validity of applied psychoanalysis. In this regard, Esman (1998: 741) comments that the non-clinical application of psychoanalysis to the products of culture has been viewed with mixed feelings, ranging from "a dubious procedure" to "a valuable and legitimate extrapolation of the basic principles". However, as he explains, the non-clinical application of psychoanalysis was central to Freud's approach in developing and supporting a number of his theories. Schmidl (1972: 402) provides a list of Freud's work that was based on applying psychoanalysis to other fields which, as noted by Ernst Kris (1954) in Freud (1954 [1887-1902]), began in 1898 with a story by Meyer that was likened by Freud (1909 [1908]) to the 'family romance' fantasies encountered in clinical psychoanalysis. Schmidl (1972: 402) includes in this list Oedipus Rex and Hamlet, which were mentioned in Freud's (1900a: 261-266) *The Interpretation of Dreams*, followed by a clinical approach to a fantasy in *Delusions and Dreams in Jensen's Gradiva* (1907 [1906]); a psychosexual study based on Leonardo da Vinci (1910), as well as subsequent works by Freud such as *Totem and Taboo* (1913 [1912-1913]); *The Moses of Michelangelo* (1914); *Group Psychology and the Analysis of the Ego* (1921); *The Future of an Illusion* (1927a); *Dostoevsky and Parricide* (1928 [1927]); *Civilization and its Discontents* (1930 [1929]); and *Moses and Monotheism* (1939 [1934-1938]). As noted by various authors (e.g. Esman 1988: 743, Schmidl 1972: 404-405), whereas the application of psychoanalysis to other fields originally served the purpose of informing and supporting Freud's theories, applied psychoanalysis subsequently became a tool in its own right, allowing insight into other fields.

Despite the ambivalent views regarding the validity of applied psychoanalysis (as mentioned by Baudry 1984, Esman 1998, Schmidl 1972 and others), both among psychoanalysts and researchers in other fields, some authors, such as the psychoanalyst Donald Kaplan (1988, 1993), emphasise that applying psychoanalytic theory to culture is a valuable and necessary endeavour. A detailed discussion about the ongoing debate concerning the value and validity of applied psychoanalysis is beyond the scope of this thesis. However, it is worth summarising here the views of Esman (1998), supported by other authors, relating to a reconsideration of the definition and boundaries of applied psychoanalysis, as these considerations apply to this thesis.

Quoting pertinent examples related to Freud and others during the early years in the development of psychoanalysis, Esman (ibid.: 742-743) argues that many psychoanalytic theories were not in fact based on clinical material, but rather on the findings derived from 'applied psychoanalysis'. He illustrates this point with examples such as Freud's work: *The Interpretation of Dreams* (1900a, 1900b) (based on his own dreams); *The Psychopathology of Everyday Life* (1901); much of *Three Essays on the Theory of Sexuality* (1905a); *Jokes and their Relation to the Unconscious* (1905b); and *Psycho-analytic Notes on an Autobiographical Account of a Case of Paranoia (Dementia Paranoides)* (1911a). Consequently, Esman (1998: 742) rightly asks "what, then, is being applied to what?" and, more to the point, "to what degree were Freud's (and those of later analysts) clinical observations themselves shaped by theoretical notions derived from extra-clinical sources?" Esman (ibid.: 745) develops his argument about the fuzziness of the distinction between clinical and applied psychoanalysis by adducing Edelson's view (1988: 157) that "psychoanalysis as treatment is also applied psychoanalysis, for it involves the application of psychoanalytic knowledge". Feder (s.a.) has helpfully suggested that the appellation 'interdisciplinary psychoanalysis' may be more appropriate than that of 'applied psychoanalysis', which would indeed be the case in relation to this thesis. In contrast to Edelson's (1988: 157) view above, Lacan (2007g [1958]: 630) believed that "Psychoanalysis is applied, strictly speaking, only as a treatment and thus to a subject who speaks and hears". Otherwise, Lacan affirms, it is a matter of psychoanalytic method, in which signifiers are interpreted to the exclusion of the signified. Nonetheless, as pointed out by Rechardt (1985: 106), one aspect of the music-listening experience involves the "working over of psychical conflicts" and psychoanalysis provides an effective method to investigate this and other aspects in the listener/audience.

In addressing the distinction in terms of the presence or absence of an analysand, as well as the issues of reliability and validity of non-clinical data, Esman (1998: 745) mentions the point raised by Spence (1982) that a psychoanalyst's interpretations within the private clinical setting are subject to review and correction by the analysand, even though this is not often reflected in the literature. In addition, Esman (ibid.: 746) highlights the lack of agreement among psychoanalysts, as identified by Green (1996), about what can actually be considered a clinical fact. Esman (1998: 745) compares and contrasts this position to that of the published findings of applied psychoanalysis, which are public and thus subject to review and correction by other scholars. Furthermore, Esman (ibid.: 746) refers to the similarity illustrated by Brooks (1987) between the transference and counter-transference aspects of the clinical psychoanalytic setting and the reader's relationship to a literary text. In the same way that an analysand's utterances attempt to influence the psychoanalyst, Esman (1998: 746) explains, a literary text aims to do the same to its reader. He continues that, like the psychoanalyst's counter-transference to the analysand, the reaction of each reader differs based on his/her individual personality traits and conflicts. In the words of Brooks (1987: 12):

> We intervene in a text by our very act of reading, in our (counter)transferential desire to master the text, as also in the desire to be mastered by it. When we are what we call literary critics, our interventions – our efforts to rewrite and retransmit it – may closely resemble the psychoanalyst's, with all the attendant perils of transference and countertransference.

Although the parallel relates to literary texts, an explanation is not required to justify how this can apply equally well to the music-listening experience. Perhaps it applies more so to the music-listening experience, which primarily involves sound as in the psychoanalytic clinical setting, as mentioned by various authors (e.g. Greenson 1967, Nagel 2008, Nass 1971, Salomonsson 1989). In the case of vocal music, and perhaps opera in particular, the analogy is arguably even closer on account of the verbal content.

2.2.1 The issue of validation

In light of the above discussion about the validity of applied psychoanalysis, a significant related issue needs to be considered at this point, in that it applies directly to this research. The issue concerns the validation of interpretations obtained by applying psychoanalysis to the products of culture. A detailed discussion of the extensive ongoing debate on this subject, both within and outside the field of psychoanalysis, is beyond the scope of this thesis. In any case, it may perhaps be more productive to describe the foundation upon which the psychoanalytic interpretations in this thesis have been constructed and developed, allowing the reader to be convinced, or otherwise, as to their validity.

A useful place to start might be Schmidl's (1972: 407) proposition that the validity of psychoanalytic interpretations hinges on "the fitting together of the gestalt of what has to be interpreted with the gestalt of the interpretation" (1955: 112). In other words, this means achieving a holistic interpretation of the essence of that which is being interpreted, an explanation that accounts appropriately for a cluster of observations. However, in so doing, it is also necessary to be mindful of the problems described by various authors, such as the fact that almost any psychoanalytic theory can be justified to apply to the cultural product being investigated (Baudry 1984: 576), or that many possible meanings exist, not a single correct one (ibid.: 559). The literary critic Lionel Trilling (2008 [1948]: 48-49) aptly stated that:

> There is no single meaning to any work of art […] artistic understanding is not a question of fact but of value […] the meaning of a work cannot lie in the author's intention alone. It must also lie in its effect. In short, the audience partly determines the meaning of the work.

Although he was referring to the interpretation of works of art, rather than the appropriateness of psychoanalytic interpretations specifically, his observation is nonetheless relevant here. In particular, the last sentence is relevant to the approach adopted in this thesis, namely exploring the reception dynamics in the operatic listener/audience. In other words, to restate what may appear to be the obvious, a psychoanalytic interpretation of the reception of opera must take into account and is determined by the effects of opera on the listener/audience and their reactions. As noted by Baudry (1984: 576), the plausibility of hypotheses provides a point of departure rather than arrival (or validation), echoing Hartmann's (1964 [1927]: 388) statement that: "no matter how meaningful a self-evident interpretation as such may appear to be, it cannot on this account alone claim to be a causally valid interpretation. In itself it may remain only an especially plausible hypothesis". Baudry (1984: 576) proposes that, for the purposes of validation, the interpretations of applied psychoanalysis should include and explain diverse information about form and content. In addition, interpretations should be parsimonious, consistent both in themselves and in relation to psychoanalytic theory, augmenting our understanding and enjoyment of the work in question. All of these criteria have been taken into account in the structure of this thesis. However, it is hoped that the reader will be aware of a further criteria that permeates this thesis, namely the successful conveyance of an 'inner conviction', as mentioned by Schmidl (1972: 408). He refers to a parallel made by the historian H. Stuart Hughes (1975 [1964]: 47):

> For the historian as for the psychoanalyst, an interpretation ranks as satisfactory not by passing some formal scientific test, but by conveying

> an inner conviction. For both, plural explanations are second nature. The former speaks of ‘multiple causation’; the latter finds a psychic event ‘overdetermined.’ Indeed, for both of them, the word ‘cause’ is admissible only if defined with extreme flexibility: most of the time they prefer to express their interpretations in terms more clearly suggesting the possibility of alternative ways of looking at the matter. Both deal in complex configurations, searching for a thread of inner logic that will tie together an apparent chaos of random words and actions.

Schmidl (1972: 408-409) feels that a researcher using applied psychoanalysis should be able to arrive at an inner conviction about the accuracy of their interpretations and successfully convey it, avoiding reductionism, in order to convince both psychoanalysts and experts in the field being investigated. The notions proposed in this thesis, in particular as they relate to the application of psychoanalytic theory, are inspired by this concept.

2.2.2 Approaches in applying psychoanalysis

Moving on from the issues of validity and validation, the last part of this section will consider the various approaches that may be adopted in applying psychoanalytic theory to cultural products, as well as the specific approach used in this thesis. It may be useful to begin this discussion by considering the three areas of focus in the psychoanalytic exploration of art that were identified in the literature by Ernst Kris (2000 [1952]: 17):

> [F]irst, the ‘ubiquity’ in mythological and literary tradition of certain themes known from or related to the fantasy life of the individual; second, the close relationship between the artist’s life history in the psychoanalytic sense and his work; and, third, the relationship between the working of creative imagination, the productive capacity of man, and thought processes observed in clinical study.

Whilst these categories provide a historical description of the broad areas of focus in applied psychoanalytic investigation, they are quite general and do not reflect current approaches as much, nor that adopted in this thesis. Although related to literary texts as such, a more sophisticated description of psychoanalytic approaches, which could apply equally well to the investigation of any product of culture, is provided by Francis Baudry (1984: 551-552):

1. In the first approach, the analytic writer treats a novel, play or poem as a case history, ignoring the as-if nature of the literary text and performing a type of character analysis.
2. The second approach relates the text to the mental life (both normal and abnormal) of the author. The text is viewed as a modified form of free association.
3. The third approach considers the text in its own right and carries out a thematic analysis identifying traces or derivatives of mental contents.
4. The fourth approach concerns itself with the reaction of the reader and the production of poetic and aesthetic effect.

The approach adopted in this thesis does not fall under any of the three categories identified by Kris. However, the third and fourth approaches listed by Baudry would appear to describe, in general terms, the focus of this thesis on the dynamics of the relationship between the audience/listener and the voice as object (the vocal object) in opera. The difference being, of course, that a purely textual reading of opera will not be undertaken for the reasons mentioned by Robinson (2002a), which were discussed in the previous chapter.

Looking specifically at music, a further refinement in defining a psychoanalytic approach is possible. Rechardt (1985: 95-96) notes that psychoanalytic explorations of music have adopted four basic approaches (Feder 1978, 1980, 1981; Friedman 1960; Kohut 1957; Kohut and Levarie 1950; Mosonyi 1935; Nagel 2008; Nass 1971, 1975, 1984; Niederland 1958; Salomonsson 1989; Spitz 1965; Wittenberg 1980):

(I) Introspective observation of the impressions evoked by listening to music. What can psychoanalysis say about these experiences?

(II) Psychoanalytical biographies of musicians and composers. Autobiographies of musicians and their narratives of musical experience.

(III) Experiences derived in psychoanalytical situations concerning the occurrence of musical experience, and knowledge drawn from analyses of musical people.

(IV) Psychoanalytical knowledge and its theory formation derived from childhood development utilized and extrapolated towards a general psychoanalytical theory of music.

He further remarks that the traditional view in the psychoanalytic literature about music is that the subjective experience of music is characterised by an isomorphism, or a similar form and structure, "that ties the psychic event and the musical language together, extending from the primitive levels of the psychic event all the way to current social relations" (ibid.: 96). Based on Rechardt's list above, points 1 and 4 apply to this thesis: the affective response of the audience/listener will be explored in psychoanalytic terms, and various psychoanalytic theories will be applied to arrive at a general interpretation of the elements of vocal music that may be responsible for these affective responses. Thus, combining the two pertinent elements from both of the lists above, the specific approach adopted here may be summed up as follows:

1. Exploring the nature of the relationship on the part of the listener/audience towards the operatic voice, by investigating primarily the reception dynamics and affective responses in psychoanalytic terms.
2. Examining the constituent elements of opera, such as music, language and voice, in order to arrive at a possible interpretation of the affective responses and the enjoyment of the listener/audience, through the application of various strands of psychoanalytic theory.

2.2.3 Has music 'fallen on deaf ears' among psychoanalysts?

This section will briefly consider possible reasons why music has not been an especially prolific area of investigation by psychoanalysts, in contrast to the ample application of psychoanalytic theory to music by scholars from other disciplines, or the increasing music research conducted in other disciplines, such as psychology and the neurosciences. One of the reasons may be that, as mentioned earlier, Freud had very little to say about music *per se*. This may have set the tone (excusing the pun) at the outset, resulting in music being more or less inadvertently relegated to a less fruitful area of research by other psychoanalysts. Régnault (2010) notes that the classical psychoanalytic literature is silent about the form and structure of music itself. He also mentions, although without being able to provide a reference, that the only statement about music attributed to Lacan, for example, is that music is the supreme art, along with architecture. However, in his "Identification" seminar, Lacan (1961-1962, Seminar of 29 November 1961) also refers to singing in relation to language:

> If it often happens that you do not understand what the singer is saying,
> it is precisely because one cannot sing occlusives and I also hope that

> you will be happy to land on your feet again by thinking that everything is in order because in short my dog sings, which reinserts her into the concert of the animals. There are many others who sing and the question is not still demonstrated whether for all that they have a language.

Régnault (2010) affirms that both Freud and Lacan appeared "unwilling to decide on music", which according to Régnault indicates "a symptom, in both writers, of a non-relation". Nonetheless, Lacan is known to have attended concerts regularly (Régnault 2010) and Freud did have a number of favourite operas, despite displaying an ambivalent position towards music in general (Cheshire 1996). Whereas Lacan's position in respect of music remains for the most part un-researched, Freud's often contradictory relationship with music has been the subject of much speculation and debate among a number of authors seeking to clarify the situation. As an exhaustive treatment of the subject is beyond the scope of this research and, given the extent of interest that the subject has generated over the years, only a few salient aspects will be dealt with here. These aspects are intended solely to cast some historical light on the possible reasons for the comparative silence about music on the part of psychoanalysts. However, as illustrated previously, a number of psychoanalysts long after Freud, some notable examples being Feder (e.g. 1978, 1980, 1981, 1993a, 1993b, 1998, etc.), Feder et al. (1990, 1993), Kohut (1955, 1957), Nagel (2007, 2008), Nass (1971, 1975, 1984, 1989), Noy (1966-1967), Reik (1953), Rose (1993, 2004), Stein (1999, 2004, 2007), have contributed to addressing this relatively neglected area by examining various aspects of music.

Freud's references to music in his theoretical work are generally indirect, that is they do not deal with music in itself. (The reasons for this will be addressed below.) For example, in *The Interpretation of Dreams,* Freud (1900a: 50) refers to the overlap between acoustic and visual images in dreaming:

> If one falls asleep with the memory of a series of musical notes in one's mind, the memory becomes transformed into an hallucination of the same melody; while if one wakes up again […] the hallucination gives way in turn to the mnemic presentation.

Freud (1900b: 418-419) deals with music again, and opera specifically, in a footnote in the second part of *The Interpretation of Dreams*, in relation to the mechanism of distortion in a patient with musical hallucinations of songs or song fragments. The first example that he quotes relates to Agathe's aria in "Der Freischütz", an opera of the

German Romantic period by Carl Maria von Weber (1786-1826). Nagel (2008: 509) feels that such references by Freud would suggest his awareness of the symbolism in music. However, as discussed by a number of authors (e.g. Adorno 2009 [1952], Sachs 1945, Sterba 1965) Freud apparently had little or no interest in music. Indeed, by his own admission, although he was powerfully affected by works of art such as literature and sculpture, his feelings about music were rather different: "with music, I am almost incapable of obtaining any pleasure" (Freud 1914: 211). It may be of relevance that Freud (ibid.) admitted to being drawn more to the content of works of art rather "than their formal and technical qualities", which may have been due to his self-confessed lack of knowledge about the methods and effects in the arts, including music. This would be somewhat of an obstacle to the enjoyment of music, given that form and content are closely related in music, as Salomonsson (1989: 127) remarks.

However, as documented in detail by Cheshire (1996) and others, Freud consistently displayed more than a superficial (though non-technical) knowledge about music, and opera in particular (to the point that he would hum tunes from Mozart operas to himself and to his dog), despite his claim of being a "completely unmusical person" (*ganz unmusikalischer Mensch*) (Freud 1961 [1936]: 430). His overall favourite operas were "Die Meistersinger von Nürnberg" by Wagner (1813-1883), "Carmen" by Bizet (1838-1875), "Le nozze di Figaro" and "Don Giovanni" by Mozart (1756-1791) (Cheshire 1996: 1127), who was documented as being his favourite composer (ibid.: 1129). The reasons for these preferences have been dealt with thoroughly by Cheshire (ibid.) and are briefly outlined below.

Various hypotheses have been proposed to account for Freud's attitude towards music, which appears to be contradictory. These range from a visual bias (Feder 1998: 253) to a form of tone-deafness resulting from 'acoustic atrophy', discussed by Diaz de Chumaceiro (1990), and even to a conflict, discussed at length by Cheshire (1996). It may be that each of these hypotheses provides some valid insight by addressing the situation from different viewpoints. However, Cheshire's very detailed discussion of this topic, which is beyond the scope of this thesis, appears to be the most cogently reasoned, based on solid evidence from a wide variety of sources. Essentially, Cheshire (1996: 1127) points to a conflict rather than a deficiency in Freud's exaggerated difficulty with music, given that Freud enjoyed a number of operas and regularly used music-related metaphors in his writings. A further contradictory element pointed out by Cheshire is that Freud's psychoanalysis has an oral and aural basis, in which auditory images have a prominent role in both perception and memory. Interestingly, as mentioned elsewhere in this thesis, both psychoanalysis and opera have the common feature of language, in other words sound mediated by a verbal component. In analysing Freud's (1914: 211) insightful statement about his conflict with music:

> Some rationalistic, or perhaps analytic, turn of mind in me rebels against being moved by a thing without knowing why I am thus affected and what it is that affects me.

Cheshire (1996: 1140) identifies the emotional response of being moved without knowing why or by what as being a possible source of anxiety for Freud, in the sense that it could have potentially resulted in the loss of control of his emotions. This situation could be prevented by the verbal control afforded by the lyrics in opera. In other words, the verbal element in opera served as an anchor, or even a break or a buffer, for the emotions 'mysteriously', evoked by 'pure' music. In this way, given Freud's lack of technical knowledge about music, in which form and content are closely bound, the verbal element of opera would provide him with a familiar structure or form to protect against the possibility of being moved without knowing how or why, or to a point that could be uncomfortable or 'dangerous'. A further consideration in Freud's preference for opera, rather than 'pure' music, has been identified by Cheshire (ibid.: 1142), who proposes that this may also have been related to Freud's classical education. Freud would have read about the dangerous emotional power of music, the struggle by Odysseus to protect himself against the Sirens' song described by Homer, or about Greek tragedy with its song-like declamation to heighten delivery of the words, which, as mentioned in the previous chapter, parallels to some extent the *Sprechgesang* (spoken song) in opera.

In discussing possible neurotic processes or traumatic experiences that would cause the otherwise pleasurable activity of listening to music to be associated with anxiety, Cheshire (ibid.: 1141) mentions an hypothesis proposed by Vitz (1988). Although Cheshire (1996: 1141) does not appear wholly convinced by it, the hypothesis revolves around episodes in Freud's childhood in Moravia involving the temporary separation from his mother, while she gave birth to his sister, and the permanent loss of his nanny after she (the nanny) had been convicted of theft. The link with music lies in the nanny who, being Catholic, would take Freud to church services with her, where he would likely have been exposed to music. The constellation of anxiety-provoking traumatic events, according to this hypothesis, would have been the source of Freud's subsequent conflict with music. Although, as Cheshire (ibid.: 1142) affirms, this hypothesis remains speculation. However, the hypothesis does inspire some 'wild analysis'. One wonders whether, as a result of the temporary separation from his mother, envy towards his younger sister, Anna, may have been the reason that led Freud as a child to convince his parents to have the piano removed from their home, so that Anna would be prevented from playing it, as subsequently described by Freud's son, Martin (Freud 1957).

A defensive element may also have had a part to play in Freud's continued ambivalence towards music, as mentioned by Cheshire (1996: 1161-1162), in respect of his future wife's musically-gifted suitor, Max Meyer, on the one hand, and the important position that music occupied in Vienna, on the other. As noted by Cheshire (ibid.: 1129) and documented by other authors, Freud was also ambivalent towards his adopted city of Vienna, which was famous for its music. Perhaps, as Cheshire asserts, Freud rejected music in the same way that his theories and Jewish origins appeared to be rejected by the Viennese. Interestingly, Cheshire (ibid.: 1139) points out that three of Freud's limited associations and references to music revolve around "the theme of anti-authoritarian subversion and symbolic parricide", as discussed by Schorske (1981 [1973]) and Krüll (1987 [1979]). Conversely, as Cheshire (1996: 1157) also observes, Freud may have enjoyed his favourite operas because their content involved "'oedipal' features" and "dynamics of 'eros' and 'thanatos'" that resonated with him and his theories. Perhaps the dynamic here is similar to that in which the words are found to provide the link between a particular situation and a tune that appears to come to mind spontaneously (ibid.: 1146), or as stated by Freud (1916 [1915-1916]: 108):

> In the same way tunes that come into one's head without warning turn out to be determined by and to belong to a train of thought which has a right to occupy one's mind though without one's being aware of its activity. It is easy to show then that the relation to the tune is based on its text or its origin.

However, in order to ensure that the subject of music remained at arms length, Freud (ibid.) also had to point out the following:

> But I must be careful not to extend this assertion to really musical people, of whom, as it happens, I have had no experience. It may be that for such people the musical content of the tune is what decides its emergence.

Whereas Freud's position in relation to music has been the subject of much debate on the part of psychoanalysts by virtue, paradoxically, of an apparent non-relation, Lacan's Freudian-inspired theories have increasingly been used to explore music by scholars in other disciplines.

2.3 The Voice and the Gaze

In this section, psychoanalytic theory will be applied to explore the role and function of the voice and the gaze in the reception experience of operatic music. Although there are a number of significant differences that will be discussed as they arise, the reception contexts are understood to comprise the opera house, live relay broadcasts on the radio, on television, in the cinema and on public 'big screens', as well as recorded audio and video that are played back using a range of appropriate technology. Therefore, given these diverse contexts, the reception experience may occur as part of a group of people (audience) or alone (listener/viewer). However, in all cases, despite whatever may be implied by the terminology that is used, and whether it occurs within a group or alone, the reception experience is essentially and ultimately an individual experience, in particular as regards affective responses. These considerations should be borne in mind when the terms 'listener/audience' or 'listener' are used, as appropriate, based on the reception context that is being discussed. As mentioned in the previous chapter, the primary reception context is the opera house, this being the venue for which the vast majority of operas were originally intended.

When one thinks of opera, the first image that often comes to mind is that of a lavish stage spectacle involving a significant suspension of reality in terms of the story and the way it is enacted. This last element is what distinguishes opera from other forms of stage drama: the enactment is mediated by the singing voice rather than speech. Because of this, the singing voice is the overwhelming focus of the serious opera devotee. This is why, as mentioned in the previous chapter, elements that would be either significant or problematic in other theatrical contexts become of somewhat secondary importance on the operatic stage when compared to the role occupied by the singing voice. Some examples of these elements include often overly complex plots, dramatic situations that develop very rapidly or very slowly, including their attending enacted emotional content, and of course the fact that dialogue is sung rather than spoken. For this reason, in Figure 1.3 illustrating the layers of opera in the previous chapter, the voice is shown at the centre of the overlapping rings. This is because without the singing voice, the other elements of opera would have no reason to exist. Yet at the same time, they each justify the presence of the singing voice to varying degrees. The orchestral music and the narrative of opera justify the presence of the voice and are put to its service. They are auxiliary elements for the voice to express itself, yet they are ultimately transcended by the voice as it follows its own trajectory. The same holds true for the visual element of stage sets, costumes, lighting and effects, which occupies a secondary role even in the opera house, as illustrated in Figure 1.3 and as will be dealt with later. It is the 'eye candy' that titillates and lures the gaze of the audience, an auxiliary element that is specific to the opera house and that contributes to the audience's overall focus on the voice. An example to support this statement would be concert performances of operas, or parts thereof, in which stage sets and costumes may be limited or non-existent. The stage is occupied instead by the singers and an orchestra that in the opera house is traditionally kept discreetly in the orchestra pit. Despite its discreet location in the opera house, the orchestra remains visible to the audience, yet it does not prove to be a distraction from the central spectacle of the voice. From this perspective, then, the lavish stage sets of the opera house are not the icing on the cake after all. If this were the case, recordings of the singing voice would not be as popular as they are. Opera may be described paradoxically as an aural spectacle, irrespectively of performance venue or reception context. The opera devotee ultimately seeks the intense enjoyment of the singing voice and, as will be proposed here, the excess that lies beyond it. The nature of this excess of enjoyment, or *jouissance* to use the Lacanian term, as well as that which lies around and beyond it, will be explored in the subsequent sections of this chapter.

2.3.1 The voice: meaning, materiality and phonic excess

It seems appropriate to begin by recounting the humorous story that can be found at the beginning of the book *A Voice and Nothing More* by Mladen Dolar (2006: 3). The humour in the story hinges on two stereotypes about Italians. Although the story may not be politically correct, it is not overtly offensive either. It is directly pertinent to the subject of this research, as it illustrates some considerations related to the operatic voice.

The story is about a company of Italian soldiers whose commander orders the men to attack. Despite issuing the command in a loud and clear voice, the soldiers do not leave the trenches. The commander repeats the order, this time shouting louder.

Again, nothing happens. However, when the commander repeats the order a third time, yelling at the top of his voice, one of the soldiers expresses his appreciation by saying: "*Che bella voce!*" ("What a beautiful voice!"). As Dolar explains, the story illustrates a number of points. The meaning of the message is (purposefully) overlooked in favour of the voice as the medium of the message. Although by focusing on the materiality of the voice, another meaning arises beyond the message itself. The soldiers fail to acknowledge themselves as the recipients of the message (or perhaps, more accurately, choose not to respond to the message), "the call of the other" (ibid.), which plays on the first stereotype related to Italian soldiers. In addition to failing to acknowledge themselves (or excluding themselves) as the addressees of the commander's message, the soldiers focus specifically on the materiality of the voice, which plays on the second stereotype, this time related to Italians in general. Although the meaning and content of the commander's message has been 'undone' by the soldiers focusing on the materiality of the voice, the 'call to battle' having apparently fallen on semantically (or selectively) deaf ears, another message has nonetheless been acknowledged by the soldiers. They consider themselves to be Italians (rather than soldiers) – again playing on the stereotypes of Italians being less than courageous soldiers and a nation of opera lovers – and, as such, connoisseurs of the voice, who can discern and enjoy a beautiful voice even in the midst of battle!

As Dolar affirms, we normally hear meaning and only overhear the voice; that is, we usually focus on the semantic content of an utterance rather than its phonic medium. However, the point that is being conveyed by Dolar in retelling the above story is that both the meaning and the voice are misunderstood by the soldiers when they focus on the voice as an aesthetic object, attributing meaning to the voice beyond the message itself. Later on in his book, Dolar (2006: 30-31) refers to the voice in song, stating that by virtue of its focus, singing risks losing the voice by transforming it into a fetish object (this will be discussed later), which as such becomes the opposite of the voice as *objet petit a*. However, he points to an ambivalence in this concept, in that music both evokes the voice as object and renders it less distinct by opening "the gap that cannot be filled" (ibid.: 31).

In his psychoanalytic exploration of the operatic voice, *The Angel's Cry: Beyond the Pleasure Principle in Opera*, Michel Poizat (1992 [1986]: 102-103) deals with this distinction between signification and vocal materiality by quoting two examples. The first relates to a bilingual viewer of a dubbed film. When asked some time after having seen a dubbed film, a bilingual viewer may not be able to recall in which language s/he saw the film, unless some problematic or unusual feature made the soundtrack stand out. The second example relates to the foreign quality of accents that are heard outside of their national or regional areas, which occurs because the vocal materiality, the vocal object, stands out beyond the signification of the utterance. In all three of the examples described above, vocal materiality functions as a signifier, yet at the same time it produces a meaningless phonic excess. This excess is the object of *jouissance*, or *objet petit a* (ibid.: 102), the partial lost object that is sought after by the opera listener for the *jouissance*, or the excess enjoyment, that is produced by it. These notions will be explored progressively in the next sections.

2.3.2 The gaze: the separation between the eye and looking

Although it is tempting to consider the visual elements of opera, such as the stage sets, effects and even the singers themselves, as being central to opera in their appeal to an audience's scopophilic side, they actually are or become of secondary importance. Their role is auxiliary rather than primary. It is paradoxical that the "dialogic" and "multi-layered" (Tambling 1996: 109) qualities of opera – in the sense that this art form makes use of words and music, images and sound – actually disappear at the moments of most intense emotion, or *jouissance*, which are experienced by the listener in response to the singing voice. At these times, the signifying order can be said to fall away (Poizat 1992 [1986]: 36). When the voice as object achieves the status of 'pure cry', as described later, the visual order ceases to exist, albeit momentarily. This paradox is all the more striking given the often lavish stage sets that one tends to associate with opera house productions. However, the lavishness of the stage sets, in addition to the notorious complexity of the storylines, may be said to perform the dual function of developing and adding to the visual interest and dramatic pathos, while at the same time concealing the audience's ultimate progression towards the infinite void of vocal *jouissance*, that is of the singing voice. In this regard, Poizat (ibid.: 32-34) explains that the lavishness and complexity of the *mise-en-scène* is an integral element, in that it serves to create a perspective leading to a point of emptiness, by preventing a certain immediacy. As a result, those parts of the action that are most significant can take place around this point, the void around which art revolves, according to Lacan (1997b [1959-1960]: 135-136).

Therefore, when enraptured listeners reach the point of musical *jouissance* mediated by the voice as object, they close their eyes to the stage apparatus that has led their gaze to the point of infinity and terminates in the void, that is, the point at which the void begins. Everything else up to that point outside of or around the voice as object (which on account of it being a lost object, is in itself a lack and thus a void) has contributed to the momentum, the crescendo required to achieve the 'pure cry'. Even the singer, as Poizat (1992 [1986]: 35) explains, risks annihilation as a subject in order to achieve this pure voice. This point will be taken up again and amplified later.

If one accepts the above to hold true, the voice being the ultimate focal point in opera as the locus of *jouissance*, then it follows that the spectacle of the visual elements (the stage set, lighting and effects) has the auxiliary role of arousing desire in the gaze of the Other. It is like Salomé's 'Dance of the Seven Veils' which, through the gaze mediated by the music, conceals and then gradually reveals and leads to the object of the listener's desire. It is the foreplay leading to the supreme moment of vocal *jouissance* that results in the spectators/listeners 'losing their heads', not literally like John the Baptist in Salomé's story, but in the sense of losing control of their emotions, becoming one with the voice as incorporeal object, the lost 'pure cry', fleeting in its evanescence like the pleasure of orgasm. These ideas will be taken up again in subsequent sections.

Building on and further developing Sartre's (1958 [1943]) notions, in "Of the Gaze as Objet Petit a" Lacan (1998 [1973]: 67-119) considers the gaze as being separate from the eye and from looking and related to the scopic drive, as "the gaze of the Other". In this separation, Lacan (1998 [1973]: 103) highlights the distinction between looking on the part of the subject and the gaze on the part of the object. This separation and position of the gaze as the object of the scopic drive is similar to the previously mentioned phonic excess of the voice, the voice being the object of the invocatory drive. In this way, both the gaze and the voice are partial objects, as will be discussed next. However, before closing this section, it is worth reiterating that, given the focus of this thesis on the voice in opera, the gaze will only be dealt with to a limited extent in its secondary or auxiliary function within the specific context of staged performances. In this regard, the synaesthetic-like effect of the overlap between the voice and the gaze will be discussed in a subsequent section.

2.3.3 *The voice and the gaze as partial (lost) objects*

The term 'partial object' or 'part-object', as opposed to 'whole object', was first used by Karl Abraham (1988 [1924]) in the context of object-relations and the libidinal aims during the various psychosexual stages of development (Laplanche and Pontalis 2004 [1967]: 301). Subsequently, the term became significant in the work of Melanie Klein (e.g. 1984a [1946], 1984b [1952]) – who had been psychoanalysed by Abraham – where the breast is considered the first object that is split into good and bad part-objects. By extension, while part-objects such as the breast, penis or faeces are themselves split into good and bad objects, whole objects are also split once the infant is able to perceive them (Laplanche and Pontalis 2004 [1967]: 189). In other words, partial objects are incomplete parts of a whole object. This interpretation corresponds to the Kleinian view that infants are limited in their perceptions and solely preoccupied with their own needs, whereby initially they are only able to relate to a part of another person, typically the mother's breast (Hinshelwood 1991: 378-380).

In "The Four Fundamental Concepts of Psychoanalysis", Lacan (1998 [1973]: 103-104) states that the voice and the gaze are partial objects of a drive, where the object is the cause of desire, or *objet petit a*:

> At the level of the scopic dimension [the gaze], in so far as the drive operates there, is to be found the same function of the *objet a* as can be mapped in all the other dimensions […]. At the scopic level, we are no longer at the level of demand, but of desire, of the desire of the Other. It is the same at the level of the invocatory drive […].

Lacan added the voice and the gaze as two partial objects of desire to Freud's list of lost objects: breast, faeces and phallus (Salecl and Žižek 1996: 90). Although Lacan's list of partial objects originally included the urinary flow, the phoneme and the nothing, subsequently to his formulation of *objet petit a* as the cause of desire he only mentions the voice, the gaze, the breast and faeces as partial objects (Evans 1997: 135). Lacan (2007h [1960]: 693) describes these objects as being partial not because they are part of the body as a whole, but rather because they "only partially represent the function that produces them". In addition, he notes that these partial objects have one thing in common: "they have no specular image, in other words, no alterity" (ibid.). Lacan's view differs fundamentally from that of the Kleinians, in that "[…] the characteristic of being partial [...] is applicable not because these objects are part of a total object, [...] but because they only partially represent the function that produces them" (ibid.).

As was mentioned previously, the main focus of an opera audience lies in the voice, while the gaze has a secondary or auxiliary position. The reason for this, as explained by Poizat (1992 [1986]: 99-104), is that the intense enjoyment derived from opera results from the *jouissance* experienced during the seemingly indescribable and unexplainable moments of musical ecstasy produced by the voice. His explanation is based on the Lacanian theory described above. The operatic voice functions as a partial object, a lost object, the listener's object of desire, in other words *objet petit a*. However, as the path of desire is circuitous, the listener is driven in an attempt to obtain the voice as *objet petit a*, but being a partial lost object it is characterised by lack and is ultimately unattainable. Thus the voice as *objet petit a* is the cause of desire in the listener, the lack around which this desire circles endlessly. The only aim of this desire is to ensure the continuation of desire itself and not that of obtaining the object cause of desire, or *objet petit a*, as this would result in desire being annihilated. Consequently, *objet petit a* remains just beyond a listener's reach. It is close enough to be tantalising, yet far enough to be unattainable, ensuring the function of desire in its perpetual circuit.

At this point a question arises: how does the voice become lost, a partial object? Poizat (ibid.) provides a good explanation of the theory that attempts to answer this question, describing the process as a 'mythical' experience. It is mythical in the sense that it cannot be pinned down to a specific instance; it occurs in a child's nebulous past as a stage of development. According to Poizat's explanation, a pre-verbal baby who is dependent on the Other (a parent or guardian, perhaps most often the mother) for the satisfaction of his/her needs emits an empty cry in reaction to a need or some displeasure or discomfort that s/he is experiencing. This cry is then attributed meaning by the Other, who responds to the cry and provides satisfaction in some form, based on the Other's interpreted meaning of the cry. This satisfaction, as well as the associated details of the situation, leave a trace in the baby's mind with a link to his/her cry. Prior to this attribution of meaning, the baby's cry was a 'pure cry' that had not entered the signifying order (language) of the Other. The Other can only experience the baby's cry as a demand, a 'cry for' something. As soon as meaning is attributed to the baby's cry, the 'purity' of the cry is lost, as every subsequent cry will have signification as speech. However, the initial *jouissance* experienced by the baby at his/her first cry can never be repeated, it becomes lost, as the subsequent situation and satisfaction provided by the Other will not match the initial trace of the baby's experience. In this way, the sound of the voice, the 'pure cry' devoid of meaning, becomes a partial (lost) object when the baby enters the realm of language through the desire of the Other. As such, this pure cry becomes the object of a drive in the (impossible) quest to recapture it. As Poizat (ibid.: 103) affirms, the aim of this quest is not simply to recapture phonic materiality itself, but rather the vocal object that is no longer under the sway of signification. This point will be addressed later in terms of the excess of vocal *jouissance* resulting from the undoing of language by the phonic materiality of the singing voice.

All of the above illustrates the central role of the voice, and the auxiliary position of the gaze, as objects of desire in opera. The other two elements of opera, namely the orchestral music and the narrative, have not been forgotten. Whilst, on the one hand, they are arguably not of pivotal significance in a discussion focusing on the operatic voice, they are nonetheless relevant to it, by virtue of the fact that they are constituent elements of opera. Therefore, they will be dealt with during the course of subsequent discussions. Besides which, a separate detailed treatment of these two elements would be beyond the scope of this thesis. Support for this approach may be found in the arguments put forward by Robinson (2002a) about the problems of a textual reading of opera, as well as those proposed by Abel (1996) relating to the narrative content in opera, and those set forth by Poizat (1992 [1986]) concerning the position and function of the music and the narrative in opera, all of which were mentioned in the previous chapter.

However, a few thoughts about the music and narrative in opera may be appropriate in closing this section. Tambling (1996: 112) remarks that opera as discourse draws its power from its “pleonastic utterances”, where the orchestral music supports the narrative of the singing and acting. Yet, at the same time, the orchestral music in opera acts as a catalyst for the dramatic and vocal elements, modulating the tempo and determining (despite itself and the plot) the inevitable moment of non-return, in the form of vocal *jouissance*. The culminating point of vocal *jouissance* is ‘the (pure) cry’, the ‘operatic orgasm’ as Abel (1996) describes it, which is the interface between performer and spectator. It is the point at which both performer and spectator together transcend and ultimately transgress in their quest for *jouissance*.

2.3.4 The voice, the gaze and synaesthesia

As described by Salecl and Žižek (1996: 92-93), and discussed by the art critic Joannes Késenne (s.a.) in the context of synaesthetic metaphor, when we enter the symbolic order, that is the order of language, we lose the immediacy of our experiences. Voice is permanently separated from the body and becomes autonomous, an evacuated object as soon as it is spoken, a mute voice resonating in a void, where the tone of voice represents a lost object of immediacy, a lament for a lost object. However, the ambiguous nature of the lament for the lost object means that the resonance in the void also serves to keep the voice as object at a safe distance. This is why we derive pleasure from listening to music: so that we do not have to confront the voice as object. When the music breaks down and becomes "a pure unarticulated scream" (Salecl and Žižek 1996: 93), at that point we encounter the voice as object. In this way, Lacan explains the relationship between voice and silence, where the resonating voice provides a background against which the figure of silence becomes visible. This illustrates, in turn, the relationship that exists between voice and image, where the voice points at the gap in the field of the visible, at what cannot be seen by the gaze, so that "*we hear things because we cannot see everything*" (ibid.).

The complementary relationship between sound (the voice) and silence, as well as the notion of silence becoming visible against the background of the resonating voice, can be conceived of for the purposes of illustration as a cut out fretwork screen. In relation to the voice, the spaces in the fretwork screen may be taken to represent silence. Conceived of in this way, the complementarity of voice and silence becomes immediately apparent. The voice cannot exist without silence and vice versa. However, as Žižek (1996: 93) points out, it is the silence, the vacuum, the void that reverberates, not the sound of the voice. A useful analogy to illustrate this complementarity in visual terms can be found in a number of M. C. Escher's optical illusion images, such as "Sky & Water" or "Mosaic" shown below. By focusing on the 'spaces' between the images that appear to stand out in the foreground, the 'spaces' are brought forward into the foreground and appear as thematically complementary or contrasting images in their own right.

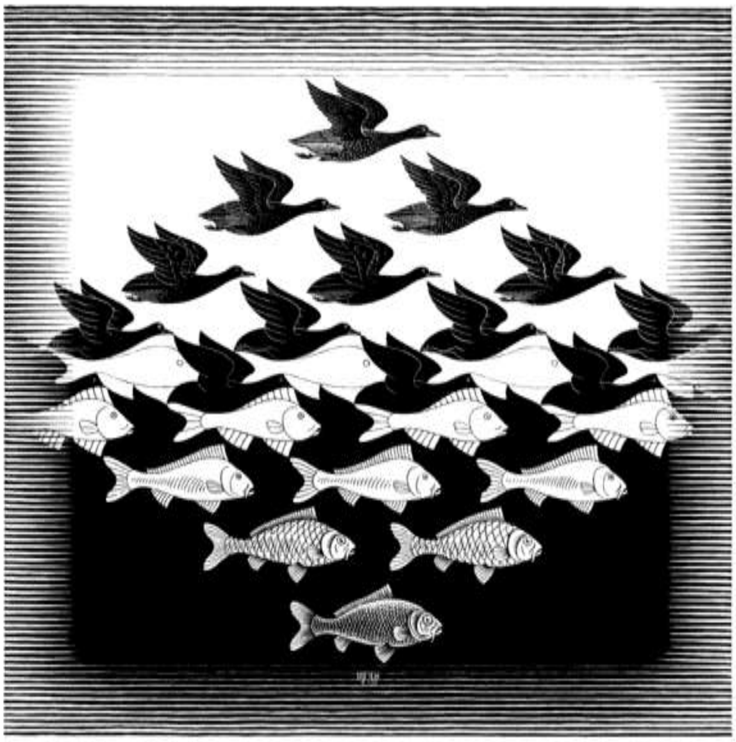


Figure 2.1 “Sky and Water” by M. C. Escher
(source: http://www.mcescher.nl/Shopmain/Foto/Posters/e8.jpg)

Figure 2.2 “Mosaic” by M. C. Escher
(source: http://www.mcescher.nl/Shopmain/Foto/Posters/e21.jpg)

The synaesthetic experience of sound (the voice) surfacing in the visual field (the gaze) (Késenne, s.a.) has an interesting parallel in opera. There is an overlap between our senses of vision (the stage set and action) and hearing (the singers' voices and the orchestra's music), as well as the paradox of the written word (the libretto) that is not spoken but sung. As a result of the music and singing, the words become harder to understand and the narrative detail is potentially harder to follow. In the ongoing interplay between orchestra and singer, voice and meaning, a point is reached at which the voice exists as a (lost) vocal object beyond meaning and is enjoyed for its own sake amid vocal embellishment and ornamentation. An example of this might be a soprano's high C (C6, two octaves above middle C), Lacan's 'pure cry' as object of *jouissance*, the *objet petit a*, as discussed by Poizat (1992 [1986]: 101-102) in relation to opera. Davies (1994: 207) remarks that the expressiveness of music, and therefore of singing, does not lie in a similarity with the speaking voice, but rather with wordless sounds such as howls and groans, even though music attempts to imitate vocal inflections. This brings to mind Lacan's dog, mentioned in a previous section.

Music is capable of letting us hear what we cannot see, as "it renders directly the drive of the life substance that words can only signify [...] bypassing the detour of meaning" (Salecl and Žižek 1996: 94). In this respect, Pratt (1952: 24) observed that "music sounds the way emotion feels" and Langer (1953: 27) affirmed that "music is a tonal analogy of emotive life". By allowing us to 'see with our ears', music mediates fantasy and daydreams (Késenne, s.a.). Interestingly, at the culminating moments of opera, the singing voice loses its connection with speech and language and becomes increasingly unintelligible as pure music until it finally builds up to the point of the 'pure cry'. At this point, the listener/audience experiences a melting away of everything else outside of the voice, including the singer's body itself, and becomes lost in the voice. There is a parallel with viewers who are able to 'hear' the silent cry of "The Scream" (1893) by Edvard Münch (1863-1944) with their eyes (ibid.). For when a listener experiences vocal *jouissance*, the disembodied operatic voice evacuated of meaning, which leaves the singer mute and annihilated, the listener becomes aware of the silent void by (re-)encountering the pure cry and experiencing that which cannot be understood. The listener identifies with the voice as it becomes a vocal object and deep emotion is aroused that can only find expression in a breathless sob signifying the realisation of absolute loss (Poizat 1992 [1986]: 37).

Deleuze (1981: 41) deals with this overlap of the senses in his analysis of Francis Bacon's picture (shown below) "Study after Velázquez's Portrait of Pope Innocent X" (1953), where:

> Bacon paints the cry because he puts the visibility of the cry, the mouth open like a shadowy abyss, in relation with invisible forces which are no longer anything other than those of the future (translation by Bogue 2001: 98).

Figure 2.3 "Study after Velazquez's Portrait of Pope Innocent X" by Francis Bacon

As observed by Bogue (2001: 98), in relation to Deleuze, art aims to represent "the forces that play through things", or as Deleuze (1981: 41) puts it: "if one cries it is always as prey to invisible and insensible forces which blur every spectacle, and which even go beyond pain and sensation" (translation by Bogue 2001: 98). This would be an apt description for vocal *jouissance* in opera. However, there is a paradoxical quality in this observation, which is articulated by Deleuze (2004[1968]) according to a logic that

Bogue (2001: 98) encapsulates as the "unsayable that can only be said and the invisible that can only be seen". In this sense, the figurative representation of the voice can only be seen and not heard. Conversely, that which cannot be said can only be expressed by the singing voice.

In the progression of the voice's trajectory towards the 'pure cry', the listener is carried forward to an endpoint situated in a pre-verbal past, before voice and meaning, whereby the cry of opera allows the listener to confront and experience the abyss of silence and pure feeling (Citron 2005: 455). Therefore, vocal *jouissance* in opera can be said to involve 'enjoyment beyond the signifier' (Hamilton 2008: 11), in which the sense of language – Lacan's *j'ouis sens*, 'I hear meaning' – is gradually undone by 'sense-less' (asemic) sound (ibid.). The drive to (re-)encounter the voice, that is the *objet petit a* of desire, through language and the *jouissance* of meaning, *jouis-sens*, provides "a partial 'masochistic' satisfaction of unconscious desire […] through the dissatisfaction of *jouis-sans*" (Chiesa 2007: 85), namely enjoyment that is characterised by lack. Vocal *jouissance* thus requires language and meaning, so that both language and meaning can be undone by the voice in order for the 'sense-less' vocal object to be (re-)encountered.

There is an ebb and flow of tension in opera between the predominance of the music (the score, the orchestra and the voice) and the predominance of the words (the libretto, the storyline), to which Salieri and Casti alluded in the title of their opera *Prima la musica e poi le parole* (*First the Music and Then the Words*) and that was addressed in the question posed in the opera *Capriccio* by Richard Strauss: 'First the music or first the words?' (Poizat 1992 [1986]: 80-81). This tension is matched by an ongoing dynamic between the predominance of meaning (intelligibility of the words) and the breaking through of the 'sense-less' voice as an asemic vocal object (the undoing of meaning). In this regard, the greater expressive capacities of music and, in particular, the singing in opera can weaken language – which is inherently lacking – and limit its meaning, though as a result meaning can be opened up beyond signification (Hamilton 2008). The singing voice in opera is thus able to transcend the boundaries of language (Tambling 1997: 267) and become the *objet petit a* towards an apparently boundless enjoyment of desire. However, even the voice as object cannot really fill the lack, as it is ethereal and fleeting. This is why vocal *jouissance* is both pleasurable and painful, being characterised at once by satisfaction and dissatisfaction, fullness and lack. It provides temporary satisfaction, or fullness, by making the listener cry with the pain of intense enjoyment, which in any case turns out to be dissatisfying because it is short-lived and thus lacking. The inherent lack of language is temporarily transcended, as language is undone, and the resulting void is filled for a moment in the form of ‘a lump in the throat’ of the listener, who (re-)encounters the lost vocal object for a brief, ecstatic instant as the pre-verbal pure cry. This is the ‘operatic orgasm’ to which Abel (1996) refers, the intense enjoyment of vocal *jouissance*, which will be explored in more detail in the next section.

2.4 The Big ‘O’ in Opera

The word ‘jouissance’ was present in eighteenth-century English, as noted in the introduction to Kristeva's (1980: 15-16) book *Desire in Language: A Semiotic Approach to Literature and Art*, but it fell into disuse after that time. As explained in *The Oxford Dictionary of Literary Terms* (Baldick 2008), the meaning of the French word *jouissance* is that of ‘enjoyment’ (including ‘orgasm’ in a sexual sense), for example enjoyment of rights or property. However, unlike the French word *jouissance*, sexual connotations are largely absent from the English word ‘enjoyment’ (Kristeva 1980: 16), which leads Alan Sheridan to point out in his translator’s note to *Écrits* by Jacques Lacan (1982: vii) that the word cannot be adequately translated into English. Similarly, in the translator’s note to *The Angel’s Cry: Beyond the Pleasure Principle in Opera* by Michel Poizat (1992 [1986]: xiii), Arthur Denner explains that *jouissance* may also be translated as ‘bliss’ or ‘ecstasy’, although he adds that these words do not adequately convey “the literal and metaphorical senses of orgasmic experience expressed by the term, or its transgressive aspects”. Consequently, as Žižek (2007: 79) remarks, references to Lacanian theory in English often leave the word *jouissance* in French “in order to render palpable its excessive, properly traumatic character […] a violent intrusion that brings more pain than pleasure”. In keeping with this practice, and to ensure – in particular for the thrust of this research – that the erotic and orgasmic connotations of the French term are not weakened or lost in a lacking translation, the word *jouissance* has been retained as such.

In psychoanalytic terms, *jouissance* can be defined broadly as an excess of pleasure that becomes painful, through transgression, or as Lacan (1997b [1959-1960]: 184) affirms: “*jouissance* […] is suffering”. This transgression referred to by Lacan is related to Freud’s (1911b: 219) ‘pleasure principle’, which sets a limit to enjoyment that the individual constantly tries to transgress by going ‘beyond the pleasure principle’

(Freud 1920b). However, this transgression for the purpose of obtaining more pleasure has the opposite effect, in that an individual can only bear so much pleasure beyond which enjoyment turns into suffering, the 'painful pleasure' of *jouissance* (Evans 1997: 92). In addition, referring to the statement made by Freud (1930 [1929]: 110) in *Civilization and Its Discontents* about the natural aggressiveness of individuals and their tendency to exploit their neighbours in order to satisfy personal interests, Lacan (1997b [1959-1960]: 184) affirms that "*jouissance* is evil" (as pointed out in a footnote (ibid.: 179), Lacan's *le mal*, translated as "evil", also includes the idea of 'suffering'), as its suffering "involves suffering for my neighbour". Stated another way, *jouissance* involves contravening the law that requires an individual to love his or her neighbour, a law that limits an individual's enjoyment. Hence, Lacan concludes, based on Freud's (1930 [1929]) interpretation, that goodness in itself hinders *jouissance,* and that although a beyond is entailed by the pleasure principle, "or least suffering principle", the individual is kept "on this side of it rather than beyond it" (Lacan 1997b [1959-1960]: 185). Both Freud and Lacan concur that the pleasure principle has the effect of regulating the amount of excitation that is experienced by "keeping it as low as possible or at least […] constant" (Freud 1920b: 9), maintaining a "state of equilibrium" by acting as a "homeostat" (Lacan 1991b [1954-1955]: 79-80). In other words, the constant aim is that of decreasing "an unpleasurable tension" either by "an avoidance of unpleasure or a production of pleasure" (Freud 1920b: 7). Based on this, and with reference to Kojève's (1980 [1947]: 46) distinction between Hegel's *Genuß* 'enjoyment' and *Lust* 'pleasure' (Evans 1997: 91), Lacan (1997b [1959-1960]: 184) differentiates between pleasure and *jouissance*, the latter being an excess of excitation that the pleasure principle aims to prevent. This would explain why Freud (1900: 600) originally called it "the unpleasure principle". Therefore, the "traumatic character" and "violent intrusion" of *jouissance,* mentioned earlier with reference to Žižek (2007: 79), represents a constant threat to the equilibrium that the pleasure principle aims to achieve.

Lacan's (1997b [1959-1960]: 68) description of the pleasure principle that "makes man always search for what he has to find again, but which he will never attain" is similar to Freud's (1920b) description of the repetition compulsion and link to the death drive. Lacan (1969-1970, Seminar of 14 January 1970) subsequently re-states this repetition as *jouissance* continually transgressing the pleasure principle to seek death. This is Freud's (1920b: 44-61) "death instinct" or drive. Lacan (1938: 4-13) referred to the death drive as "nostalgia for wholeness", a "return to the mother's womb", which "dominates the whole of the life of man", and the weaning complex "leaves in the human psyche the permanent trace of the biological relationship it interrupts". (This notion will be taken up later in the context of Winnicott's theories.) However, for Lacan (1997b [1959-1960]: 211-212, 2007b [1953]: 261) the death drive is explained through culture and does not as such equate to Freud's biological death instinct. In addition, unlike Freud's (1920b: 44-61) conception of death drives (Thanatos) standing in contrast to life drives (Eros), for Lacan (1998 [1973]: 257) all drives involve a life and death aspect. Indeed, according to Lacan (2007j [1964]: 719-720), all drives are sexual and partial, in that a drive "represents sexuality in the unconscious", whilst "every drive is virtually a death drive", given that drives are taken to their limits, through repetition, towards the painful enjoyment of *jouissance* beyond the pleasure principle. Therefore, Lacan (2007l [1969-1970]: 18) affirms that *jouissance* is "the path toward death". Escher's image of an eye (shown below), in which on closer inspection a reflection of a skull can be perceived in the pupil, illustrates the relationship between desire, drives (in this particular case the scopic drive) and death.

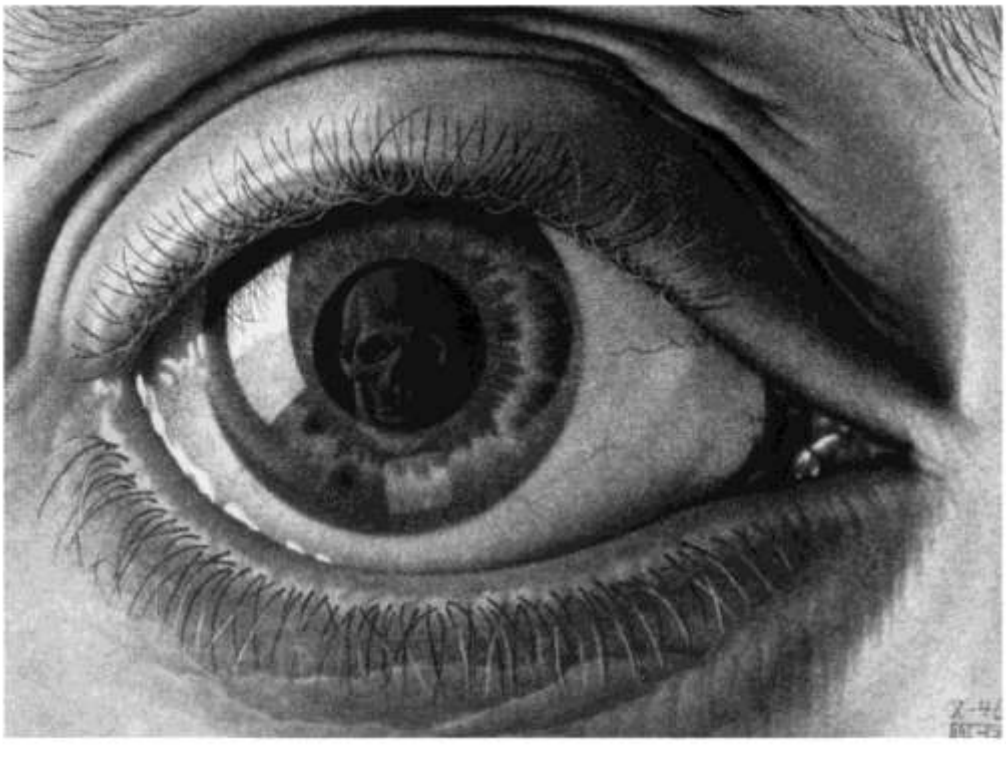


Figure 2.4 "Eye" by M. C. Escher
(source: http://www.mcescher.nl/Shopmain/Foto/Posters/e55.jpg

Although all drives involve a life and death aspect, the relationship between the gaze and the voice – these being the partial objects of desire of the scopic and the invocatory partial drives, respectively – can be said to feature an opposition between life and death, or in the words of Salecl and Žižek (1996: 94):

> [H]earing oneself speak" [*s'entendre-parler*], as Derrida has demonstrated, is the very kernel, the fundamental matrix, of experiencing oneself as a living being, while its counterpart at the level of the gaze, "seeing oneself looking" [*se voir voyant*], unmistakably stands for death: when the gaze *qua* object is no longer the elusive blind spot in the field of the visible but is included in this field, one meets one's own death.

The notion described by Salecl and Žižek (ibid.: 92-93) concerning the possibility of the voice functioning as the *objet petit a* of the gaze can be developed and usefully applied to the reception experience in the opera house, as discussed in the previous section dealing with the overlap of the voice and the gaze. According to this notion, the voice as *objet petit a* can be said to function as the blind spot that returns the gaze. The voice assumes the quality of an autonomous spectre, detached from its source, cutting a hole in the visual reality and operating as an invisible and absent master. Chion (1982) referred to this phenomenon as "acousmatisation" in relation to early films with sound.

An operatic example of the absent master that readily comes to mind is the ghostly statue of the *Commendatore*, whose voice from beyond the grave ominously intones "*Don Giovanni! A cenar teco m'invitasti*" (Don Giovanni! You invited me to dine with you) in the last scene of Act 2 of Mozart's "Don Giovanni" (1787). This spectral voice emanates from a lifeless statue, the void beyond life, dominating and cutting a hole in the reality of the scene. It forebodes Don Giovanni's imminent death and descent into Hell as punishment for unrepentantly pursuing his libertine desire beyond the pleasure principle, to the point of extinction of his desire and to his own death. In meeting his fate, Don Giovanni's final response takes the form of a baritone D-minor cry, which represents one of the few male cries in opera (Poizat 1992 [1986]: 142). Drawing on Felman (1983), Poizat (1992 [1986]: 142-143) suggests that Don Giovanni's libertinage, in the form of seduction and broken promises, is based on his belief in his own self-referential system rather than good or evil. This system is based on reducing meaning to the concrete certainty of arithmetic alone, which is essentially 'meaningless' and does not involve language or even reality. Consequently, as Poizat explains, Don Giovanni's broken promises to the women he seduces involves a transgression of language and meaning as such, the law of the dead *Commendatore*. As Poizat continues, when Don Giovanni is faced with the ghostly statue of the *Commendatore* who asks him to repent, like the "return of the repressed" (Freud 1915a: 154, 1939 [1934-1938]: 127), this supernatural event challenges and undoes Don Giovanni's reality. His final and ultimate transgression before he descends into Hell, as Poizat concludes, is also a transgression of language, going beyond meaning by uttering a 'meaning-less' cry.

The silent scream or cry depicted by Münch and Bacon (the latter was illustrated in the previous section), can be said to represent the vocal object that is "stuck in the throat" (Salecl and Žižek 1996: 93), which allows us to hear the reverberation of the void of silence with our eyes, or the suspension of life itself, as in Caravaggio's *Testa di Medusa* (ibid.: 94). However, when the cry actually leaves the throat and resounds as "a pure unarticulated scream" (ibid.: 93), as can be said to occur at the high points of the operatic voice in the higher registers (e.g. soprano), the vocal object becomes evacuated, a lost object. It is at this point that the listener, a barred or split subject by virtue of having acquired language and thus having entered the Symbolic order (which will be discussed later), is faced with and briefly (re-)encounters the lost vocal object, the painfully pleasurable unconscious realisation of which produces *jouissance*. This results in the physical manifestation in some listeners of a *globus pharyngis*, a 'lump in the throat', the voice that is caught in the throat and fills the void of the 'pure cry' that was lost as a result of the acquisition of language; or it makes the listener weep at the unconscious realisation of this object-loss. At this moment, the eyes of the enraptured listener/audience close to the stage spectacle and the voice functions as the *objet petit a* of the visual: it cuts a hole in the field of the visual.

As observed by Evans (1997: 91), the sexuality of *jouissance* can be found in Lacan's references to enjoyment in relation to masturbation (1994 [1956-1957]: 241), sexual objects (2007c [1957]: 378-379) and orgasm (1985 [1958]: 89). The sexual element of *jouissance* parallels Freud's (1921: 90) conception of the libido, which "is invariably and necessarily of a masculine nature, whether it occurs in men or in women" (Freud 1905a: 219), given that for Lacan (1999 [1972-1973]: 9, 73-74) "jouissance, qua sexual, is phallic", although he qualifies this by stating that there is a supplementary feminine *jouissance* of the body that is "beyond the phallus" and is of the Other (Evans 1997: 92).

The 'Other', or 'big Other' (indicated by the symbol 'A' for *Autre* in French) is distinct from the 'other', or 'little other' (indicated by the symbol 'a' for *autre*), which will be explained later. As expounded by Evans (1997: 132-133), the Other encompasses several facets, including: 1) the Other as another subject (Lacan 1991c [1960-1961]: 202); 2) "the Other sex" (Lacan 1999 [1972-1973]: 39); and 3) the Other as "a locus in which speech is constituted" (Lacan 1997a [1955-1956]: 274), namely language and the law, or the Symbolic Order, which will be discussed in a subsequent section. Facet 1) is secondary to facet 3), as "the Other must first of all be considered a locus […] in which speech is constituted" (Lacan 1997a [1955-1956]: 274), although this locus may be embodied by a subject for another subject (Lacan 1991c [1960-1961]: 202). In facet 2), when Lacan refers to "the Other sex" (Lacan 1999 [1972-1973]: 39) he means woman in relation to males and females, as "man here acts as the relay whereby the woman becomes this Other for herself as she is this Other for him" (Lacan 1985 [1958]: 93). Lacan (1997b [1959-1960]: 53) refers to the "prehistoric, unforgettable Other", or the (m)Other as the object of the fundamental yet forbidden desire of incest – *das Ding*, the (maternal) thing (ibid.: 67), the lost object of desire that is inaccessible (ibid.: 159), but which a subject constantly seeks to re-find. The subject is kept at a distance from *das Ding* by the pleasure principle, which only allows a certain amount of excitation (ibid.: 58), and as a result the subject can only "go around" (ibid.: 95) *das Ding*, but never obtain it. As a child's first Other, the mother interprets her child's cries by attributing meaning to them (as mentioned earlier), whereupon the child enters the order of language, that is the Symbolic Order. In this sense speech and language are from the locus of the Other, outside the subject and their consciousness, or as Lacan (1988 [1955]: 32) puts it: "the unconscious is the discourse of the Other". However, the Other is always lacking (the phallus) and the discovery of this by the child gives rise to the castration complex; the lacking or castrated Other is thus referred to as the barred Other.

It is conceivable then, that the operatic voice as *objet petit a*, which fuels the desire that circles endlessly around the lost vocal object, may provide unconscious access through vocal *jouissance* to this "prehistoric, unforgettable Other" (Lacan 1997b [1959-1960]: 53) and the pre-Symbolic (Imaginary) at-oneness of the (m)Other/child dyad. Therein may be found one aspect of the powerful emotion and eroticism associated with the vocal *jouissance* of opera. This notion will be resumed later, also with reference to Winnicott's theories.

Whereas the big Other relates to the Symbolic Order, as mentioned above, the little other relates to the Imaginary Order (both of which will be dealt with in a subsequent section). Lacan (1991b [1954-1955]: 321) describes it as "the other which isn't an other at all, since it is essentially coupled with the ego, in a relation which is always reflexive, interchangeable". The *objet petit a* is the object of desire that is sought in the other (Lacan 1991c [1960-1961]: 177), but that cannot be attained, and to which Lacan (1962-1963) refers as the object cause of desire, around which the drives circle, never achieving their goal (Lacan 1998 [1973]: 178-179). The *objet petit a* cannot be attained because the enjoyment and purpose of the desire that it sets in motion consists in its following a repetitive circular path, rather than achieving a goal (Lacan 1998 [1973]: 168).

Lacan (2007h [1960]: 689) distinguishes desire from need and demand by stating that "desire begins to take shape in the margin in which demand rips away from need". What does this mean? A need is expressed as a demand, such as a pre-verbal child's cry expressing that s/he is hungry, and this need is satisfied by the (m)Other until the next need arises. This satisfaction of the child's need comes to represent the Other's love, so that the child's demand eventually articulates not only need but also a demand for love. The Other is able to satisfy the child's needs, but not the child's demand for unconditional love. This part of the demand that is not satisfied produces desire, which Lacan (2007f [1958]: 580) defines as "neither the appetite for satisfaction nor the demand for love, but the difference that results from the subtraction of the first from the second". Therefore, desire can never be satisfied, as it relates to a lack rather than an attainable object, the mother being the primary desire as the child's first Other (Lacan 1997b [1959-1960]: 67), and desire is inherently "the desire for something else" (Lacan 2007d [1957]: 431) that is not already possessed.

As Evans (1997: 48) explains, demand is related to the oral and anal partial drives (stemming from the erogenous zones of the lips and the anus, having the corresponding partial objects of the breast and faeces), whilst desire is related to the scopic and the invocatory partial drives (stemming from the erogenous zones of the eyes and the ears, having the corresponding partial objects of the gaze and the voice, described above). As mentioned earlier, Lacan (1998 [1973]: 204-205) considers all drives to be sexual and they are partial because they only relate to enjoyment and not to the reproductive aspect of sexuality. This largely follows Freud's (1905a) conception of partial drives in sexuality, except that Lacan disagrees with Freud about their organisation and fusion in puberty and that they are parts of a unitary genital drive (Evans 1997: 47).

The erotic nature of a listener's enjoyment of the operatic voice, as proposed in this thesis, is conceived in relation to the above framework of *jouissance*, the painful pleasure of excess, which functions as the 'operatic orgasm' – a term devised by Sam Abel (1996: 79) and alluded to in the title of this section. These operatic orgasms do not occur off-stage, as some plots would have it, nor do they occur between the characters, despite gushing love duets that would indicate as much, but rather they occur as part of the performance and are experienced between the singers and the audience (ibid.: 86). Abel suggests that the narrative and music of opera, and in particular the singing voice, are punctuated by these orgasms. He claims that the stimulation experienced by the audience becomes a narrative in itself, often replacing what may be perceived as an opera's 'weak' storyline, by virtue of it being far-fetched or hard to follow. In addition, he points out that the operatic orgasm mirrors sexual intercourse, in which there is foreplay, a development of tension and finally a climax, and the cycle is then repeated. The operatic orgasm parallels sexual intercourse even in terms of the time that it takes (approximately seven to ten minutes): from the foreplay of the prelude that creates musical tension, to the development or crescendo and finally the climax, followed by a calm postlude (ibid.: 91). This additional "orgasmic musical narrative" is what holds the interest of audiences, carrying them forward through the opera and allowing them to follow the plot, however absurd or unintelligible it might be, and even despite language barriers (ibid.: 86). Abel (ibid.: 111) asserts that opera produces a delimited space which allows for sexual transgression to be portrayed, to the extent that this transgression actually fuels opera and is inherent in the way the audience relates to it, given that the operatic orgasm itself is like "an elaborate form of exhibitionistic group sex" (ibid.: 114). However, the sexual transgressions portrayed by opera remain safely within the bounds of the stage: they are visible, but at the same time concealed, and cannot impact real life. The audience has power over the operatic characters by recognising their transgressions, yet at the same time it can overlook that power temporarily and participate in the fantasy (ibid.: 125). This would account for another aspect of the eroticism in the reception of opera. Further support for the notion of an erotic musical narrative (i.e. vocal *jouissance*) that runs parallel to, or rather independently of, the narrative proper of opera can be found in Freud.

According to Freud (1942 [1905 or 1906]: 305), drama serves the purpose of arousing "sympathetic suffering" in order to "purge the emotions" by opening up "sources of pleasure or enjoyment in our emotional life". As well as providing an outlet to discharge emotions through enjoyment, the affect that is aroused by drama is accompanied by sexual excitation, which allows us to experience the sensation that the potential of our psychical state has been raised. In addition, Freud (1924b: 160) proposed that sensations of pleasure and unpleasure are determined by variations in the strength of rhythmic movement. The rhythm of music (and thus the voice as music) can be considered as a forward movement towards a goal, with "dissonance striving to resolve in consonance" (Rose 2004: 134). This sense of forward motion inherent in music is one of the elements that are believed to convey affect (ibid.). By extension, this movement in music reflects the variations in the listener's desire, where rhythm provides a recurring stimulation, as well as a framework that allows for an awareness of feelings (ibid.: 135). The rise and fall in pitch, the forward movement, the crescendo, climax and anti-climax of music in general, and within the narrative / musical / vocal multi-layered structure of opera in particular, reinforce the erotic nature of the pleasure derived in the reception of opera.

This notion can be further developed, in relation to the claim made by Poizat (1992 [1986]: 145) that the voice in opera pursues its own trajectory and the purpose of the text is that of expressing the voice. A resonance can be found in Barthes' (1997 [1973]: 10-11) description in *The Pleasure of the Text*, where "a rhythm is established, casual, unconcerned with the *integrity* of the text". Similarly to the tmesis concept proposed by Barthes (ibid.), where a seam occurs at the moment of consumption of language, the same can be said to occur in the reception of opera. A rhythm and forward progression towards vocal *jouissance* is established by the voice that breaks through and beyond language and the text at the high points, or in the arias, duets, quartets, and so forth, that punctuate the narrative and musical continuum. These vocal punctuations – or infixations, to borrow a term from linguistics – that stand out from the flow of the drama and music, are like cuts that in many operas (though not all) temporarily suspend the forward progression of the underlying narrative of the text. The relationship between the vocal peaks, the spaces between them if they can be considered as such, is extremely important for the existence of the peaks themselves, which allow the listener to confront silence. These spaces, seams, vocal punctuations, infixations and high points in opera, which occur even in Wagner's continuous melody, facilitate the trajectory of the voice, returning the listener to the 'senseless' parallel narrative of the voice as it becomes a vocal object. The listener derives enjoyment from the high points of the vocal infixations in opera precisely because of the surrounding text of the lyrics. As Barthes (ibid.) puts it:

> [W]e do not read everything with the same intensity […] our very avidity for knowledge impels us to skim or to skip certain passages […] in order to get more quickly to the warmer parts of the anecdote (which are always its articulations: whatever furthers the solution of the riddle, the revelation of fate).

In the case of opera, the fate that is revealed lies in the *jouissance* resulting from the encounter with the voice as object. In the trajectory towards that vocal end point, it is the "intermittence of skin flashing between two articles of clothing" – as Barthes (ibid.: 10) describes textual pleasure – which renders opera erotic. Furthermore, Barthes (ibid.: 13) claims that the response to art in general – and therefore to the singing voice – involves sexual pleasure with climactic instances of *jouissance*. As such, it defies rational judgment, so that the only judgment can be "*that's it!* And further still: *that's it for me!*"

2.4.1 Gender and the operatic orgasm

In concluding this section on the operatic orgasm, some considerations related to gender will be discussed briefly. As illustrated up to this point, the vocal *jouissance* experienced by a listener (re-)encountering the vocal object results from its pursuit fuelled by the *objet petit a* cause of desire. As desire circles endlessly around the *objet petit a*, ensuring that desire itself persists, the vocal object is ultimately unattainable and remains at a tantalising distance from the listener. It is this very distance between the listener and the object voice, which is neither too close nor too far, but always just beyond reach, that produces an eroticism in the endless quest to (re-)encounter the lost vocal object. The short-lived (re-)encounter is thus fleeting like the pleasure of orgasm.

Abel (1996: 87) explains that although the operatic orgasmic narrative claims to be universal, its linear structure deals exclusively with the male orgasm. This is a phallic orgasm that is imposed on the language of the narrative and is thus phallogocentric (Derrida 1987 [1980]: 478), as reflected in the fictional accounts of the world. Perhaps this would account in part for Poizat's (1992 [1986]: 156-157) claim that, even though opera audiences appear to consist of approximately equal numbers of males and females, the extent of emotional and financial involvement is perhaps greater in men than women.

If one accepts the theoretical proposition of the erotic nature of the pleasure derived by an audience (and more specifically, as indicated above, predominantly by those male members of the audience who experience the most intense emotional involvement) from the whole operatic experience mediated by the libretto, the stage set and effects, the orchestra, and the unmediated 'pure cry' of the soprano voice (and perhaps other upper vocal registers, including the male counter-tenor), then at those times when the operatic orgasm occurs, it can be argued, the aim of the audience's desire has been achieved in identifying with the voice as object. The soprano, as woman, both fills the lack and is the locus of lack itself. Thus, being characterised by a lack herself, as Poizat (1992 [1986]: 150) explains, woman in opera is the natural locus from which the quest begins for the vocal object which, being a lost object, a missing object, is itself a lack. As such, woman as voice becomes the cause of man's desire in being able to fill the lack. However, the quest to recover the vocal object is impossible, just as impossible as man's desire being satisfied by woman as voice, and so the quest becomes endless. If man's desire were to be completely satisfied by woman as voice, this would entail the death of his desire, and ultimately his own death. Thus, woman as (pure) voice approaches the divine and is considered a *diva* (ibid.). However, the impossibility of this desire being fully satisfied creates a feeling of disappointment and yearning for more, a phallic *jouissance*, as any satisfaction that can be achieved from the elusive vocal object is fleeting (ibid.: 150-151). Because this phallic *jouissance* is situated between and is involved in both the orders of the Symbolic (language) and the Real (the impossible), it is the result of language (Patsalides and Malone 2000: 129). As explained by Patsalides and Malone (ibid.), in relation to sexuality being conveyed through language, "the phallic *jouissance* supplements the lack of the body's *jouissance* [outside the Imaginary], which in its status as the *jouissance* of the Other [of the body] is lost for the speaking being".

Given the erotic nature of the relationship that can be said to exist between the listener/audience and opera, with the soprano's voice as the ultimate object of desire – and the fleeting nature of the *jouissance* that results from this encounter – the quest for the lost vocal object and its *jouissance* proves to be endless in its impossibility. As Poizat (1992 [1986]: 150) points out, opera meets all of the requirements for the voice as object of *jouissance*. It is an inaccessible lost object, ethereal, impossible to recover and thus prohibited; it is the source of a quest that results from desire; and it is a deified object, seductive, but potentially lethal (ibid.).

The constant quest for the elusive (female) vocal object of desire and the resulting *jouissance* of the 'pure cry' is what drives the repetition compulsion of the committed opera fan. Because of this, it is central to opera and the most extreme followers, naturally enough, are men (ibid.: 156-157). This endless quest would also account to some extent for the fact that, despite a potentially vast repertory, opera houses can survive by repeatedly producing the same 'popular' operas. Abel (1996: 86) believes that this confirms how "we never tire of hearing that great fundamental narrative, the story of sexual climax, especially when we ourselves get to participate in its enactment".

Opera, perhaps unlike other genres of vocal music, emphasises the voice within a musical and dramatic framework that "reproduces and reinvests the structure of the vocal fantasy" (Poizat 1992 [1986]: 209). This framework and the dynamic interaction between the elements of voice, music and drama will be explored next in relation to the three Lacanian orders of Symbolic, Imaginary and Real. As Poizat (ibid.: 208) explains, even though a striving for the 'pure cry' may be observed in vocal performers at a rock concert, for example, the resulting *jouissance* involves "a type of quasi-identification with the vocal object" on the part of the female members of the audience who themselves *become* the cry through their high-pitched screams.

2.5 Symbolic, Imaginary and Real

The framework of singing, music and drama – namely the three principal constituent elements of opera – within which the vocal *jouissance* of the operatic orgasm occurs can be related to the orders of the Symbolic, Imaginary and Real that have been mentioned hitherto. In Figure 1.3 in the previous chapter, these three orders are superimposed on the three main 'layers' of opera through the image of the Borromean knot. This image was used by Lacan (1999 [1972-1973]: 124) to illustrate the interdependence of the three orders. The image also provides a useful way to show the dynamic interactions between the layers of opera, as well as their overlap with the three Lacanian orders, producing a graphical model that facilitates a psychoanalytic interpretation of this art-form.

As explained in section 1.5 "The 'Layers' of Opera" in the previous chapter, the vocal object, that is the voice as a partial (lost) object, and hence the *objet petit a* cause of desire, occupies a central role and function in opera. Given this centrality, in Figure 1.3 the voice has been situated in the area where all three rings intersect. This area of intersection comprises something of each of the three orders of Symbolic, Imaginary and Real. The centrality and predominance of the voice in opera is evidenced by the fact that the voice determines, more than any of the other elements, the success or otherwise of a given performance, production or singer. Ultimately, it is the voice in opera – supported by the orchestral music – that gives the measure of a performance, a production and a singer. The stage sets, costumes, lighting, special effects, stage action, narrative, acting and even the orchestral music have the auxiliary function of leading the listener/audience to this central locus. These auxiliary elements can be said to function as screens that temporarily conceal the immediacy of an encounter with the voice as object. Hence, they contribute to the eroticism of the encounter. They are like veils that are slowly and tantalisingly cast off until the *dénouement* (the unknotting, untying, unravelling of the Borromean knot) that occurs during the full-on encounter with the vocal object and that results in the *jouissance* of the operatic orgasm.

However, this position of the objectified voice, either in the opera house or in recordings, is achieved above all by virtue of (or perhaps despite) the three main constituent elements of opera: singing, music and drama. As proposed in Figure 1.3 in the previous chapter, these elements can be situated in relation to the three orders of Symbolic, Imaginary and Real. According to this proposed relation, singing in opera is associated with the Symbolic order, in that singing is mediated by the words of the libretto, namely language. The drama in opera, that is the acting, the stage action, plot and narrative, are associated with the Imaginary order, where image (as opposed to the gaze, though not without relation to it) and its sensuous appeal are the key features. The orchestral music is situated between the Symbolic and the Imaginary, as it mediates or binds the singing and the drama. The listener/audience, as a lacking and thus a desiring subject, is associated with the Real in the sense that this is where the drive and repetition compulsion originate that fuel the impossible quest for the lost vocal object. In the area of intersection between the Symbolic and the Real, the auditory element mediated by singing produces the phantasy whereby the Symbolic, through language, is able to make some sense of the otherwise undifferentiated nature of the Real. In the area of intersection between the Imaginary and the Real, the fiction of the narrative action produces the diegetic reality within which the voice as singing, mediated by the orchestral music, functions and is experienced by the listener/audience. Thus the vocal object (*objet petit a*) is the resulting phonic materiality that remains when the language of the lyrics (Symbolic) in the narrative plot of the libretto (Imaginary) is undone by the singing voice. These elements will be explored in more detail presently, following a brief illustration of the Symbolic, Imaginary and Real.

Žižek (2007: 8-9) uses the game of chess to describe Lacan's three orders of the Symbolic, the Imaginary and the Real. He explains that the rules of the game represent the Symbolic level. For example, the chess pieces can be described based on the moves that they are allowed to make. The Imaginary level is represented by the shapes and names of the chess pieces; these could be changed without affecting the rules of the game. Lastly, the Real level is represented by any of the factors that can affect the game, such as the ability of the players, or external intrusions that can distract the players and affect the course of the game.

As mentioned above, the vocal object functions as *objet petit a*, the object cause of desire, mediated by the phantasy of the auditory and the reality of the visual elements of opera. The resulting *jouissance* that is experienced by the listener/audience through this encounter, mediated to a certain extent by the synaesthesia resulting from the overlap between sound and image, is on the side of the Real. The position of the listener/audience in the Real is related to the opposition between 'being' and 'existence'. Lacan (2007e [1958]: 512) states that it is "the relation to the Other, in which being finds its status", hence being is situated in the Symbolic order. However, in the same way as the Other, and ultimately the subject, this relation is marked by lack. Consequently, the effect of this lack (of being) is that it results in desire (for being). On the other hand, existence, as opposed to being, is situated in the Real. Therefore, being can occur in the Symbolic through language without an equivalent existence in the Real as such. Therefore, the link between the Real and the Symbolic is an important aspect in this exploration of opera, given that it involves desire for being, desire of/for the Other (Lacan 1998 [1973]: 235), the lack of language, of the subject and of the Other, the excess of language and the voice as *objet petit a* and the resulting *jouissance*.

On the stage side of the proscenium, the plot and narrative of the drama – mediated by the music of the orchestra – are on the side of the Imaginary. Paraphrasing Žižek's (2007: 8-9) example of the chess game, the story and the characters of an opera may change, but their role and position in this structure remain the same. The singers function within the rules of language and music, as well as the conventions of theatre and the requirements of the plot, the operatic genre, and so forth, so that their position is clearly on the side of the Symbolic. Hence, as mentioned earlier, the joint contributory effects of drama (acting – the narrative of the libretto), singing (the voice – the language of the lyrics in the libretto) and music (the orchestra – the score and its relation to the lyrics) mediate the experience of the listener/audience (re-)encountering the *objet petit a* at the nexus of all three orders.

Žižek (1991: xii) observes that the three orders of Symbolic, Imaginary and Real are also reflected within each order itself. In other words, each order is constituted in turn by this triad of Symbolic, Imaginary and Real. So there is the real Real, symbolic Real, imaginary Real, as well as the real, symbolic and imaginary dimensions of the other two orders, the Symbolic and the Imaginary. This triadic 'nested' conception of each order allows psychoanalytic interpretations to be amplified, providing further insight into the dynamic functions and interrelationships both between and within the three individual layers of opera shown in Figure 1.3 in the previous chapter. For example, the nexus of imaginary Real, or real Imaginary, in this context the narrative of opera, represents the underlying quality of drama in being able to bring out "the mysterious *je ne sais quoi*, the unfathomable 'something' on account of which the sublime dimension shines through an ordinary object"; it provides "an imaginary scenario occupying the place of the Real" (ibid.). This is the diegetic reality (that is, occurring as part of the story itself) within which the operatic fictional narrative is enacted on stage.

Pursuing this notion further, the functional dynamics that operate *within* the layer of 'drama', viewed in isolation from the other two layers of opera, are illustrated in Figure 2.5 below. In this case, drama is situated at the intersection of all three rings, given that the story being enacted on stage is the focus of this layer considered independently of the other two. However, it should be reiterated at this point that, in keeping with the nature of the Borromean knot itself, none of the rings (each one representing a layer or constituent element of opera) may be disengaged from the other two without the knot becoming unravelled. In other words, each ring is essential to the knot, in the same way that the layer or element represented by each ring is essential to and constitutive of opera. If any one of these layers or elements were removed, opera would no longer be what it is. Similarly, it should be borne in mind that these layers, or the elements within each layer, that are being parsed out and described in isolation here do not actually operate wholly independently of the others – they are all interrelated both functionally and structurally.

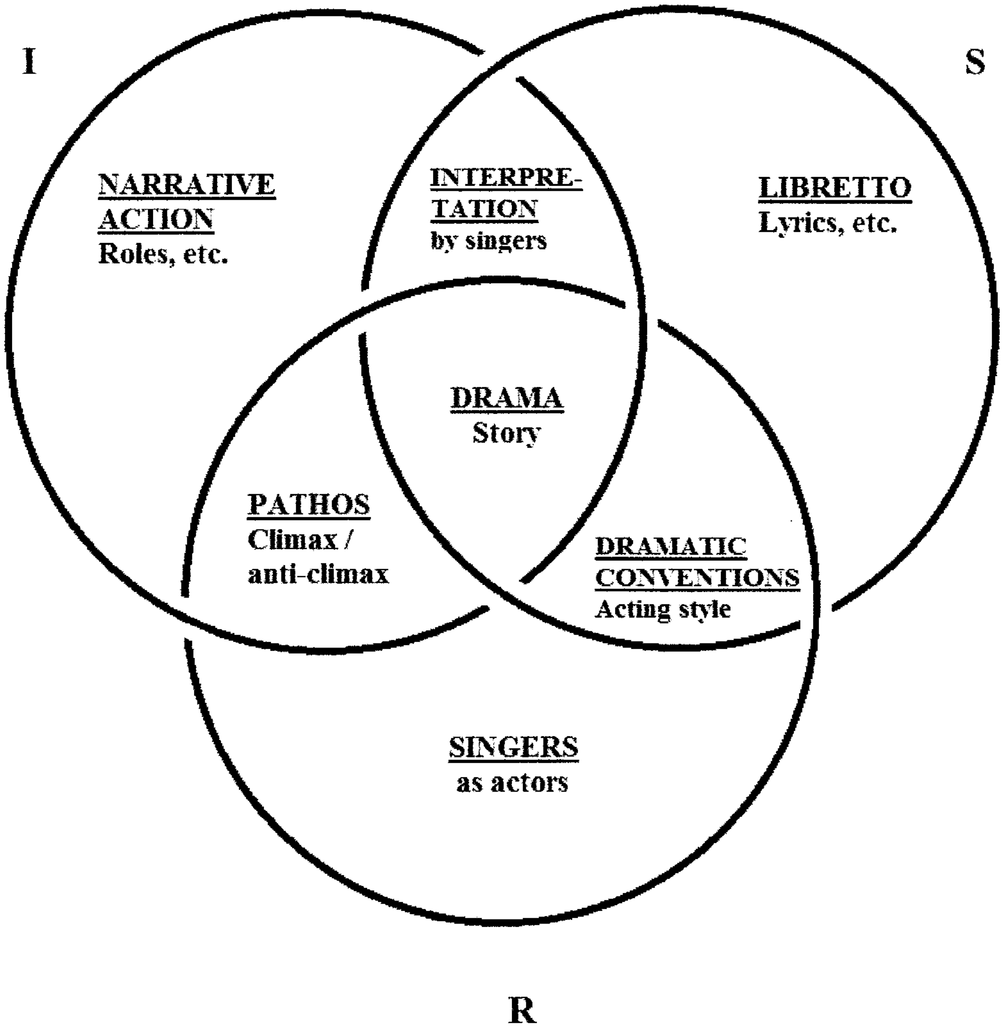


Figure 2.5 The constituent elements of opera – Drama

As shown in Figure 2.5 above, the operatic layer of 'drama' can be said to comprise its own elements of Symbolic, Imaginary and Real. The libretto, which includes the lyrics (the language through which the story is being told), the framework of the story and its structure articulated in scenes and acts, stage directions and so forth, can be situated in the Symbolic. The narrative action, which relates to the enactment and development of the fictional story with its settings, situations, roles and stage business, can be situated in the Imaginary. Lastly, in this layer of opera, the singers function as actors and can be situated in the Real. The dynamic interactions between all of these features, that is the way in which all of these elements function in relation to each other and come together to produce the operatic layer of 'drama', can be observed in the overlapping areas between the orders. Thus the interpretation by the singers (as actors in this layer) of their roles, within the combined framework of the libretto and the narrative action of the fictional story, occurs at the intersection between the Symbolic and the Imaginary. For example, this would relate to the effective (or non-effective) dramatic portrayal on stage of a particular role through a singer's acting. The acting style, which is in keeping with a set of constructed dramatic conventions belonging to a particular time in history, or devised by a director, and so forth, operates in the area where the Symbolic and the Real overlap. An example of this would be the rather static stage presence of operatic singers in the distant past, compared to a more dynamic and naturalistic acting style that is required in modern-day productions. These conventions occupy the place of the Real, as does the pathos of the narrative action, the climax and anti-climax of drama that functions at the intersection between the Imaginary and the Real.

In continuing to apply Žižek's notion of the triadic constitution of each order, the nexus of imaginary Symbolic or symbolic Imaginary (shown in Figure 1.3 in the previous chapter), namely orchestral music in this context, equates to symbolism, which may be considered an inherent feature of music, with its connotations beyond meaning, the "ideas that lie beyond the grasp of reason" (Jung 1964: 4). In Figure 2.6 below, the layer of 'music' in opera is considered in artificial isolation for the purpose of illustrating its own internal functional dynamics. Given that music is being analysed specifically in this case, it is situated at the intersection of all three rings.

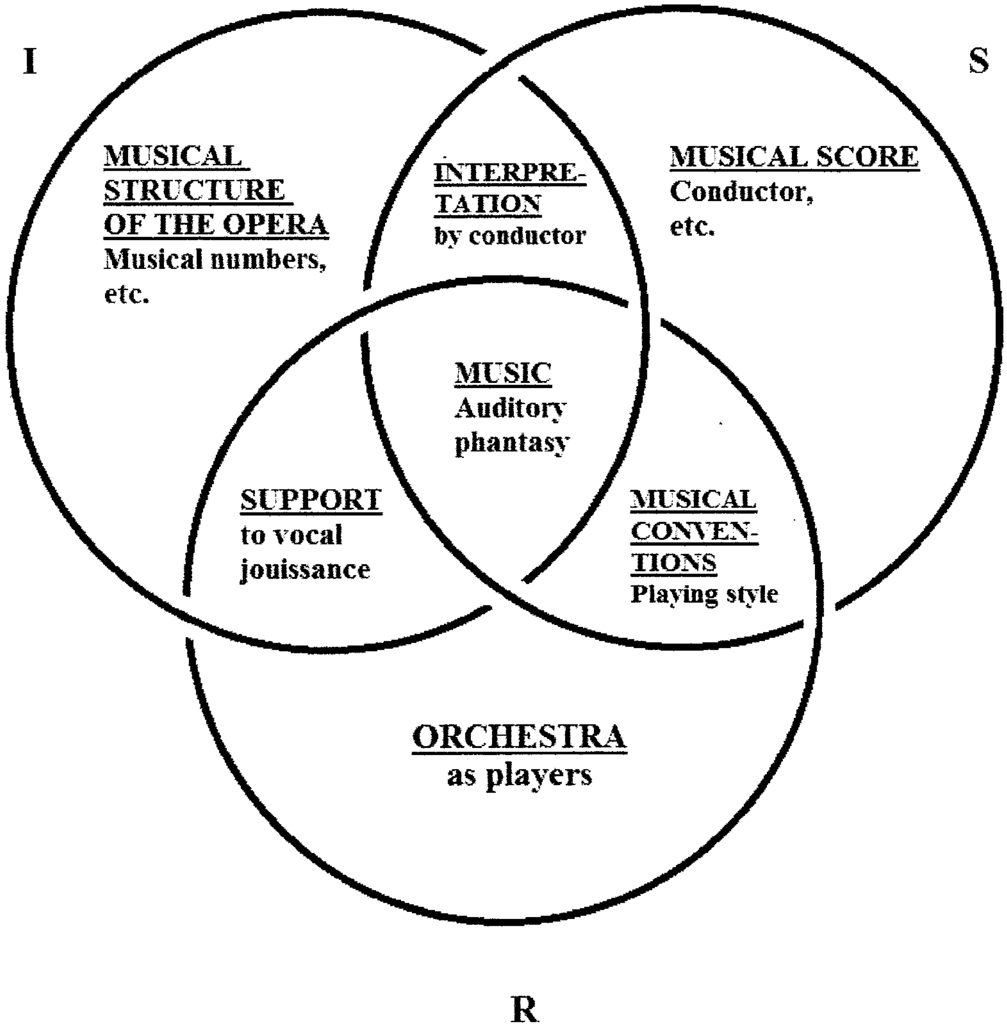


Figure 2.6 The constituent elements of opera – Music

As observed by Kerman (1988: 4-10), the dramatic element in opera is shaped by the feeling that is conveyed by the music, which provides an integral link between drama and singing. Therefore, relative to music's fundamental role of modulating feeling, 'setting the mood' and controlling it to mould and enhance the dramatic element of opera, acting as a springboard in providing the appropriate conditions for the development of vocal *jouissance*, the central function of music in opera is essentially that of favouring auditory phantasy. As such, this central function of music in opera is shown at the nexus of all three rings within this layer in Figure 2.6 above. The framework of the score, with its organising and regulating structure, under the watchful direction of the conductor, can be situated in the Symbolic. While the musical structure of the opera, which is articulated as an artificial construct of musical numbers and passages, can be situated in the Imaginary. In this layer of opera, the orchestral players are in the place of the Real. At the intersection of the Symbolic and the Imaginary, the conductor's interpretation of the musical score, through the orchestra, occupies a paradoxical position, being both in keeping with and at the same time (re-)creating afresh the musical structure of the opera. This is the locus of an artistically effective and coherent musical structure in the performance of an opera's music by an orchestra, under the masterly direction of a skilful conductor. The musical conventions and playing style that are dictated, for example, by a particular time in history and/or the specific directions of a conductor, are situated in the overlapping area between the Symbolic and the Real. The support provided by the orchestral music for the development of vocal *jouissance*, as described earlier, occurs specifically in the area where the Imaginary and the Real intersect. This is also the locus where orchestral music stands in place of the Real, whether or not the music is supporting the development of vocal *jouissance*.

Lastly, still paralleling Žižek's (1991: xii) notion described earlier, the nexus of symbolic Real, or real Symbolic (shown in Figure 1.3 in the previous chapter), mediated in this context by the auditory element of opera, is "the real as consistency: the signifier reduced to a senseless formula", namely words that are sung in accordance with a musical convention, technique, ornamentation, and so forth, which cannot be related to the actuality of daily life. The functional dynamics at work within the operatic layer of 'singing', once again considered in artificial isolation from the other two layers, are illustrated in Figure 2.7 below. In this case, singing is situated at the intersection of all three rings, with the voice as the central object of this layer. The similarity of focus here matches that shown in Figure 1.3 in the previous chapter, which underscores the centrality in opera of singing and the voice – the singing voice as *objet petit a*.

In the Symbolic of this layer, the lyrics in the libretto and the musical score function as a regulating framework that sets the boundaries within and according to which the voice can be articulated. Paradoxically, these are the boundaries that the singing voice transcends, undoing language and meaning, to become a 'meaning-less' phonic object as the pre-verbal 'pure cry' described earlier. Sometimes, this 'pure cry' even transcends music itself, going beyond the pleasure principle towards death, whereby the ultimate transgression has the effect of turning the 'pure cry' into a cry of pure horror, as in the case of the death cry emitted by Lulu in Alban Berg's (1885-1935) opera (Poizat 1992 [1986]: 40). The musical structure of the opera relating specifically to the singing, such as the musical numbers and their formal vocal organisation as arias, duets, trios, quartets, ensembles and so forth, for the purpose of achieving specific artistic effects within the work, can be situated in the Imaginary. This is the realm of the sensuous aspect of the singing voice, where the vocal embellishments of the voice act on the senses of the listener. The singers, viewed exclusively in terms of their physical function and presence as singers in this case, rather than actors, are located in the Real. In addition, the Real is the locus of anxiety (Lacan (1991b [1954-1955]: 164) experienced by the listener in relation to the lost vocal object, as well as the locus of the drive that motivates a listener to (re-)encounter the lost object, in an attempt to regain it, to make this partial object whole again, in the form of the 'pure cry'.

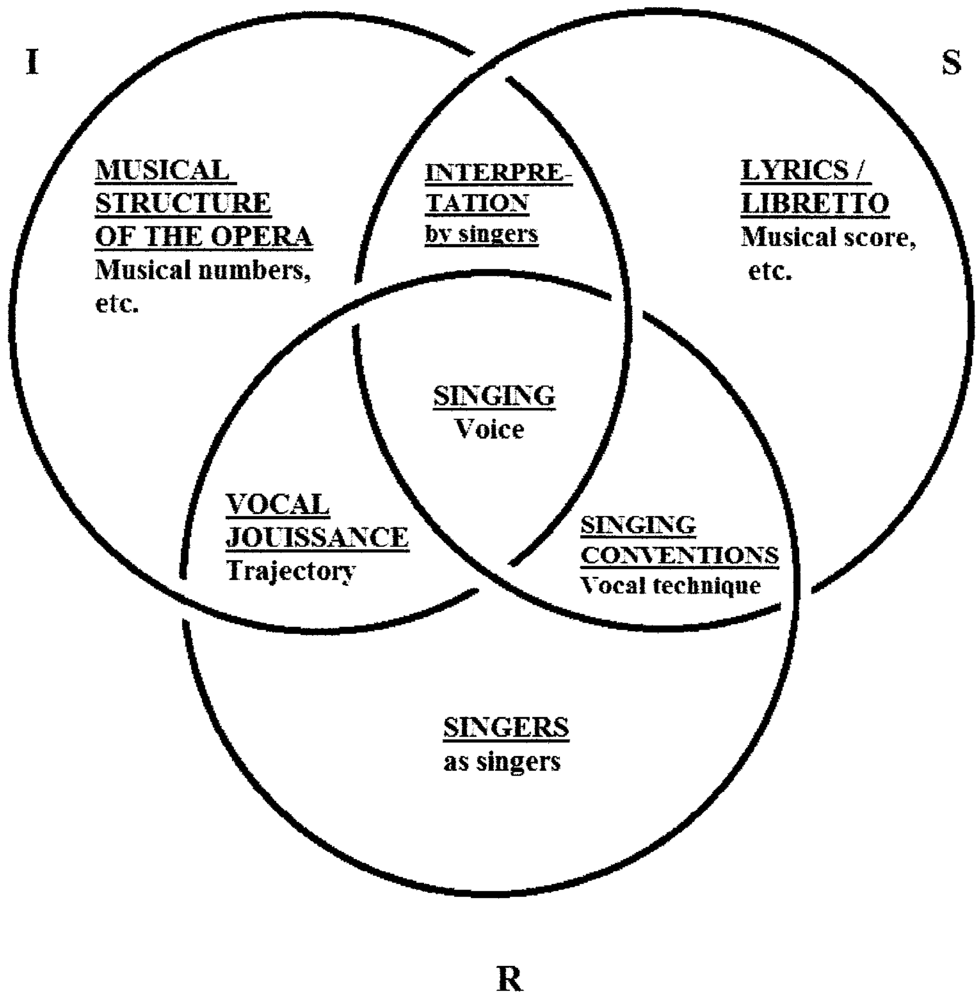


Figure 2.7 The constituent elements of opera – Singing

The vocal interpretation of the singers lies in the overlapping area between the Symbolic and the Imaginary in this layer of opera. In other words, this area accounts for the way in which the singers function within the framework of the lyrics and the music that is scored for these lyrics in the context of the musical numbers, including the sensuous aspects of the expressive features of singing itself. This is the place where the successful interpretation, or vocal characterisation, of a given operatic role resides. However, specific vocal techniques, which are part of the singing conventions of a particular operatic genre and/or time in history, being artificial constructs that have no counterpart in daily life outside opera, stand in place of the Real at the intersection between the Symbolic and the Real. This is where a listener experiences the feeling of awe in response to a singer's amazing vocal feats, where the Symbolic is momentarily able to interrupt the Real. An excellent singer can be said to combine a good command of both of these intersecting areas between Symbolic / Imaginary and Symbolic / Real, namely skilful vocal interpretation and technique. A singer's additional command of the area between the Imaginary and the Real, achieving the trajectory of vocal *jouissance*, is on the path towards greatness. In order for a particular singer to achieve greatness, to become the 'voice of measure' for an operatic listener, all three of these qualities must be present: skilful interpretation, perfect technique and the ability to move the listener deeply by eliciting vocal *jouissance*. These are the necessary conditions for the operatic voice when it functions as the *objet petit a* at the intersection of the Symbolic, Imaginary and Real, resulting in vocal *jouissance*.

In all three layers of opera, specific forms of *jouissance* can be said to operate at the intersection between each pair of orders. That is to say, each form of *jouissance* is situated between two orders and at the same time involves both orders – it results from both. So, for example, phallic *jouissance* is situated between and is involved in both orders of the Symbolic and the Real – it is the result of language (Patsalides and Malone 2000: 129). The Symbolic relates to the law of language and culture, to a variety of signifiers, whilst the Real is the impossible (Lacan 1998 [1973]: 167), a whole "without fissure" (Lacan 1991b [1954-1955]: 97), that which cannot be symbolised (Lacan 1991a [1953-1954]: 66). As Lacan (2007b [1953]: 229) explains, the signifiers of language introduce differentiation "in the *hic et nunc* of the all" and thus create "a world of things" which "at first run together". And whereas the Symbolic aspect of language itself relates to the signifier, the Imaginary side (Lacan 1991b [1954-1955]: 306) involves signification and that which is signified, as well as empty speech. In other words, by virtue of the acquisition of language, namely as a result of becoming speaking beings, we are able to establish our surrounding world as constituted of different things, rather than a unitary, undifferentiated whole.

Given that phallic *jouissance* is related to language and the signifier, it lies outside the body (Lacan 1974: 189), supplementing the lack of *jouissance* of the body, and it hinges on language and its lack (Patsalides and Malone 2000: 129). In a similar way, *jouissance* of the Other, of the body, or feminine *jouissance* – which is lost for the speaking being – lies between the Real and the Imaginary, outside the Symbolic order, and it is rendered to a certain extent by poetry and words of love (Lacan 1999 [1972-1973]: 75-76) (Patsalides and Malone 2000: 129). In the context of opera, it is the *jouissance* of drama, of the narrative, of the libretto, that contributes to and sometimes coincides with the phallic *jouissance* of the singing voice, which becomes a vocal object through language, after language has been undone by the singing voice.

Lastly, the third form of *jouissance*, or '*jouis-sens*' (of meaning, of the unconscious), is situated at the intersection of the Imaginary and the Symbolic, between the desiring unconscious and language that is spoken (ibid.). The Imaginary is alienation (Lacan 1997a [1955-1956]: 146) in the sense that the subject is split from the outset, without the possibility of becoming whole, whereby "the initial synthesis of the *ego* is essentially an *alter ego*, it is alienated" (Lacan 1997a [1955-1956]: 39). The Imaginary is also related to illusion, such as that of wholeness, or appearances, like affects that hide the structure beneath them. However, the Imaginary is structured by the Symbolic, for example in relation to the illusory duality and similarity of the mirror stage (Lacan 2007a [1949]: 76) and, with reference to the context of this thesis, to the visual field (Lacan 1998 [1973]: 88, 91-92).

This *jouis-sens* (a homophonic play on the words '*j'ouis sens*', 'I hear meaning', and *jouissance*) the *jouissance* of meaning, of the unconscious, is the result of *lalangue*, which forms the basis of the Symbolic (Patsalides and Malone 2000: 130). *Lalangue* – a word coined by Lacan, combining the French article *la* and the word *langue* (meaning 'language'), is made up of the disorganised raw material that is then ordered through the knowledge of language (Lacan 1999 [1972-1973]: 139). It relates to the 'not-all' or lack of language, its ambiguities and inconsistencies, as well as the elements that are not connected with communication *per se*, such as meaningless sound, stuttering, muttering and so forth (Patsalides and Malone 2000: 130). Therefore, the phonic materiality of the voice, that is the asemic voice (with no semantic meaning) that results from the undoing of language and meaning by singing, represents the meaning-less sound of *lalangue*.

2.6 The Operatic Voice and the Fetish

Can the operatic voice be considered a fetish object? This possibility is not entirely inconceivable, based on some of the 'evidence' that at first glance would appear to support this notion. As was mentioned earlier, the operatic listener/audience focuses predominantly on the materiality or phonic medium of the voice – the voice objectified – as opposed to the semantic content that is being conveyed (Dolar 2006: 30-31). Consequently, according to Dolar (ibid.), this objectified voice in opera risks being transformed into a fetish object through singing. This focus on the materiality of the singing voice is taken even further by the serious opera devotee, who often focuses on *the* voice, a single voice that is considered to provide the measure against which all others are compared (Vaughan 2009). Indeed, the most devoted opera fan goes to great lengths to hear and preserve this voice of measure (Poizat 1992 [1986]: 35), often becoming an avid collector of recordings, programmes and other significant mementos, like fetishes sustaining the repetition compulsion that fills a lack and allows the object of desire to be controlled (Koestenbaum 2001: 75-76). In ordinary parlance, this behaviour would warrant the appellation of 'fetishistic'. Furthermore, the greater emotional investment in opera by males, suggested in an earlier section, would also be in line with the view held by Freud (1927b) and Lacan (1994 [1956-1957]: 154, 2007i [1962]: 618) that fetishism is to be found (almost) exclusively in males.

A notable example of the singing voice as fetish has been documented in the psychoanalytic literature, in the article "The Voice as (Female) Phallus" by Bunker (1934). As related at one point in Bunker's (ibid.: 395-396) exposition of the patient's case history:

> [H]is real interest lay hardly at all in music *per se* but was almost exclusively centered upon singing and the voice, still more upon the female voice. Needless to say, opera furnished him with a combination of all that he found acutely pleasurable […]. [T]he patient had a hobby […] namely, that of collecting phonographic records made in the old days when the voices of these prima donnas had been recorded. Many of these records had long since become difficult to obtain and necessitated search or happy accident for their discovery.

Bunker (ibid.: 403) establishes a connection for this patient between the voices of the prima donnas and the phallus:

> The prima donnas of the operatic stage are phallic women […]. And as regards their outstanding attribute, the voice, we already know what must have been its significance in the unconscious of the patient; we already know this from the phonographic records which the patient treated […] as if they were a female penis. In a word, then, of these phallic women, of these opera stars, the voice was, and must have been, the phallus.

The psychoanalytic literature also contains what can be considered the flip side of this phallic conception of the singing voice, that is from a male singer's perspective rather than that of a male recipient of the female voice. Harris (1957: 342-343) quotes the singer's words as follows: "When I sing in good voice, it is as if my voice were a throbbing phallus plunging into the ear of every woman in the hall". (Unfortunately, there is no indication as to the singer's *tessitura* (range) or to the musical genre that he performed.) As Harris notes, drawing from the anthropological publication "Anthropophyteia" of 1912, this conception of the voice as phallus is paralleled by the vagina being considered the 'ear between the legs' ("*das Ohr zwischen den Beinen*"). The relation between the phallus and fetishism will be discussed presently. First, it may be useful to examine briefly the origin and development of the fetish as a concept.

According to Gamman and Makinen's (1994: 14-15) detailed explanation, the derivation of the word 'fetish', ultimately from the Latin *facticium* ('artificial'), can be traced back to the Portuguese word *feitiço*, which in the Middle Ages referred to heretical 'talismans' and later assumed the meaning of 'charmed' or 'bewitched' in connection with occult practices. In the English language, Gamman and Makinen continue, the word 'fetish' is recorded as first appearing in 1613 with reference to the amulets used by the natives of the Guinea coast. Throughout the seventeenth and eighteenth centuries European writers generally used the term 'fetishism' to refer to the rituals of 'savages'. However, in the nineteenth century, the word 'fetish' entered popular usage referring to anything held in especially high regard without apparent justification. In addition, in the second half of the nineteenth century, as Gamman and Makinen conclude, sexual connotations were attributed to the term initially by Krafft Ebing (1840-1902) and subsequently by Binet (1857-1911), both of whom are referenced in Freud's work.

If one accepts Freud's (1905a: 154) premise that "the normal sexual aim is regarded as being the union of the genitals in the act known as copulation", then fetishism is considered by him to be a deviation from the natural (hetero)sexual aim, a perversion that may involve areas of the body other than the genital organs and a marked focus on sexual elements usually leading up to copulation (ibid.: 150). A fetishist may focus on a specific part of the body or a particular object – neither being necessarily related directly to the act of copulation – which are required in order for the fetishist to achieve the sexual aim, although in some cases the fetish itself may completely replace the sexual aim (ibid.: 153). According to Freud (ibid.: 154), whilst there is some degree of fetishism in 'normal' love, a fetish can be considered a pathology when it replaces the sexual aim, or when it is not associated with an individual and becomes the sexual object in itself.

As mentioned by Gamman and Makinen (1994: 38), Paul Gebhard (1969) suggests four levels of fetishism, based on Freud's definition. The first level relates to a slight preference for particular partners or activities rather than an actual fetish. The second level designates the mildest form of fetishism, in which there is a strong preference for particular partners or activities. At the third level, or moderate fetishism, the fetish is a requirement to ensure sexual arousal and performance. The fourth level, which constitutes high-level fetishism, involves the sexual object being completely replaced by the fetish itself. This last level equates to Freud's pathological fetishism, in which the sexual aim is abandoned and replaced exclusively by the fetish (Gamman and Makinen 1994: 38).

Freud (1927b: 152-153) affirms that in all cases, "the fetish is a substitute for the woman's (the mother's) penis that the little boy once believed in and […] does not want to give up". In other words, the little boy notices the lack of a penis but refuses to accept that his mother does not have one, fearing that he too may be subject to the same castration (ibid.: 153). Therefore, the experience is repressed and the lack of a penis, which is associated by the little boy with a traumatic threat of castration, is disavowed (ibid.). This castration complex, which occurs in connection with the Oedipus complex, applies equally to male and female children. However, it evolves in a different way for each gender: "the girl accepts castration as an accomplished fact, whereas the boy fears the possibility of its occurrence" (Freud 1924a: 178). For males, the castration complex brings the Oedipus complex to a close, whilst in females it marks its beginning (Freud 1925: 256). Through a fear of castration, the boy gives up his desire for his mother, whereas the girl resents her mother as the cause for the lack of a penis. Through jealousy towards her mother and abandonment of the wish for a penis (penis envy), this being replaced by the wish for a child in a "symbolic equation 'penis-child'" (ibid.), the girl consequently shifts her desire from her mother to her father (ibid.: 254).

In the same way as Freud, Lacan (1994 [1956-1957]: 216) considers the castration complex to be decisive in the Oedipus complex, although for Lacan, unlike Freud, the castration complex marks the end of the Oedipus complex in both males and females. In addition, for Lacan (ibid.: 240-241) the Oedipus complex always involves a triad, either that of mother-child-phallus or, subsequently, that of mother-child-father.

A digression may be in order at this point to clarify the specific meaning and use of the Lacanian term 'phallus' compared to the Freudian term 'penis'. Whereas Freud generally uses the term 'penis' to refer to both the male genital organ itself as well as related abstract interpretations, such as the symbolic equation described above in 'penis envy', Lacan distinguishes between the two by making specific use of the term 'phallus'. The Lacanian 'phallus' is used in relation to both males and females, yet it does not directly represent the genital organs of either gender (Lacan 2007f [1958]: 576). Lacan's use and discussion of the phallus often appears to be couched in 'negative' terms of: a) what it is not, such as the phallus not being a fantasy or an object (ibid.: 579) or not having any feminine equivalent (Lacan 1997a [1955-1956]: 176); b) a lack, for example the imaginary phallus in the castration complex; or the symbolic phallus in woman, who possesses it by virtue of its lack (Lacan 1994 [1956-1957]: 153), whilst man "is not without having" ("*Il n'est pas sans l'avoir*") the symbolic phallus (Lacan 1958-1959, Seminar of 11 February 1959); and c) a renunciation of the imaginary phallus prior to possession of the symbolic phallus (Lacan 1994 [1956-1957]: 208-209, 227). In addition, as shown in the foregoing examples, the term 'phallus' is qualified by Lacan as real, imaginary or symbolic. The 'real penis' is the actual penis, which becomes sexually significant through masturbation during the pre-Oedipal period of the imaginary phallus (Lacan 2007f [1958]: 576). The 'imaginary phallus' in the pre-Oedipal period is the mother's object of desire, as imagined by the child (Lacan 1994 [1956-1957]: 31) and which the child tries to become for the mother, until this endeavour is abandoned in the Oedipus complex through the threat of symbolic castration (Lacan 2007h [1960]: 697). Lastly, the 'symbolic phallus' relates to the 'phallic function' (Lacan 1991c [1960-1961]: 298) and the sexual difference between males and females. The symbolic phallus applies to both males and females (Lacan 2007f [1958]: 576), given that there is no feminine equivalent, as mentioned above. However, the difference lies in the 'having / being' relationship of males and females to the symbolic phallus (ibid.: 582). Man comes to have the symbolic phallus (i.e. abandons the attempt to be the imaginary phallus for his mother) only by virtue of accepting his castration (lack), whilst woman is lacking the symbolic phallus and her lack functions as a sort of having (Lacan 1994 [1956-1957]: 153).

Returning to the Oedipus complex, which involves the realisation of sexual difference by both genders and the passage from the Imaginary to the Symbolic order, Lacan (1957-1958, Seminar of 22 January 1958) describes this as involving three stages, which are translated as 'moments'. During the first moment, or the pre-Oedipal stage, a child (male or female) believes that the mother has a phallus – the phallic mother (Lacan 2007f [1958]: 576) – but the child soon becomes aware of the (m)Other's inherent lack or privation (Lacan 1994 [1956-1957]: 218), i.e. her desire for the imaginary phallus that she lacks and which, as a result, the child tries to be for her. The introduction of the incest prohibition by the imaginary father in the second moment results in what the child understands to be the mother's privation of the imaginary phallus.

The imaginary father refers to the image of the father created by a child, either in an idealised form (Lacan 1991a [1953-1954]: 156, 2007h [1960]: 308) or in negative terms (Lacan 1997b [1959-1960]: 308). In either case, the imaginary father is always all-powerful (Lacan 1994 [1956-1957]: 275-276), even if this does not correspond to the child's father in actuality. The incest prohibition relates to Freud's (1913 [1912-1913]: 132) 'father of the primal horde' who forbade incest and was killed by his sons (ibid.: 141), which overlaps with the story of Oedipus and "the two primal wishes of children" (ibid.: 132).

During the third moment of the Oedipus complex, the real father brings about the symbolic castration complex, and consequently the dissolution of the Oedipus complex, by demonstrating that he has the phallus, which causes the child to stop trying to be the imaginary phallus for the mother (Lacan 1994 [1956-1957]: 208-209, 227). Ceasing the endeavour of trying to be the imaginary phallus for the mother is achieved at the expense of *jouissance* on the part of the child: "Castration means that jouissance has to be refused in order to be attained on the inverse scale of the Law of desire" (Lacan 2007h [1960]: 700). This lost *jouissance* can never be obtained again no matter how much it is sought.

According to Lacan (2007k [1964]: 723), the acceptance of castration sets up the lack which forms the basis of desire. The endless 'circularity' of desire lies in the fact that desire, like castration, can never be completely accepted. This refusal to accept castration is central to perversion (Lacan 1994 [1956-1957]: 192-193), such as fetishism. It comes about through disavowal, namely refusing to accept the realisation that the mother does not have the phallus. In fetishism, then, the fetish makes up for the lack of the phallus in the mother (ibid.: 194). Freud's conception of perversion described earlier is further clarified by Lacan (1991a [1953-1954]: 221), who considers perversion an actual psychical structure that may or may not include to various degrees the transgression of social norms, morals, nature, the sexual aim or the reproductive goal. Importantly, for the purposes of this present exploration in relation to the operatic voice and the nature of its enjoyment by the listener, the perverse structure that underpins fetishism involves striving to pursue *jouissance* as far as possible (Lacan 2007h [1960]: 700) beyond the pleasure principle.

However, all of this does not seem to provide a satisfying answer to the question posed at the beginning of this section, namely: can the operatic voice be considered a fetish object? Something seems to be lacking, which highlights the gap referred to by Dolar (2006: 31), mentioned earlier in this chapter, where "the fetish object is the very opposite of the voice as object a" although "this gesture is always ambivalent: music evokes the object voice and obfuscates it; it fetishizes it, but also opens the gap that cannot be filled". Carol Mavor (2006) provides a useful insight in this regard. Whilst affirming that the fetish and the *objet petit a* are similar, she distinguishes the two by emphasising that "fetishism is associated with neurosis, while the game of the *objet petit a* is not; it is desire itself" (ibid.: 284). This neurotic characteristic of fetishism, which originates in the pre-Oedipal triad of mother/child/phallus, where a subject identifies with the mother and the phallus yet is barred from both, stands out in the excerpt provided earlier in this section drawn from the case history described by Bunker (1934). He relates that his patient's interest "lay hardly at all in music *per se* but was almost exclusively centered upon singing and the voice, still more upon the female voice", coupled with the patient's hobby that involved "collecting phonographic records" of prima donnas (ibid.: 395-396). Bunker (ibid.: 403) identifies a connection between the singing voices of the prima donnas and the phallus: the singers themselves as phallic women, as well as their voices and the phonographic records, both of which function as a female phallus for the patient. Although this clinical vignette may help to elucidate the distinction between the singing voice as fetish and the *objet petit a* cause of desire that fuels the opera fan's all-consuming passion for the singing voice, nonetheless the separation, or rather the overlap, between the two still leaves a lingering doubt in one's mind. For in both cases (the singing voice as fetish, or as *objet petit a*), the phonic materiality of the voice that remains after the meaning of language has fallen away achieves its own signification beyond language. The meaning-less residue becomes meaning-full beyond the semantics of language. As Mavor (2006: 284) remarks, "the boundaries between the fetish and the *objet petit a* are blurred. They are almost synonyms. Their undecidable relationship is typically Lacanian and elusive (like a haunting aroma)". She draws a parallel between this elusive, haunting aroma – similar to the doubt referred to above that lingers like a (bad) smell – and the Minister's "*odor di femina*" in Lacan's (1988 [1955]: 48) "Seminar on *The Purloined Letter*". Mavor (206: 284) also observes that it is the *odor di femina* which initiates and drives Don Giovanni's seductions in Mozart's opera. In Act I, Scene 4, Don Giovanni exclaims: "*Zitto: mi pare sentir odor di femmina…*" (Hush! I think I can smell the scent of a woman [here 'scent' does not refer to 'perfume' – my own translation]). The response from his servant, Leporello, is inadvertently portentous: "*Che odorato perfetto!*" (What a keen sense of smell! [my own translation]). For the "*odor di femmina*" that Don Giovanni smells eventually turns out to be that of his own wife, whom he had been trying to avoid (ibid.).

The answer to the question posed at the beginning of this section, or at least a pivotal consideration in attempting a distinction between fetish and *objet petit a*, may lie in the *odor di femina*. It appears to emanate from and at the same time fill the space between the voice as *objet petit a* and the voice that is objectified and fetishised – as opposed to the voice as a sexual fetish object that is necessary for sexual arousal and performance, or which replaces the sexual aim completely. Although the answer may be found under one's nose, as it were, the *odor di femina* is ephemeral and ethereal, it is difficult to define and quantify, much like the ultimately indefinable qualities of an opera aficionado's 'voice of measure'. The *odor di femina* exudes most powerfully from the topmost reaches of the singing voice, the natural preserve of the female voice, that of the soprano and the higher ranges of the mezzo-soprano. Yet the subtlety of its scent, at the height of its ambivalence and ambiguity, echoing the Minister to which Lacan (1988 [1955]: 48) refers, is perhaps most noticeable in the male alto and countertenor voices. Based on historical accounts, this must have applied even more so to the *castrato* voice, with its indescribable, androgynous quality that "continually bridged the gap between masculine and feminine" (Barbier (1998 [1989]: 17) and was capable of making listeners swoon with pleasure (ibid.: 137), vocal *jouissance* by any other name. In this case, the *odor di femina* can be conceived of as a negative presence, a sort of presence by virtue of absence. In other words, though lacking by virtue of being feminine, it represents and at the same time stands in place of a lack – that brought about by castration. In the unintentionally ironic words of a (female) spectator describing the performance of the *castrato* Giovanni Carestini, known as '*Il Cusanino*' (1700-1760): "'He sings well, one has to say: he's lively and expressive, but one feels there's something missing…'" (ibid.: 136).

2.7 The Transitional Experience of Opera

This last section will consider the operatic listener/audience experience in terms of the specific contribution to psychoanalytic theory made by Donald W. Winnicott (1953), as first described in his article "Transitional Objects and Transitional Phenomena – A Study of the First Not-Me Possession". This discussion follows on naturally from the last section, as will be examined presently. The background information that precedes a discussion of Winnicott's theories considers the similarities and the significant differences between a fetish object and a transitional object. Following an exposition of Winnicott's theories of transitional objects and transitional phenomena, the discussion will be extended to consider the solacing effect of the transitional experience that persists throughout an individual's life. The section will conclude with the application of Winnicott's theories to opera and its reception.

2.7.1 Background – Fetish object or transitional object?

There is a connection between the last section that dealt with fetishism and the voice and this discussion of Winnicott's theories about transitional objects and phenomena. Actually, there are a number of connections both direct and indirect that will become apparent throughout this section. However, before examining Winnicott's theories in detail, it may be useful to take a look at some background considerations. An important consideration to examine, and which additionally represents a direct link between the last section and this one, is the difference between a fetish object and a transitional object. As noted by Kahne (1967: 248), before Winnicott's article was published in 1953, there was little reference in the literature to the subject matter that provided the basis for his theories about transitional objects and phenomena. However, Winnicott (1953: 92, 96) points out that Wulff (1946) had dealt with similar material, but that he had referred to transitional objects as childhood 'fetish objects'. In addition, as Kahne (1967: 248) also notes, Winnicott had attributed the origin of the term 'transitional' to Fairbairn (1994 [1952]) and had traced the subject back to Abraham (1953 [1916]) and to Lindner in 1879.

Whereas the inanimate objects to which infants form attachments were considered by Wulff (1946) to be childhood fetish objects, a view echoed by Dickes (1963) and Sperling (1963), who in addition looked upon the use of transitional objects as pathological, Winnicott (1953: 96) reserved the term 'fetish object' to describe a sexual perversion, rather than the widespread and healthy transitional experience of infancy. Bowlby (1969) and Hong (1978) concur that the use of a transitional object reflects a healthy relationship between a mother and her child. According to Bak (1974), this difference in views may have derived from an imprecise use of terminology, where childhood 'fetish object' should in fact be understood as 'transitional object' in Winnicott's sense. As Hong (1978: 62-63) observes, confusion also arose over the distinction between the terms 'transitional object' and 'transitional phenomena', which were sometimes used interchangeably in error. Hong explains that this was perhaps due to a lack of clarity on Winnicott's part in distinguishing the two terms.

However, unlike a transitional object (which will be explained later), for Winnicott (1953: 96) a fetish object results from "a *delusion* of a maternal phallus", whilst a non-pathological place should be kept "for the *illusion* of a maternal phallus". This illusion is central to Winnicott's theory of transitional objects in infancy and to the capacity to experience, as will be discussed presently. According to Winnicott, whereas a transitional object may represent the maternal phallus, and ultimately the maternal breast, thus providing useful insight about fetishism, the reverse approach starting from the psychopathology of fetishism does not help in understanding the widespread and healthy transitional experience of infancy. As affirmed by Winnicott (ibid.: 97), a fetish object may originate in and persist from the transitional experience in infancy, but in combination with "the delusion of a maternal phallus".

In her article "The Fetish and the Transitional Object", Phyllis Greenacre (1969) highlights the similarities and, more importantly, the differences between the transitional object and the fetish. In the strict sense of the sexual fetish, the fundamental difference lies in the fact that "the fetish […] is commonly adopted as a necessary prop or adjunct to insure adequate sexual performance in adult life" (ibid.: 144). The fetish object allows a far wider range of features than the transitional object, and black is often a colour associated with fetish objects, perhaps enhancing their visibility, an aspect that is more prominent than is the case with transitional objects (ibid.: 150). The fetish object is a bisexual symbol that both confirms and denies sexual difference (ibid.). The fetishist does not usually abandon the fetish, unlike the infant who gives up the transitional object; the fetishist often views the fetishism as abnormal, but as it allows sexual gratification it is accepted as an abnormality rather than a symptom (ibid.: 151). The fetish can be considered a container of anger resulting from castration anxiety and, as such, represents the female phallus, whilst also serving to reassure possession of the phallus by the fetishist (ibid.: 162).

In her subsequent article, "The Transitional Object and the Fetish with Special Reference to the Role of Illusion", Greenacre (1970) explores how the transitional object facilitates growth, development, creativity and forward progression in infancy. In contrast to this, fetishism in infancy allows development to continue to some extent, despite the problems in the mother-child relationship at the root of the fetishism itself. The fetishism established during latency and adulthood – in particular when contrasted with the forward progression that characterises the transitional experience in infancy – appears to crystallise an early experience, preserving it, rendering it immutable and preventing forward progression.

2.7.2 Transitional objects and transitional phenomena

In his article "Transitional Objects and Transitional Phenomena – A Study of the First Not-Me Possession", Winnicott (1953) describes the ubiquitous infant behaviour that begins at the age of approximately 4-12 months and involves attachment to a special object, such as the corner of a sheet or blanket. This attachment to a special object develops between the stages of oral erotism, involving manual stimulation of the mouth, and subsequent play with dolls and teddy bears (ibid.: 89). The cherished object has a transitional function between these two stages, before true object-relationships, and between the infant's inner and outer worlds; it is viewed by the infant as his/her "first not-me possession" (ibid.).

Winnicott (ibid.: 91) provides a detailed explanation of the features and functions of this first possession, which has a particular texture or quality "that seems to show it has vitality or reality of its own", and the infant "assumes rights over the object". The object is both loved and treated roughly and must not be changed in any way except at the hands of the infant. The object may become dirty and smelly, but the importance of unchanging constancy in the object is recognised by the infant's mother, who allows the object to remain unwashed. A rudimentary name may be created by the infant for the object, which may include part of a word used by adults. Although the object is external to the infant, it is not viewed entirely as such by the infant. Yet it does not originate from within the infant either, as it is not an hallucination. It provides comfort and allays anxiety, by maintaining a feeling of unity with the mother during separation from her, for example while the infant is falling asleep. In addition to explaining these transitional objects, Winnicott (ibid.: 89) also points out the nature of transitional phenomena (that is non-material objects), which may include, for example, babbling in the younger infant, or singing songs and humming tunes before sleep in older children.

According to Winnicott (ibid.: 90), the "intermediate area" of transitional objects and transitional phenomena creates a space of illusion "between the subjective and that which is objectively perceived". He affirms that in this transitional experience, the child's inner and outer worlds merge and overlap, whereby the boundaries between the two become indistinct. Winnicott (ibid.: 96) claims that this intermediate area develops as a result of the gradual separation from the breast and the mother – from illusion to disillusionment – leading to the child's individuation and the formation of other object-relationships in the external world. In the opinion of Winnicott (ibid.: 92), although the transitional object may symbolise a part object, for example the mother's breast, its significance lies in the overlapping position that it occupies at once between representing the mother's breast whilst not actually being the mother's breast. Therefore, because of the symbolism involved in this intermediate position, the transitional object marks the beginning (prior to reality-testing) of an infant's ability to distinguish between inner and outer worlds, fantasy and reality, subjectivity and objectivity. As such, for Winnicott (ibid.: 94), the transitional object is at the same time neither entirely an external object, nor an internal one as conceived by Melanie Klein (1984a [1946]). According to Winnicott (ibid.: 94), the transitional object represents the external reality of the mother's breast, but only through the infant's internal symbolisation of it. Furthermore, the transitional object is not subject to 'magical control' by the infant, as in the case of the internal object, yet it is not beyond the infant's control, as in the case of the actual mother.

In Winnicott's (ibid.) view, the successful establishment of object-relationships in the external world is dependent upon a 'good enough mother' who facilitates the infant's individuation (i.e. separation from the mother) through the process of illusion and disillusionment. The good enough mother, who may not be the infant's actual mother, is sufficiently devoted to the infant in order to satisfy his/her needs fully at first and then gradually withdraws this attention as the infant develops and is increasingly able to tolerate the frustration of her failure. In other words, the mother must initially create the illusion that her breast is part of the infant. Subsequently, the mother’s decreasing adaptation to the infant’s needs produces gradual disillusionment and allows the infant’s separation and individuation to be achieved (ibid.: 95). The infant’s increasing ability to tolerate frustration through this process of illusion-disillusionment mediated by the mother has the result of juxtaposing hate to the dimension of love, making external objects real and distinguishable (ibid.: 94). Therefore, according to Winnicott (ibid.: 95), the illusion-disillusionment process is related to weaning of the infant, yet its effects continue long after weaning has been completed. Conversely, if the illusion-disillusionment process is not successful, weaning cannot be said to have occurred simply by virtue of the fact that breast-feeding has been stopped (ibid.: 96). Weaning, then, is a significant developmental stage in the infant only when the illusion-disillusionment process is successful. Winnicott (ibid.: 95) emphasises, however, that the term ‘breast’ relates to the mother’s actual breast and to the breast as symbolising the mother, as well as the whole process of mothering itself, irrespectively of whether an infant is breast-fed or bottle-fed.

Hong (1978: 52) remarks that a number of psychoanalysts (e.g. Busch et al. 1973; Gaddini 1970; Greenacre 1969; Tolpin 1971) after Winnicott have proposed that the transitional object may symbolise a part object, such as the breast, or the mother and reunion with the mother. In addition, Hong (1978: 54) observes that physical contact within a relationship with a ‘good enough mother’ is significant for the development of a transitional object in the infant. This is borne out, Hong affirms, by research which showed that deprived infants in institutions did not form attachments to transitional objects (Provence and Lipton 1962). Furthermore, Hong (1978: 50) describes research (Busch et al. 1973; Gaddini 1970; Hong and Townes 1976) which found that more than fifty percent of Anglo-Saxon infants have transitional objects. The increased or decreased prevalence of transitional objects has been attributed to socio-cultural differences and distinct child-rearing practices, such as the amount of physical contact with the mother, sleeping arrangements, the pattern of falling asleep and breast feeding (Hong 1978: 58, 75). So, for example, in cultures where there is less physical contact between mothers and infants, and where infants sleep in a separate room to that of the mother, the development of a transitional object is more likely (ibid.: 58).

As Hong (1978: 64) affirms, the transitional object is one of many transitional phenomena, which include sounds such as babbling, lullabies, songs and tunes, movements such as rocking, patting and rubbing by the mother, and the mother herself. He explains that although they are transitory, different forms of these transitional phenomena persist into adulthood and continue throughout life, as will be discussed next. Before moving on, it is worth bearing in mind, as noted by Hong (ibid.: 68) and others (Coppolillo 1967, 1976; Tolpin 1971; Winnicott 1953), that the development of a transitional object represents a creative act by the infant, who is thereby able to internalise and make use of a soothing maternal presence as required, and this may form the basis for the subsequent development of creativity and defence mechanisms. Consequently, as stated by Hong (ibid: 75), transitional phenomena are significant for:

> [T]he development of object relations, perception, cognition, reality testing, symbolism, ego structure, defense mechanisms, creativity and ego autonomy. In short, transitional phenomena aid an infant in ego differentiation and separation-individuation toward establishing a cohesive self.

2.7.3 The transitional experience as a lifelong source of solace

Winnicott (1953: 91) explains that over time, the infant's transitional objects are set aside, although they are not forgotten, nor are they repressed – they become decathected, as transitional phenomena gradually occupy more and more of the intermediate area "between 'inner psychic reality' and the 'external world as perceived by two persons in common', that is to say, over the whole cultural field". A number of psychoanalysts (such as Coppolillo 1967, 1976; Hong 1978; Kahne 1967) concur with Winnicott's (1953: 97) view that the transitional experience is retained throughout life, "in the intense experiencing that belongs to the arts and to religion and to imaginative living, and to creative scientific work". This is because we all constantly have to come to terms with reality, relating our inner world to it, and "relief from this strain is provided by an intermediate area of experience which is not challenged" (ibid.: 96). Horton (1981: 127) affirms that a link with the mother underpins this transitional experience throughout life:

> Transitional activities early in life […] are soothing principally because of their evocation of the soothing maternal primary process presence. During the second half of life the underlying oceanic elements become more significant. The maternal link is not lost, however, as the elderly dying man's cry for his mother may attest.

Just as the child must come to terms with the separation from the mother, so the adult must accept the separation from life itself that is brought about by death: "the child's comforting transitional object is used to allay the separation anxiety signaled both by sleep and later by the idea of death" (Grolnick and Lengyel, 1978: 381). Interestingly, in this respect, Etruscan burial objects may be viewed as serving the function of bridging the gap between life and the separation brought about by death (ibid.: 405-406). The erotic representations found on these burial objects include references to the primary bond between child and mother (ibid.: 518).

Whereas the transitional objects and transitional object equivalents of early infancy may range from blankets to teddy bears, or various 'collections' such as sports cards for older children, or pop music recordings and videogames (Hull 1985) for adolescents, objects that provide a similar comforting, solacing experience in the case of adults can include items such as cars, paintings, antiques and so forth, or people with whom one can relate transitionally, for example a teacher, a priest, or a psychoanalyst (Collins 1981). This presence and persistence throughout life of the need for transitional objects and transitional phenomena has been observed by a number of psychoanalysts in addition to Winnicott (e.g. Coppolillo 1967, 1976; Hong 1978; Horton 1981, 1984; Kahne 1967). As Hong (1978: 70) notes, it is not uncommon for adults to have hobbies in which they become lost, or bedtime rituals, or thoughts that they find comforting. Horton (1984: 172) quotes the example of a 93 year old woman who at bedtime would recite a solacing poem about death that she had learned in her youth after her mother had died. The continuing need for solace in adulthood, in order to allay pain, anxiety and stress through the transitional experience of adaptation to changing circumstances, results in an attachment for example to religion, art, poetry and music. In its broadest sense, then, the transitional experience (including transitional objects and phenomena) involves a personal relatedness to animate or inanimate, tangible or intangible objects, activities or sounds that provide solace through their symbolic and associative links "with an abiding maternal primary process presence" (Horton 1984: 168). According to Horton (ibid.: 169), the ability of the transitional experience to provide solace by relieving anxiety stems from "the first and most meaningful, psychologically internalized relationship with a loving presence". He explains that the success of this internalisation results in the solacing effects being replicated in future transitional experiences. However, if the internalisation fails, the individual continues to seek this solace and, although the individual may experience it to some degree, independence from its external sources is lacking. In addition, Horton believes that although the maternal association is an essential element for the solacing effect of the transitional experience, there may be other contributing factors such as the father, other family members and relatives, as well as the relationships between them.

Among the wide variety of objects and phenomena outlined above that may provide a solacing transitional experience, language and sound are perhaps the most significant in relation to this exploration about a listener's enjoyment of the operatic voice. Winnicott (1953: 89, 91) mentions the babbling of infants and the singing of songs and tunes before sleep by older children as transitional phenomena, or the way that a transitional object is 'named' by an infant, often incorporating part of a word that is used by adults. Other authors (Greenson 1954: 234; McDonald 1970: 515) refer to the sound "mm" made by infants and adults to express contentment, how this sound may relate to transitional phenomena, and the significance of the sound of words in an infant's preference for certain soothing songs. In addition, the soothing quality of sound and (pre-verbal) language can be observed in the co-actional vocalisation between infants from three to four months of age and their mothers, which precedes subsequent experiences of soothing or solacing vocalisations in unison, such as group prayer and choral singing (Stern et al. 1975). In all of the above examples, as mentioned by Horton (1984: 172), the transitional experience can be identified in the uses of sounds and/or language. They have a comforting quality, an element of maternal presence and the combination of these features with actual or perceived external reality, allowing anxiety to be relieved. Horton (ibid.) points out that the vocalisations range from pre-verbal sounds "to the most complex cultural productions (e.g. an operatic love duet)". Interestingly, Horton (ibid.: 173) claims that the first vocalisation in the form of crying, which occurs before an infant's transitional relatedness, may represent an indirect search for solace but is not as closely connected with the development of language competence as the soothing features of co-actional vocalisations. The significance of this soothing function of sound is mentioned by Winnicott (1953: 89, 91). As explained by Horton (1984: 190), an infant's transitional relatedness may be observed to occur before or at the same time as early language competence. Horton (ibid.) observes that solacing language, from an infant's early sounds to the sophistication of poems and operatic arias, is similar to the development of transitional relatedness and involves: "comfort, the sense of a maternal presence, the blending of internal and external reality, and the achievement of cultural resonances".

These elements characterising transitional relatedness are mentioned by McDonald (1970: 513) in her description of the progressive stages in infants of the transitional experience that may be afforded by a tune. At first, a tune is experienced as part of the infant, rather than a separate entity. Later on, when the infant can reproduce the tune, by singing it or playing it, s/he gradually takes possession of the tune and can control it, like a transitional object, although it is actually among the transitional phenomena. McDonald (ibid.: 515) points out that, in the preverbal infant, the tune itself has a comforting effect, rather than any words associated with it. She remarks that lullabies are prime examples of transitional tunes, having the function of soothing infants prior to separation, such as before sleep. In musical terms, McDonald (ibid.: 516) observes that the melodic line of lullabies would appear "to convey to the infant a sense of separation and safe reunion", which is achieved by a wide interval expressing momentary tension within an overall soothing melody, such as occurs in "Rock-a-bye Baby" and the "Lullaby" by Brahms (1833-1897).

Coppolillo (1967: 245) affirms that the transitional experience mediates the formation of ego structures that allow the individual to develop progressively more mature and socially appropriate object relations. He suggests that the products of culture, such as songs, poems, stories, prayers and so forth, function as transitional objects both when conceived by the author and when used by others to deal with conflict. They can be set aside when the conflict has been resolved and made use of again when required. Coppolillo (ibid.: 241) explains that the enjoyment of a cultural product may occur at two different levels. For example, a song can be enjoyed both in terms of its aesthetic qualities (that is the song as it exists in a listener's external reality) and the experience that it provides for the listener in an intermediate area. This intermediate area of experience is capable of mediating fantasy, by allowing the listener to draw upon elements from his/her inner world and to relate them to the external reality of the song. In other words, the listener continues to enjoy the song for its aesthetic qualities too. The element of illusion that functions in this intermediate area will be discussed next in relation to opera and its reception by a listener/audience.

2.7.4 The operatic space of illusion

As mentioned earlier in this section, illusion has a central role in Winnicott's theories about the transitional object and phenomena. Illusion and its opposite, disillusionment, provide the basis not only for infant individuation and separation from the mother, but also for creativity itself. Winnicott (1953: 90) states early on in his seminal article that he is "studying the substance of illusion, that which is allowed to the infant, and which in adult life is inherent in art and religion". He goes on to say that

> We can share a respect for illusory experience, and if we wish we may collect together and form a group on the basis of the similarity of our illusory experiences. This is a natural root of grouping among human beings.

In other words, both the creation and reception of cultural products, such as music, art and religion, involves sharing illusory experiences in a common intermediate area. This area, as Winnicott (ibid.: 96) explains, is unchallenged. As discussed earlier in relation to Winnicott's theories, the capacity of illusion is pivotal to the development of object relatedness beyond the primary object of the mother, whilst at the same time maintaining a symbolic maternal link.

Winnicott (1953: 96) likens this intermediate area in which cultural products are conceived and enjoyed to "the play area of the small child who is 'lost' in play". As a shared cultural product, opera and its reception create and function within and as a space of illusion. Opera creates and operates within an intermediate area that provides a derivative transitional experience, allowing the listener/audience to relate inner and outer worlds through illusion and fantasy. A virtual reality is created through the temporary suspension of the actual reality beyond it. It is within this liminal space that emotion is mediated by illusion, providing a transitional experience. The 'holding environment' (Winnicott 2005: 150) of this space allows the intense emotion and eroticism of opera, as discussed earlier in this chapter, to be experienced safely. Through the fiction of the story being enacted, as well as the response to the operatic voice also mentioned earlier, the holding environment of opera allows the listener/audience to 'practice' experiencing intense emotions without having to endure the associated real-life traumatic situations. In this way, as a derivative transitional experience, like other cultural products, opera is also capable of providing a source of comfort and solace (Horton 1981, 1984), as discussed above. It is capable of relieving the strain of negotiating reality by maintaining a symbolic link with the M(O)ther, alongside the listener's enduring and impossible quest to (re-)encounter the (lost) vocal object.

An interesting parallel may be drawn here between the dynamics of desire, which is driven by lack and partial satisfaction, as well as phantasy, and Winnicott's (1953: 94) theory of illusion and gradual disillusionment in the child's individuation process mediated by the mother. The eroticism of intermittence (Barthes 1997 [1973]: 10), as mentioned earlier in this chapter, with regard to desire thriving on the frustration of satisfaction, may be related to Winnicott's (1953: 95) notion of the child re-creating the idea of the mother's breast repeatedly in order to satisfy a need. As explained by Winnicott, when the mother provides the breast, as the child is re-creating the idea of the breast in order to obtain satisfaction of the need to eat, a subjective concept of the breast develops in the child. However, the disillusionment of the child's gradual separation and individuation process may be claimed to instil a lack and dissatisfaction that, in turn, may perhaps lay the foundation for eroticism and desire throughout life. Similarly, the importance of the transitional experience and the intermediate area mediated by illusion, which persist throughout life, results from the ongoing concern "with the problem of the relationship between what is objectively perceived and what is subjectively conceived of" (ibid.).

The enduring maternal link in the transitional experience of opera may also account for the position of the operatic *diva*. As discussed earlier in this chapter, she at once fills the lack and is the locus of lack itself. As such this makes her the natural locus from which to begin the ongoing quest for the vocal object, which being a lost object, a missing object, is itself a lack (Poizat 1992 [1986]: 150). Therefore, the transitional experience of opera may be said to reside in the symbolic link with the mother, which is reinforced when an adult listener (re-)encounters the lost vocal object in the intermediate space that is mediated by operatic illusion, eroticism and desire. As mentioned earlier, the delimited space of opera allows sexual transgression to be experienced safely in the form of the 'operatic orgasm' of vocal *jouissance*. This is experienced in a shared intermediate area, which would appear to support the notion proposed by Abel (1996: 114) that the operatic orgasm is like "an elaborate form of exhibitionistic group sex". Like the infant's transitional object, the listener/audience experiences the operatic vocal object in an intermediate area where inner and outer worlds are mediated by fantasy and illusion. This allows the operatic voice to be enjoyed both on its own terms, that is for its inherent aesthetic qualities, and in relation to a particular combination (which is specific to an individual's inner world) of the various elements discussed throughout this chapter.

Conclusion

This chapter considered a number of psychoanalytic themes and theories in relation to opera, both in terms of the functional and structural dynamics at work within opera, as well as those involved in its reception by a listener/audience. This was achieved by drawing primarily on the theories of Freud, Lacan and Winnicott. The opening overview was followed by a discussion concerning applied psychoanalysis, and specifically the application of psychoanalysis to music. This discussion included the issue of validation. In addition, it dealt with the benefits and disadvantages of the various approaches in applying psychoanalytic theory beyond the clinical realm of the consulting room. Possible reasons for the relative silence by psychoanalysts on the subject of music in general were also examined. Significant theoretical aspects about the voice and the gaze, as lost objects, were analysed in relation to the reception of opera. This included the synaesthetic-like effect that occurs when the voice and the gaze merge, blend and overlap. The enjoyment of opera and the proposed erotic nature of this enjoyment, defined as the 'operatic orgasm', were explored in relation to vocal *jouissance*. This exploration also took into account the role of gender in the operatic orgasm. Following on from the description of the three layers of opera in the last chapter, the constituent elements of each of these layers were considered in relation to the orders of the Symbolic, Imaginary and Real, as well as the overlapping areas between them and the triadic nested nature of each order. The question was raised as to whether the operatic voice can be considered a fetish object. A theoretical discussion attempted to identify the position of the voice in relation to the fetish and *objet petit a*. The chapter concluded by looking at opera as a transitional experience by drawing on and applying the theories of Winnicott, as well as other authors. Based on this, the notion was discussed that opera can be a source of solace. Lastly, the operatic space of illusion was considered in relation to other psychoanalytic themes and theories that were introduced and dealt with throughout the chapter. Using psychoanalytic theory, an attempt has been made in this chapter to cast light on *why* we enjoy the operatic voice, the nature of this enjoyment and the possible source of the emotions and reactions that are evoked in the listener/audience.

Chapter 3 – Music and (Neuro)Science

Introduction

Whereas the previous chapter dealt with opera through a psychoanalytic lens, this chapter will focus on music from a neuroscientific perspective. An explanation would appear to be warranted for the apparent shift in focus from dealing specifically with the vocal music of opera in the previous chapter to mainly non-vocal music in this chapter. In one sense, it could be argued that no actual shift in focus is involved at all, despite the title and contents of this chapter. As mentioned earlier in this thesis, the voice is considered by singers to be an instrument that produces music – the voice *in* music and the voice *as* music. In another sense, a formal shift in focus is in fact involved, being mainly due to the nature and scope of neuroscientific findings themselves. As already mentioned, there is not a wealth of neuroscientific literature dealing specifically with vocal music – even less in the case of opera. One of the main reasons for this may be the requirement in empirical studies to eliminate, or at least reduce, possible confounding issues that could arise from investigating multiple variables at once, as in the case of music *and* singing. This consideration may not be as critical in a conceptual approach such as this, which has the advantage and benefit of allowing one or more of the diverse facets of opera to be explored at once, in relation to each other and to the whole. Except where specifically stated in this chapter, such as the few studies that investigate the differential effects on the listener of lyrics and music, neuroscientific findings pertaining to non-vocal music will be deemed to apply in somewhat the same way to vocal music – at least in purely acoustic perceptual terms. That is to say, both singing and music will be considered simply as musical sound, independently of the neural processing of language syntax and semantics related to the presence of any lyrics. The overlap between the processing of music and language syntax, as discussed in this chapter, can be adduced as a partial justification for this approach.

Following a brief introductory overview to open the chapter, section two will discuss the origins of music and singing, drawing upon evolutionary biology and evolutionary psychology, amongst other fields. A description will be provided of various hypotheses and evidence relating to animals and human beings as to how music and singing originated, their purposes or functions (if any), such as mate selection, affect and behaviour regulation, cohesion during collaborative work and mother/infant bonding in the form of lullabies and infant-directed speech. In addition, the link between music and movement will be examined. Building on this common basis, in section three the role of culture, society, memory and language will be explored in relation to the music-listening experience. This will be followed in section four by a discussion of the overlap between the neural processing of music and language, including our innate capacities for both and their relation to the processing of syntactical rules. A description will be provided of two syntax-based hypotheses that account for this overlap. The significance of Broca's area will be discussed in terms of its historical and ongoing importance for neural research, as well as its role in the neural processing of music and language. This will allow the subsequent exposition in section five of current knowledge about the way in which music is processed in the brain and, as a result, how the music-listening experience is enjoyed. The similarities and differences between singing and speaking will be explored in the context of voice production and reception. The reception and neural processing of music will be examined by looking at the constituent features of music and their perception. The music and emotion debate will be addressed in section six by exploring what is meant by emotion, the issues of whether music evokes emotion and, if so, whether this emotion is specific to music. The features of music that evoke emotions will be discussed, as well as two important hypotheses that claim to explain our affective response. This topic will be extended in section seven, which will examine the extent of integration and separation in the neural processing of music and lyrics, as well as evidence of differences in the intensity of the affective response to music with and without lyrics. These differences will be discussed in terms of gender, from a cognitive as well as a neural perspective. Lastly, to conclude the chapter, the notion will be considered as to whether there may be some neural overlap between the intense enjoyment and pleasure derived from listening to music and that related to sexual arousal/orgasm. The findings of studies unrelated to music, in the field of human sexuality, will be drawn upon for this purpose.

3.1 Overview

As mentioned by Levitin and Tirovolas (2009: 211) in their comprehensive review of "Current Advances in the Cognitive Neuroscience of Music", modern research in the field of music perception and cognition has a long history, the roots of which can ultimately be traced back to the Aristotelian philosopher Aristoxenus in the fourth century B.C. Aristoxenus, the authors continue, believed that the classification of musical intervals should be based on their effects on listeners. However, Levitin and Tirovolas explain that it was not until the 1860s that the first experiments investigating the psychological effects of external stimuli were conducted. Music, the authors affirm, was among the first areas of interest in experimental psychology research – it was also one of the main areas of investigation that resulted in the Gestalt movement being formed. In recent years, as the authors state, the increasing number of studies investigating the neural processing of music have focused largely on music perception, emotion, memory and performance using a wide range of research techniques and technologies, such as fMRI (functional Magnetic Resonance Imaging), PET (Positron Emission Tomography), EEG/ERP (Electroencephalography / Event-Related Potentials) and MEG (Magnetoencephalography).

Neuroscientific research has attempted to establish whether music is processed in specific regions of the brain and their respective functions (Deutsch et al., s.a.). Initially, researchers believed that in right-handed individuals, music processing occurred primarily in the right hemisphere (Levitin and Tirovolas 2009: 213). However, as stated by Levitin and Tirovolas (2009: 214), whilst there is some laterality in certain functions, studies have since shown that music processing in the brain actually involves many different networks, with communication across both hemispheres (Deutsch et al., s.a.), involving the cortex, neo-cortex, paleo-cerebellum and neo-cerebellum (Peretz and Zatorre 2003; Platel et al. 1997; Sergeant 1993; Tramo 2001). The main regions of neural processing based on musical activities are shown in Figures 3.1 and 3.2 below.

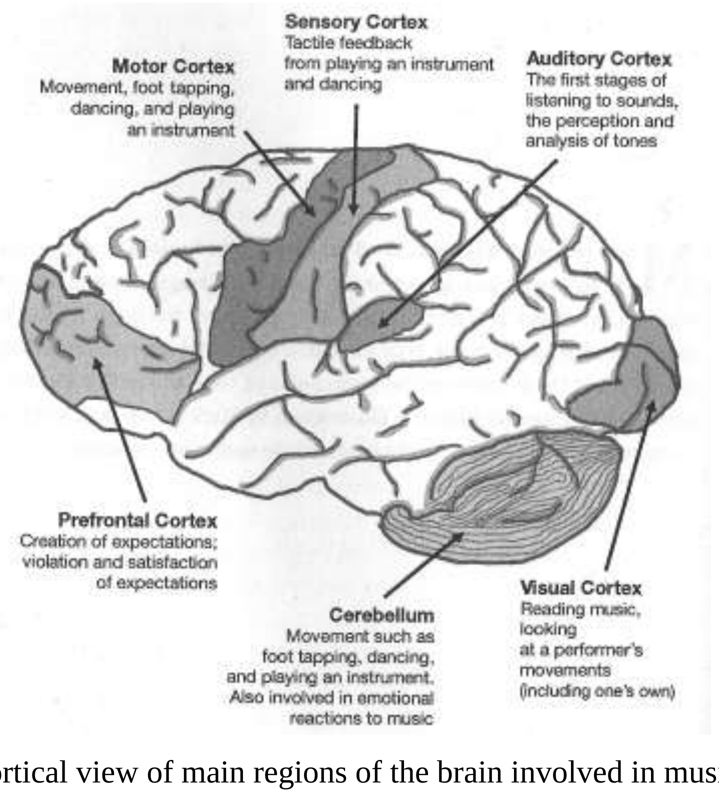


Figure 3.1 Cortical view of main regions of the brain involved in music processing (source: Levitin (2007: 270), based on Tramo (2001)

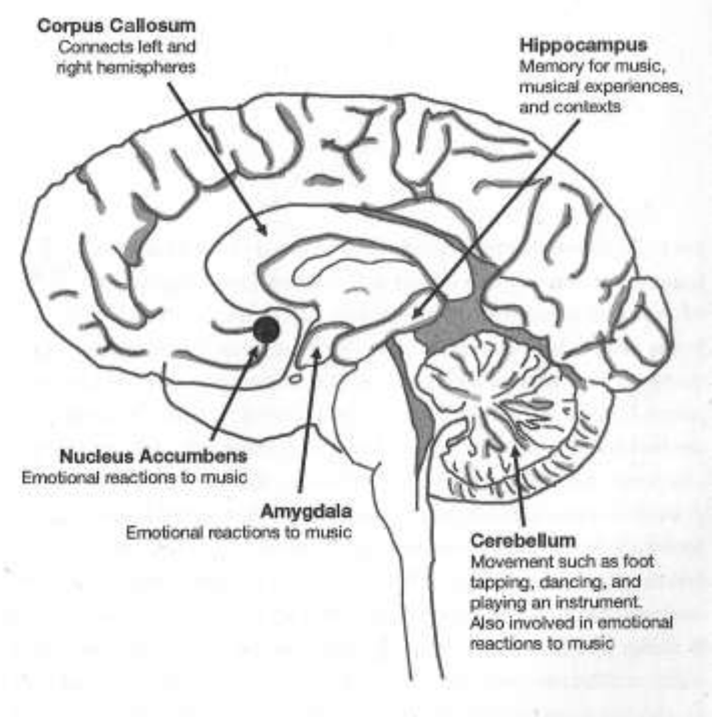


Figure 3.2 Cross-sectional view of main regions of the brain involved in music processing (source: Levitin (2007: 271), based on Tramo (2001)

Although our affective response to music is ultimately very personal, our individual appreciation and understanding of music, in turn, is largely culture-specific or culture-dependent. In other words, we can enjoy listening to music from another culture, but the differences in our own acculturation may cause us to overlook certain features and nuances of the other culture's music (Ball 2008: 162). We tend to enjoy, understand and listen most often to music that is part of the musical tradition in which we have been raised and that we have learned, and/or to which we have been habituated through consistent exposure. The brain learns the rules of the musical tradition in which we are raised, and our neural networks are shaped accordingly, in the same way that we innately learn the rules of the language of the culture into which we are born (Levitin 2007: 26, 108). During this learning process, the brain forms schemas (ibid.: 117). However, as in the case of language, these schemas are not fixed and immutable, rather they are updated and reviewed whenever we listen to music (ibid.: 116). In this regard, Levitin (ibid.: 117) mentions an apt description by the music theorist Eugene Narmour (1992), who explained that listening to music involves – among many other physiological and neural processes – the processing and comparison in memory of the notes that we have just heard against all music with which we are familiar and that is similar to the music to which we are listening now.

Given that our understanding and appreciation of music is related to a large degree – although not exclusively – to our acculturation and familiarity with the structure, or ‘language’, of our own culture’s music, it is not surprising that there has been much scientific interest and speculation in trying to establish the origins and development of music (e.g. Blacking 1974; Cross 2001; Huron 2001; Levitin 2008a, 2008b; McDermott 2008; Mithen 2006; Peretz 2006; Tecumseh Fitch 2006; Trehub 2003; Wallin 1991; Wallin et al. 2001), as well as any links that may exist between music and language (e.g. Fedorenko 2009; Jentschke et al. 2008; Koelsch, Gunter et al. 2005; Koelsch et al. 2006; Koelsch, Maess et al. 2000; Koelsch et al 2001; Koelsch and Mulder 2002; Koelsch, Gunter et al. 2002; Koelsch, Gunter et al. 2005; Koelsch, Jentschke et al. 2007; Kujala et al. 1997; Levitin and Menon 2003; Maess et al. 2001; Mithen 2006; Patel 2003, 2008a, 2008b; Patel et al. 1998; Sluming et al. 2002; Steinbeis and Koelsch 2008a, 2008b).

In addition to the long-standing interest by researchers of various disciplines in the origin of music and its relation to language, much research has also been carried out in an attempt to understand meaning and emotion in music, how this is expressed and perceived, and whether there is any connection with language (e.g. Baumgartner et al. 2006; Budd 1985; Davies 1994; Eldar et al. 2007; Huron and Margulis 2010; Juslin and Sloboda 2001; Juslin and Västfjäll 2008; Koelsch 2005a, 2010; Koelsch et al. 2006; Koelsch, Jentschke et al. 2007; Koelsch, Remppis et al. 2007; Koelsch, Fritz et al. 2008; Koelsch, Kilches et al. 2008; Koelsch et al. 2010; Kramer 2002; Krumhansl 1997; Meyer 1956; Rickard 2004; Sammler et al. 2007; Scherer 1995; Schmidt and Trainor 2001; Seashore 1940; Siegwart and Scherer 1995; Sloboda and Juslin 2001; Steinbeis et al. 2005, 2006). Another significant research area relates to the investigation of neural and cognitive differences between musicians and non-musicians (e.g. Bosnyak et al. 2004; Gaser and Schlaug 2003; Koelsch et al. 1999; Koelsch, Gunter et al. 2000; Kuriki 2006; Limb 2008; Marques 2007; Münte et al. 2001, 2002; Nager et al. 2003; Pantev et al. 1998, 2001; Schlaug and Chen 2001; Schneider et al. 2002; Shahin et al. 2003, 2007; Sluming et al. 2002; Tervaniemi et al. 2005; Trainor et al. 1999).

However, as mentioned earlier, there is an apparent paucity of neuroscientific literature relating to vocal music. There is even less material dealing specifically with opera. One of the reasons for this, as has already been explained, may be due to the requirement of eliminating or minimising confounding factors when investigating cognitive phenomena in response to music stimuli. Therefore, studies generally investigate aspects of one feature of music at a time, the other features serving as a control (Levitin and Tirovolas 2009: 212). Nonetheless, there is a certain amount of neuroscientific material that aims to establish and investigate the relationship between singing and music (e.g. Ali and Peynircioglu 2006; Besson et al. 1998; Ginsborg and Sloboda 2007; Poulin-Charronnat et al. 2005; Sammler et al. 2010; Wallace 1994). Material of relevance to this thesis includes that dealing with the expression of emotion in singing and music (e.g. Scherer 1995; Seashore 1940; Siegwart and Scherer 1995) and the intelligibility of certain features of the singing voice (e.g. Gregg and Scherer 2006; Hollien et al. 2000; Howes et al. 2004; Mellody et al. 2001; Scotto di Carlo 2007a, 2007b). Furthermore, material relating to singing / music and infants (e.g. Bergeson and Trehub 1999; Morton and Trehub 2007; Perani et al. 2008; Trainor and Zacharias 1998; Trehub and Hannon 2006; Trehub et al. 1999, 2010) is of relevance to the psychoanalytic theory discussed in the previous chapter, providing evidence from a different perspective.

3.2 The Origins of Music and Singing

Menon and Levitin (2005: 175) mention the claim that the origins of music date as far back as the oldest evidence that exists for any other human activity (Cross 2001) and that all cultures throughout history have had some form of music (Huron 2001; Sloboda and Juslin 2001). However, unlike other human behaviours such as eating, drinking, speaking and having sex, to which an adaptive function can easily be attributed, the activities of music-making and music-listening cannot be explained in a straightforward manner (McDermott 2008: 287). In support (or defence) of this unfathomable position of music in terms of human evolution, practically every researcher – including this one – quotes Charles Darwin’s (2004 [1871]: 636) view:

> As neither the enjoyment nor the capacity of producing musical notes are faculties of the least use to man in reference to his daily habits of life, they must be ranked amongst the most mysterious with which he is endowed.

Darwin also makes the interesting observation that song is usually considered to be the basis of instrumental music (ibid.: 636). In other words, that singing preceded the invention of instruments. This is linked with the hypothesis that considers music to be a by-product of language, as mentioned below.

3.2.1 Evidence from the animal world

Beyond human beings, singing is also present in gibbons, humpback whales and four or five thousand species of birds, as noted in a research article entitled "The Song System of the Human Brain" by Brown, Martinez, Hodges et al. (2004: 363). The researchers continue by stating that the claimed purposes of these singing vocalisations range from defending territories, attracting mates and bonding, to group cohesion and signalling (Brown 2000; Hagen and Bryant 2003; Miller 2000; Wallin et al. 2001). They explain that a system of brain areas and neural pathways known as the 'song system' allows singing production and learning (Janik and Slater 1997, 2000) and that in most species, singing is a learned behaviour which can be either 'age-limited' or 'open-ended', that is singing is either learned during a specific age-range or throughout the lifespan. However, the researchers point out that singing is limited to males in many bird species and in such cases the vocal centres are much larger in males than females (MacDougall-Shackleton and Ball 1999), whereas the vocal centres are of similar size in those species where both males and females sing (Deng et al. 2001). In addition, the researchers note that the song system is absent in bird species that do not sing, or in birds that have not acquired their ability to sing through learning (Kroodsma and Konishi 1991). Therefore, as the researchers claim, it follows that this learning process by imitation evolved over time with the resulting development of a relevant control system in the brain.

In their article about the song system in the human brain, Brown, Martinez, Hodges et al. (2004: 364) list features that are similar to and distinct from those in birds and other singing species (Gray et al. (2001). Similarities include: the use of absolute and relative pitch processing (MacDougall-Shackleton and Hulse 1996); the use of combined pitch codes to generate melody (Marler and Pickert 1984); improvisation and invention (Johnson 2006; Kroodsma et al. 1999); the song serves as a basic unit of communication (Searcy et al. 1999); songs form part of repertoires (Slater 2000); imitation is an important feature in learning to sing (Baptista 1996; Bertin et al. 2009); singing occurs all year, rather than seasonally (Brown and Farabaugh 1991); and songs can be acquired throughout the lifespan (Eens et al. 1992). Whereas important differences that distinguish singing in human beings from that in other species are the features of choral singing and harmony, the synchronised singing in tropical birds and gibbons lacks the vertical integration of parts that is found in human singing. As the researchers state, this indicates that the human song system is distinct from that of other species, as it allows the harmonic integration of multiple singers. Although similarly to birds, in human beings the capacity to sing evolved as a neural specialisation.

Other research (Bass et al. 2008; Cornell University 2008) suggests that speech and singing as we know it today originated about 400 million years ago in the humming midshipman fish and toadfish (*Batrachoididae*). The research provides important information about the evolution of neural network development associated with social communication which, as remarked by the investigators, is an area that has not been explored to the same extent as that of the genetic basis of human speech (Bass et al. 2008: 417). The investigators claim that vocal communication in vertebrates evolved from "an ancestrally shared developmental compartment already present in the early fishes" (ibid.). Among vertebrates, Teleost fish (which include *Batrachoididae)* display a range of vocalisations, as well as a similar organisation of vocal and auditory pathways as found in amphibians, reptiles, birds and mammals (ibid.: 418). Although other studies have observed similar features in the auditory and vocal pathways in the forebrain of birds and mammals, this research suggests a much earlier origin for motor networks capable of generating timing signals for a range of acoustic behaviours in vertebrates (ibid.: 419). The research found that the humming and growling of various species of fish during courtship are controlled by a neural vocalisation network (Cornell University 2008). This vocal motor nucleus network is controlled by neurons located in a hind-brain compartment called rhombomere 8 (ibid.). The compartment is of interest to researchers because it is believed to form the basis of pattern-generating networks in all vertebrates that communicate vocally (Bass et al. 2008: 418). The research compared equivalent neural vocalisation networks in other species, including mammals and primates, and found basic similarities across species (Cornell University 2008). Therefore, the social communication of vertebrates, including speech (and thus singing) in human beings, would appear to have originated from a hindbrain compartment in early fish (ibid.). This finding highlights the centrality of social communication (ibid.), which in this particular case serves a biological purpose associated with sexual selection, supporting the hypothesis proposed by Darwin and others to account for music (Levitin 2007: 251; McDermott 2008: 287). As quoted by the investigators (Bass et al. 2008: 419-420) who conducted the research, the musicality of the sounds emitted by male fish during their breeding season had already been mentioned by Darwin (2004 [1871]: 612-613):

> Hence when the primeval members of this class were strongly excited and their muscles violently contracted, purposeless sounds would almost certainly have been produced; and these, if they proved in any way serviceable, might readily have been modified or intensified by the preservation of properly adapted variations.

3.2.2 Hypotheses and evidence related to human beings

A number of hypotheses have been put forward to account for the origins of music and singing. For example, it has been suggested that music and singing may have developed as a method of social cohesion in group activities, such as war and cooperative work, or as a primitive form of language for the purpose of conveying knowledge, or even as a way to soothe babies (Levitin 2008a: 58; McDermott 2008: 287).

The last of these hypotheses is not so far-fetched, given that it connects other hypotheses (as well as being of particular relevance to this research), when one considers that lullabies and music intended for infants can be found in practically every culture and are characterised by common features (McDermott 2008: 288). For example, lullabies tend to have a slow tempo, a softer tone and a lower volume, whilst singing during play with babies tends to be based on a faster tempo and more accentuated rhythm (Trainor 2008: 598). Although cultural differences have been observed in the frequency of use of lullabies compared to play songs, depending on the qualities that are valued in a specific culture, for example calm contentment versus vitality and expressiveness (Trehub et al. 2010: 649), listening to vocal music is in general among the earliest activities of most newborns (Menon and Levitin 2005: 175; Trehub 2003: 669). A higher pitch is used by mothers singing to their babies (Bergeson and Trehub 1999) compared to communication with other adults, and it would appear that babies have a preference for singing and speech at higher pitches (Trainor 2008: 598; Trainor and Zacharias 1998), as well as a preference for vocal music compared to instrumental music (Trehub et al. 2010: 651). The affective state or mood of pre-verbal infants is regulated by mothers/caregivers through modulation of their singing (Trainor 2008: 598). A noteworthy feature of maternal singing is the marked and readily distinguishable affective engagement with the infant that can be perceived in the timbre of the mother’s voice. This may be due to a tendency on the part of mothers to smile while singing to their infants, thus affecting the shape of the vocal tract (Trehub et al.

2010: 650). Maternal singing may be considered a non-verbal form of vocal communication with infants that occurs within a regulatory system and which results in affective responses being evoked (ibid.: 660). In this way, an infant can be soothed and calmed, for example, by his/her mother's singing voice.

Researchers have demonstrated the importance for infants of the voice, and musical features related to the voice, including babies born to parents who are deaf and unable to speak (ibid.: 651). In addition to maternal singing, another form of melodious vocal communication between mother and baby involves what is known as infant-directed speech. Compared to adult-directed speech, infant-directed speech is characterised by specific features: playful infant-directed speech shows greater musicality, a pitch that is higher, broader in range and with specific contours, as well as a slow, rhythmic tempo and reiteration, whilst in soothing infant-directed speech the pitch is low and descending and the tempo is slow (ibid.: 647). These musical or melodious qualities of infant-directed speech with pre-verbal infants highlight the importance of form over actual content, with frequently repeated questions in a rising pitch to attract and keep the infant's attention (ibid.: 647-648). The main features that vary in these repeated utterances to infants are pitch and tempo, whilst rhythm shows less variation (ibid.: 648). Similarly, another universal feature of this vocal communication with infants is a relatively limited range of melodies, although the characteristics of melodies are specific to individual mothers. This allows an infant to recognise and distinguish his or her own mother's voice, which may be a way to promote mother/infant bonding (DeCasper and Fifer 1980; Trehub et al. 2010: 648). Studies have shown that infants prefer infant-directed speech compared to adult-directed speech, in particular when this is emotionally positive, indicating that positive affect is a key element in maintaining an infant's attention (Trehub et al. 2010: 648). Preference for infant-directed speech is further demonstrated by the fact that infants gradually lose interest in this as their verbal skills increase (ibid.). A key point based on these observations is that the affective element of infant-directed maternal speech is aimed at influencing the infant in accordance with the mother's wishes, such as attracting and maintaining attention, soothing, comforting and so forth (ibid.: 649), in the same way that maternal singing is aimed at regulating mood and affect. Interestingly, compared to infant-directed singing versus singing that is not infant-directed, infant-directed speech versus adult-directed speech displays significant differences, such as being 4-5 semitones higher and having a greater dynamic range (ibid.: 650).

These experiences during early development allow infants to learn the features of the music that is present in their culture, and it is against this knowledge that all future listening is based (Trainor 2008: 599). It seems plausible, then, that interest in and affective response to music in adults is the result of their exposure to the melodious non-verbal vocal communication of their mothers and caregivers, which is aimed at regulating mood, affect and engagement (Trehub et al. 2010: 660). This early exposure to the affective content of music and musicality, in addition to the comfort of the mother/infant dyad, promotes learning and social bonds throughout life, so that a listener's response to music in adulthood retains social features of affective regulation and relatedness to others (ibid.: 661). Therefore, music may be considered to involve a communication process originating in vocal affect aimed at obtaining a specific response in the listener, either emotional or behavioural, and this dynamic has in turn shaped the whole process in evolutionary terms (ibid.: 646).

As mentioned by Trehub et al. (2010: 653), some researchers claim that selection has favoured vocal communication that is capable of affecting the emotional response of listeners (Bachorowski and Owren 2003) and, in particular, the vocal communication of mothers (Falk 2004). In the latter case, the evolutionary argument adduced is that foraging mothers used vocal communication to keep in touch with their infants, given that the infants could not be held or even kept within sight continuously (Trehub et al. 2010: 653). Research (Nakata and Trehub 2002) has shown that this hypothesis may be valid, given that infant-directed speech is more expressive when mothers are restricted from touching their babies. However, this restriction does not appear to affect maternal singing style, which is equally effective at maintaining the infant's attention even in the absence of touch. So the expressive qualities of infant-directed speech and singing can be said to 'touch' infants (Trehub et al. 2010: 653).

In addition to the important role of melodious maternal vocal communication, a relevant consideration in early infant development is the combined effect of music and movement, such as rocking when being sung a lullaby. This results in the establishment of neural connections between movement and auditory input (Trainor 2008: 598). The establishment of these neural connections, and their subsequent refinement through pruning, allows the developing brain of a baby to be able to distinguish between the array of sensory inputs, which are blended together during the first six months of life (Levitin 2007: 262). The connection between movement, rhythm and music, is explored in more detail below.

Some responses to music may be the result of acoustic factors, whilst others may be related to associations and experiential factors (ibid.: 646). Parallels with the composition, performance and reception of music are self-evident. Affective responses are evoked in listeners through features of the music, such as tempo and rhythm, major and minor keys, and so forth, as well as cultural and other features with which listeners are familiar (ibid.). Consequently, music probably shapes a listener's affective response in general terms, dynamically, rather than communicating specific and easily or accurately definable affective meanings (ibid.). However, as noted by Trehub et al. (2010: 660), some researchers believe that music involves the communication of discrete emotions (Juslin and Laukka 2003: 771). The affective response, in turn, varies individually based on a range of factors, such as personal and musical experiences (Trehub et al. 2010: 646). Yet it tends to be described, amongst other ways, using conventional "discrete emotional categories" (ibid.: 660). There may be a number of reasons for this, as explained by Trehub et al. (ibid.: 661). Language often proves inadequate to describe complex, dynamic emotions evoked by music. In addition, participant responses may be of a personal and private nature that are not easy to disclose in research settings, or the settings themselves are not conducive to evoking a wide range of emotions as in other listening contexts. Participants are often constrained by the design of studies, given that the emotion evoked in listeners is not limited to "discrete states of happiness, sadness, anger or fear" (ibid.). Trehub and colleagues point out an interesting discrepancy that has been observed in studies: respondents primarily use positive descriptors to convey their affective responses to music, but use negative descriptors to identify emotions that are expressed by the music.

Another possibility to account for the origin of music is that it simply developed out of capacities related to other functions and that deriving pleasure from music was discovered by chance, through its similarity with other sounds (McDermott 2008: 287). Music may have developed as a by-product, perhaps from language – which the cognitive psychologist Steven Pinker (1997) considers to be an adaptation. As such, music may be viewed as a 'spandrel', a term borrowed from architecture by Stephen Gould (1991) to describe a by-product that results from an evolutionary adaptation (Levitin 2007: 247-248). However, in his book *The Singing Neanderthals: The origins of Music, Language, Mind and Body*, Steven Mithen (2006: 25) opposes Pinker's (1997: 534) contention that music resulted from other adaptations and is non-adaptive "auditory cheesecake, an exquisite confection crafted to tickle the sensitive spots of at least six of our mental faculties". In Mithen's (2006: 25) view, music is quite distinct from language, for example. By virtue of its affective power, according to Mithen, music necessarily has a long evolutionary history and is not simply a recently contrived source of pleasure as Pinker (ibid.: 524-525) would have it:

> We enjoy strawberry cheesecake, but not because we evolved a taste for it. We evolved circuits that gave us trickles of enjoyment from the sweet taste of ripe fruit, the creamy mouth feel of fats and oils from nuts and meat, and the coolness of fresh water. Cheesecake packs a sensual wallop unlike anything in the natural world because it is a brew of megadoses of agreeable stimuli which we concocted for the express purpose of pressing our pleasure buttons. Pornography is another pleasure technology [….] [T]he arts are a third.

As noted by Levitin (2007: 249), similar views to those of Pinker (1997) were expressed by the psychologist Dan Sperber (1996: 142), who considered music to be a parasite that made use of the brain's ability in pre-linguistic humans to process speech sounds, and by the cosmologist John Barrow (1995), who claimed that music serves no function in the evolutionary survival of human beings.

The central hypothesis convincingly proposed by Mithen (2006: 172) is based on "the 'Hmmmmm' communication system" used by Neanderthals, consisting of a holistic musical language which incorporated sound, movement and gesture that could influence affective response and behaviour, "a prelinguistic musical mode of thought and action" (ibid.: 267). In addition to comforting infants, ensuring their emotional development and facilitating their acquisition of a means of communication, the 'Hmmmmm' communication system allowed complex emotions to be shared, thus promoting social bonds (ibid.: 234). The "iconic gestures, dance, onomatopoeia, vocal imitation and sound synaesthesia" (ibid.) of this communication system led to the formation of additional neural circuits, further development of the brain and, in turn, further development of language, amongst other capacities.

Any one or all (or perhaps none) of these hypotheses may explain why music has existed in every culture known to man (Huron 2001: 48; McDermott 2008: 288; Menon and Levitin 2005: 175; Sloboda and Juslin 2001: 71). Despite its universality, however, music does not appear to serve a specific or clearly-defined purpose, nor are researchers any closer to discovering its origins (McDermott 2008: 288).

3.2.3 Music and movement

A common feature of music in all cultures throughout history is its close association with movement and dancing (Levitin 2007: 57). As Levitin and Tirovolas (2009: 217) remark, this capacity to synchronise sound and movement is limited to human beings (Patel 2008a; Sacks 2007). Levitin and Tirovolas (2009: 217-218) also note that research has established a link between music and dancing through a motor theory of speech perception, based on the discovery of mirror neurons in Broca's area (Heiser et al. 2003; Johnson-Frey 2003; Lametti and Mattar 2006). This area of the brain is associated with language and will be discussed later. In many languages there is no distinction between the concepts of 'music' and 'dancing' and, in fact, they are both associated in terms of neural processing (Levitin 2008a: 58; Levitin and Tirovolas 2009: 218). Even when we keep perfectly still as we listen to music, there is activity in the brain's motor cortex (ibid.). The connection between music and motion lies in the concept of rhythm and its perception through the vestibular system that controls balance (Trainor 2008: 598). Therefore, due to the fact that movement in human beings developed before music, our interaction with rhythm in music is somewhat paradoxical: rhythm makes us want to move with the music, but the way in which we move also affects how we perceive rhythm (ibid.). This has been demonstrated in studies where the perception of a waltz or a march – both involving 6-beat rhythms – is dependent on the accent (meter) that is attributed by the listener, which determines whether two groups of three beats (waltz) or three groups of two beats (march) are perceived (ibid.).

Rhythm is processed in the lateral cerebellum and the cerebellar vermis (Levitin 2007: 91). The accuracy in timing, and our memory for tempo, is attributable to the cerebellum and its time-keeping system (ibid.: 61). The cerebellum allows us to remember the timings of music that we have heard before, that we are listening to now and that we will perform in the future, perhaps by singing a song (ibid.). Different parts of the cerebellum are responsible for processing functions such as controlling movement or obtaining sensory information and these areas form part of three separate networks that are involved with various aspects of temporal control (Thaut 2008: 50-51). This timing function of the cerebellum is also believed to involve the basal ganglia in terms of the production and contour of rhythm, as well as tempo and meter (Levitin 2007: 61). Thaut (2008: 39, 58) explains that the sensory events of music are regulated by rhythm, which activates a wide cortical and sub-cortical network in the brain to handle the motor, sensory and cognitive features of music (Penhune et al. 1998, Platel et al. 1997, Schlaug and Chen 2001). The combination of rhythm and melody is capable of activating at once the most primitive part of the brain (the cerebellum) and the most evolved part of the brain (the cerebral cortex), uniting motion and cognition and moving us both physically and intellectually (Levitin 2007: 263).

Rhythm, tempo and meter determine the dynamic progression of music over time by controlling how long series of notes last and how they are formed into units, the overall speed of a piece of music and how notes are grouped within a period of time (ibid.: 15-17). One of the ways in which we derive pleasure from listening to music lies in our brain's ability to predict rhythmic expectations, among other features, based on the schemas that we have learned within our musical culture (Huron 2006: 184-185). This will be discussed in more detail in the next section. Therefore, as Levitin (2007: 114-115) notes, based on experience of music that has been heard before, the brain expects that certain features will occur together again in music that is heard in the future. Levitin (2008: 61) explains that tension in music, and thus arousal in the listener, can be developed by repeating predictable features. The resolution of this tension can be achieved by violating expectation. This violation, in turn, is perceived as pleasurable by the brain.

3.3 Music: Culture, Society, Language and Memory

The ubiquity of music in all cultures throughout history, as mentioned earlier, is indicative of its importance for human beings. Nonetheless, despite its universality and pan-cultural features, music is not a homogenous entity across all cultures. Similarly to language, music evolves dynamically and is shaped by the culture, society and historical context in which it originates and in which it currently occurs. Moving forward from the universal evolutionary hypotheses and evidence that have been proposed to account for the origins of music and singing in human beings, this section will briefly explore some of the similarities and differences that can be observed in music both vertically and horizontally – that is historically and cross-culturally – in relation to culture and society. In addition, the relationship between music, culture, society, language and memory will be drawn together at the end of this section.

Irrespective of the origins of music, which may never be discovered, its social role – like that of language – is highlighted by the position that music occupies in culture and society. Because of the way in which it is closely woven into culture and society, music is in turn influenced and shaped by both, as suggested by John Blacking

(1974) in his book *How Musical is Man?* In acknowledging a biological, cognitive and acoustic basis for human musicality (ibid.: 68, 89, 100), Blacking's question bears an affinity with the question posed by Steven Mithen and Lawrence Parsons (2008: 415) in their article "The Brain as Cultural Artefact", mentioned in Chapter 1, namely: "Where does biology end and culture begin?" Their question is based on the premise, supported by their empirical research involving music, that culture is a product of the brain, which "provides the capacity for culture" and, at the same time, the brain is influenced anatomically and functionally by the pursuit of cultural activities (ibid.). This has been borne out both directly and indirectly by a number of music-related empirical studies conducted by other researchers. For example, Münte et al. (2002) observed experience-driven brain neuroplasticity in musicians. Schneider et al. (2002) found that musicians have more grey matter in Heschl's gyrus, as well as enhanced auditory cortex activation, while Sluming et al. (2002) found that musicians have more grey matter in Broca's area. The findings of Gaser and Schlaug (2003) showed differences in the brain structures of musicians compared to non-musicians. Pantev et al. (1998, 2001) found increased and enhanced auditory cortical representation in musicians, while Bosnyak et al. (2004) found modified auditory cortical representation following pitch discrimination training of non-musicians.

A macro-level example of the influence exerted on music by culture and society, in the widest meanings of these terms, can be illustrated by describing a current global situation. Like minority languages, the diversity of music as a universal human activity is being eroded through the infiltration of Western music – our technological advances would allow us to research rapidly disappearing musical cultures, yet it is modern technology that is causing their disappearance (Huron 2008a: 457). Consequently, this Western globalisation of world musical cultures has the effect of severely limiting the value of any universal traits that may be identified in future by scientific and other research related to music perception, cognition and performance (ibid: 456).

Similarly to this homogenising effect that is working its way horizontally across cultures, a certain parallel may also be drawn vertically, in terms of our reception, appreciation, interpretation and understanding of music that is historically remote from the present – as can occur in the case of opera. A number of factors can influence all of these 'hearing' aspects in relation to historically remote music. As we are conditioned by what we hear and have heard most often in our cultural environment, this affects the way in which we hear, or expect to hear, historical music performed now, which probably differs from the way in which that music was performed during its time, or subsequently. Interpretational performance styles vary over time, between different cultures sharing the same musical genre and even between individual performers. So, for example, we may find that we do not enjoy listening to older recordings of music that we are otherwise used to hearing in more recent renditions. Some historical aspects of music are lost forever and are unknown to us now, such as the first opera "Dafne" (1597) by Jacopo Peri (Lamarque 1988: 517; Porzio 1991: 10; Rosenthal and Warrack 1987: 78), or the sound of the *castrato* voice. In some cases, all that can be achieved is an approximate recreation, based at best on scholarly research and at worst on little more than informed supposition – sometimes both overlap.

For example, research on the *castrato* voice, including scientific attempts to recreate it artificially, faces the basic insurmountable obstacle that nobody today actually knows what this voice sounded like. There are only subjective historical accounts of its sublime 'angelic' qualities. This hardly represents adequate scientific evidence that would allow the *castrato* voice to be recreated artificially in a sound laboratory. The only 'hard' evidence of this voice type that is available today is in the form of recordings dating from 1902 and 1904 of Alessandro Moreschi (1858-1922). He was the last *castrato* to have sung in the choir of the Vatican's Sistine Chapel until he retired in 1913 (André 2006: 18). Moreschi's (1902 and 1904) digitally re-mastered voice sounds anything but sublime to modern ears. Apart from what would now be considered an outdated operatic vocal technique, there is interference that could not be completely removed from the old recordings (André 2006: 18-19). Despite the interference, it is perhaps Moreschi's vocal technique of *portamento* (which literally means 'carrying' the voice), namely the grace notes and *acciaccature* or embellishments between notes spanning intervals greater than a third and intervals of a sixth or more, that sounds 'wrong' to modern listeners (ibid.: 19, 187). This is because the technique is only used to a limited extent in current operatic vocal performance to add emotional expression. For a modern listener, this apparent overuse of *portamenti* by Moreschi gives the impression of imprecise vocal attacks, sobs and swooping gestures of the voice (ibid.: 19). But then, the modern listener does not have any other point of reference or comparison, as André (2006: 20, 187) remarks in relation to John Wolfson's (1987) "Producer's note" to the recording:

> The pitching of Moreschi's records presented us with some problems, since no-one had the slightest idea of what his voice ought to sound like.

> However, we discovered that when we pitched both the 1902 and 1904 recordings of Rossini's "Crucifixus" to the score key of A flat, all of the records made at both sessions fell into score keys or unreasonable keys, and sounded vocally correct to several musicians for whom they were played.

Ironically, although not entirely unsurprisingly, the artificially recreated *castrato* voice in Gérard Corbiau's film "Farinelli" (1994), which was the stage name of the famous *castrato* Carlo Broschi, sounds more agreeable to modern ears (André 2006: 20). Perhaps it is less spectral and eerie, given that there is no perceivable intervening patina of time. Farinelli's voice was recreated for the film by fusing the voices of coloratura soprano Ewa Mallas-Godlewska and counter-tenor Derek Lee Ragin, which together effectively rendered the reportedly impressive technical abilities and vocal range of the legendary *castrato* (ibid). This was painstakingly achieved by homogenising the two voices electronically, by means of phase-vocoding, additive analysis/synthesis and spectral envelope and pitch estimation (Depalle et al. 1995: 242). The 'modern' musical features of the individual singers' voices, despite their voices being combined to form an otherwise impossible 'trans-gendered' entity, may be the reason why this artificial hybrid voice sounds more acceptable than Moreschi's 'real' *castrato* voice.

This difference in reception highlights several related but contrasting points. Whilst music and singing are capable of transcending time, culture and society, allowing some degree of "cross-cultural communication", they are nevertheless received in different ways even within the same culture (Blacking 1974: 108-109). Although we may enjoy our own culture's music from a previous era, a thorough understanding of that music necessarily involves knowledge of the historical context in which it came about, including the aesthetic values and musical conventions of the time (ibid.: 68), which were associated with specific social groups that may have been included or excluded (ibid.: 72). A possible explanation for the continued appeal of music that is historically remote, and/or culturally removed, may lie in features present in the deep structures of music that "are common to the human psyche" (ibid.: 109). This would account for the criterion of 'feeling' that is often adduced by listeners when distinguishing between two competent renditions of the same piece of music (ibid.). In general terms, apart from historical considerations, the receptivity of listeners is dependent on their capacity not only to appreciate the 'sonic object' itself as a product of another sensitive human being (ibid.: 34), but also to relate to the cultural experiences of its creator and/or performer (ibid.: 54). If one accepts that music may be considered a "synthesis of cognitive processes which are present in culture and in the human body" and is experienced and expressed by individuals, whereby its forms and its effects on listeners are the result of "the social experiences of human bodies in different cultural environments" (ibid.: 89), then the appeal of particular music may be found in its meaning for a listener qua member of a given culture and/or social group (ibid.: 33).

3.3.1 Learning and experience

Learning and experience are relevant factors when considering the relationship between culture and music. For example, the perception of music is based on experience (Trainor 2008: 599), while the affective response to certain scales and chords is the result of a listener's acculturation (McDermott 2008: 287). As Trainor (2008: 599) explains, the various styles of music that are present in a listener's culture, as well as the organisation of pitches and harmonic structures, are learned during infancy. It is based on this knowledge that subsequent processing of music occurs. In the case of Western listeners, Trainor continues, implicitly acquired knowledge of the major scale allows them to identify wrong notes in melodies based on this scale even without any musical training. Therefore, through exposure, a listener absorbs the features of his/her culture's music and is then able to make sense of that culture's scales and pitch categories based on unconsciously perceived signals in the music during pitch variations (Patel 2008b: 726). This is possible due to a universal characteristic of music across all cultures, namely the use of a limited range of pitches and octave intervals (ibid.). The ability to perceive pitch intervals may be a biologically programmed feature of the auditory system in human beings (McDermott 2008: 287). Studies carried out in various cultures have shown that infants possess innate abilities related to music (ibid.). For example, as explained by McDermott, babies are able to perceive when the notes in a melody have been ordered in a different way, but they cannot identify shifts in pitch ranges. Like adults, they prefer consonant rather than dissonant sounds and they are able to identify rhythm changes (ibid.: 288). Before the age of one year, babies are able to distinguish between changes in music that do and do not violate the structure of the major scale (Trainor 2008: 599). In addition, up to the age of one year, babies have the ability to perceive complex structures in rhythm, but this ability is lost if they are not exposed to complex rhythms, such as those in folk music (ibid.: 598). These innate capacities point to a biological basis for music-related abilities in human beings.

Conversely, it is this biological basis that shapes and constrains music (Trainor 2008: 598).

Although the styles and structures of music constantly evolve across cultures, these changes occur within the constraints imposed by human biology (ibid.). Evidence for this can be found in the features of music itself. For example, pitch organisation is based on the human auditory system and its ability to identify and separate sources of sound; the organisation of pleasant and unpleasant sounds is based on consonance and dissonance; scales with limited pitch categories repeating at intervals of an octave, so that listeners have less to remember; a minimum of two scale intervals of different sizes, which allows for variations in tonal relationships, such as the Western concepts of 'tonic' and 'dominant' in diatonic scales (ibid.).

However, the patterns of musical features are not always evident even to people listening to music of their own culture and so they are sometimes missed or misinterpreted (Huron 2008a: 456-457). For example, the melodic pitches in Western music, as well as in the music of many other cultures, feature a normal distribution that is characterised by a regression to the mean (ibid.: 456). This statistical conceptualisation is supported by evidence that infants become familiar with their culture's music through a process of statistical learning (Huron and Margulis 2010: 577-578; Saffran et al. 1996; Saffran et al. 1999). Western listeners are largely unaware of this, so when they hear a large change in pitch in a melody, they expect this to result in a change of direction in the music. This phenomenon is known as 'post-skip reversal' (Huron 2008a: 456; Huron and Margulis 2010: 578-579; von Hippel and Huron 2000). Another feature of Western music that is overlooked by native listeners is the initial rise in pitch in melodies, which tend to be characterised by a pitch that first rises and then falls (Huron 2008a: 456). Research findings of this type have shown that the way in which music is organised is not directly related to the way in which music is interpreted by the mind (ibid.). Consequently, although we may enjoy listening to music from another culture, it is more likely that we will overlook or misinterpret certain features within it (Ball 2008: 162). Similarly, patterns that we may identify in the music of another culture may not have any significance for native listeners (Huron 2008a: 456-457).

Despite the universality of music and its apparent biological basis in human beings, there are significant differences in the structure of music across cultures. Although the structure of Western musical scales is considered in the West to be based on the natural laws of acoustics in relation to our auditory system, the pitch intervals in other cultures are quite different (Patel 2008b: 726). The concept of harmonic structure, organised in accordance with rules of musical syntax, is not universal across musical cultures outside of the Western one (Trainor 2008: 599). As Patel (2008b: 726) points out, for example, not only are the pitch intervals in Javanese *pelog* and *slendro* scales different than those used in the West, they also vary in terms of tuning between different gamelan orchestras. The micro-tone system in Arabic and Indian music involves intervals that are not part of the Western structure of music (ibid.).

3.3.2 Language

Although there is no language (including tone languages) in which pitch is organised in relation to musical scales (ibid.), the rules, customs and practices of any culture's music form an organised system which bears a similarity to the one that governs language (Lerdahl and Jackendoff 1996; Lerdahl 2001; Levitin and Tirovolas 2009: 216). The system constitutes an artificially (and seemingly arbitrarily) constructed supra-structure that is underpinned by an innate capacity. This innate capacity in infants to acquire language, by virtue of what Chomsky (1965) termed a 'language acquisition device', is matched by an innate musical capacity that Levitin and Tirovolas (2009: 216) have called the 'music acquisition device'. The system, in the case of music and language, needs to be learned, it evolves over time and it differs across cultures – even across different social groups within the same culture. Through extensive exposure, listeners automatically learn the rules and conventions of their culture's musical system (ibid.), in much the same way as occurs with their native language. Indeed, comparative research is continuing to identify an increasing number of overlapping areas between music and language cognition, such as the encoding of sound and the syntactic organisation of words and musical tones (Patel 2008b: 726). Levitin and Tirovolas (2009: 221) explain that a basic similarity between music and language involves a structured evolution of elements over time, which has been addressed by temporal coherence theories in both cases (Cooper and Meyer 1960; Cooper and Paccia-Cooper 1980; Krumhansl 1990; Lerdahl 2001; Lerdahl and Jackendoff 1996; Patel 2008a; West et al. 1985; Zatorre et al. 2002). Furthermore, Levitin and Tirovolas (2009: 221) add, this structured coherence also relates to specific ordering of individual elements, namely the words in a sentence (Akmajian et al. 1980) and the notes in musical phrases – neither words nor notes may be used in random order.

The similarities between music and language, in terms of the overlap in neural processing, will be discussed in detail in a subsequent section.

3.3.3 Memory

Identification of musical phrase boundaries over time – that is, the beginning and the end of phrases that are perceived during the listening experience – allows music to be stored in a listener's memory (ibid.: 217). The significance of these boundaries is related to the limited capacity of the brain's working memory (as opposed to a potentially limitless long-term memory), which is only able to handle small segments of information at a time when performing any task (Levitin 2007: 218). The information that is extracted from these segments is stored within dynamic schemas containing similar information obtained from previous analogous experiences, and it is constantly being compared and updated with each subsequent experience (ibid.: 115-116). In this way, as explained earlier, music is stored in memory by means of musical schemas that are based on feature comparisons and relationships rather than a continuous, unitary 'recording' (Levitin 2007: 115). Consequently, when listening to a piece of music, the brain performs statistical comparison calculations, based on the schemas constructed using information derived from music that has been heard in the past, setting up expectations or predictions of musical features that the listener is likely to encounter next (ibid.: 114-115).

The element of expectation related to memory in the listening process applies equally to familiar and unfamiliar music. An example of the role of expectation when listening to a familiar piece of music is provided by Huron and Margulis (2010: 580). They describe the phenomenon known as 'Wittgenstein's puzzle', namely a deceptive cadence that retains this quality even when a listener is familiar with the piece of music in which the cadence occurs (Dowling and Harwood 1986). A cadence in music creates an expectation through the use of a sequence of chords that usually result in a satisfying closure, or resolution (Levitin 2007: 111-112). A deceptive cadence, on the other hand, involves the repetition of chord sequences in order to create an expectation of closure that is followed by an unexpected chord which does not result in the anticipated resolution (ibid.: 112). Huron and Margulis (2010: 580) affirm that this phenomenon, which occurs even when a piece of music is familiar to the listener, can be explained by the distinction between schematic expectations (long-term memory) and veridical expectations (episodic memory), as proposed by Jamshed Bharucha (1994). This distinction relates to the difference between knowing the features of a particular piece of music (veridical expectations) in relation to the features of music in general (schematic expectations), and both of these independent but concurrent memory processes influence expectations during music listening (Huron and Margulis 2010: 580). In this way, a deceptive cadence violates schematic expectations but not veridical expectations (ibid.). As will be discussed later, in terms of the role of expectation in the cognitive processing of music, research has shown that a listener's affective response to music is related to veridical expectations and episodic memory (Juslin and Västfjäll 2008).

The role of memory in relation to emotion and to the processing of music in the brain will be dealt with later, in the relevant sections below. However, in concluding this section, it is worth emphasising both the importance of memory in relation to the neural processing of music and the significant shift that has occurred in scientific opinion about the nature of memory in relation to the brain's predictive processes (Huron and Margulis 2010: 579). As mentioned by Huron and Margulis, the fundamental importance of these predictive and anticipatory processes has been emphasised by a number of researchers (Bar et al. 2007; Hawkins and Blakeslee 2004; Raichle and Gusnard 2005). Memory serves an adaptive purpose by being associated with a predictive function, allowing imagination and the simulation of future events (Huron 2006, Huron and Margulis 2010: 579). Of particular relevance to this present research, the fundamental relationship between memory and music can be effectively summed up by the statement that "without memory there would be no music" (Levitin 2007: 166).

3.4 The Overlap between the Neural Processing of Music and Language

As Warren (2008: 32) points out, superficial parallels can be drawn between the domains of music and language based on their comparable level of complexity, abstraction and subjection to syntactical rules. However, as illustrated by Warren's examples, there are some basic irreconcilable differences between the two systems: music cannot be used to make a shopping list and, conversely, language proves inadequate when trying to express that which is uniquely conveyed by music – and there is disagreement as to what is actually conveyed. Further basic differences described by Warren relate to a dissociation that may occur between music and language, as in the case of aphasic patients who can still sing; or the fact that, unlike language, musical competence is not as widespread (at least in the West) and appears to differ greatly among individuals. In the latter case, additional cultural and sociological factors (which were mentioned earlier) need to be considered when comparing the extent of musical competence across communities, as well as the way in which this competence is measured within a specific community. Bearing in mind these similarities and differences, this section will focus on exploring the overlap between the neural processing of music and language.

Levitin and Tirovolas (2009: 221) note that research on the overlap between music and (spoken) language has been increasing consistently over the years, in line with the growing realisation that both music and language involve a wide range of neural processing systems relating to memory, attention, classification and identification of specific elements. The most obvious overlapping features, described by Levitin and Tirovolas, are that music and language both involve sound production and reception. However, as the researchers go on to explain, both music and language may exist in written form alone. In addition, transmission and reception may occur through conduction rather than audition. Patel (2008b: 726) remarks that in terms of neural processing, both music and spoken language involve discrete sound categories that are produced and received over time as part of an articulated acoustic signal. Patel explains that spoken language is composed of phonemes, or discrete sounds, which we learn to distinguish in order to understand the meaning of the individual components, or words, that make up the articulated acoustic signal. Whereas timbre allows us to identify the phonemes in language, pitch enables us to pick out notes and intervals in music (ibid.). These discrete sound categories make up larger elements, such as the words, phrases and sentences of language, or the chords, chord progressions and keys of music. These are governed by rules of grammar and syntax which, in combination with expressive modulations, enable individual elements to be arranged in order to produce an endless variety of sequences (Levitin and Tirovolas 2009: 213; Patel 2003: 674).

3.4.1 Innate capacities for music and language

The themes discussed in the two previous sections relating to possible evolutionary and biological links between music and language, the significant influence of culture on both music and language, as well as the fundamental role of memory, may be supported by a number of scientific studies involving newborns and infants. For example, there is evidence that the ability to process features of music and syntactic rules (such as those of music and language) are innate, as they are present from birth and are similar to those of adults. A functional Magnetic Resonance Imaging (fMRI) study conducted by Perani et al. (2008) found that newborns are able to identify even small structural differences in (Western) tonal music in a similar way to adults, providing evidence that the brain is wired from birth to process music. In a study by Stefanics et al. (2009: 304), the Event-Related Brain Potential (ERP) response of newborns indicated that their auditory system is able to discriminate pitch intervals in a similar way to adults, which allows infants to learn music and speech prosody. As mentioned by Fadiga et al. (2009: 456), the innate ability to process syntactic rules (as those in language and music) was demonstrated in a study involving newborns (Gervain et al. 2008). The newborns were found to prefer structurally regular sequential stimuli, resulting in activation of the left inferior frontal gyrus (ibid.), i.e. Broca's area, which is associated with language production, amongst other things. A study by Nazzi and Ramus (2003: 233) showed that sensitivity to rhythm from birth facilitates the development of speech segmentation procedures, which subsequently allow infants to learn words in their native language. Other studies provide indirect evidence about auditory input that is processed and retained in memory even before birth. A study by Moon et al. (1993: 495) indicated that infants just two days old show a preference for their native language. During the study, the infants activated audio recordings in their native language more often than those in a foreign-language. Similarly, the results of a previous study by Mehler et al. (1988: 143) indicated that four-day old French newborns and two-month old American infants are able to distinguish utterances in their native language, as opposed to a foreign language, based on familiarity with at least one of the languages and discrimination of prosodic cues. Another study (Nazzi et al. 2000) found that familiarity and rhythm were implicated in language discrimination. Five-month old infants are able to distinguish between their native language (or a variant, such as American English and British English) and a foreign language, based on knowledge of the rhythmic classes of their native language. However, they are unable to discriminate between two foreign languages even if they have a similar rhythmic class (such as Italian and Spanish). Research has also shown that there are neural differences between the processing of rhythm in music and language (Huron 2008a: 456).

Surprisingly, in a study that was conducted more recently, Mampe et al. (2009: 1994) found melody and intensity contour differences between the crying patterns of thirty French and thirty German newborns. The French newborn cries had a rising melody contour, whilst the German newborn cries had a falling contour. According to the researchers, the findings suggest that the melody of newborns' cries is influenced by the speech prosody of people around them, possibly as a result of vocal learning as well as biological predisposition. These studies and similar findings would appear to indicate that the natural ability of infants to process music is closely related to their natural ability to acquire language (Patel 2008a: 361). Conversely, this overlap also suggests the possibility that any innate predisposition for music may not be specific to music alone (Patel 2008a: 377; Trehub and Hannon 2006: 73). In fact, there is little evidence at present for music-specific innate abilities (Patel 2008a: 382).

In his book *Music, Language, and the Brain* (2008a: 417), Patel affirms that "as cognitive and neural systems, music and language are closely related". Patel (ibid.: 359) also claims that the spontaneous onset of babbling in infants serves to prime the vocal apparatus for language acquisition and provides evidence that human beings have the innate ability to acquire language. This also applies even if deafness is present. In the case of deaf infants who are exposed to sign language, babbling can be observed in their sign language communication (ibid.: 360). As Patel explains, feedback from a caregiver can increase the amount and complexity of an infant's babbling, but soon after the babbling stage, the vocal sounds emitted by infants are influenced by the language of speakers in their environment.

As mentioned earlier, mothers in practically all cultures perform various types of music for their pre-verbal infants. In many cultures, mothers speak to their infants in a sing-song manner, known as infant-directed speech, even though the infants cannot understand the meaning of the words (Trehub 2003: 671). An interesting point mentioned by Trehub in this respect is that infants prefer maternal singing to maternal speech, although the musical qualities of speech appear to be attractive to pre-verbal infants. In addition, infants show considerable attention when they can see the person who is singing to them. However, newborns appear to display a preference for their mother's voice as opposed to that of a stranger (Patel 2008a: 382). As noted by Patel, this may be accounted for by the fact that sound perception begins at approximately thirty weeks of gestation, so a newborn has already had a fair amount of exposure to the sounds in his/her environment, including a good knowledge of the qualities of his/her mother's voice (DeCasper and Spence 1986).

3.4.2 The neural processing of syntax

A large number of neuroscientific studies have been and continue to be conducted using various methodologies to investigate the way in which musical and linguistic syntax, as well as semantics, are processed in the brain. The relationship between the neural processing of language and the various constituent elements of music has been investigated in numerous studies. For example, Koelsch, Maess et al. (2000) and Maess et al. (2001) found that musical syntax is processed in Broca's area, while Koelsch, Gunter et al. (2002) established that music is processed by a cortical language network. Levitin and Menon (2003) observed that the structure of music is processed in the brain's language regions, whereas the interaction between syntax processing in language and music was investigated by Koelsch, Gunter et al. (2005). The processing of music over time in language regions of the brain was researched by Levitin and Menon (2005), while musical violations and neural correlates of musical structure processing were studied by Tillmann et al. (2006). Further areas of research include syntactic and sensory processing (Koelsch, Jentschke et al. 2007) and language impairment and musical syntax processing in children (Jentschke et al. 2008). The range and number of studies related to the overlap between music and language are considerable. Examples of additional areas of research include the processing of music and language meaning (Steinbeis and Koelsch 2008a) and semantic processing of tension-resolution patterns by neural resources shared between music and language (Steinbeis and Koelsch 2008b). As Patel (2008b: 726) remarks, most neuroscientific research to date has focused on Western languages and music. However, as mentioned previously, the structure of Western music (and languages) is not universal, but a consistent use of pitches and intervals can be found in all musical cultures (ibid.). According to Patel (ibid.: 727), the syntax of language may influence the way in which we perceive basic patterns, including those that are not related to language. Patel gives an example to illustrate differences in rhythm perception between many Western European languages and Japanese: e.g. *le livre, il libro* ('the book'), which equates to a short / long pattern, as opposed to *hon-wo* (where *hon* means book and *wo* is a particle), which produces a long / short pattern. Based on Western research, as Patel explains, it had been a long-standing belief that rhythm patterns were perceived in a standard way. According to this view, groups of short / long sounds could only be perceived as such – yet Japanese speakers actually perceive these groups of sounds as being long / short. As

Patel affirms, research appears to indicate that this difference in perception can be connected to language.

A related area of research concerns the overlap between pitch variations in music and language (Levitin and Tirovolas 2009: 222). Although variations in pitch are a common feature of prosody in most languages, serving to facilitate semantic clarity, in tonal languages such as Cantonese they affect the meaning of individual words, for example '*ma*' can mean either 'mother' or 'gunpowder' (ibid.). However, the neural overlap between pitch variations in tonal languages as opposed to actual music has yet to be established. Levitin and Tirovolas mention a study that was conducted by Wong et al. (2007) in which Western participants with no prior knowledge listened to tonal language phrases. The results of the study showed that the tonal language phrases were encoded with greater accuracy at a sub-cortical level – in the inferior colliculus – by musicians compared to non-musicians. This confirmed for the first time that musicians' brains are better equipped at processing pitch variations, which may be due to a greater focus on this feature as part of their occupation. Similarly, Levitin and Tirovolas (2009: 222) mention another study, by Marques et al. (2007), which found that French musicians were able to identify subtle foreign-language prosodic incongruities in Portuguese (a cognate language), compared to non-musicians.

As illustrated above, neuroscientific research is gradually providing more evidence to confirm the long-held view that music and language share some common features (Patel 2003: 679, 2008a, Patel 2008b: 727). However, disagreement and contradiction appear to persist even about fundamental issues (Juslin and Västfjäll 2008: 612; Patel 2003: 679, 2008a), such as the apparent overlap in neuroimaging studies and the apparent divergence in neuropsychology related to the processing of syntax in music and language (Patel 2003: 679, 2008a: 268-276). There is strong evidence in support of both fields, as illustrated by Patel (2003: 675, 2008a: 268-276). His examples from neuroimaging research relate to the activation of language regions of the brain during the processing of musical syntax, or activation of the language areas of Broca and Wernicke (see Figure 3.3 below) during harmonic processing (e.g. Koelsch, Gunter et al. 2002; Tillmann et al. 2003).

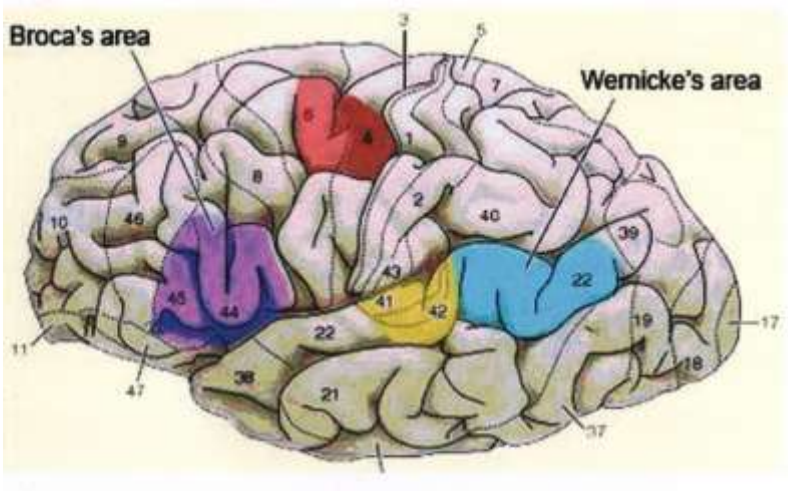


Figure 3.3 The areas of Broca and Wernicke
(source: Dubuc 2002)

Patel's (2003: 675, 2008a: 269-270) examples from neuropsychology relate to dissociation between the processing of syntax in music and language, as in the case of congenital or acquired amusia (i.e. the inability or loss of the ability to process music) in the absence of aphasia (i.e. the partial or total loss of the ability to communicate) (Ayotte et al. 2000, 2002; Griffiths et al. 1997; Peretz et al. 1994); or in the opposite case, aphasia in the absence of amusia. Examples in the latter category include the Russian composer Vissarion Shebalin (1902-1963) (Luria et al. 1965), who had a left temporo-parietal lesion which affected his speech but not his musical abilities, and George Gershwin (1898-1937), who had a temporal right hemisphere cerebral tumour that eventually caused verbal apraxia (i.e. the inability to say what one means) but that did not affect his musical abilities (Ruiz and Montañés 2005).

As mentioned by Patel (2008a: 270), it has been observed (Tzortzis et al. 2000) that cases of aphasia without amusia have mainly been reported to occur in composers and conductors, namely highly-skilled professional musicians. This is the opposite situation to that for amusia in the absence of aphasia. The reason for this is probably attributable to the differences that have been found in the brains of professional musicians, such as a greater density of grey matter in certain frontal cortex areas and a larger corpus callosum (see Figures 3.1 and 3.2) above (Schlaug et al. 1995; Gaser and Schlaug 2003). However, as Patel (2008a: 270) points out, there is no definitive evidence of aphasia in the absence of amusia in non-musicians that proves double dissociation between amusia and aphasia, despite the findings of Peretz et al. (2004). These findings, as Patel (2008a: 270) explains, were not related to cases of true aphasia, but rather to auditory agnosia (i.e. the inability to understand speech). Conversely, there is evidence relating to aphasia in non-musicians, which indicates an overlap in disorders involving music and language syntax (ibid.).

3.4.3 Broca's area

As noted by Fadiga et al. (2009: 448), research on disorders affecting language production and/or comprehension has a long history that began with research in 1861 by neurologist Paul Broca (after whom Broca's area and Broca's aphasia were named). Broca identified the involvement in language production of the left inferior frontal gyrus, based on evidence of his patients' brain lesions (Dronkers et al. 2007). Fadiga et al. (2009: 448) explain that, as a result of this evidence, Broca's aphasia was defined as involving difficulty in speaking, as well as melody and articulation deficits, semantic and phonemic paraphasias, and anomalous use of syntax (Alexander et al. 1990; Caplan et al. 1996). Broca's research was, and still is, significant for two reasons: it identified for the first time the region in the brain responsible for language and this paved the way for localisation research of other brain regions (Fadiga et al. 2009: 448). It is interesting to note that, to date, the specific neural location of various aspects of language has yet to be confirmed (ibid.: 449). Fadiga and colleagues also mention that much later research found that Broca's area, which had been considered responsible for speech production, and Wernicke's area (a temporal area that had been associated with speech perception), were in fact both involved in the comprehension of language as well as its production (Ojemann et al. 1989; Schaffler et al. 1993). However, Fadiga et al. (2009: 449) point out that, based on syntax encoding, the areas of Broca and Wernicke were subsequently found to have distinct functions as well – for example, Broca's area is involved in the comprehension of complex syntax and ambiguity in language (Fiebach et al. 2004). This significant finding of the separate functions of Broca's and Wernicke's areas resulted in a distinction between the anterior and posterior areas of the brain related to language (Fadiga et al. 2009: 449). Current research proposes that language processing in the brain involves an integrated and dynamic network, including a number of temporal, parietal and frontal areas. Fadiga et al. describe a study by Catani et al. (2005) that observed functional connectivity between the three areas of Broca, Wernicke and Geschwind (inferior parietal lobule), where Wernicke's area is connected to Broca's area by means of the long segment fibres, Wernicke's area is connected to Geschwinds's area through the posterior segment fibres and Geschwind's area is connected to Broca's area through the anterior segment fibres. Fadiga et al. (2009: 450) also note that, in addition to its involvement in language functions, some overlap has also been found between the pars opercularis of the inferior frontal gyrus (Brodmann area 44) in Broca's area and the pre-motor cortex (Brodmann area 6).

Studies have shown that lesions in Broca's area cause motor problems as well as language impairments (ibid.: 452). Fadiga et al. (ibid.: 451) affirm that this is consistent with findings that show involvement of Broca's area in categorising and representing the manipulation of man-made objects, such as tools (Gerlach et al. 2002; Kellenbach et al. 2003), and activation of Brodmann area 44 when imagining movements (Gerardin et al. 2000; Lotze and Halsband 2006) or performing actions such as grasping objects (Blinkofski et al. 1999; Gerardin et al. 2000). Furthermore, there is evidence that Broca's area is also involved in other cognitive activities, such as working memory, calculation and, importantly for this present research, music (Fadiga et al. 2006). According to Fadiga et al. (2009: 453), this evidence points to an overlap between movement, vision, audition and the mirror-neuron system (Kohler et al. 2002), whereby the brain forms a representation of sounds related to actions so that the movements required to actually execute those actions can be planned. Fadiga et al. (2009: 453) explain that evidence of somatotopic activation (i.e. specific areas of the brain are activated in relation to certain parts of the body) of pre-motor neural areas has been observed for sounds produced by the hand or mouth (Gazzola et al. 2006). As an example, they mention research which has found that listening to the sound produced by tools activates a mirror-like network corresponding to motor areas of the brain responsible for executing the actions required to use the tools (Lewis et al. 2005). Similarly, they explain that mouth and face responses are prepared by the brain when non-verbal vocalisations are heard, in particular if the sounds are related to emotions that are positive and highly arousing (Warren et al. 2006). In other words, the same areas of the brain are activated when *hearing* these sounds as those that are involved in *producing* the same or similar sounds (Fadiga et al. 2009: 453). Fadiga et al. add that the same process occurs in musicians during passive listening to pieces of music with which they are familiar, so a pianist's motor and pre-motor brain areas are activated when listening to piano music (Haueisen and Knosche 2001); the same effect has been observed in non-pianists after a short training period (Bangert et al. 2006). Research (Langheim et al. 2002; Zatorre and Halpern 2005) has found that this overlap between listening to and performing familiar music, including music imagery in which the experience of performing and/or hearing a piece of music is re-enacted by musicians, involves an extensive neural network comprising the motor, pre-motor and supplementary motor areas, as well as the inferior parietal lobule and the superior temporal gyrus (Fadiga et al. 2009: 453-454). This neural network has been found to apply equally to musicians (Bangert et al. 2006; D'Ausilio et al. 2006; Haueisen and Knosche 2001) and non-musicians following appropriate training (Bangert and Altenmüller 2003; D'Ausilio et al. 2006; Lahav et al. 2007), as well as overlapping somewhat with the findings of research (Gernsbacher and Kaschak 2003) related to language, and research (Rizzolatti and Craighero 2004) dealing with action and observation (Fadiga et al. 2009: 454).

As affirmed by Fadiga et al., beyond the fact that music and language each involve complex structures, they both share many additional features in cognitive processing terms, such as the way in which structured sound is encoded and how words in language and tones in music function in relation to a governing syntax. The overlap between the neural processing of syntax in music and language has been demonstrated by the findings of various studies (Koelsch 2005b, 2006; Koelsch, Maess et al. 2000; Koelsch et al. 2001; Koelsch, Gunter et al. 2002; Koelsch, Gunter et al. 2005; Maess et al. 2001). Subsequently to the bilateral inferior frontal gyrus being identified as the area in which music syntax is processed in the brain (Maess et al. 2001), a study by Koelsch, Gunter et al. (2002) found that very similar neural networks are involved in processing both music and language, including the areas of Broca and Wernicke, the superior temporal sulcus, Heschl's gyrus, the plana polaris/temporalis and anterior superior insular cortices (Fadiga et al. 2009: 454).

3.4.4 The Shared Syntactic Integration Resource Hypothesis (SSIRH)

Returning to the divergence mentioned earlier between neuroimaging and neuropsychological evidence related to the processing of music and language syntax, the two can be reconciled by Patel's (2003: 678, 2008a: 283) 'Shared Syntactic Integration Resource Hypothesis' (SSIRH). In line with the findings of studies investigating the neural processing of language (Haarmann and Kolk 1991; Kaan and Swaab 2002), this hypothesis suggests that the syntax of music and language is processed in the anterior regions of the brain in combination with posterior regions that contain syntactic representations (Patel 2003: 678, 2008a: 283). In other words, frontal regions provide the necessary resources that allow rapid selection and activation of syntactic representations stored in posterior regions, but processing of the actual integration occurs in the posterior regions (ibid.). This is illustrated in Figure 3.4 below, in which the arrows show the functional relationship between neural networks that process syntax in music (M) and language (L) (Patel 2008a: 283).

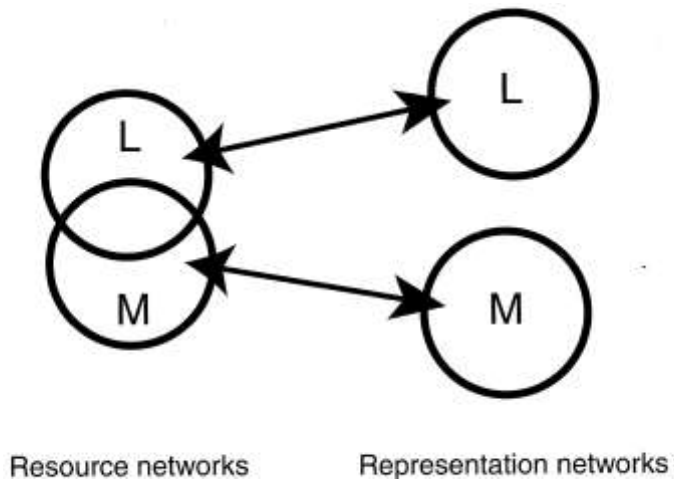


Figure 3.4 Schematic diagram of the functional relationship between linguistic and musical syntactic processing (source: Patel 2008a: 283).

The resource networks on the left side of the diagram are located in the frontal areas of the brain, whilst the representation networks on the right side of the diagram are located in the posterior areas of the brain (ibid.). The SSIRH is able to account for research (Patel, Gibson et al. 1998) suggesting that the processing of syntactic integration occurs in posterior brain areas, as well as research (Janata et al. 2002; Koelsch, Gunter et al. 2002; Tillmann et al. 2003) showing that the processing of musical harmony involves the activation of frontal brain areas associated with language processing (Patel 2008a: 284). Similarly, as mentioned by Levitin and Tirovolas (2009: 221), the SSIRH accounts for the activation of brain areas associated with the processing of language syntax as a result of violations in musical structure, and as a result of violations of musical expectations (i.e. Brodmann area 47 and the anterior insula (Levitin and Menon 2003, 2005) in the first case and Brodmann area 47 (Koelsch, Maess et al. 2000) and Broca's area (Koelsch, Gunter et al. 2002) in the second case). Furthermore, the SSIRH accounts for the dissociation between the processing of music and language syntax observed in acquired amusia as resulting from damage to areas of the brain that are believed to store representations of musical syntax (i.e. the superior temporal gyri

Ayotte et al. 2000; Patel, Peretz et al. 1998; Peretz 1993; Peretz et al. 1994), as opposed to areas that are responsible for processing the integration of syntactical representations (Patel 2008a: 284). In the case of congenital amusia, or tone deafness, the SSIRH attributes this to a deficit in the formation of musical pitch representations, and consequently representations of scales, chords and keys, which renders the processing of musical syntax impossible (ibid.). For this reason, according to Patel, congenital amusia is not relevant to research dealing with the overlap between the processing of syntax in music and language.

Given the neural overlap in the processing of syntax in music and language proposed by the SSIRH, and because of the limited availability of resources for syntactic processing (Gibson 2000), it would be reasonable to expect interference when the processing of music and language syntax occurs at the same time (Patel 2008a: 285-286). As Patel (ibid.: 286) explains, research combining music and language, specifically harmonic and semantic processing (as opposed to syntactic processing) did not identify any interaction between the two (Besson et al. 1998; Bonnel et al. 2001), except for factors related to attention (Poulin-Charonnat et al. 2005). However, research (Fedorenko et al. 2009; Koelsch, Gunter et al. 2005; Slevc et al. 2009) based on the SSIRH and focusing specifically on the interaction between the concurrent processing of syntax in music and language has confirmed the occurrence of interference and hence that the processing of syntax in music and language involves shared resources (Patel 2008a: 288-290). Interestingly, in the study by Slevc et al. (2009) mentioned by Patel (2008a: 289-290), a three-way interaction was observed between language expectancy, music expectancy and language syntax or semantics, where an unexpected chord was found to cause interference in the processing of the syntactic rather than the semantic structure of language.

3.4.5 A 'supramodal syntax'

In concluding this section exploring the overlap between the neural processing of music and language, mention should be made of the hypothesised role of Broca's area in supramodal representations proposed by Fadiga et al. (2009: 455). According to this hypothesis, Broca's area may be responsible for encoding hierarchical structures in music, language and action, based on its encoding role for the syntax of language and music. As Fadiga and colleagues (ibid.: 454) explain, although Broca's area has long been associated with language production, more recently there has been a renewed interest in its receptive functions – including music listening. In addition, research (Rizzolatti and Craighero 2004) has found that a neural network including Broca's area is involved in encoding observed or executed action (Fadiga et al. 2009: 455). According to Fadiga and colleagues, Broca's area may also be involved in the representation of syntactic rules for action. In other words, as the researchers explain, Broca's area and pre-motor areas are activated in the processing of action-hierarchies for the execution of goal-directed actions. The researchers illustrate this by quoting the goal-directed action of drinking, which requires a number of different motor acts depending on the drinking context, e.g. using a glass or a public drinking fountain. These action-hierarchies are typical of those involved in music and language, in which Broca's area and pre-motor areas are activated. Consequently, the researchers claim that music, language and action are related by the fact that they involve the use of hierarchical and syntactical structures, and that Brodmann area 44 is part of a neural circuit with a supramodal syntactic processing role, similar to that of an artificial grammar (ibid.: 455-456). This leads to the supposition, for which there is some support (Gervain et al. 2008) mentioned earlier in this section, that we are programmed from birth to respond to syntactical structures in language – and therefore also in music. This in turn allows us to develop and grow through the encoding of sensory and motor experience based on a hierarchically-structured supramodal syntax (Fadiga et al. 2009: 456).

3.5 How Music is Processed in the Brain and Enjoyed

Following on from the language-related themes discussed in the last section, and given that the focus of this thesis is vocal music – albeit its reception rather than its production – it may be useful to begin this section by examining what can be considered a ubiquitous musical ability and practice: singing (Peretz and Zatorre 2005: 99).

3.5.1 Singing and speaking / production and reception

Although it is widely believed that musical abilities may have evolved as a by-product of language, as mentioned earlier in this chapter, there is considerable evidence to indicate that we are born with a predisposition for music, which spontaneously allows us to develop a complex knowledge that is specific to music (Peretz and Hyde 2003: 362). As affirmed by Peretz and Zatorre (2005: 99-100), among other researchers, most adults appear to have a basic singing ability even without any musical training. The first signs of this natural ability appear spontaneously in infants at the age of approximately one year; by five years of age, infants have already accumulated a large number of songs through exposure to music in their environment (ibid.). As discussed earlier, infants appear to possess a number of natural musical abilities that are comparable to those found in adults, such as an awareness of scales and temporality (Peretz and Hyde 2003: 362). Given the universality of this feature of musical scales (Burns 1999) and the preferences of infants as young as four months (Drake 1998) for music with a regular temporal pulse (Peretz and Hyde 2003: 362), these facts would suggest that infants are capable of learning the structure of any culture's music (Levitin and Tirovolas 2009: 216; Peretz and Hyde 2003: 362). Infants between the ages of six and nine months are better at processing consonant rather than dissonant intervals (Schellenberg and Trehub 1996) and they prefer learning musical scales that have unequal steps (Trehub et al. 1999), including artificial musical scales having this feature, which indicates that this preference does not occur as a result of exposure to music in the environment (Peretz and Hyde 2003: 362). Peretz and Hyde conclude from the evidence that, based on the apparently spontaneous appearance of various musical capacities at an early age which do not serve any obvious purpose in terms of language, this would indicate that we are born with abilities related specifically to music (Trehub 2001). Levitin and Tirovolas (2009: 216) note that, by five years of age, syntax violations in the music of an infant's culture evoke an electrophysiological response similar to that found in adults, known as the 'Early Right Anterior Negativity Response' (ERAN), with a negative voltage response known as 'N5' that occurs 500 ms after the violation has been perceived (Jentschke et al. 2008).

Peretz and Zatorre (2005: 100) point out that clinical research has found a natural singing ability even in aphasic subjects, who are able to sing despite being barely capable of speaking (Yamadori et al. 1977), and non-aphasic right-handed normal subjects can still sing even when their ability to speak has been temporarily halted through transcranial magnetic stimulation of the left frontal cortex (Stewart et al. 2001). However, stimulation of the *right* frontal cortex has little effect on the speaking or singing abilities of normal subjects (Epstein et al. 1999; Stewart et al. 2001). Furthermore, research (Hébert et al. 2003; Peretz et al. 2004) has found that although the number of intelligible words produced by aphasic subjects is about the same when spoken or sung, the production of melody is unaffected (Peretz and Zatorre 2005: 100). The opposite has been observed in studies (Ayotte et al. 2002; Peretz et al. 1994) involving subjects with amusia, who are able to speak normally but cannot sing (Peretz and Zatorre 2005: 100).

Amusia, or the inability to process music, may be either acquired or congenital. Acquired amusia can manifest as a result of brain lesions or abnormalities, sensory or intelligence deficits, or lack of exposure to music, whilst congenital amusia may be present from birth and/or cannot be accounted for by any of the reasons for acquired amusia (Peretz and Hyde 2003: 363). Amusia is sometimes referred to as tone-deafness, dysmusia or dysmelodia and both the congenital and the acquired varieties may manifest in many different forms (ibid.).

These opposite situations may occur as a result of the way in which certain features of music and language are processed by the brain. Peretz and Hyde (2003: 365) explain that congenital amusia may likely be the result of “a deficit in fine-grained pitch discrimination” which impedes “the normal development of the neural networks that ascribe musical function to pitch”. In other words, they claim that the source of the problem may be acoustic and relevant to music rather than specific to it. Therefore, based on this view, as supported by other researchers (Zatorre et al. 2002), the brain may be specialised in terms of processing “fine spectral acoustic cues”, rather than music specifically (Peretz and Hyde 2003: 365). Consequently, as affirmed by Peretz and Hyde (ibid.: 366), congenital amusia may be viewed as “the mirror image of SLI [Specific Language Impairment], whereby pitch is to music what time is to speech”. Their statement relates to the model put forward by Zatorre et al. (2002: 40) which proposes, in essence, that the processing of music and speech in the brain involves the complementary specialised functions of the left auditory cortex for the temporal features of speech, rather than frequency, and of the right auditory cortex for the spectral resolution of music, rather than temporal features. In addition, Peretz and Hyde (2003: 363) make their comparison between amusia and Specific Language Impairment based on researchers (Tallal et al. 1993) who attribute language-related problems to a deficit in the perception of fine acoustic temporal variations.

Peretz and Zatorre (2005: 100) remark that research findings would indicate a neural dissociation between the production of language (spoken or sung words) and melody (singing as music), as well as their perception. This dissociation is supported by research (Jeffries et al. 2003; Perry et al. 1999) investigating speaking and singing, which found that compared to speaking and listening, singing resulted in increased activation of bilateral motor areas, especially in the pre-motor, insular and auditory areas of the right hemisphere (Peretz and Zatorre 2005: 100).

However, in contrast, there is also evidence (Binder et al. 1997; Binder et al. 2000; Gaab et al. 2003; Griffiths 2003; Griffiths et al. 1999; Koelsch, Gunter et al. 2002; Koelsch et al. 2004; Maess et al. 2001; Patel 2003; Tillmann et al. 2003) that areas of the brain associated with language processing are activated by music (Özdemir et al. 2006: 628). The processing of pitch and rhythm, memory related to pitch and the syntax of music has been found (Binder et al. 1997; Gaab et al. 2003; Griffiths 2003; Koelsch, Fritz et al. 2005; Koelsch, Gunter et al. 2002; Maess et al. 2001; Patel 2003; Platel et al. 1997) to activate the language-related posterior part of the inferior frontal gyrus, which includes Broca's area (Özdemir et al. 2006: 628). As Özdemir and colleagues remark, this evidence pointing to an overlap between the neural networks involved in processing music and language appears to stand in contrast to the dissociation indicated earlier between singing and speaking, such as occurs in aphasia. They mention an explanation that has been proposed for this (Ellis and Young 1996; Lum and Ellis 1994; Wilson et al. 2006), whereby propositional speech is processed mainly in the left hemisphere of the brain, as opposed to the right hemisphere that processes automatic speech – this includes singing songs that are familiar. Özdemir et al. (2006: 628) refer to research findings that language production and reception are lateralised in the left hemisphere of the brain, which is also involved in the processing of the temporal features of music, whereas certain features of music like the perception of melody and meter or spectral aspects are processed to a greater extent by the right hemisphere. They affirm that, given these findings, music processing occurs across both hemispheres of the brain and involves an extensive neural network (including, amongst other areas, the superior temporal gyrus, superior temporal sulcus, inferior and superior parietal lobule, inferior frontal gyrus and parts of the pre-motor cortex), as will be discussed later. According to Özdemir et al. (ibid.: 629), the fact that music processing involves both hemispheres may account for aphasic patients who have lesions in the left side of the brain being able to sing words that they are otherwise unable to speak. In addition, as these researchers claim, this may indicate that the production of words can occur in two ways: (a) through the left hemisphere, as in normal speech, or (b) through the right hemisphere or across both hemispheres, as in song or melodic intonation. The researchers refer to evidence (Brown, Martinez, Hodges et al. 2004; Guenther et al. 1998; Jeffries et al. 2003) for involvement of both hemispheres in the production and motor control of vocalisation in speaking as well as singing, albeit with increased processing in the left hemisphere for normal speaking.

The results of the fMRI study by Özdemir et al. (ibid.: 632) investigating shared and distinct neural activation between singing and speaking revealed that both activities resulted in a significant overlap in various areas of the brain (i.e. the inferior pre- and post-central gyrus, superior temporal gyrus and superior temporal sulcus in both hemispheres). The researchers claim that these areas may represent a neural network that processes "the motor preparation, execution and sensory feedback/control for both intoned and spoken vocal production" (ibid.). Furthermore, their study found that compared to speaking, singing resulted in stronger activation in certain areas of the right hemisphere (i.e. anterior to mid-portions of the superior temporal gyrus, including Heschl's gyrus, the anterior portion of Brodmann Areas 22 and 38). As noted by the researchers, the activation of Brodmann Area 38 has been observed in other studies involving music (Gaab et al. 2003; Jäncke et al. 2002; Overy et al. 2004), especially for complex musical sounds and singing (Brown, Martinez, Hodges et al. 2004; Griffiths et al. 1998). The findings of Özdemir et al. (ibid: 633) provide support for the view (Brown, Martinez, Hodges et al. 2004; Guenther et al. 1998; Jeffries et al. 2003) that there is an overlap in most of the motor processes for singing and speaking, except they found that compared to speaking, singing activates a more extensive neural network. Additionally, and of particular interest for the purposes of this thesis, Özdemir et al. (2006: 633) refer to previous research (Hickok et al. 2003) that found a parallel overlap between the production and reception of speech and music. Specifically, the research showed an overlap in the following brain areas that were found to be activated by the production and reception of speech and music: the left posterior Sylvian fissure at the parietal-temporal boundary (Sylvian parietal temporal region), left posterior superior temporal sulcus, left and right premotor cortex, with music also activating the right posterior superior temporal sulcus.

It is evident from the above research findings that the neural processing of music, both in terms of its production (for example in singing, as just discussed) and its reception (listening and understanding), involves many different distinct and overlapping brain areas –some of which correspond to areas that are also associated with language production and reception – rather than a single 'music centre' (Warren 2008: 32). Consequently, it is important to consider the 'collaboration' that occurs between various brain areas, as well as their individual functions, in order to understand the neural processing and enjoyment of music. The rest of this section will focus on this, specifically in terms of music reception.

3.5.2 Music reception and processing

Levitin (2007: 91) provides a basic explanation of what happens in the brain when we listen to music. The primary auditory cortex (A1), in the temporal lobe, receives incoming signals from the ear and processes the various sound frequencies. In addition, there are extra connections from the ear that are linked directly to the cerebellum, a supplementary auditory system that allows fast response to sound based on emotion and with resulting movement, such as flight (ibid.: 184-186). The timbres of the music are identified in the superolateral areas of the temporal lobe bilaterally, such as the superior temporal sulcus and superior temporal gyrus, while the hippocampus and areas located between the temporal, occipital and parietal lobes are involved in the retrieval and identification of memories of similar sounds that we may have heard in the past (ibid.: 91). Musical pitch activates the dorsolateral prefrontal cortex and Brodmann areas 44 and 47, whilst rhythm activates the lateral cerebellum and the cerebellar vermis. The lyrics of vocal music (such as the words in opera), activate the brain's language networks as described previously, including the areas of Broca and Wernicke, among others in the temporal and frontal lobes (ibid.: 86). As mentioned earlier, the structure of music is also processed in the frontal regions of the brain that are associated with language (ibid.: 191). The involvement of language networks may explain why we tend to focus a great deal on the higher notes when listening to music, given that most of the energy that is released by consonants in speech is within the same range as most melodies (Jourdain 2002: 250). Emotion evoked by music, as discussed in the next section, activates the frontal lobes, cerebellum, amygdala and nucleus accumbens, which are components of a neural system associated with the processing of any pleasurable and rewarding activity, such as eating or sex (Levitin 2007: 91), as discussed towards the end of this chapter. The nucleus accumbens is central to the brain's 'reward system' in that it releases dopamine, which is related to the motivation for rewards (wanting), as opposed to the pleasure of the rewards themselves (liking), so the nucleus accumbens is also involved in addiction (ibid.: 189; Purves et al. 2008: 610). Research has found that the nucleus accumbens and other areas contain "hedonic opioid hot spots" that are related to the dopaminergic system and ‘wanting’, by contributing to reward motivation, in that they are responsible for enhancing the ‘liking’ that results from sensory pleasure (Peciña et al. 2006).

As illustrated by the basic description provided above, the complex process of music reception involves the activation of numerous brain regions, including those associated with reward, motivation, emotion and arousal, namely: the auditory cortex, frontal regions, mesolimbic dopamine system (in which the nucleus accumbens has an important role), cerebellum and basal ganglia (Blood et al. 1999; Blood and Zatorre 2001; Levitin 2007: 191; Menon and Levitin 2005). Given this complexity, the additional detail provided by the following considerations is warranted in order to have a fuller understanding of the various aspects of neural processing that are involved in the reception of music. Before examining this additional detail, an organisational overview of brain processes may help to clarify how the flow of information is structured when we listen to music.

Warren (2008: 33) explains that the auditory system in human beings features a hierarchical organisation, both anatomically and functionally, in which there is a bi-directional flow of information from lower to higher levels in the system. As the information moves from lower to higher levels, the degree of abstraction and complexity of the resulting representations increases. In other words, as Warren affirms, the initial stage of this process when listening to music (or any complex sound) involves the encoding of raw data, such as frequency, harmonics, duration and loudness of individual notes. As this incoming information is processed and passed to subsequent higher levels in the auditory system, representations are gradually constructed in the brain of specific instruments or melodies based on information that is stored in memory and other cognitive areas. When this abstract representational process has been completed, as Warren goes on to explain, the brain prepares a response to the processed musical information based on emotional criteria. These are processed in a hierarchical system that is partly independent and that establishes what the response to this music will be in future, such as whether or not we will want to hear it again.

As noted by Warren (ibid.: 34), imaging studies (Koelsch and Siebel 2005; Peretz and Zatorre 2005; Stewart et al. 2006) have shown that music is essentially processed by the same neural networks as any other complex sound and, consequently, there is no area of the brain that deals solely with music. However, Warren remarks, the constituent elements of music are processed separately by various areas of the brain.

These areas operate collaboratively in a functional hierarchy, in which there is a relative rather than an absolute selectivity for music and its constituent elements.

Therefore, listening to a piece of music may be described as involving a deconstruction, or at least a parsing, of incoming auditory information. The separate strands of information are then reconstructed or reassembled, drawing on memory, to produce an abstract and seemingly unitary neural representation of the music. An appropriate emotional response is then formed based on this abstract representation, or mental 'sound image'. The discussion that follows will consider the constituent elements of music that are perceived and processed as separate strands of incoming auditory information during the reception experience.

The constituent features of music in terms of perception include pitch, rhythm, timbre, tempo, metre, contour, loudness and spatial location (Levitin and Tirovolas 2009: 213). The perception of these eight elements involves a process of grouping, whereby for example metre is perceived as a result of tones being grouped into sequences over time; grouping may also occur based on similar features, such as timbre and loudness, onset time, or pitch proximity (ibid.). This process allows us to hear separate sound stimuli as a single entity or as separate entities, such as an orchestra as opposed to its individual instruments, or the sound of a violin rather than its constituent harmonics (Levitin 2007: 78-79). This grouping process can occur based on the similarity of sounds (timbre), such as hearing the violin section of an orchestra rather than individual violins, or as a result of focusing one's attention on particular sounds, such as the violin section of an orchestra rather than the orchestra as a whole (ibid.). Similarly, grouping by onset time allows us to hear two (or more) different instruments playing together as a unit, when they begin playing at the same time, or as separate entities or groups if they begin playing at different times with respect to each other (ibid.: 80). Additional factors that influence grouping (and, consequently, segregation) include spatial location, where sounds are grouped based on the perceived position of their source; loudness, which for example allows individual voices or groups of voices to stand out in operatic ensembles; and pitch, where for example the distance between high and low notes (in combination with a change in timbre) can make a voice stand out or blend in (ibid.: 80-81).

In the same way that a relative predominance of the right hemisphere of the brain has been observed in the processing of certain aspects of music, the same holds true for specific brain areas that are activated within a hemisphere while processing the individual constituent elements of music (Warren 2008: 34). However, imaging and clinical research have identified specific areas of the brain that are associated with the processing of certain constituent elements of music (see Figure 3.5 below).

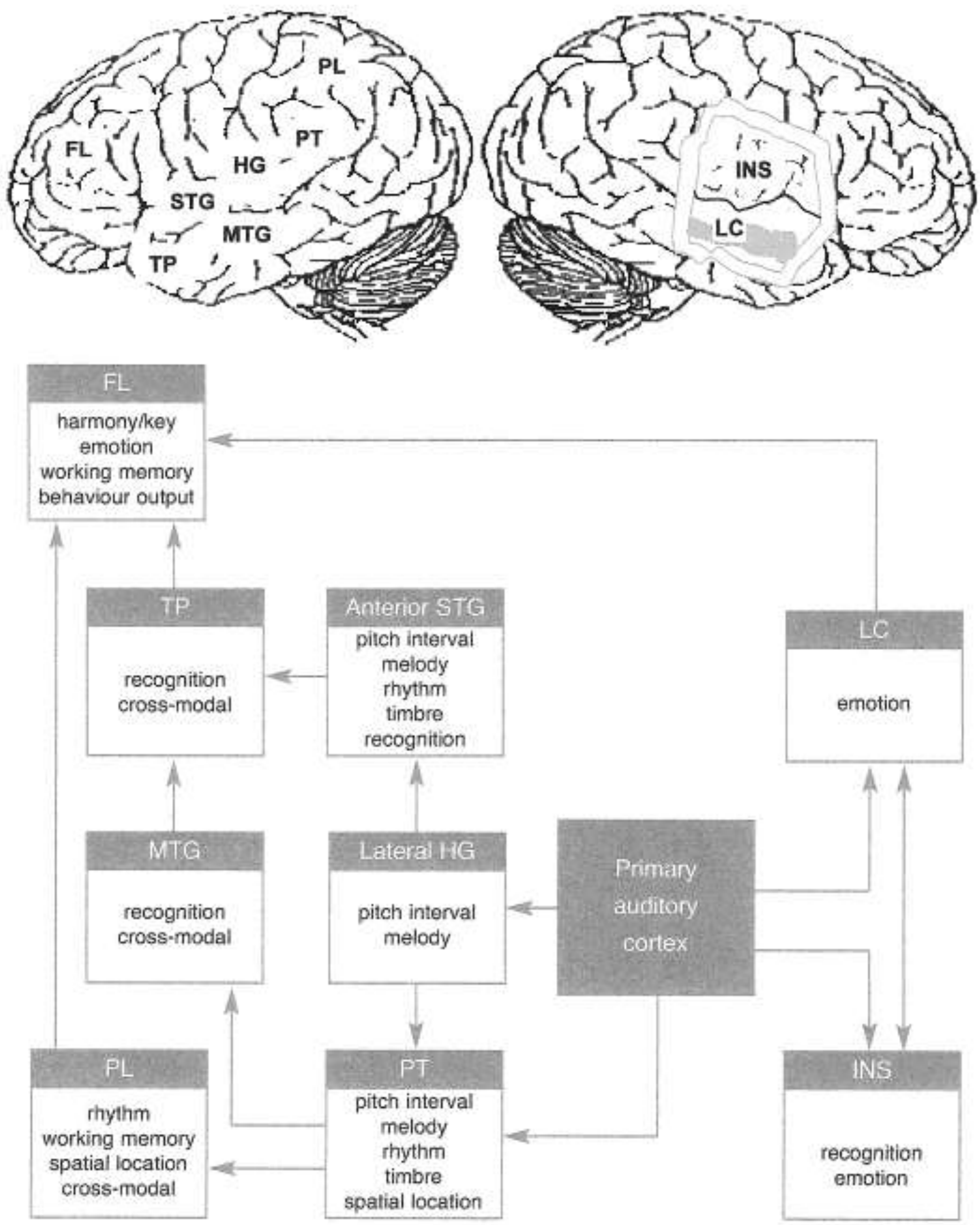
Pitch perception and processing are mediated by the lateral part of Heschl's gyrus, planum temporale and anterior superior temporal gyrus (ibid.). Whereas fixed pitches and noise are processed by Heschl's gyrus, pitch height and pitch chroma are processed in posterior and anterior areas of the secondary auditory cortex, respectively; the planum temporale is also associated with absolute pitch (Levitin and Tirovolas 2009: 214, 217). As pitch serves as the basis for melody (the variation of pitch over time), chords (several pitches occurring at once) and harmony (several melodies occurring at once) (Warren 2008: 35), these structures have been the subject of specific investigation. For example, research (Patterson et al. 2002) has found that the superior temporal gyrus and planum polare are activated by melody, as well as intervals and contour, while other findings (Green et al. 2008) related to mode melodies identified the activation of the left parahippocampal gyrus, bilateral ventral anterior cingulate and left medial prefrontal cortex (Levitin and Tirovolas 2009: 214, 215). Research (Mizuno and Sugishita 2007) on the perception of major and minor keys found the activation of bilateral inferior frontal gyri, medial thalamus and dorsal cingulate cortex, where frontal and thalamic areas probably mediate key identification and the cingulate resolves conflict in the decision (Levitin and Tirovolas 2009: 215). Another study (Pallesen et al. 2005) found that the amygdala, retrosplenial cortex, brain stem and cerebellum are activated by minor chords (Levitin and Tirovolas 2009: 215). Harmonies, as well as keys, are mediated by the frontal lobe (Warren 2008: 34).

Rhythm processing involves a number of brain areas, including the parietal lobe, anterior superior temporal gyrus and planum temporale (ibid.). Evidence from research (Halsband et al. 1993; Ivry and Keele 1989; Janata and Grafton 2003) has shown that the perception and production of rhythm activate parts of the cerebellum, basal ganglia and motor areas (Levitin and Tirovolas 2009: 215). The temporal or timing features of music, including rhythm, metre and tempo, are processed by a neural hierarchy that parallels pitch, melody and harmony processing (Warren 2008: 35); the cerebellum has a key role (Ivry and Hazeltine 1995; Ivry and Schlerf 2008; Levitin and Cook 1996; Sternberg et al. 1982) in this temporal processing (Levitin and Tirovolas 2009: 215). Based on the results of other studies (Ayotte et al. 2000; Di Pietro et al. 2004; Liégeois-Chauvel et al. 1998; Peretz 1990; Peretz and Kolinsky 1993; Piccirilli et al. 2000;

Vignolo 2003), it is believed that pitch, rhythm and loudness are processed independently of each other and subsequently integrated to form a complete representation (Levitin and Tirovolas 2009: 215).

Timbre is processed by areas in the right superior temporal lobe, anterior superior temporal gyrus and planum temporale (Warren 2008: 34). The planum temporale has been identified as an auditory association area that allows specific features of a sound to be analysed, such as the timbre of a voice or instrument, pitch patterns and spatial location (which is also processed in the parietal lobe) (ibid.).

Familiar music is identified by areas in the anterior temporal lobe and insula (Ayotte et al. 2000; Satoh et al. 2006), whilst memory related to sound, including music, involves the parietal and frontal lobes, which also process response to sound (Warren 2008: 34). The segmentation of phrase boundaries – a neural operation that allows music (and other information) to be encoded in memory by identifying relevant start and end points – is mediated with a right hemisphere predominance by dorsal and ventral fronto-temporal areas (Sridharan et al. 2007), namely the ventrolateral prefrontal cortex and posterior temporal cortex at the beginning of phrase boundaries, and the dorsolateral prefrontal cortex and posterior parietal cortex at the end of phrase boundaries (Levitin and Tirovolas 2009: 217). As mentioned earlier in this chapter, memory is central to the listening experience and to the enjoyment of music, given that it mediates musical prediction and expectation, the violations of which involve activation of the ventrolateral prefrontal cortex (ibid.). Interestingly, research (Chen et al. 2008) involving musicians found that rhythm production results in increased activation of the dorsolateral right prefrontal cortex and right inferior frontal gyrus, which are related to working memory in connection with music (Levitin and Tirovolas 2009: 225-226).



Legend: FL = frontal lobe; HG = Heschl's gyrus (site of primary auditory cortex); INS = insula (shown with overlying cortex removed); LC = limbic circuit (shown with overlying cortex removed); MTG = middle temporal gyrus; PL = parietal lobe; PT = planum temporale; STG = superior temporal gyrus; TP = temporal pole.

Figure 3.5 Neural organisation in the processing of the constituent elements of music (source: Warren 2008: 34).

Therefore, as summed up by Warren (2008: 36), music processing involves the encoding of sound features via the auditory cortex and the extraction of patterns in primary and higher auditory cortices by means of modular neural networks across both hemispheres. These networks are linked and structured in a hierarchy and the representations produced at each stage of processing are increasingly complex. These representations are subsequently linked to memory and meaning by brain areas beyond the auditory cortex and, as a result, a behavioural response to music is produced. The limbic system functions alongside the auditory and cognitive processing networks and mediates the emotional response that underpins the enjoyment of listening to music. As Warren (ibid.: 35) also remarks, research (Blood and Zatorre 2001; Menon and Levitin 2005) has shown that the powerful affective response evoked by music activates the pleasure and reward centres of the limbic system in a similar way to basic biological drives (such as eating and having sex).

3.6 The Music and Emotion Debate

A link between music and emotion had already been suggested by Plato (Mula and Trimble 2009: 84). Levitin and Tirovolas (2009: 219) observe that many authors (e.g. Cooke 1959; Dowling and Harwood 1986; Helmholtz 1954 [1863]; Langer 1957 [1942]; Meyer 1956; Nietzsche 1994 [1871]) have written about music-induced emotion and that people enjoy listening to music because of the emotions that it evokes in them (Juslin and Sloboda 2001). Nonetheless, the link between music and emotion continues to be a controversial subject and research has not been able to provide an exhaustive explanation as to the nature of these emotions (Juslin and Västfjäll 2008: 559). However, a wide range of neuroscientific studies continues to be conducted in this area, focusing on increasingly specific aspects of music audition, perception, processing and production, as research methods and equipment are further perfected and enhanced. It has been proposed that despite a lack of agreement between researchers and results, the findings of studies related to music and emotion may prove useful to the wider field of research dealing with emotion (ibid.).

As mentioned earlier, this thesis focuses on the emotion that is evoked in listeners by music – in particular, operatic vocal music. The distinction between the emotion that is expressed in and conveyed by music, as opposed to the emotion that is evoked in and experienced by a listener/audience in response to music, has been highlighted by various authors (e.g. Meyer 1956; Patel 2008a: 309; Sloboda and Juslin 2010: 82-84). This distinction is sometimes overlooked in empirical studies and/or confused by participants (Gabrielsson 2002; Sloboda and Juslin 2010: 82). In relation to this issue, the philosopher Kivy (1990), for example, proposes a refinement of the distinction by adopting a cognitivist approach, namely that emotions are not evoked in listeners by music, rather listeners perceive the emotions that are expressed by music (Sloboda and Juslin 2010: 83). On the other hand, some researchers such as Konečni (2003: 332) go even further in claiming that "instrumental music cannot directly induce genuine emotions in listeners". Interestingly, the composer Igor Stravinsky (1998 [1936]: 53-54) believed that music is "essentially powerless to *express* anything at all, whether a feeling, an attitude of mind, a psychological mood, a phenomenon of nature, etc….".

3.6.1 What is meant by emotion?

Before delving deeper into the neuroscientific aspects of music and emotion, some of them being the subject of ongoing debate and controversy among researchers, it may be worth considering briefly what is meant by 'emotion'. Purves et al. (2008: 434) define an emotion as consisting of three components: 1) feelings, such as the subjective feeling of fear which is experienced consciously; 2) physiological changes, such as the autonomic response of an increased heart rate; and 3) behaviour, such as running away. Consequently, the authors affirm, an emotion can be said to mediate a reaction to a stimulus that may be of significance, for example running away from a threat, helping to ensure a positive outcome for the individual and, ultimately, successful evolutionary development. However, the authors add that emotions may also be triggered by thoughts or memories, as well as events in an individual's environment (ibid.: 435). The clarity and simplicity of this description belies a number of underlying problems and disagreements among researchers. Indicative of these problems is the lack of a completely uniform definition of emotion. For example, Kleinginna and Kleinginna (1981) found 92 variations in the basic criteria used to define emotion (Sloboda and Juslin 2010: 74). A useful broad definition is provided in the *Handbook of Music and Emotion* by Juslin and Sloboda (2010) as follows:

> Emotions are relatively brief, intense, and rapidly changing responses to potentially important events (subjective challenges or opportunities) in the external or internal environment, usually of a social nature, which involve a number of subcomponents (cognitive changes, subjective feelings, expressive behaviour, and action tendencies) that are more or less 'synchronized' (Sloboda and Juslin 2010: 74).

As remarked by Sloboda and Juslin (ibid.: 75), the tripartite composition of an emotion can be examined based on the underlying processes on three levels (Dennett 1987): a) phenomenologically, such as feelings; b) functionally, such as the different ways in which information is processed; and c) in terms of hardware, such as neurons and hormones. In addition, as Sloboda and Juslin (2010: 75) note, although there may be a number of mechanisms that mediate external events and resulting emotional responses (Juslin and Västfjäll 2008: 559), the subjective assessment of these events by an individual based on personal criteria may also be a source of emotion in daily life (Scherer 1999). Therefore, the importance of such events, or stimuli, depends on their subjective interpretation by the individual in a given context (Sloboda and Juslin 2010: 75).

There are basic problems and resulting disagreements among researchers, as noted by Sloboda and Juslin (ibid.), relating to whether emotion is processed as a sequence of events or continuously. In the former case, as the authors explain, the problem lies in identifying the beginning and end points of an emotion. Although this problem would appear to provide support for those who believe that emotion processing is a continuous process, Sloboda and Juslin point out that this entails a similar issue in trying to differentiate between the constructs of 'emotion' as an intense state and 'mood' as core affect (Russell 2003). Purves et al. (2008: 435) propose useful distinctions in this regard. Emotions are relatively short-lived, lasting only seconds or minutes, in order to facilitate adaptation to varying situations, and involve physiological changes in response to a stimulus. Moods are longer-lasting emotional states that involve working memory, among other processes, and do not always result directly from an event or thought. Affect relates to the outward expression of emotion based on internal feelings, although it is often used interchangeably with the term emotion. Temperament, on the other hand, describes a general predisposition to the way in which events are experienced and an individual's reaction to them. Lastly, motives represent the needs and desires that underlie an individual's behaviour and actions towards goals, such as the basic needs of eating, drinking, sleeping or having sex, and their related emotions.

An additional problem related specifically to music-induced emotions relates to the issue of 'real' versus 'artificial' emotions. This issue is discussed by Koelsch et al. (2010: 330-333), who claim that music is capable of evoking all 'real' emotions, despite the views of researchers such as Scherer (2004: 244) and Zentner et al. (2008: 496) that basic emotions cannot be evoked by music, or the view of Noy (1993: 126) that music-evoked emotions are not the same as those that occur in daily life. Koelsch et al. (2010: 330-333) present a number of convincing arguments in support of music being able to evoke real emotions. For example, they affirm and adduce evidence that music can indeed evoke basic emotions, such as happiness or sadness (which have been extensively researched), even disgust (Koelsch et al. 2006), surprise (Koelsch, Kilches et al. 2008), anger, aggression and hate (Becker et al. 2006; Garofalo 2010: 734-736, 744-745, 747-749). The view proposed by Koelsch et al. (2010: 330-333) is based on the premise that once the brain defines a situation as 'real', this results in real consequences for the brain, namely when an emotion is evoked its consequences are real. Furthermore, the authors maintain that no music-evoked emotion is artificial (i.e. can only be induced by music) and, conversely, that should there be any emotion which cannot be evoked by music, then it is not an actual emotion. Addressing another related point, which was discussed earlier in this chapter, Koelsch et al. (ibid.) counter the argument of music not having a survival function in evolutionary terms by adducing as evidence the real physiological benefits of music-induced emotion (Koelsch and Siebel 2005), in addition to its social aspects in this respect. Another important observation by Koelsch and colleagues (2010: 330-333) concerns the relationship between sadness evoked by music as opposed to that which may be experienced following an event in the reality of daily life, such as bereavement. They claim that the enjoyment that some listeners derive from sad music may be a function of the relief experienced in the realisation that a negative event will not actually occur, as may be the case after having avoided an unpleasant situation, for example. As a result of this, the authors explain, the brain's reward centre is activated, making the experience pleasurable. This could provide one explanation for the enjoyment that the operaphile derives from tragic opera, although it would be an incomplete account.

Another possible explanation for the enjoyment of sad music has been proposed by Huron (described in the interviews by Farr 2008 and McCallumo 2007; also mentioned in Levitin 2008b: 133, Levitin and Tirovolas 2009: 220), who points out that when we cry in response to music, our tears contain prolactin, a hormone that is associated with bonding experiences, such as breast feeding, and which is produced in larger amounts in women than men. In addition, other hormones are released in the brain, including dopamine and oxytocin, which replicate the feelings that we experience during an intimate connection with others, such as the bonding between mother and infant, sexual intercourse or being praised. These hormones, Huron affirms, are produced as a result of cortical inhibition of the amygdala. Furthermore, he claims that the phenomenon of crying in response to music is closely related to that of laughter, *frissons* or chills, and awe or gasping. Levitin and Tirovolas (2009: 220) provide further information in this respect, explaining that prolactin is a tranquilising hormone released by the anterior pituitary gland when an individual feels sad, as well as following orgasm and childbirth. In addition, prolactin is not present in normal tears, or tears of laughter, but only in tears of sorrow. In terms of neural activation, Levitin and Tirovolas (ibid: 221) list the following brain areas: ‘happy’ classical music activates the bilateral ventral and left dorsal striatum, left anterior cingulate and left parahippocampal gyrus in listeners not selected by musical background (Mitterschiffthaler et al. 2007); ‘neutral’ classical music activates the insula; and ‘sad’ classical music activates the hippocampus and amygdala (in all three cases, auditory association areas are also activated).

In contrast to Huron’s hypothesis about prolactin, research by Evers and Suhr (2000: 144) did not find significant evidence of changes in prolactin or adrenocorticotropic hormone (ACTH) in response to the reception of different types of music. The authors also mention that previous research investigating levels of stress hormones (such as prolactin and ACTH) in response to music listening found that levels of ACTH and cortisol may be affected by listening to certain types of music, but in most studies the level of prolactin was not affected. However, as the authors caution, the length of time participants in their study listened to music may have been too short to produce significant changes. Nonetheless, the authors conclude that “the affective attitude towards the music is the more relevant factor influencing changes of neurotransmission during music perception” (ibid.: 147). This comment ties in with Panksepp’s (1998: 278) observation relating to research about music-induced chills, which will be discussed later. As regards the duration of exposure to music stimuli, this could be raised as an issue in the case of most studies, which typically require that participants listen to short musical fragments rather than complete works. As a result, it could be argued, the incomplete nature of the musical stimuli themselves further compounds the artificial setting of the laboratory. In other words, participants are exposed to musical stimuli in a setting that is not natural and a full affective response cannot be obtained due to the truncated nature of the musical stimuli. This would most likely pose a problem in the case of opera, which is typically designed to evolve over several hours so that a cumulative affective response can be developed based on intervening peaks and troughs.

Although a definitive neuroscientific explanation may not as yet be available to account for the enjoyment of listening to sad music, there is evidence that people do listen to music for the purpose of affect regulation (Chamorro-Premuzic and Furnham 2007: 182). As mentioned by Sloboda and Juslin (2010: 83), one of the first studies to measure physiological changes in response to various types of music was conducted by Krumhansl (1997), who demonstrated that these changes were similar to those not induced by music. However, Hodges (2010: 296-297) notes that some researchers who support a cognitivist position question a direct link between music and emotion, such as Grewe et al. (2007b), Konečni (2008), Konečni et al. (2008), Scherer (2004) and Scherer and Zentner (2001). Hodges (2010: 296-297) provides a number of examples, such as Konečni (2008), who believes that an emotional response may not be associated with physiological changes while listening to music; or Konečni and colleagues (2008: 292), who believe that physiological changes do not equate to the presence of an emotional response, and that although music may contribute to physiological changes underlying real emotions, it cannot induce them. Despite these views, as Hodges (2010: 296-297) observes, there are many more psycho-physiological studies that demonstrate a link between music and its ability to induce or evoke emotions, such as by Rickard (2004), who established that skin conductance and chills increase in response to music that is emotionally powerful; or Gomez and Danuser (2007), who found a relationship between the structure of music and perceived as well as experienced emotions; and Lundqvist et al. (2009), who showed that emotions evoked in listeners matched those conveyed by the music. Even so, Sloboda and Juslin (2010: 83-84) raise an important consideration in this respect: although some studies assume an equivalence between the emotion perceived in music and that experienced by a listener, Gabrielsson's (2002) work has shown that this is not always the case. The relationship may be positive (e.g. music is perceived as happy and induces happiness in the listener); negative (e.g. music is perceived as happy but induces sadness in the listener); no systematic relationship (e.g. music is perceived as happy but does not induce emotion in the listener) and unrelated (e.g. no emotion is perceived in the music, but emotion is evoked in the listener).

Echoing a difficulty mentioned earlier in this chapter, Hodges (2010: 297) emphasises that ongoing disagreement among researchers revolves around the basic issue of “what constitutes an induced emotion”. Juslin and Västfjäll (2008: 561-562) provide a description of the features that researchers generally agree characterise an affective response, namely a reaction to an event or change in the internal or external environment:

> (a) cognitive appraisal (e.g., you appraise the situation as “dangerous”), (b) subjective feeling (e.g., you feel afraid), (c) physiological arousal (e.g., your heart starts to beat faster), (d) expression (e.g., you scream), (e) action tendency (e.g., you run away), and (f) regulation (e.g., you try to calm yourself).

Similarly to Gabrielsson (2002), as mentioned above, Juslin and Västfjäll (2008: 561) note that the perception of emotion does not necessarily reflect what a listener is actually feeling. The researchers distinguish between how emotions are conveyed and perceived, as opposed to how a listener actually responds. Juslin and Västfjäll (ibid.: 559) identified a neglect by researchers of the underlying mechanisms through which emotions are evoked by music, or at least an assumption that these emotions are induced by cognitive appraisal. Consequently, in an attempt to resolve disagreements among researchers and promote consistent findings, Juslin and Västfjäll (ibid.) proposed a further six mechanisms to account for the way in which emotion may be induced by music: “(1) brain stem reflexes, (2) evaluative conditioning, (3) emotional contagion, (4) visual imagery, (5) episodic memory, and (6) musical expectancy”.

3.6.2 Being surprised by the (un)expected

Expectation or anticipation and surprise are at the heart of a psychological theory proposed by David Huron (2006) to account for the way in which music evokes certain emotions. This theory essentially hinges on the ‘biology of pessimism’, or self-preservation, that is the ‘fight’, ‘flight’ and ‘freeze’ responses to surprise and fear of a potentially life-threatening danger (ibid.: 34-35). According to Huron’s theory, the *frissons* or chills and related piloerection (body hair ‘standing on end’) evoked by music are likened to the fight response, which is characterised by an aggressive stance, as when the coat of animals becomes puffed up, making them look bigger (ibid.: 35). He claims that this particular response can be heightened by loudness and violation of expectation of certain musical features. On the other hand, his theory likens laughter evoked by music to a panting-like flight response and awe evoked by music to the freeze response, in which you inhale sharply and then hold your breath. In short, all three of these responses to music are based on an adapted fear response. The explanation for this is attributed to a supplementary auditory circuit (mentioned earlier) that links the ear directly to the amygdala and cerebellum, allowing fast response to sound based on emotion and consequent movement, such as flight (Levitin 2007: 184, 186). Depending on the context, any one of these three fear responses may be triggered very quickly, before we become conscious of it, and the evaluation process that follows immediately after may cancel (inhibit) the fear response if no actual threat is identified (Huron 2006: 36). Huron claims that listening to music may be similar to other activities that involve taking pleasurable risks, such as skydiving.

However, as Huron explains, in the case of music, the surprise response brought about by the violation of expectation can only occur if a listener is familiar with the conventions and schemas of the musical form in question, which is dependent on the listener's acculturation. Conversely, the surprise or startle effect of a particular musical feature, such as loudness or a sudden variation, still occurs even when the piece of music is familiar to a listener (ibid.: 226). This illustrates the operation of the 'instinctual' response involving the supplementary auditory circuit and the subsequent risk-evaluation process by the cognitive areas of the brain (ibid.: 38), i.e. initial activation of the thalamus-amygdala circuit as opposed to subsequent activation of the thalamus-cortex-amygdala circuit (ibid.: 226). Huron (ibid.: 38-39) suggests that this type of modified fear response may help to prevent it from being unlearned given that, in theory, we are able to learn an infinite number of new surprise responses out of fear of potential threats. Another effect that may be linked to a prevention of unlearning is music that becomes lodged in the head – an 'earworm' as Oliver Sacks (2007: 42) describes it, from the German term *Ohrwurm*. These musical segments last about 20 seconds, as long as auditory short-term memory, and may serve the purpose of allowing the brain to practise variations on a theme (Levitin 2008a: 61).

Nevertheless, Huron (2006: 39) explains that the *frisson*, laughter and awe responses to the violation of expectation in music may not apply to the same extent, if at all, in the case of music-evoked emotions such as happiness or sadness. Huron's hypothesis to account for a listener's enjoyment of sad music has been described above. Another response mentioned by Huron (2008b) that is relevant to this thesis is that of surrender or appeasement, which in human beings is manifested as a 'lump in the throat' or weeping.

Although Huron's expectation theory is convincing, in particular as it could apply to certain affective and physiological responses in operaphiles, as described below, it does not fully account for all emotions that may be experienced in response to music listening. One of the reasons for this may be the fear-response basis of Huron's theory, which hinges on initial activation of the thalamus-amygdala circuit and subsequent activation of the thalamus-cortex-amygdala circuit (Huron 2006: 226), given that the amygdala are also involved in processing positive emotions and not just fear (Jarrett 2008). Evidence for this has been found by various studies (e.g. Costafreda et al. 2008; Hamann and Mao 2002; Koelsch, Fritz et al. 2008; Sergerie et al. 2008). The amygdala may be more accurately described as having "a pivotal role in the processing of emotionally significant sensory information" (Ball et al. 2007: 1). According to Ball et al., specific areas of the amygdala, known as latero-basal group (LB), superficial group (SF) and centro-medial group (CM) are thought to be involved in the processing of different sensory stimuli, with positive auditory stimuli activating LB, whilst negative auditory stimuli activate SF and CM. The LB group appears to show greater activation in response to auditory stimuli. However, these findings serve to nuance Huron's theory, rather than invalidate it.

3.6.3 Lost and found

Panksepp's (1995, 1998) psycho-biological evolutionary theory of separation distress is worth mentioning here, as it relates to elements in Huron's theory, as well as to the overall scope of this thesis. Panksepp (1998: 278) highlights several interesting points about sad music and the *frissons* or chills that it evokes in listeners. He explains that, based on research, music-induced chills are experienced by listeners more frequently in response to music that is rated as sad, as opposed to music that is rated as happy. He also mentions that music-induced chills are experienced to a greater extent in response to music that is selected by listeners themselves, perhaps because of their intimate knowledge of the music, as well as its special meanings and associations for them. Based on these findings related to sad music and chills, Panksepp (1998: 278) suggests the possibility that:

> [A] major component of the poignant feelings that accompany sad music are sounds that may acoustically resemble separation DVs [distress vocalisations] – the primal cry of being lost or in despair.

Additionally, Panksepp and Bernatzky (2002: 143) comment that chill-inducing music may have similar acoustic features to the distressed separation calls of young animals. Hence, and of particular relevance to this thesis, Panksepp and Bernatzky (ibid.) believe that:

> [A] high-pitched sustained crescendo, a sustained note of grief sung by a soprano or played on a violin (capable of piercing the 'soul' so to speak) seems to be an ideal stimulus for evoking chills.

Therefore, chills may be the physiological manifestation of a homeostatic thermal response that occurs as a result of the brain's emotional system perceiving and reacting to social loss and separation, given the possible link between the brain's thermo-regulatory functions and social motivation (Panksepp 1998: 278; Panksepp and Bernatzky 2002: 143). According to the separation distress theory proposed by Panksepp (1998: 278):

> [W]hen we hear the sound of someone who is lost, especially if it is our child, we also feel cold. This may be nature's way of promoting reunion. In other words, the experience of separation establishes an internal feeling of thermoregulatory discomfort that can be alleviated by the warmth of reunion.

Based on the above considerations, Panksepp and Bernatzky (2002: 144) conclude that:

> [W]ithin musical performances that evoke chills, a wistful sense of loss blended with the possibility of reunion may be so well represented in the dynamics of sound that we become deeply moved. Such musical experiences speak to us of our humanness and our profound relatedness to other people and the rest of nature. The musical experience may communicate to us the possibility of redemption, the joy of being found and nurtured if one is lost.

These theories are of particular relevance to the discussions in this thesis, as they mesh with certain subjective aspects of the operatic reception experience.

Furthermore, Panksepp and Bernatzky state that music-induced chills are controlled in part by endogenous opioids that may result from the release of endorphins, which may perhaps be related to a sudden decrease in opioid activity. Panksepp and Bernatzky localise the neural networks of the emotional system responsible for separation distress in "the bed nucleus of the stria terminalis and septal area, the medial diencephalon and the PAG [periaqueductal gray]" (ibid.), based on evidence from a

PET study by Blood and Zatorre (2001) that showed activation of these areas while subjects listened to chill-inducing music.

Huron and Margulis (2010: 597) draw a connection between Panksepp's theory and the work of Beeman (2005) on the acoustic properties of infant cries, which have an energy peak of approximately 3-4 kHz. Interestingly, as explained by Huron and Margulis (2010: 597), hearing in human beings is more sensitive in the range of 1-6 kHz, and especially in the range of 3-4 kHz (Fletcher and Munson 1933). Huron and Margulis (2010: 597) point to a link between these data and research showing that adults find the cries of babies distressing (Drummond et al. 1999; Lester 1978; Lester et al. 1992). In addition, they highlight that the scream of adult males and females is also within the 1-6 kHz range of optimal hearing. Of particular relevance to this thesis, Huron and Margulis (2010: 597) describe the work of researchers (Johnstone and Scherer 1995; Sundberg 1972, 1977, 1987) who studied the acoustic features of the operatic voice and found that the peak energy levels of the "singer's formant" (Sundberg 1972, 1987), as mentioned in Chapter 1, correspond approximately to those of infant cries and adult screams, namely between 2.9 kHz and 4.1 kHz. Huron and Margulis (2010: 597) conclude that this close similarity with the adult scream or the infant cry may also account for listeners who dislike the operatic voice. In this respect, the authors mention Panksepp's (1995) observation that responsiveness to distress calls varies between individuals and is related to bonding and familiarity, so that although parents empathise with their children's cries, a stranger finds them annoying.

3.6.4 Features of music that induce emotions

The features of music that are significant in inducing emotional responses include loudness, pitch, high and low notes (Levitin 2007: 71-72), tension and resolution, as well as dissonance and consonance (Trainor 2008: 599). Although very small variations in loudness can significantly affect the emotion that is conveyed by music (Levitin 2007: 72), pitch is the principal element that expresses emotion in music (ibid.: 26). High and low notes are capable of expressing happiness or sadness, and their combination can convey a whole range of emotions (ibid.). Pitch sequences are processed in the dorsolateral prefrontal cortex, as well as Brodmann areas 44 and 47, while emotion is processed in the frontal lobes, cerebellum, amygdala and nucleus accumbens, which form part of the pleasure and reward systems of the brain (ibid.: 91). An fMRI study conducted by Mitterschiffthaler et al. (2007) to investigate 'happy' and ‘sad’ affective responses to classical music found a possible network for the processing of emotion evoked by music. This network consists of the ventral and dorsal striatum, the reward system, areas related to movement, as well as the anterior cingulate that is associated with attention, and medial and temporal areas that are associated with assessment and processing of emotions (ibid.). Warren (2008: 35) explains that emotional responses to music are processed by the limbic system, an evolutionarily much older neural network that comprises a number of areas, including the amygdala, hippocampus, fornix, parahippocampal gyrus, thalamus, hypothalamus, cingulate gyrus, brainstem, ventral tegmental area, septum and nucleus accumbens. He adds, as mentioned earlier, that music activates the limbic system in a similar way to basic drives, such as eating or having sex. The insula is described by Warren (ibid.: 35-36) as being involved in the processing of perceptual, cognitive and emotional information and therefore may be responsible for integrating these aspects during music listening.

3.7 Music, Emotion, Gender and Sexuality

As noted in the introduction to a study by Schön et al. (2005: 71) on the neural processing of music and lyrics in songs, much research in this area has investigated music and language separately. Schön and colleagues emphasise the problems of comparing the results of research involving different tasks, subjects and analyses when trying to identify significant common features among study findings. This issue was mentioned among the potential limitations of the research presented in this thesis. Schön and colleagues also remark that, although these comparison difficulties may be lessened when the same participants and similar methods are used across studies, the models are often too simplistic and the validity of materials is compromised in any attempt to make the tasks and materials comparable. Perhaps it is partly because of these difficulties in trying to reconcile study findings that there has been an ongoing debate among researchers as to whether the lyrics and tunes in vocal music are processed separately or jointly by the brain (Sammler et al. 2010: 3572). Nonetheless, there appears to be some agreement that the long history, popularity and richness of vocal music may be due to the fact that it combines both language and music (Bonnel et al. 2001: 1201; Sammler et al. 2010: 3572; Schön et al. 2005: 71), which are “two of the most specific, high-level skills of human beings” (Besson et al. 1998: 494).

Sammler et al. (2010: 3572) note that, among researchers supporting the view that music and lyrics are processed independently of each other, convincing clinical evidence (e.g. Hébert and Peretz 2001; Hébert et al. 2003; Peretz 1996; Racette et al. 2006; Samson and Zatorre 1991, experiment 2) has been adduced based on studies involving patients with aphasia and brain lesions, as well as findings of studies (e.g. Besson et al. 1998; Bonnel et al. 2001) involving healthy participants. In addition, Sammler et al. (2010: 3572) observe that there is also strong evidence from a variety of studies (Bigand et al. 2001; Crowder et al. 1990; Lidji et al. 2009; Poulin-Charonnat et al. 2005; Schön et al. 2005; Samson and Zatorre 1991, experiment 1; Serafine et al. 1984, 1986) supporting the notion that the neural processing of music and lyrics occurs in an integrated manner. Whereas it has been proposed that music and lyrics may be integrated in terms of memory (Crowder et al. 1990; Samson and Zatorre 1991; Serafine et al. 1984, 1986), semantic and melodic/harmonic processing in real time have been observed to occur independently of each other (Besson et al. 1998; Bonnel et al. 2001). However, as Besson et al. (1998: 497) remark, the comparison of other elements of music and lyrics, such as syntax and rhythm, or prosody and melody, could yield different results. In attempting to solve the debate surrounding the polarised views of integrated versus separate processing of music and lyrics, a further possibility suggested by Besson and colleagues may be that the unity of vocal music, like that of other cognitive tasks, results from the collaboration of separate neural processes.

3.7.1 Integration and separation in the neural processing of music and lyrics

A recent fMRI adaptation study by Sammler et al. (2010) made a significant step forward in resolving this debated issue by investigating the neural processing of the lyrics and tunes of unfamiliar songs. The originality and significance of the results of this study lie in the fact that they are able to reconcile to some extent both sets of opposing views supporting either the integrated or separate processing of music and lyrics. Specifically, the study found that passive listening to unfamiliar songs involves various degrees of integration and separation during the different processing stages in the superior temporal lobe and left pre-central gyrus (ibid.: 3576). The authors suggest that the process evolves with a posterior-anterior gradient, from an initial integration of music and lyrics in the mid superior temporal sulcus, to an increasing separation in the processing of lyrics in the anterior temporal regions (ibid.). Given the importance of these findings in the field of music reception, as well as their relevance to the thrust of this thesis, it may be worthwhile examining this study in more detail.

The study by Sammler and colleagues (ibid.: 3573) involved six male and six female participants, who were non-musicians and native speakers of French. The subjects were required to listen to songs with meaningful lyrics that had been composed specifically for the experiment, based on French folk songs from the nineteenth century. The songs were performed by trained singers – two sopranos, an alto, two tenors and a bass – and the recordings were played to study participants in a random manner to avoid adaptation to the singers' voices. A total of 168 songs were divided into four groups: songs with the same music and lyrics; songs with the same music but different lyrics; songs with the same lyrics but different music; and songs with different music and lyrics. The study methodology in presenting randomised songs from these groups of auditory stimuli during fMRI scanning was based on an adaptation paradigm, which is also known as neural priming. According to this paradigm, the repeated presentation of specific features of a stimulus results in decreased activation of the neural circuits that process those features (ibid.: 3572-3573). Based on this principle, and using fMRI to observe blood flow, the researchers were able to identify areas of the brain in which adaptation was induced.

As described by Sammler et al. (ibid.: 3574), the fMRI scans showed auditory activation of Heschl's gyrus, the superior temporal gyrus and sulcus bilaterally, the pars triangularis of the left inferior frontal gyrus (Brodmann area 45 – Broca's area) and the left inferior temporal gyrus (Brodmann area 20), as well as motor activation of the dorsal pre-central gyrus, the cerebellum bilaterally and areas of the basal ganglia. The repetition of lyrics, even with varying music, was found to induce adaptation mainly in the superior temporal gyrus and sulcus predominantly in the left hemisphere. The adaptation effect was even greater if the music as well as the lyrics were repeated. Interestingly, similar areas bilaterally were affected by the repetition of music. However, as pointed out by the researchers (ibid.: 3575), adaptation was not observed in any areas of the brain in response to the repetition of music with varying lyrics, except for a very limited effect in the right mid superior temporal sulcus. On the other hand, the repetition of music and lyrics was found to induce adaptation bilaterally. In comparing these aspects of their results with those of other studies claiming the separate processing of music and lyrics, the researchers found that repeated lyrics rather than music induced a greater adaptation effect in the anterior part of the left superior temporal sulcus. In the case of music as opposed to lyrics, no distinct adaptation effect was observed in any area of the brain. By further analysing the fMRI data at a different statistical threshold, the researchers also observed the integrated processing of music and lyrics in the left mid superior temporal sulcus and the left dorsal pre-central gyrus, but not in the right hemisphere.

Sammler et al. (ibid.: 3576) comment on the similarity between their findings and those of other studies dealing with speech perception that observed increasingly complex and abstract hierarchical stages of processing in the superior temporal lobe, from primary auditory areas towards the left superior temporal gyrus and superior temporal sulcus. In summary, the study by Sammler and colleagues identifies a posterior to anterior gradient in the left superior temporal sulcus, essentially involving integrated processing of music and lyrics at a phonemic level in the mid superior temporal sulcus, followed by increasingly abstract and independent processing of lyrics, in terms of structure and semantics, in the left anterior superior temporal sulcus (ibid.: 3575, 3576). Lastly, an interesting point noted by the researchers (ibid.: 3577) is that whilst the processing of music and lyrics is closely bound, lyrics are processed in a more independent manner. This point is of particular relevance to this thesis and casts light on previous discussions, for example about the historical tension between the words and music in opera, or the way in which the singing voice transcends the lyrics and the music in opera, or the overlap between the processing of music and language.

3.7.2 Music and lyrics – emotion and gender

The relationship between music and lyrics was investigated in a slightly different way, in relation to emotion and to gender, in a study involving four experiments conducted by Ali and Peynircioglu (2006). The authors examined the extent to which the music and lyrics of songs convey/induce emotion by comparing the reception of the same instrumental music with and without lyrics. As a backdrop to this aspect of their research, Ali and Peynircioglu (2006: 513-514) mention two previous studies (Galizio and Hendrick 1972; Gfeller and Coffman 1991) confirming that song lyrics influence the perception of emotion, as well as contradictory evidence of two studies focusing on happy and sad emotions which demonstrated that lyrics can influence mood more than melody (Stratton and Zalanowski 1994) and vice versa (Sousou 1997).

The study by Ali and Peynircioglu (2006: 514) also investigated the emotion conveyed/induced by music and lyrics in relation to the gender of study participants and based on the gender of the vocalists. Unfortunately, for the purposes of this thesis, the researchers did not specify the vocal register (e.g. soprano, tenor, etc.) of the vocalists. In any case, the researchers did not find any differential effects either in terms of the vocalists' gender affecting participants' intensity ratings, or in terms of interaction between vocalists and participants based on gender (ibid.: 518). The background provided by the researchers includes the claims that, in general, emotion appears to be experienced more intensely by females than males (Brebner 2003) and that females seem to be more sensitive than males to the emotional content of instrumental music (Peretti 1975). An additional background consideration mentioned by Ali and Peynircioglu (2006: 514) in relation to emotion and gender is that music and lyrics, both separately and jointly, produce higher affective response ratings for negative emotions by females, compared to higher affective response ratings for positive emotions by males (Coffman et al. 1995). Furthermore, the researchers refer to the findings of a previous study (Iversen et al. 1989), according to which females considered lyrics more personally relevant if they were presented in song rather than in written form with no music, whilst the opposite was true in the case of males. Ali and Peynircioglu (2006: 514) refer to the possibility that males focus more on the music than the lyrics, whilst females integrate music and lyrics to identify the emotion that is conveyed by both together. These suggestions are significant for the purposes of this thesis, as they appear to tie in with the notions suggested in the previous chapter relating to the trajectory of the operatic voice and the greater emotional involvement of males in the reception of opera.

The study conducted by Ali and Peynircioglu (ibid.) consisted of four experiments, each of which investigated the following: 1) the intensity of affective responses to music with and without lyrics; 2) any predominance of music or lyrics, tested by means of occasionally mismatching the two in terms of emotion; 3) the transfer by association to non-musical stimuli, namely images of common objects, of the affective response to background music with and without lyrics; and 4) the same as experiment 3, except that music and lyrics were not always emotionally congruent, as in experiment 2. The emotion intensity rating 'labels' used in these experiments were 'happy' and 'calm' (positive emotions), 'sad' and 'angry' (negative emotions). These experiments yielded interesting results and the main points merit further description, at least in general terms, given their relevance for the overall scope of this thesis. In the following description of the experiments, the fine detail of the results pertaining to each of the four emotion 'labels' has been omitted in favour of a condensed outline, using the broad categories of 'positive emotions' and 'negative emotions' instead.

In experiment 1, Ali and Peynircioglu (ibid.: 517) found that all participants rated music conveying positive emotions as more emotionally intense than music conveying negative emotions, although the researchers caution that this result may have been due to a tendency to this effect among the participants, or to the particular selection of music that was used in the experiment. Overall, participants rated music without lyrics as more emotionally intense. In the case of females, but not males, the lyrics were found to detract from the intensity of the emotion conveyed by the music. Interestingly, music conveying negative emotions was rated by participants as more emotionally intense when combined with lyrics, whilst the opposite was true for music conveying positive emotions.

In experiment 2, Ali and Peynircioglu (ibid.: 520-523) observed that emotional congruence of music and lyrics, as opposed to incongruence between the two, was rated as more emotionally intense by participants, indicating that both music and lyrics were jointly contributing to the evoked emotion. However, in the case of mismatched music and lyrics, the researchers noted that higher emotional intensity ratings were achieved in the case of emotionally congruent music with mismatched lyrics than vice versa, indicating that the music of a song, rather than its lyrics, was more effective in evoking the intended emotion. Additionally, happy music with sad lyrics was rated as evoking more happiness than sadness, whilst sad music with happy lyrics was rated as evoking more sadness than happiness. Therefore, when the music and lyrics were emotionally incongruent, the emotion conveyed by the music was found to predominate in terms of evoked emotion. No significant gender differences were observed.

The results obtained by Ali and Peynircioglu (ibid.: 525-526) in experiment 3 showed some similarities as well as differences compared to those in experiment 1. For example, in terms of emotions transferred to images of objects, pictures combined with music conveying positive emotions were rated as more emotionally intense than those combined with music conveying negative emotions, which was consistent with the results in experiment 1. However, unlike experiment 1, positive emotions were not lessened by music with lyrics, nor were negative emotions increased by music with lyrics. In other words, in this experiment, the lyrics had even less effect on the transfer of emotions to the pictures. Conversely, although specific emotions were decreased by presenting the pictures, the broad emotion conveyed by the music was unaffected.

Lastly, in experiment 4, Ali and Peynircioglu (ibid.: 526-527) found that images presented in combination with emotionally congruent music and lyrics evoked more intense emotion than music with emotionally incongruent music and lyrics, although only with music that did not match the image as opposed to lyrics that did not match the image. Pictures presented in combination with emotionally congruent music but incongruent lyrics evoked more intense emotion than with incongruent music and congruent lyrics. In addition, images presented with incongruent music and lyrics evoked more emotion than images presented with no music, although this only occurred when the lyrics did not match the picture. As in the previous experiment, the emotion evoked by the music was transferred by association to the images. Furthermore, the music was again found to predominate over the lyrics in terms of evoking the intended emotion transferred to the images.

The results of these experiments are of interest in terms of their possible relevance to the operatic reception experience. Experiments 3 and 4 could be related to the primary venue of the opera house. By extrapolation, whilst the visual element of opera may enhance the affective response to the music and singing in certain cases, it is ultimately the music and singing (the voice *as* music), rather than the semantic content of the lyrics (the voice *in* music), that are responsible for evoking the most intense affective response.

Ali and Peynircioglu (ibid.: 529) concluded from these results that lyrics are capable of enhancing the effect of music conveying negative emotions, whilst the absence of lyrics enhances the effect of music conveying positive emotions. In addition, the emotional impact of music is transferred by association to neutral stimuli, particularly in the case of positive emotions. As mentioned above, the researchers did not observe any main effects based on the gender of participants, or between the gender of participants and that of the vocalists. However, the researchers did find a significant gender difference in experiment 1, namely that in females (but not males), lyrics reduce the intensity of emotion that is conveyed by music (ibid.: 517). This would appear to tie in with the notion proposed in the previous chapter, as mentioned above, that males have a greater emotional investment in opera than females. In general, however, the results of the experiments conducted by Ali and Peynircioglu cannot be said to support or complement the theories discussed in the last chapter. In this regard, it is worth highlighting that the music used by these researchers was jazz and not opera. Therefore, the musical and other dynamics involved, and the resulting effects on the listeners, are arguably quite different.

Although there are other studies that have not identified any main effects based on gender in terms of the affective response to music (Robazza et al. 1994), the valence and intensity of musical emotions (Schmidt and Trainor 2001), or the way in which music is used in daily life (Chamorro-Premuzic and Furnham 2007), this is by no means the case in all studies. The reason for this contradiction in findings may be due to differences in the design of studies. As noted by Chamorro-Premuzic and Furnham (2007: 183), gender has been identified in several studies (such as Coffman et al. 1995; Kamenetsky et al. 1997; Panksepp 1995) as an important factor in the emotional response to music, the general consensus being that the affective response to music is more marked in females than males. However, as mentioned earlier, detailed clarification is required to disambiguate whether this response means being more sensitive to identifying emotion that is conveyed by music, or actually experiencing more intensely music-induced emotion, and/or if this evoked emotion is congruent with the emotion conveyed by the music (and if not, how and why it differs).

A useful way of exploring gender differences in music reception is by examining the processing of music in terms of the functional organisation of the brain. This was done in an original study by Koelsch et al. (2003) investigating brain electrical responses in music processing, based on data from previous experiments using electroencephalography (EEG) and event-related brain potentials (ERPs). Musical chords had been used as the experimental stimuli for the 62 non-musician male and female participants. Stated as a premise by the researchers (ibid.: 709), the brains of males and females are known to differ in terms of structure and functionality (Kimura 1999), such as greater bi-laterality in language processing in females as opposed to greater left hemisphere processing for the same task in males. Koelsch et al. (2003: 709) affirm that these differences are supported by evidence from fMRI studies (Jaeger et al. 1998; Kansaku et al. 2000; Phillips et al. 2001; Pugh et al. 1996), left-hemisphere lesion studies in male and female aphasics (McGlone 1980), research on dichotic listening in children (Moulden and Persinger 2000) and the greater incidence of language disorders in males (Hier 1979). In addition, there is further evidence of this difference from recent research demonstrating the effect of testosterone on the organisation of language in infant brains (Friederici et al. 2008). The study by Koelsch et al. (2003: 712) observed for the first time that gender differences in the response to inappropriate harmonies in musical sequences were similar to those for language processing. Bilateral activation of the brain was found in females, as opposed to lateralised right hemisphere activation in males, in response to music stimuli. These findings revealed gender differences in processing auditory information beyond language, such as syntax, semantics and phonology.

Gender differences have also been identified by other studies. For example, Rademacher et al. (2001: 1561) found that the brain volume of the auditory cortex is significantly larger bilaterally in females, with more frequent asymmetries towards the right side. Ruytjens et al. (2007: 2073) observed that, whereas the primary auditory cortex in both males and females is activated to a greater degree by music than noise, this distinction is much more significant in males. By contrast, the authors found that compared to baseline values, activation of the primary auditory cortex in response to noise is greater in females, whilst the right prefrontal cortex (which is associated with selective or sustained auditory attention) becomes deactivated in males but not in females. Based on these findings, the authors suggest that there may be a difference in auditory attention between males and females, which results in distinct activation of the primary auditory cortex. In other words, males are able to focus by filtering out extraneous sounds to a greater extent than females. Before moving on, it is worth reiterating that it is unfortunate for the purposes of this conceptual thesis that, to this author's knowledge, research has not been conducted using operatic vocal music to investigate any differential reception effects based on the gender of listeners and the gender of vocalists. This merits specific attention, given the unique vocal dynamics and conventions of operatic music and the somewhat unique resulting effects on listeners, as discussed elsewhere in this thesis. Perhaps this point will be investigated empirically by other researchers in future.

The last part of this section, which closes this chapter, will explore the possibility of some overlap between the brain processes involved in the enjoyment of music and those relating to sexual arousal and/or orgasm. In order to do so, a relevant choice selection of the otherwise abundant literature in the field of sexuality research will be drawn upon. Rather than attempting to come up with definitive neural evidence of any overlap, which would be beyond the scope of this thesis, the following discussion aims instead to provide support for the *possibility* that such an overlap may exist, based on the findings from another area of scientific research. The purpose of doing so is to bolster empirically, to some degree, one of the theoretical notions proposed in this thesis, namely that the enjoyment of the music-listening experience has an erotic component. It is hoped that this discussion may inspire subsequent research to investigate the possibility directly.

3.7.3 A possible neural basis for an erotic component in the music-listening experience

As a preamble to this discussion, in order to reinforce the possibility of a neural link between the experience of enjoyment and pleasure in the contexts of music listening and sexual arousal/orgasm, it is worth reiterating a couple of points that were made earlier. Firstly, the response of the brain's limbic system to music is similar to that of other basic drives, such as eating or having sex (Warren 2008: 35). Secondly, the emotion evoked by music is processed in the frontal lobes, cerebellum, amygdala and nucleus accumbens, which form part of a system of brain regions that are associated with pleasure and reward (Levitin 2007: 91). Consequently, the experiential outcome of listening to music or having sex, namely enjoyment and pleasure, can be said to involve some of the same neural processes. Obviously, a key distinction is that the enjoyment and pleasure of listening to music does not result from or involve genital or related stimulation, as is the case in sexual arousal/orgasm. Based on this consideration alone, the notion of a parallel between the two activities would immediately appear to have a serious flaw. Nonetheless, a number of arguments may be adduced in support of a possible relationship by virtue of the absence of genital stimulation.

In their book *The Science of Orgasm*, Komisaruk et al. (2006: 199) dedicate a chapter to 'atypical orgasms', namely non-genital orgasms that occur without genital stimulation. The diverse evidence provided by the authors suggests that orgasms can be generated in the male and female brain even in the absence of sensory information from the genitals. Among the unusual descriptions of 'phantom limb orgasms', 'nose orgasms' and 'knee orgasms' (ibid.: 221-222), a couple of contexts for non-genital orgasms are of particular interest: those occurring during dreaming sleep (ibid.: 199-200) and during epileptic seizures (ibid.: 214-216).

In the first case, Komisaruk and colleagues (ibid.: 199-200) refer to research by Fisher et al. (1983) in which physiological changes were recorded for a sleeping woman who experienced an orgasm during a dream. The woman described the dream when she woke up. The physiological changes included doubled heart rate, almost doubled respiration, as well as significantly increased vaginal blood flow and vascular engorgement – which is similar to an erection of the penis in males. As Komisaruk et al.

(2006: 200) explain, this evidence demonstrated that although the orgasm experienced by the sleeping woman in a dream was not the result of genital stimulation, her autonomic system was activated by the brain in the same way as it would have been following genital stimulation, indicating that the orgasm was initiated 'spontaneously' within the brain.

In the second case, relating to orgasms during epileptic seizures, Komisaruk and colleagues draw upon the findings of various empirical studies demonstrating the occurrence of orgasms independently of genital stimulation. The authors point out that research on epileptic seizures has provided a great deal of information about the neural processing of orgasms (ibid.: 214). As explained by the authors, prior to a seizure many epileptics have described experiencing an orgasm-like state, which has been called an 'orgasmic aura' or 'sexual aura' by researchers (Anzellotti et al. 2010; Calleja et al. 1988; Janszky et al. 2002, 2004; Reading and Will 1997). Orgasmic or sexual auras are characterised by "erotic feelings accompanied by sexual arousal and orgasm" (Aull-Watschinger et al. 2008: 124). However, the pleasant erotic feelings and thoughts do not necessarily lead to arousal and orgasm as such (Anzellotti et al. 2010: 88). Komisaruk et al. (2006: 214) state that these sexual/orgasmic auras have been found to originate mainly, although not exclusively, in the right temporal lobe, where the hippocampus and amygdala are located. They also add that, although orgasmic auras may be experienced as non-genital orgasms, in some cases these auras also involve the sensation of genital stimulation. Komisaruk and colleagues (ibid.: 216) propose that this orgasmic experience in epilepsy may be due to a consecutive series of abnormal synchronous activations and deactivations of a large number of neurons, which parallels the rhythmic timing of the mass synchronous neuronal activation/deactivation resulting from genital stimulation.

In concluding their chapter on atypical, non-genital orgasms, Komisaruk et al. (ibid.: 223-225) state that the genitals are ideally structured to mediate orgasm and the physiological effects of orgasm are perceived in various areas of the body, such as the respiratory system. Although the authors propose that, under appropriate conditions, other areas of the body may also mediate an experience with many of the same features of orgasm, independently of genital stimulation. Having established the existence of abundant evidence demonstrating that arousal and orgasm can be experienced in the brain without genital stimulation, it may be useful to examine next some of the research findings about brain areas and neurochemical processes involved in the experience of arousal/orgasm. This will allow parallels to be drawn between sexual arousal/orgasm and the enjoyment of music.

Komisaruk et al. (2006: 267-285) provide a detailed explanation – within the limits of current knowledge – of the brain areas involved in the process of orgasm, which broadly comprise the limbic system and more specifically the paraventricular nucleus of the hypothalamus, the nucleus accumbens, the cingulate cortex, the insular cortex, the hippocampus and the amygdala. As a comparably detailed discussion of these areas is beyond the scope of this thesis, only relevant points about each area's functions will be provided here.

According to the description provided by Komisaruk and colleagues (ibid: 273-274), the paraventricular nucleus is activated during orgasm, which causes the pituitary gland to release oxytocin (Carmichael et al. 1994). Oxytocin is a hormone that is associated with orgasm in males and females, but also acts as a neurotransmitter in males regulating erection and ejaculation (Komisaruk et al. 2006: 274). The release of oxytocin is mediated by dopamine, a neurotransmitter produced by the dopaminergic 'reward' system, which is associated with orgasm in males and females (Komisaruk et al. 2008: 100-101). Dopamine neurons originate in the ventral tegmental area of the lower brainstem (Komisaruk et al. 2008: 101) and research (Holstege et al. 2003) has found that these are activated during male ejaculation. In addition, as mentioned by Komisaruk et al. (2006: 275, 2008: 101), research has shown that dopamine neurons are linked with the nucleus accumbens, which is activated during orgasm in females (Komisaruk et al. 2004) and males (Holstege et al. 2003). The stimulation produced by dopamine during orgasm activates the nucleus accumbens, which also occurs with drugs, for example, producing a similar orgasmic feeling (Komisaruk et al. 2006: 275). The role of the nucleus accumbens in addiction is understandable, given that this area of the brain is associated both with the anticipation and the experience of pleasure (ibid.). Research (e.g. Baumgartner et al. 2006; Blood and Zatorre 2001; Brown, Martinez and Parsons 2004; Koelsch et al. 2006; Levitin and Menon 2005; Mitterschiffthaler et al. 2007) pertaining to music has found that the nucleus accumbens is involved in the behavioural response to incentive stimuli (Koelsch et al. 2010: 322).

In addition, the anterior pituitary gland releases prolactin, which occurs after orgasm and birth and during lactation in females (Levitin 2008b: 133; Levitin and Tirovolas 2009: 220). As suggested by Huron (in the interviews by Farr 2008 and McCallumo 2007; also mentioned in Levitin 2008b: 133, Levitin and Tirovolas 2009:

220), this tranquilising hormone that has been associated with bonding experiences, such as breastfeeding, may account for our enjoyment of sad music – as evidenced by its presence in the tears of sorrow in response to music. According to Huron, cortical inhibition of the amygdala (see below) is responsible for the release of these hormones.

So far, all of these brain components involved in the experience of orgasm have been mentioned previously in this chapter in relation to the neural processing and enjoyment of music. This is also true of the other brain components described next. Activation of the cingulate cortex during orgasm may also be associated with the release of oxytocin (Komisaruk et al. 2004: 85), as well as activating the autonomic nervous system and producing an increase in heart rate, blood pressure and so forth (Komisaruk et al. 2006: 276). According to Komisaruk et al. (ibid.: 276-278), the anterior cingulate cortex responds both to the bodily sensations of orgasm (or pain) and to cognitive stimuli, producing autonomic system changes, and is therefore involved in affect regulation. The authors point out that the cingulate cortex has the double function of mediating the feelings of orgasm, as well as producing the autonomic changes that are associated with orgasm itself. Bush et al. (2000: 215) suggest that the anterior cingulate cortex is involved in the dual function of integrating "sensory, motor, cognitive and emotional information" and "influencing activity in other brain regions […] modulating cognitive, motor, endocrine and visceral responses". Beyond orgasm, activity in the anterior cingulate cortex has also been identified in a number of studies (e.g. Blood et al. 1999; Blood and Zatorre 2001; Janata 2009; Mitterschiffthaler et al. 2007) relating to music reception (Koelsch et al. 2010: 322). In these studies, the anterior cingulate cortex has been associated with autonomic and affective response regulation, mediation of emotion and cognition, motivation and attention, as well as synchronisation of various sub-systems such as cognitive appraisal and motor activity (ibid.).

The insular cortex, or insula, which is activated during orgasm, has been found to mediate the visceral response to pleasure, as well as pain, and is thought to be involved in the representation of reward in general (Komisaruk et al. 2006: 278). In addition to its role in autonomic regulation, the insular cortex is believed to be involved in integrating visceral and somatosensory response with autonomic activity (Koelsch et al. 2010: 322). As noted by Koelsch et al. (ibid.), activation of the insular cortex has been observed in music and emotion research (e.g. Baumgartner et al. 2006; Brown, Martinez and Parsons 2004; Koelsch et al. 2006; Koelsch 2010; Levitin and Menon 2005; Mitterschiffthaler et al. 2007).

Lastly, as described by Komisaruk et al. (2006: 280), the interconnected areas of the hippocampus and the amygdala are both activated during orgasm. The authors explain that, in addition to being associated with short-term memory, the hippocampus is also activated during orgasm, including thought-induced orgasm, which suggests that it may be involved in the cognitive processing of orgasm. The authors refer to research (Nauta and Feirtag 1986) indicating that the amygdala may also be involved in the cognitive processing of orgasm, namely integrating sexual stimuli with the emotions related to orgasm, as well as research (Reiman et al. 1997) that found activation of both the hippocampus and the amygdala in response to films with significant emotional content. As noted by Koelsch et al. (2010: 321), activation of these areas has been observed in studies relating to music and emotion, in which the hippocampus has been associated with memory and positive emotions (e.g. Baumgartner et al. 2006; Blood and Zatorre 2001; Brown, Martinez and Parsons 2004; Eldar et al. 2007; Koelsch et al. 2006), whilst the amygdala has been found to initiate responses of an emotional, autonomic and hormonal nature (e.g. Ball et al. 2007; Baumgartner et al. 2006; Blood and Zatorre 2001; Eldar et al. 2007; Koelsch et al. 2006).

In closing this section, several contrasting points from sexuality research are worth mentioning. Research by Holstege et al. (2003: 9185) found that male ejaculation involves strong activation of the ventral tegmental area (among other related areas), which is associated with the brain's reward system. In addition, strong activation was observed in the cerebellum, an area of the brain associated with motor control and the processing of emotion. However, activity in the amygdala, which is responsible for vigilance, was found to decrease. By contrast, subsequent research on female orgasm conducted by Holstege and colleagues (reported in June 2005 to the European Society of Human Reproduction and Embryology, Le Page 2005: 14; Portner 2008: 66) found that in addition to deactivation of the amygdala, the female brain practically shuts down. The left lateral orbitofrontal cortex showed decreased activity, which was interpreted as a lowering of tension and inhibition, whereas decreased activation of the dorsomedial prefrontal cortex, an area that may be associated with moral reasoning, was believed to indicate that judgement and reflection were temporarily suspended (Portner 2008: 66). In other words, the main differences are that orgasm in females involves significant deactivation of brain areas, in particular those that control fear and emotion, whilst orgasm in males results in activation of the brain's reward centre. According to Holstege, "at the moment of orgasm, women do not have any emotional feelings" (ibid.).

Based on the above information, the notion of a possible link between the neural processing of arousal/orgasm and music may not be implausible. As has been illustrated, both activities involve some of the same brain areas, functions and hormones. Evidence of cognitive, non-genital orgasms, without genital stimulation – even in the absence of pathology – may be consistent with the intense 'orgasmic' feeling and related autonomic responses that can be evoked by music under certain circumstances.

Conclusion

In this chapter the origins of music and singing were discussed in relation to various theories that have been proposed over time, such as evolutionary, social and language-related hypotheses. These elements informed a subsequent exploration of the reciprocal influence on the music-listening experience of culture, society, memory and language. The growing body of empirical research on the overlap between the neural processing of language and music was considered, providing a basis for the subsequent discussion of how music is processed by the brain and enjoyed. The significant and long-debated issue of music and emotion was introduced, given that music is enjoyed because of its ability to modulate emotion. Distinctions were mentioned between the conveyance, perception and induction of emotion related to music, as well as any specificity of music-evoked emotion. The last section of this chapter dealt with the reported differences in the affective response to music with and without lyrics, based on the gender of listeners. Relevant cognitive and neural distinctions were discussed in this regard. Lastly, drawing from the findings of research unrelated to music, namely in the field of human sexuality, the notion was proposed that there may be some overlap between the neural processing of music and sexual arousal/orgasm. Accordingly, a parallel was drawn between the enjoyment of music listening and sexual pleasure, based on the long-standing association between music and eroticism mentioned elsewhere in this thesis. To this end, a comparison was made of neurological, physiological and hormonal evidence in both fields in order to support the *possibility* of an overlap.

Chapter 4 – The Duet between Psychoanalysis and Neuroscience

Introduction

Following the 'complementarist' path of exploration that was pursued in the last two chapters, looking at opera and music through the separate lenses of psychoanalysis and neuroscience, this chapter represents the final destination of neuropsychoanalysis that will bring the two disciplines into focus to provide a combined, parallel account. In order to do so, significant common threads from each of the two disciplines will be woven together, in an attempt to achieve greater insight about the reception of opera and, in particular, the enjoyment of the operatic singing voice. It is hoped that by applying the inter-discipline of neuropsychoanalysis, as conceived in this thesis, the strengths of both its constituent fields can be leveraged to maximum effect. In general terms, the intended outcome of this approach is that of gaining a clearer understanding of the reception of opera and, as a result, mutually informing in this regard both psychoanalysis and neuroscience. As mentioned previously, the reception of opera has not been extensively researched by either psychoanalysis or neuroscience (or indeed by neuropsychoanalysis). In specific terms, given its versatility and analytic power, this approach can perhaps yield further information that may explain: (1) how the operatic voice is enjoyed, as well as possible reasons why; (2) the origin and nature of the powerful emotional response that is evoked in some listeners by the operatic voice; and (3) whether enjoyment of the operatic voice has something erotic about it. These are the three areas that this thesis has set out to explore, the motivations for which were described in Chapter 1. Neuropsychoanalysis provides an ideal vantage point from which to examine all three of these areas, drawing on common elements such as infant development, language and sexuality. It affords the unique ability of dealing at once with the subjective and the objective, providing a first-person and a third-person view, by combining theories of mind with knowledge about the brain.

As mentioned in Chapter 1, the effects of brain injury and pathology have proven useful in laying the foundations for establishing connections between brain and mind in neuropsychoanalysis, such as the case of Phineas Gage quoted by Solms and Turnbull (2002). Looking beyond the neuropsychoanalytic literature, another more recent example that relates directly to music also serves to illustrate this link between mind and brain. A recent article by Miranda et al. (2011) describes a brain/computer music interfacing system that allows people with severe physical disabilities, for example resulting from brain and spinal injuries, whose cognitive functions are unaffected, to make music without the need for actual physical movement. The user operates the system by directing his/her gaze at targets displayed on a computer screen in order to perform an action, which in this particular case would be that of making music. The system works by monitoring a user's brain signals through electroencephalography (EEG). By varying the intensity of his/her gaze, a user can change the brain signal that is monitored by the EEG and hence control features of the music that s/he is playing. This example clearly illustrates the dynamic interaction that exists between mind/thought and brain/action, as well as a practical and beneficial application of harnessing the mind/brain overlap. Despite the valuable information and the resulting advances that cases of brain injury and pathology can provide, an 'additive' approach can be equally fruitful. That is, much useful insight can be gleaned from analysing gains as well as losses in mind/brain function and organisation. For example, an article by Mithen and Parsons (2008), mentioned previously, discusses a number of studies pertaining to music, including their own, demonstrating that the pursuit of cultural activities, namely a specific use of the mind and thought, can produce changes in the anatomy and function of the brain. There are many more similar examples, as described in Chapter 3 (e.g. Bosnyak et al. 2004; Margulis et al. 2009; Münte et al. 2002; Pantev et al. 1998, 2001; Schneider et al. 2002; Sluming et al. 2002).

This chapter will be articulated in four main sections. The first three sections correspond to the questions/research areas of this thesis. The fourth section will propose a theoretical formulation based on the material discussed throughout this thesis. Section one will consider how and why the operatic voice is enjoyed by drawing together neuroscientific knowledge about music reception and relevant psychoanalytic theory applied to opera. Section two will explore the possible origins and nature of the powerful affective response that is evoked in some listeners by the operatic voice. In order to do so, a range of previously discussed material will be synthesised and discussed. Section three will attempt to address the question as to whether enjoyment of the operatic voice has something erotic about it. This discussion will consider the important role of the subjective mind when interpreting current objective neuroscientific knowledge about music processing in the brain. The last section describes a theoretical formulation that attempts to account for the dynamics that underpin the enjoyment in the reception of the singing voice in opera. This will represent a logical end-point after all of the ingredients in this thesis have been distilled, producing what is hoped will be an essential neuropsychoanalytic formulation that captures the sensual and sensuous nature of a listener's enjoyment of the operatic voice.

4.1 How and Why is the Operatic Voice Enjoyed?

The findings of neuroscientific research on the reception of music that were detailed in the last chapter represent a useful starting point in order to examine this intense emotional response to the operatic voice, that is the *jouissance* associated with the phonic materiality of the operatic voice *as* music, after language has been undone by singing. Similarly to instrumental music, in this sense, the reception of the operatic voice *in* music and *as* music involves a complex range of neurochemical and neurofunctional processes that begin in the brain's auditory cortex. As described by Warren (2008: 36), the various features of the incoming sound are first encoded so that patterns can be extracted in the primary and higher auditory cortices, making use of hierarchically-structured interconnected modular networks in both hemispheres of the brain. As a result of this processing, increasingly complex representations are produced and linked to other areas of the brain, such as those responsible for meaning and memory, as well as sensory and motor activity. For example, temporal patterns contribute to the build up of the affective response to music, such as expectation, anticipation, tension and resolution (Huron 2006, 2008b; Huron and Margulis 2010). According to recent research (Salimpoor et al. 2011: 261), during this build up (anticipation) that precedes peak affective response, there is increased dopamine activity in the caudate. This area is part of the striatum and is linked to other areas of the brain, as mentioned above, that process associations, sensations and movement. Because of this, the caudate has been connected with response associations to stimuli, as well as the reinforcement of rewarding stimuli. As the research states, the dopamine activity in this area of the striatum, which is part of the mesolimbic reward system, may be associated with 'wanting' the musical stimulus, or anticipatory pleasure. On the other hand, the research also states that at the peak of affective response, there is greater dopamine activity in the nucleus accumbens, an area of the brain that is linked to regions in the limbic system, for example the amygdala, hippocampus, cingulate and ventromedial prefrontal cortex, which are responsible for processing emotion. This dopamine release in the nucleus accumbens may be associated with 'liking' the musical stimulus, or consummatory pleasure. The study concludes that although both the anticipatory and consummatory stages of musical enjoyment involve dopamine release, this occurs in distinct areas of the striatum that have different functions and connections (ibid.: 262). Therefore, the authors propose that the enjoyment of music hinges on the connection between emotion and dopamine release. Interestingly, as will be addressed in a subsequent section, Komisaruk et al. (2008: 100) affirm that, in the context of sexual response, “dopamine is the key neurotransmitter involved in stimulating orgasm in humans”.

Overlaying psychoanalytic theory to the above general description, in order to arrive at a neuropsychoanalytic interpretation of the overall reception process, at least three meshing points can be identified. Each of these will be explored in more detail a little later, after they have been outlined below. The first meshing point can be said to occur in an early stage of reception, when patterns are extracted from the musical sound and processed by neural networks that deal with meaning, memory, sensation and movement, as described above. At this stage, a listener’s subjective impressions and associations come into play. At first, the meaning of the words that are being sung may be interpreted (this will be dealt with below), as well as the meaning of the musical piece as a whole. If the musical piece in question is known to the listener, specific memories and associations may be automatically elicited. In the case of a previously unheard piece of music, memories and associations may be conjured up by particular elements of the music, singing and/or lyrics. These personal memories and associations are unconsciously recruited in relation to the musical piece overall, as well as to specific constituent elements, such as specific qualities of the singer’s voice. Features of the music and the singing voice, both in combination and separately, such as rhythm and timbre, amongst others, may also contribute to the evocation of memories and associations. These may or may not be directly related to the features themselves. For example, it can be readily understood how the lilting rhythm in 6/8 time of the singing and music in the “Barcarole” (‘*Belle nuit, ô nuit d'amour*’) from Act 2 of “Les contes d’Hoffmann” by Jacques Offenbach (1819-1880) may immediately conjure up a romantic gondola ride, or fond memories of a trip to Venice. These associations and memories can be said to relate directly to a feature of the music. By contrast, the piece may evoke negative associations that are specific to a listener, whereby the otherwise appealing musical qualities are lost. In this case, the listener is relating to a personal meaning that has come to be associated for whatever reason with the piece as a whole, rather than to specific features of the singing and music. Although a listener may be intensely moved in both cases – though for completely different reasons – neither scenario illustrates how vocal *jouissance* functions as conceived in this thesis. The associations in these examples are direct and relate to memory rather than to drives and unconscious processes. Yet both of the examples do have something of the ingredients that are constitutive of vocal *jouissance*: the orchestral music that sets the affective mood, supporting the trajectory of the voice, and an extra-musical phenomenon that is evoked by the music. This discussion will be taken up again later.

A second meshing point can be identified during the stage in which the brain is producing increasingly complex representations and recruiting various specialised networks for this purpose. This meshing point relates to language, meaning and the interpretation of the words that are being sung. As discussed in the previous chapter, a recent study (Sammler et al. 2010) has cast more light on the issue of whether words and music (in unfamiliar songs) are processed jointly or separately in the brain, concluding that both conditions are involved to varying degrees. According to this study (ibid.: 3577), lyrics and music are processed jointly at first up to the mid superior temporal sulcus. After that, there is an increasing degree of separation as the brain interprets the meaning of the words, whereby the lyrics are then processed in the anterior superior temporal sulcus independently of the music. An interesting observation of the study relates to a difference in the connection between music and lyrics. Music was found to be closely bound to lyrics, as opposed to a greater independence in the processing of lyrics alone, possibly in terms of their meaning rather than their melodic aspect. Leaving aside possible influencing factors, as mentioned by the authors, relating to memory, familiarity of musical pieces and specific design details of the study, such as musical expertise of the participants, this observation is nonetheless thought-provoking in neuropsychoanalytic terms. As discussed in chapter 2, in the trajectory of the voice towards vocal *jouissance*, language and meaning are gradually undone by singing, whereby the words become harder to understand, leaving the phonic materiality of the voice to be enjoyed for its own sake in excess of meaning. This notion may be related to the study finding that music is closely bound to the lyrics, yet lyrics are processed more independently of music. Whereas the music and the melodic element of the lyrics are processed together, the semantic element of the lyrics is processed separately. As the study did not investigate emotional response or make use of operatic excerpts as stimuli, a connection cannot be made between peak affective response and vocal *jouissance*. However, the neurospychoanalytic overlap does apply in theory to the listening dynamics in opera prior to peak affective response / vocal *jouissance*. The separation observed in this study (though not the initial integration) had been reported in a previous study (Bonnel et al. 2001: 1212) that investigated the relationship between the processing of lyrics and music in operatic songs specifically. The findings confirmed that the semantic element of the lyrics and the melodic element of music are processed independently of each other. Importantly, this earlier study found that the semantic and melodic elements of language are also processed separately, and that the results applied equally to musicians and non-musicians (ibid.: 1201).

The third meshing point follows on from the previous one in several ways. Language continues to play a role here. It is involved in the interplay between words and music, in the trajectory towards vocal *jouissance* / peak affective response during which language is gradually undone by the singing voice. This trajectory of the singing voice which, as described in chapter 2, functions independently of other considerations and even despite the voice itself, corresponds to the anticipation mentioned above that causes dopamine to be released in the caudate just before peak affective response. Conversely, the proposed connection between dopamine activity in the mesolimbic reward system and the reinforcement of rewarding stimuli would account for an operaphile 'wanting' to repeat the listening experience – even despite the resulting bitter-sweet enjoyment of vocal *jouissance*. As discussed elsewhere, the tension of this anticipatory build up, amongst other things, may contribute to the inherent eroticism of the music-listening experience. When the operatic voice has followed its own trajectory to its natural conclusion, finally undoing language and allowing the listener to enjoy the asemic vocal object, that is the meaning-less phonic materiality of the singing voice, at this point a peak affective response is achieved in the form of vocal *jouissance*. This can be said to correspond to the release of dopamine in the nucleus accumbens which, as described above, is linked to areas in the limbic system that are responsible for processing emotion. As noted in the previous chapter, the limbic system and the nucleus accumbens are involved in the processing of emotion related to music, and they are activated by music in a similar way to other basic biological functions like eating or having sex (Levitin 2007: 91; Warren 2008: 35). When this fact is considered alongside the statement by Komisaruk et al. (2008: 100) regarding the central role of dopamine in sexual response and Money's (1997) hypothesis, described in chapter 1, proposing a connection between language, song and sex, there would appear to be some sort of confluence of multi-disciplinary evidence. If psychoanalytic theory and other relevant considerations mentioned elsewhere relating specifically to opera are added to this evidence, then a compelling conceptual argument would appear to emerge in support at the very least of an erotic element in the operatic listening experience. This discussion will be resumed later.

In these three meshing points, a number of significant themes stand out. They relate to the way in which emotion is mediated by language and memory and, specifically in this case, by language in combination with music, or more precisely the meaning of language that gives way to and is superseded by the music of the singing voice. The themes also involve the relationship between 'outside' and 'inside', as well as brain and mind. They relate to the border between objective and subjective, and the ability of intangible external phenomena to cross the outside/inside border to evoke internal emotion that only becomes tangible through embodiment and subsequent external manifestation. The themes of eroticism and sexuality are also present, but these will be addressed in a subsequent section.

A number of these themes are explored in the book *Listening Subjects* by David Schwarz (1997). Of particular relevance here, he refers to the 'oceanic' fantasy of the "sonorous envelope" in the music-listening experience, where a listener is surrounded and embraced by the music, which crosses the body's skin threshold and dissolves the inside/outside boundary, resulting in the physical manifestation of "goose bumps" (ibid.: 6-7). He describes this sonorous envelope as both a fantasy thing and space, in which the threshold of a "clearly marked-off adult body" is crossed by the music, allowing a retrospective fantasy representation of an "archaic body less distinctly marked off from the external world" in the pre-linguistic state of at-oneness with the mother that is otherwise inaccessible directly (ibid.). These observations resonate with Winnicott's (1953) theories relating to infant individuation, illusion and the maternal presence in the transitional experience. Schwartz (ibid.: 20-21) also mentions the related "acoustic mirror", an aural stage of infant development that precedes and is the visual counterpart of the mirror stage, where the infant "both recognize itself in and hears itself separated by the sound of the mother's voice". He explains that this contributes to the process of individuation, setting up the infant's ability to communicate with others and achieve separation from the external world.

Taking up the themes mentioned above, individual subjective experiences relating to language, words and their semantic value, as well as memories and resulting associations, are capable of being embodied and manifested as physiological changes such as increased heart rate, sweating, laughing, crying and so forth. External phenomena that appear abstract and intangible, such as language, words, speech and singing, nonetheless have the power to function across the border of inside and outside worlds, that is the subjective and the objective, first person and third person, 'I' and 'other'. In crossing that border, they can become felt, embodied and hence tangible and observable. As a result of this embodiment, the physiological response has the effect of turning the subjective into the objective, the invisible thought or feeling into its corresponding visible expression. In this way, it is possible for a subjective emotion to arise inside in response to intangible phenomena outside. After being interpreted in relation to memory, cognition, conscious and unconscious processes, it may then emerge, or sometimes erupt, as an objectively visible external manifestation of the internal emotion.

The reception of opera (and music in general) functions in a similar way. The essentially intangible music and singing of opera exists as an external reality to a listener's inner world. It enters the listener's inner subjective world by crossing the outside/inside inter-subjective border of self and other that is constituted by the body and the brain, which processes the incoming sound. As a result of the processing outlined above and detailed in the previous chapter, the intangible begins to take form through the recruitment of subjective memories and associations, as well as sensorimotor responses. By virtue of the unconscious memories and associations that are elicited, in addition to a range of musical features that build up anticipation, neurochemicals are released in the brain and the listener experiences emotions. Although these emotions may be experienced as a phenomenon of the mind, of the subjective inner world, they nonetheless produce tangible physiological responses that can be measured (e.g. increased heart rate, perspiration, neurochemical changes, activation of specific brain areas, electrical activity), or felt (e.g. *frissons*, feeling choked up, tearful, 'a lump in the throat'), or sometimes even observed (e.g. piloerection, crying). The psychologist and philosopher William James (1842-1910) described the process of experiencing emotion as the feeling of the bodily changes that occur in response to the perception of a stimulus (LeDoux 1998: 43). In other words, there is feedback from an individual's inner awareness of physiological changes in response to an outside stimulus. This explanation was subsequently refined in the 1960s by Stanley Schachter and Jerome Singer, who proposed an intermediate step involving the cognitive interpretation and labelling of specific states of arousal, and hence the awareness of specific emotions, based on physical and social context, as well as knowledge of emotions in given situations (ibid.: 47). However, despite the logical appeal of emotion being mediated by conscious appraisal, this explanation has since been considered incomplete in that it cannot fully account for emotions – or the unexplainable motivations of an emotion – that remain unclear and undefined, which likely involve unconscious processes instead of or in addition to conscious processes (ibid.: 64).

Both short-term and long-term memory has a key role in the neural perspective of the music-listening experience, as discussed in detail in the previous chapter. A listener's response to music is based on veridical expectations (episodic memory), or knowledge of a particular piece of music, situated within the context of schematic expectations (long-term memory), or the features of music in general (Juslin and Västfjäll 2008; Huron and Margulis 2010: 580). The interaction of these two memory processes accounts for the persistence of the effects of certain features of music even when a listener is familiar with a given piece (Huron and Margulis 2010: 580). This effect can be summed up as 'being surprised by the expected', given that a listener must first be aware of the rules of a particular music, for example through acculturation (Huron 2006: 36). During the reception of music, the various features of the auditory signal are parsed – they are deconstructed and then reassembled by drawing on memory in order to produce a mental representation of a 'sound image'. The retrieval and identification of memories of similar sounds that have been heard in the past involves the hippocampus and areas between the temporal, occipital and parietal lobes (Levitin 2007: 91). Therefore, the listening process basically involves a comparison with all music stored in memory (Narmour 1992). The resulting 'sound images' of certain passages or whole pieces of music, in combination with the effects of specific features of music such as key, key changes, rhythm and so forth that contribute to anticipation, expectation, tension and resolution, are at once linked with and capable of eliciting memories and associations, both conscious and unconscious. Levitin (Levitin 2007: 166) is not exaggerating when he claims that "without memory there would be no music". All of these combined and separate dynamics and interactions, involving neurophysiological, neurochemical, conscious and unconscious processes, result in emotion being evoked and modulated in the listener. As discussed elsewhere, the universal appeal and the ultimate motivation for listening to any music resides specifically in its power to evoke emotion in the listener.

A recent study (Weizmann Institute of Science 2011) investigating memory and insight, or "'Aha!' moments", found that in addition to its role in mediating emotion and the (re-)consolidation of long-term memories, in particular those associated with emotion, the amygdala is also involved in identifying and storing significant events characterised by the realisation that there has been a sudden reorganisation of previously apprehended information. Although the study made use of images in conducting the experiment, it would be plausible to suggest that unexpected modulations in music could involve the same memory-encoding process. If so, the amygdala may be responsible for indelibly storing in memory musical and/or vocal passages that are associated with intense emotion, especially if some sort of new insight is involved on the part of the listener. This effect can be related to Freud's (e.g. 1900a: 205, 1918 [1914]: 45) theory of *Nachträglichkeit* or "deferred action", which was subsequently taken up again by Lacan (2007b [1953]: 213) as "*après coup*". According to this theory, a past event or impression that may not have been apprehended as significant at the time it was experienced later acquires a new significance in afterwardness (Laplanche 2002: 121). The effect involves a two-way direction, both forwards and backwards in time. It also involves a reappraisal of information through experience, resulting in insight through realisation. In the words of Hustvedt (2010: 38), which seem pertinent in this regard: "True stories can't be told forward, only backward. We invent them from the vantage point of an ever-changing present and tell ourselves how they unfolded". Furthermore, Hustvedt (ibid.: 112) states that:

> The faculty of memory cannot be separated from the imagination. They go hand in hand. To one degree or another, we all invent our personal pasts. And for most of us those pasts are built from emotionally colored memories.

It is not hard to see a possible connection in the context of the music-listening experience involving various levels of conscious and unconscious memory. The notion can be extended further as an underlying mechanism at work in the 'meaningful' insights and realisations that music is capable of affording, the 'meaning beyond words' that can only be experienced, felt and not articulated as such. The mechanism may have an indirect role in the solacing effect brought about by the enduring maternal presence in the transitional experience of music (and other cultural activities, as discussed in Chapter 2). It may also be responsible to some degree for the unconscious realisation of utter loss in experiencing vocal *jouissance*. In other words, when the operatic voice achieves the 'pure cry', beyond language and meaning, the voice is finally confronted as a lost object, whereby the mythical childhood experience of acquiring language and entering the Symbolic order becomes inscribed with new meaning. This might constitute an 'Aha!' moment fuelled by unconscious memory processes that are specific to the individual listener. The listener is consciously aware of the emotion-laden subjective experience in response to the operatic voice. However, the intensity and sudden irruption of this emotion, and any attendant physical manifestation (e.g. tearfulness, feeling 'choked up'), is felt by the listener as inexplicable, given the inaccessible unconscious processes at work.

One of the salient themes to emerge from the three meshing points discussed earlier remains to be explored in a little more depth. In the above considerations relating to memory, emotion and subjective / objective experience in the reception of opera, an appraisal of the central role and function of language has been conspicuous by its absence, or rather by its somewhat indirect discussion. If anything, this perhaps serves to illustrate the paradoxical position of language in the otherwise overwhelmingly musical context of opera. Language is central to opera in the sense that it serves as a vehicle for the singing voice to express itself. As mentioned in chapter 2, contrary to what may be supposed, the purpose of the lyrics in opera is that of expressing the voice (Poizat 1992 [1986]: 145). The lyrics, in addition to the narrative, stage sets, special effects and even the music, justify the presence of the singing voice. Yet it is by its undoing of language that the singing voice in opera comes into its own. In other words, it is actually by virtue of the presence of language in the first place, and the undoing of language and meaning subsequently, that the overtly musical experience of opera is enjoyed. In particular, this enjoyment is brought about by the interplay and tension between language and music, the intermittence between singing as speech (recitative) and speech that is sung rather than spoken; the voice *in* music and *as* music; meaning and meaning-less voice. These specific features, which occur in a constellation that is arguably unique to opera, result in an inextricable bond of unity and opposition, integration and separation between language, meaning, voice and music. This may account, in turn, for the claim being made here that the specific dynamics of the operatic listening experience, as well as the underlying mechanisms of the resulting powerful emotions that are evoked in some listeners, are unique to the reception of the operatic voice. In other words, the proposition here is not so much the uniqueness of the powerful emotional response to the operatic voice in neurophysiological terms, but rather the specificity of the unconscious dynamics at work in the listener that render the subjective enjoyment of the operatic voice unique.

As will be discussed in greater detail in the next section, which explores the origin and nature of this powerful emotional response, the enjoyment of the operatic voice in particular is essentially mediated by language. Indeed, the agency of language in this respect has a much more fundamental unconscious role in the enjoyment of opera. It operates at various levels and reaches far deeper than the supportive function of the lyrics that allow the voice to express itself. In order to plant the seed for this discussion that will be resumed later, it will be posited for the moment that language and meaning are prerequisites, a starting point. Their undoing subsequently allows the listener to enjoy the materiality of the voice as an asemic, meaning-less excess of language. This produces the *jouissance* of *lalangue*, of vocal embellishment and vocalise. It also produces the ultimate vocal *jouissance* of the pre-verbal 'pure cry' in the higher registers of the singing voice theorised by Poizat (1992 [1986]). This is the end-point of the voice's musical trajectory in opera, where the failure of language and meaning leads to an unconscious realisation in afterwardness for the listener. It connects objectivity and subjectivity, working backwards from the listener's present world of language, meaning and speech to that of a pre-verbal past. The inextricable neurobiological connections between language, meaning, voice and music were evidenced in the last chapter, such as Money's (1997) "songmap" and "speechmap", or the theory of separation distress calls put forward by Panksepp (1995, 1998) and Panksepp and Bernatzky (2002). In addition, evidence from various sources was presented in relation to social and developmental connections, such as language acquisition and processing in infants. A fundamental neurobiological link has been identified in the results of an empirical study conducted by Gill and Purves (2009). The researchers found a spectral similarity between the musical scales of different cultures throughout history and they propose that there is a biological basis to the preference for tone combinations resembling the spectral features of vocalizations. Loosely speaking, we prefer music that is closest to the range of sounds produced by the voice. This reflects the claim made by Jourdain (2002: 250) that establishes a connection between the involvement of language networks in the neural processing of music and the fact that listeners focus a great deal on the higher notes. He proposes that the basis for this connection lies in a similarity between the energy range of consonants in speech and that of most melodies. These empirically-based connections are complemented and supplemented by psychoanalytic theory, such as Poizat's (1992 [1986]) formulation for vocal *jouissance* in opera; the transitional experience and solacing effect provided by sound and language, as suggested by Horton (1984); or the notions proposed in thesis that will be synthesised in a theoretical formulation at the end of this chapter. When all of this material is woven together, the result is a comprehensive and coherent neuropsychoanalytic understanding that accounts for the objective and the subjective.

4.2 What is the Origin and Nature of the Powerful Emotional Response that is Evoked in Some Listeners by the Operatic Voice?

Having considered the principal neural processes and psychological mechanisms at work in the reception of operatic vocal music and its enjoyment, this section will focus instead on exploring the possible sources of the intense affective response to the operatic voice. It should be emphasised that the power and intensity of the response in the listener is a key consideration here. That is, the discussion will not be concerned as much with a generic, superficial response (if this is ever the case) where an operatic piece, voice or voice range is simply found to be more or less 'pleasant'. Rather, the focus will be on instances that are well known to anyone who is passionate about opera, as eloquently described by Poizat (1992 [1986]) for example, in which a sublime transcendent state is evoked in the listener that is characterised by an unsettling mix of extreme pleasure and a sense of loss. In other words, the experience of vocal *jouissance*, the bittersweet sense of enjoyment referred to above, which can sometimes elicit physiological manifestations such as feeling 'choked up' and tearful for reasons that often remain beyond a listener’s grasp. As indicated in the last section, language and meaning have a fundamental role in the underlying dynamics of this emotional response and its intensity. However, before this thread is explored further, it may be appropriate to begin the discussion by revisiting how the enjoyment of music is processed in the brain and what can be said about this neural process in psychoanalytic terms.

As mentioned in the previous chapter, the neural basis of the emotion evoked by (non-vocal) classical music was first identified in three key empirical studies. The first two were PET (Positron Emission Tomography) studies involving musicians (Blood and Zatorre 2001; Blood et al. 1999). The third was an fMRI (functional Magnetic Resonance Imaging) study involving non-musicians (Menon and Levitin 2005). As noted by Menon and Levitin (ibid.: 176), the two earlier studies had observed that an increasing intensity of physiological and psychological responses corresponded to changes in blood flow to regions of the brain that are responsible for dealing with reward and motivation, emotion and arousal, such as the ventral striatum, mid-brain, amygdala, orbitofrontal cortex and ventral medial prefrontal cortex. In the third study, conducted by Menon and Levitin (ibid.: 178), the higher resolution provided by fMRI allowed the researchers to identify the activation of the nucleus accumbens, ventral tegmental area and the hypothalamus, amongst other regions. These findings confirmed those of the previous two studies, as well as the results of another PET study (Brown, Martinez and Parsons 2004) in which activation of the nucleus accumbens had been observed (Menon and Levitin 2005: 181). The nucleus accumbens and the ventral tegmental area are part of the mesolimbic system associated with reward processing, whilst the hypothalamus is responsible for controlling autonomic and physiological responses (such as heart rate and respiration) to stimuli that evoke emotion (ibid.: 176). In addition, Menon and Levitin used connectivity analysis to observe the interaction of the various brain areas that had been activated. This connectivity analysis revealed a significant correlation between the nucleus accumbens and the ventral tegmental area, as well as between the nucleus accumbens and the hypothalamus (ibid.: 181). As the researchers state, their study was the first to provide direct evidence showing activation of the hypothalamus in response to music. However, it should be pointed out that the stimuli consisted of standard classical pieces (ibid.: 176), but did not include vocal music. In addition the music was presented to the subjects in the form of digitised recordings. Of significance for the purposes of this discussion, the researchers indicate that the music selections had similar features, such as moderate tempo and major key (ibid.: 181). They state that in terms of reward, the results would have been similar with happy or sad music, except that the response would have differed in terms of mood and arousal. The researchers (ibid.: 182) mention further points that are of significance to the discussion that follows. Connectivity was also observed between the nucleus accumbens and the insula, both of which are associated with autonomic, somatic and emotional responses. Interaction between the mesolimbic region and frontal regions showed a link between emotional and cognitive networks during music listening, which the researchers suggest may be associated with affective control. Lastly, the nucleus accumbens and the ventral tegmental area have a role in suppressing aversive stimuli.

What can be said about these findings in psychoanalytic terms? As discussed in Chapter 2, Freud (1920b: 7) proposed that the "pleasure principle" regulates variations of energy in the mind, between tension and discharge, which results in an "avoidance of unpleasure or a production of pleasure". The ultimate function of the pleasure principle is that of homeostasis (Lacan 1991b [1954-1955]: 79-80), or minimising the amount of excitation in the mind, according to the "principle of constancy" (ibid.: 9). However, Freud points out that the pleasure principle is more of a tendency than a ruling feature of the mind, given that the outcome cannot always result in pleasure because of various external forces and circumstances. Freud indicated two examples to account for this. The first one is the "reality principle", or "the long indirect road to pleasure", which involves enduring unpleasure until satisfaction can be achieved at some time in the future (ibid.: 10). The second one relates to the ego and conflicts between developing instinctual impulses, which "turn out to be incompatible in their aims or demands" and as a result they "are then split off […] by the process of repression", which prevents their satisfaction (ibid.: 11). The relevance of these theories is apparent when they are considered alongside the features of music that have been observed to produce pleasure in the listener, as described above and discussed at length in the previous chapter, such as the temporal patterns involved in tension and resolution and the resulting affective response to music (Huron 2006, 2008b; Huron and Margulis 2010). Of relevance to rhythm, another salient feature of music, it is worth recalling Freud's (1924b: 160) proposition, mentioned in Chapter 2, that sensations of pleasure and unpleasure are determined by variations in the strength of rhythmic movement. Also discussed in Chapter 2, and of particular relevance to the reception of opera as a whole, Freud (1942

[1905 or 1906]: 305) stated that drama arouses “sympathetic suffering” in order to “purge the emotions” by opening up “sources of pleasure or enjoyment in our emotional life”. In other words, drama produces excitation by arousing emotion, but it also provides an outlet to discharge these emotions through pleasure. These psychoanalytic theories may stand alongside the neuroscientific study findings described above, providing some clues about the origin and nature of the affective response to music in general and opera in particular, and why this emotion is aroused, sought and enjoyed by listeners.

As a starting point, then, it can be said that listening to music is in keeping with the pleasure principle, namely the tendency of the mind to seek pleasure and avoid unpleasure. Furthermore, listening to music bears a similarity to the way in which the pleasure principle operates, in the sense that it involves a development of tension and a subsequent resolution or discharge of tension. The way in which this tension is developed by music, postponing satisfaction, bears a resemblance to the reality principle. Overall, the outcome of listening to music corresponds to the principle of constancy, in that the affect regulation sought by listeners (described in the previous chapter) may result in minimising excitation in the mind through satisfaction. Based on the findings of the above studies, the subjective experience of the pleasure principle while listening to music can be related to the function of the limbic system, which is responsible for processing reward stimuli. In particular, the avoidance of unpleasure may be associated in neural processing terms with the nucleus accumbens and ventral tegmental area, which are involved with the suppression of aversive stimuli. The reality principle may be associated with frontal regions of the brain that are responsible for affective control. There is a plausible and readily appreciable connection between the pleasure principle and the neural processes that underpin the subjective experience of listening to ‘pleasant’ or ‘happy’ music (when this evokes ‘positive’ emotions). But how can the pleasure principle account for the pleasure that is derived from the ‘sorrowful’ emotion that may be evoked by ‘sad’ music?

As mentioned above and discussed in detail in the previous chapter, emotions evoked by music are processed by the limbic ‘pleasure and reward’ system irrespective of whether the emotions are ‘happy’ or ‘sad’. The neurochemical basis for this apparently paradoxical enjoyment of sad emotion evoked by music was discussed in the previous chapter in relation to the functions and effects of the hormones dopamine, oxytocin and prolactin, which are believed to result from cortical inhibition of the amygdala (Farr 2008; McCallumo 2007; Levitin 2008b: 133, Levitin and Tirovolas 2009: 220) in the limbic system. These hormones are also released during intimate experiences, such as breastfeeding, bonding between mother and infant, or sexual intercourse. In addition, prolactin has a tranquilising effect and is released when an individual feels sad, as well as following childbirth and orgasm. Significantly, prolactin is only present in tears of sorrow, such as those that can be evoked by music. A recently discovered function of dopamine is that of controlling the formation of new neurons in the adult brain (Berg et al. 2011). According to this finding, dopamine acts like a switch in the process of neurogenesis, turning production off when homeostasis is achieved. This represents a current example of the biological basis upon which Freud's (1920b: 38-40) theory of homeostasis, associated with apoptosis (or programmed cell death), was originally conceived, especially in relation to the life and death drives. The wider relevance of neurogenesis is apparent with regard to the discussion elsewhere in this thesis of brain function and structure being affected by the practice of cultural activities – such as the neuroplasticity in grey matter observed in professional musicians, as described in the previous chapter.

Another explanation put forward by Koelsch et al. (2010: 330-333) for the enjoyment of 'sorrowful' emotion evoked by music was also discussed in the previous chapter. This hinges on the comforting effect produced by the realisation that a negative emotion can be experienced without an accompanying event occurring in reality. This would correspond to the feeling of relief that an individual may experience after an unpleasant situation has been avoided. The avoidance of unpleasure results in activation of the brain's reward centre, which consequently makes the experience pleasurable. Beyond the obvious aim of avoiding unpleasure, there is a further connection here between these neural-based explanations that account for the enjoyment of musically-evoked 'sad' emotions and Freud's pleasure principle.

Freud (1920b: 14-17) proposed that children's play provides a form of working through of significant events and situations that have left a strong impression. Through repetition in play, the child is able to feel a sense of control or mastery of the event or situation, turning something frightening or unpleasant into a source of pleasure. Freud (ibid.: 17) draws a parallel with artistic 'play' in adults, where for example tragedy (such as that which occurs in many opera narratives) is turned into a source of pleasure.

This notion was further developed by Winnicott in his theory about transitional objects and phenomena in children, as well as other authors after Winnicott who claim that the transitional experience persists throughout life, as discussed in Chapter 2. In describing the game "*fort*/*da*" (German words for 'gone'/'there') observed in his own grandson, Freud (ibid.: 15-16) notes a repetitive staging by the child of his mother's absence/return. The game involved a wooden reel attached to a piece of string. By throwing the reel away from him ("*fort*"), the child was able to express his frustration at his mother's absence, whilst also representing her absence within a game setting. Then, by pulling on the string, the child was able to stage his mother's reappearance ("*da*"). By means of this game, the child was able to derive pleasure from a situation that was otherwise unpleasurable. As suggested by Freud, and subsequently by Winnicott and others in relation to the transitional experience, this feature and function of play can also be found in adults. As argued in chapter 2, the intermediate 'play' area provided by the transitional experience of opera (and other cultural activities, as well as science and religion) afford us an unchallenged area in which to create. In particular, the 'holding environment' provided by opera allows the listener/audience to experience potentially traumatic situations without the attendant risks in real life. The repetition of the experience, as Freud suggests, allows a sense of mastery and control. Perhaps the ultimate event that the committed operatic listener is attempting to master, through repetition, may in fact be the primary relationship with the mother. A link between opera and the maternal primary process presence was discussed in chapter 2. The voice in opera mediates this maternal link through the dynamics of *jouissance*, which provides some limited access to the lost vocal object. The fleeting nature of this access, in turn, drives the compulsion to repeat. In addition, as a source of *jouissance*, an excess of excitation (Lacan 1997b [1959-1960]: 184), the voice in opera constantly threatens the attempt on the part of the pleasure principle to limit excitation and discharge tension through satisfaction. The voice in opera, as a source of *jouissance*, may provide enjoyment for the listener, but it cannot deliver in terms of satisfaction. Being the *objet petit a* cause of desire, the operatic voice can never be apprehended, only pursued in a circuitous path. The committed operaphile has no choice other than a compulsion to repeat, constantly transgressing the pleasure principle to seek death (Lacan 1969-1970, Seminar of 14 January 1970), which Lacan (1938: 4-13) described as the "nostalgia for wholeness" and "return to the mother's womb" that "dominates the whole of the life of man”. As Freud affirmed, drawing from biology, “the aim of all life is death” (1920b: 38). Therefore, rather than being ‘consumed by the flame of desire’ (“*So muß mich die Flamme verzehren!*”), as Papageno sings in his aria “*Ein Mädchen oder Weibchen*” in Mozart’s “*Die Zauberflöte*”, it is the satisfaction of desire (and not its enjoyment) that leads to the death of desire itself and, ultimately, of man himself. These theories may account for some of the unconscious dynamics that relate specifically to the subjective experience of opera, even though all music is processed in the same way by the limbic system – where the nucleus accumbens has a central role in reward motivation, pleasure and, significantly, addiction (Levitin 2007: 91; Purves et al. 2008: 610).

However, as described in Chapter 2 and amplified in this section, there is arguably much more at stake in the operatic music-listening experience than seeking pleasure and obtaining satisfaction by discharging tension through music-evoked emotion. Although the pleasure principle may provide a valid partial account for the motivation of listening to music, as well as some basic subjective insight about the emotion that is evoked by this activity, it does not fully illuminate the origin and nature of the affective response, particularly in the case of opera. Among the various layers of opera described in Chapter 1, each of which were discussed in isolation in Chapter 2, the singing voice stands out as the focal point of a listener/audience. It achieves this central position because of and despite the other elements that surround it, which come to have an auxiliary function. Yet without the other elements, opera would not be what it is. Compared to other forms of vocal music, the voice in opera would not appear to stand a good chance of prevailing over the other elements to assume this central role. It is situated within a musical narrative in which there is an ongoing tension between the music and the words that allow the drama to be enacted. Many operatic plots are notoriously incredible, although this weakness does not appear to affect the dramatic impact on the listener/audience. The voice needs to be powerful enough to be heard above an entire orchestra, yet it must be subtle enough to express nuances of emotion. Despite its power, the voice in opera must be able to merge with other voices and standout from them as required. Musical demands are made of the operatic voice that hinder or even prevent the intelligibility of the lyrics, as detailed in Chapter 1. Despite all of these apparent challenges, the voice in opera usually manages somehow to prevail over all of the other elements with which it is fused and that justify its presence, asserting its central position within the musical whole. Sometimes, when all of the conditions are right, the voice excels in this and, as a result, intense emotion is evoked in the listener/audience. As described in Chapter 2, the auxiliary elements of narrative, lyrics, music, stage sets and effects make it possible for the voice to pursue its own trajectory towards achieving vocal *jouissance*, yet at the same time it does so despite these elements and even itself (Poizat 1992 [1986]: 145). The ultimate paradox of the voice in opera can be found in the tension between words and music. This is further heightened by the subtly varying position of the voice *in* music as opposed to *as* music. That is, attempting to "reconcile the irreconcilable" (Scotto Di Carlo 2007b: 564), or achieving the impossible task of ensuring the intelligibility of the words, whilst at the same time fulfilling the musical, aesthetic and dramatic demands that are placed on the voice. Ultimately, the lyrics are in the service of the voice *as* music. They allow the voice to express itself musically. As the theory of vocal *jouissance* proposed by Poizat (1992 [1986]: 145) to account for this was discussed at length in Chapter 2, it will not be repeated here. It is sufficient to mention for now that the voice in opera occupies a central position because language and meaning – and their undoing by the singing voice – are essential to the dynamics of vocal *jouissance*. Without the meaning of language, the meaning-less phonic excess of the voice as object would not be able to provide the same enjoyment or evoke intense emotion as it does for the listener/audience. If the main purpose of operatic singing were simply that of intelligibly conveying the lyrics in order to enact a story, then the *lalangue* of vocal embellishments would have no reason to exist in the opera context, nor would the voice function as the *objet petit a* cause of desire. Therefore, despite the overtly musical context of opera, the function of language and meaning warrant further discussion in order to get at the nature and origin of the intense affective response to the operatic voice.

As discussed in the first section of this chapter, the theory of vocal *jouissance* proposed by Poizat (1992 [1986]) would appear to provide a plausible subjective account of the increasing degree of neural separation in the processing of lyrics and music that was found in the study conducted by Sammler and colleagues (2010) described above. Even though operatic vocal music excerpts were not used as stimuli in the study, it may be safe to assume that a similar brain function would be observed with all vocal music. Any differences in neural processing would probably relate more to specific qualitative elements rather than overall processing function, such as the saliency of evoked emotion based on the features of the music, or the response to the distinct features of the operatic voice and its emergence from the orchestral music. Perhaps this would explain, in part, the findings of the earlier study (also described above) by Bonnel and colleagues (2001: 1201, 1212) using operatic excerpts, namely that the lyrics are processed separately to the music, and that the semantic and melodic elements of the lyrics are also processed separately to each other. The findings of this earlier study are also largely in keeping with Poizat's (1992 [1986]) theory, in which the melodic element of the voice is associated with vocal *jouissance*, but only by virtue of the presence *ab initio* of meaning and language. However, the neural details regarding specific data flow in the brain will no doubt be clarified in time by neuroscience using a new technique known as 'connectomics'. This allows the brain's synaptic connections to be mapped in relation to neuronal function (Seung 2011). Until such information is forthcoming, another path will need to be taken for the purposes of pursuing this discussion. A clue in identifying the nature and origin of the intense affective response to the operatic voice in neuropsychoanalytic terms may ultimately lie in the evidence that was mentioned earlier of a fundamental neurobiological link between music and language, and specifically vocalisations (Gill and Purves 2009). This evidence allows the psychoanalytic theory and neuroscientific findings discussed in the previous chapters to be reconciled from a neuropsychoanalytic perspective. Moreover, it provides a solid basis to develop a tentative neuropsychoanalytic explanation for the intensity of the affective response to the operatic voice. The thrust of the notion proposed here is that the intensity of this affective response may be subjectively experienced as such due to the combined effect of the neural processing of the acoustic and structural affinities between language and music, and the interplay of the unconscious dynamics structured by language in infancy.

A theory from the inter-disciplinary field of interpersonal neurobiology may be a good place to begin exploring this notion further, given the discussion in the previous chapters of the psychoanalytic and neural significance of language acquisition, their relationship to music and music-evoked emotion, and the proposed maternal link in the reception of opera. According to Daniel J. Siegel (1999), who developed the field that he named interpersonal neurobiology, the mother's gaze (or that of the main caregiver) is significant in the mother/infant bond for the development of empathy through mirroring. Interestingly, in relation to an earlier discussion in this chapter, Siegel (2010) explains that experience and focus result in neurogenesis and neuroplasticity. The success of this early mother/infant rapport is important, in that it provides a secure affective basis for future attachments (Bowlby 1969). The significance of the gaze in this context will be taken up again a little later in relation to the voice. For the moment, the discussion will consider the element of empathy. A number of neuroscientific studies have investigated the neural basis of empathy. Examples include a study by Singer et al. (2004: 1157), which found that empathy for a loved one's physical pain activates an area of the brain's pain network (or pain matrix) that deals specifically with the affective qualities of pain, rather than its sensory qualities. The study found an overlap between 'self' and 'other' in brain areas that were activated when a subject either received pain directly or observed the same pain being inflicted on a loved one. Another study by Hein and Singer (2008) investigated the modulation of empathy in the brain. The researchers point out that empathising with another person involves various neural networks, including somatosensory and insular cortices, parts of the limbic system and the anterior cingulate cortex, whilst empathy relating specifically to pain activates the anterior insula and anterior cingulate (ibid.: 153). The researchers also point out an important distinction between the cognitive appraisal of another person's state and empathy, the latter being an affective state that involves sharing another person's emotions or sensory state (ibid.: 154). In a more recent study by Krach et al. (2011), the anterior cingulate cortex and the left anterior insula were also found to be involved in experiencing the 'social pain' of others. However, in contrast with previous studies, research by Kross et al. (2011) investigating the link between social rejection (an unwanted break-up) and pain found that if rejection is powerfully elicited, areas of the brain that process sensory pain are activated (secondary somatosensory cortex and posterior insula). The findings of these studies demonstrate the neural basis of the subjective experience of empathic emotion. In addition, they show that parts of the 'pain matrix' are activated in response to another's pain. Significantly, if the subjective emotion of pain (in this case as a result of rejection) is strong enough, it is processed in the brain in a similar way to physical pain. This is thought-provoking when considered in combination with the posited neurobiological similarities between the processing of pain and pleasure (e.g. Komisaruk et al. 2006: 260; Leknes and Tracey 2008). For example, dopamine is released in the basal ganglia, and specifically in the nucleus accumbens in response to distress and fear (Scott et al. 2006). As noted in the previous chapter, the limbic region of the basal ganglia includes the nucleus accumbens, ventral pallidum and ventral tegmental area, which are part of the brain's reward and pleasure centre. Examples of brain areas involved in the reception of (pleasurable) music that are responsible for processing pain and pleasure include the medial prefrontal cortex, nucleus accumbens, hypothalamus, midbrain, amygdala and hippocampus (Leknes and Tracey 2008: 317). Based on the above evidence, a neuropsychoanalytic connection can plausibly be made between the neurophysiological findings of the various studies investigating music processing in the brain (described in the previous chapter) and the bittersweet subjective experience of vocal *jouissance* in response to the operatic voice (described in Chapter 2), namely a *painful* excess of *enjoyment* that is characterised by *powerful emotion*. Moreover, in addition to the involvement of the brain's pleasure and reward centre in the processing of pleasure and pain, further links can be drawn between the insula, the powerful emotion evoked by the operatic voice, its attendant physiological manifestations, pain and pleasure, as well as language. As described in the previous chapter, the insula is involved in the processing of perceptual, cognitive and emotional information and therefore it is believed to be responsible for integrating visceral and somatosensory responses with autonomic activity during the music-listening experience (Koelsch et al. 2010: 322; Komisaruk et al. 2006: 278; Warren 2008: 35-36). The insula is also thought to be involved in the representation of reward in general (Komisaruk et al. 2006: 278). Furthermore, the anterior superior insula is among the various areas that are part of similar neural networks involved in the processing of music and language (Fadiga et al. 2009; Koelsch, Gunter et al. 2002).

Having presented evidence to support the neuropsychoanalytic underpinnings of the powerful emotion evoked by vocal *jouissance* in response to the operatic voice, the fundamental role of language in this dynamic can now be examined in more detail. The basis for the claim being made here of the fundamental role of language can be highlighted by returning briefly to Siegel's (1999) emphasis on the gaze in the early relationship between mother and infant. This theory should perhaps be tempered and complemented to include the mother's voice as the primal bond before that of the gaze, given the indirect evidence of auditory input retained in memory before birth (Mehler et al. 1988; Moon et al. 1993; Nazzi et al. 2000). As detailed in the previous chapter, newborns appear to prefer their mother's voice rather than that of strangers, which may be due to the early development of sound perception at approximately thirty weeks of gestation (Patel 2008a: 382). This would allow the unborn infant to acquire a good knowledge of the mother's voice (DeCasper and Spence 1986) even before meeting her gaze. The gaze may then be said to complement and reinforce only after birth this biological primal bond that is based on the mother's voice (its timbre and phonic materiality rather than meaning), as well as the physiological sounds and rhythms of her body intermingled with those that filter in from her external environment (Pigozzi 2008: 56). Whereas a bond based on the gaze can be developed with a caretaker other than the infant's mother, this is not possible with an acoustic primal bond. Even if the mother were unable to speak, the unborn child acquires an intimate familiarity with her bodily sounds, in addition to those in her environment. Therefore, sound and rhythm have priority over sight from an early stage of life, even before birth. After birth, it is often the sound of the mother's voice through language that establishes a link with the first Other. This may account for the findings of the various studies described in the previous chapter, which showed that infants have an innate ability present from birth to process certain features and rules of music and language in a similar way to adults (Gervain et al. 2008; Nazzi and Ramus 2003; Perani et al. 2008; Stefanics et al. 2009). A recent study by Friederici et al. (2011) found that at four months of age, infants already have the ability to learn very quickly basic syntactical rules of a foreign language. In addition, they are able to identify violations of those rules, based solely on the acoustic-phonological distinction of syllables, that is independently of semantic content (given their age). This evidence of an innate, or at least a very early ability, to identify the regularities and irregularities of language based on sound rather than meaning stands in contrast to subsequent foreign language learning, for example, which focuses instead on semantic content. The researchers suggest that this early learning mechanism is due to a lack of cognitive control of the prefrontal cortex. These results are in line with earlier research (detailed in the previous chapter), such as sensitivity to rhythm from birth (Nazzi and Ramus 2003), the ability of newborns to identify even small structural differences in music (Perani et al. 2008) and discriminate pitch intervals in a similar way to adults (Stefanics et al. 2009), the innate ability to process syntactical rules (Gervain et al. 2008), and the suggestion of a hierarchical supramodal syntax (Fadiga et al. 2009) that allows us to process syntactical structures in general, such as those present in language and music.

The primal bond established before birth through the sound of the mother's voice continues to have significance for the infant after birth. However, it is conceivable that after birth, the acoustic bond that began in the mother's womb may be continued with another person in the mother's place. The agency of someone else other than the mother is in keeping with Siegel's (1999) view concerning the gaze, Bowlby's (1969) theory of attachment, as well as Poizat's (1992 [1986]: 99-104) account of the way in which an infant enters the order of language, as described in Chapter 2. After birth, then, the voice and its melodic qualities play a significant role in the bond between mother and infant, in the form of singing and infant-directed speech, for example. The details of this mother/infant vocal interaction were discussed in the previous chapter. However, a few points are worth repeating, as they can be related to the dynamics of vocal *jouissance* in response to the operatic voice. Mothers sing to their babies in a higher pitch (Bergeson and Trehub 1999) than they use to communicate with other adults, and infants appear to prefer singing and speech at higher pitches (Trainor 2008: 598; Trainor and Zacharias 1998), as well as vocal music as apposed to instrumental music (Trehub et al. 2010: 651). Thus the link between the melodic aspect of the voice, its phonic materiality, is established even before an infant enters the order of language and meaning. Exposure to musicality and emotion occurs early in infancy via the voice within the framework of the mother/infant dyad. This facilitates attachment throughout life. Therefore, a listener's response to music in adulthood retains social features of affective regulation and relatedness to others (Trehub et al. 2010: 661). All of this evidence from various fields would appear to confirm a number of points. Sound provides the basis for our earliest relatedness to others, which before birth occurs through the mother's body. This would imply that a biological primal bond is instituted with the mother based on the sound of the mother's voice, that is its timbre, rhythm and melody, before the acquisition of language that provides semantic structure. This phonic materiality of the voice conveys meaning that is not structured by language as such, but is mediated instead by emotion. This would explain how babbling and early singing (without words) in infants can function as transitional phenomena, providing a comforting maternal link during the separation-individuation process proposed by Winnicott (1953), as discussed in Chapter 2. Given the primal 'sonic bond' with the mother suggested above, it is apparent how this earliest form of relatedness can persist throughout life in various ways, such as in the reception of opera.

The point made above about meaning being mediated by emotion outside the structure of language warrants further discussion in relation to the structure of operatic music. As discussed in the previous chapter, various studies have found that the structure of music and language are processed in a similar way by the brain (e.g. Koelsch 2005b, 2006; Koelsch, Maess et al. 2000; Koelsch et al. 2001; Koelsch, Gunter et al. 2002; Koelsch, Gunter et al. 2005; Maess et al. 2001) and, as mentioned above, a "supramodal syntax" has been proposed based on the observation of what appear to be innate abilities in infants (Fadiga et al. 2009: 456). Lindenberger (2010: 120) suggests that the specific musical structure of the various genres of opera at particular times throughout its history has functioned as a communication system based on emotion. His proposition draws on the neuroscientific studies by Grewe et al. (2005 and 2007a) investigating the phenomenon of 'chills' evoked by music (not necessarily opera). According to Grewe et al. (2005: 448), a listener's knowledge, experience and attention in relation to a piece of music are responsible for evoking powerful emotion. In addition, Grewe and colleagues (2007a: 312, 313) point out that attention is maintained by a listener's knowledge of the "emotional communication system" of a given style of music, and that emotion is evoked by expectations being violated or something new occurring in the music – in other words, by modulation. Lindenberger (2010: 121-123) provides several examples of operatic music structures that can be said to function in this way. One example that he describes relates to eighteenth-century *opera seria* (such as "Alcina" (1735) by Handel (1685-1759), "Arbace" (1781) by Bianchi (1752-1810), or "Idomeneo" (1781) by Mozart (1756-1791)), which is characterised by a series of arias, interspersed with some duets and chorus numbers, all separated by extended recitative sections. Lindenberger explains that in this case the listener focused mainly on the aria, which basically consists of three sections. The first section serves to build up expectation for the vocal display in the last *da capo* section, whilst the middle section modulates tempo and mood to heighten expectation. Another example quoted by Lindenberger is the aria in two sections that is characteristic in nineteenth-century operas, such as those of Rossini (1792-1868) and Verdi (1813-1901). The two sections are separated by a *tempo di mezzo* recitative, which serves as a modulation between the slower first section and the exciting display of high notes in the dramatic and musical resolution of the final *cabaletta*. With regard to this middle section, Lindenberger refers to a study by Sridharan et al. (2007), mentioned in the previous chapter, which found that transitions in musical compositions are significant in heightening anticipation and thus mediating emotion. The last example quoted by Lindenberger concerns the ‘infinite melody’ of Wagner (1813-1883), which aims to achieve a more uniform work in terms of high points. In this case, Lindenberger explains, the *leitmotif* works as a high point, referring back to an earlier occurrence and building anticipation for its reappearance later in the opera. Lindenberger (2010: 124) concludes his argument by stating that these specific musical structures were unique to particular points in history and functioned as the “emotional communication system” proposed by Grewe and colleagues (2007a: 313). Therefore, being aware of the structure of a particular genre of opera, listeners knew what to expect even in new works.

Following on from the above points about operatic structure conveying meaning and mediating emotion, a recent study by Balteş et al. (2011) investigated the emotions induced by the various elements of opera, alone and in combination, in terms of the psychophysiological effects of vocal music, plot and acting. Given that this research is the only one of its kind to date, it is worth looking at the results in a little more detail. Unlike other studies investigating the affective response to music, which typically employ short musical pieces, this research used two extended excerpts lasting approximately 11 minutes and 8 minutes, respectively, taken from an audiovisual recording of a classic performance (1964) of Puccini’s (1858-1924) “Tosca” at Covent Garden, with Maria Callas as *Floria Tosca*, Tito Gobbi as *Scarpia* and Renato Cioni as *Mario Cavaradossi* (ibid.: 148). The excerpts were complete segments in terms of continuity that reflected the plot and provided distinct musical and dramatic features. The singers were renowned for their dramatic/vocal interpretations. The research participants included 25 females and 12 males ranging from 19 to 24 years of age with no significant musical training, knowledge of this particular work or preference for opera or classical music, although they stated that music was important in their lives (ibid.). Balteş et al. (ibid.: 146) found that listening to the music alone (no video) evoked positive emotion with autonomic arousal. When the participants listened to the music alone a second time after learning about the sad plot, their negative emotions increased and their elevated autonomic arousal was maintained. However, when the participants were then exposed to the audiovisual recording (i.e. sound and image together), their emotional response was increased and changed from ‘sad’ to ‘transcendent’. The researchers concluded that the combined effect of the various elements of opera that they investigated, namely listening to the vocal music, knowing the plot and watching the acting, contribute to enhancing and modulating the intensity of emotion that is evoked by operatic music, as evidenced by the physiological responses and the reported emotions of 'wonder' and 'transcendence', which correlated with the occurrence of 'chills' (ibid.: 153). The measures included electrocardiogram (ECG), skin conductance, respiration rate and blood pressure; positive and negative affect scales (PANAS) to identify mood prior to the experiment, Self-Assessment Manikin (SAM) for emotional arousal and valence, a record of self-reported chills, and the long version of the Geneva Emotional Music Scale (GEMS) to identify emotions evoked specifically by the music, such as wonder, transcendence, nostalgia and so forth (ibid.: 149). This study clearly indicates that listening to operatic vocal music evokes a range of emotions that affect a number of autonomic arousal measures. In addition, 'meaning' appears to be a significant element in enhancing the emotions evoked by opera, as evidenced by the affective response modulation after learning the plot, and by the increased affective response and its modulated valence when participants were exposed to all elements in the audiovisual recording. Balteş et al. (ibid.: 154) suggest that the element of meaning represents a link between the subjective and physiological changes evoked by the music. They also identify a connection between the mood of participants before the experiment and the emotions evoked during it. Interestingly, the researchers did not find any significant effects in terms of participant gender. The findings of this study raise a number of questions that are relevant in terms of this thesis. Although the research showed that operatic vocal music can evoke intense emotion in opera-naïve participants, it would be interesting to see whether the results would be the same with operaphiles as participants, in light of Lindenberger's (2010) comments above about a listener's knowledge of the musical structure of opera, or the findings of other research (e.g. Panksepp 1998: 278) that establish a link between the experience of chills and intimate knowledge of a musical piece. Another relevant issue is that the excerpts used in this study by Balteş and colleagues, although longer than those used in most other similar experiments, were essentially taken out of context and thus did not benefit from the build up that would have been produced by the whole opera. As Balteş et al. (2011: 155) remark, these results may also differ based on the genre of opera, composer, cast and so forth. The musical structure of a particular operatic genre, as mentioned by Lindenberger (2010), is relevant to the way in which emotions are evoked over the course of an opera, the particular points at which they peak and the specific vocal structures through which they are induced. Lastly, the cast is a significant factor, and would be crucial with operaphile participants. The musical and dramatic interpretation of particular singers can significantly influence the emotional impact in terms of reception. As mentioned in Chapter 2, the emotional impact is multiplied when operaphiles listen to their preferred 'voice of measure' (Vaughan 2009). Despite these comments, this study is definitely a step in the right direction, exploring the structure of operatic music and its various constituent elements in a way that more closely resembles a normal reception experience. Balteş et al. (2011: 147) point out that there has only been one psychophysiological field study (Vaitl et al. 1993) involving 27 audience members attending live performances of Wagner operas at Bayreuth from 1987 to 1988. Although the study found that physiological responses varied between leitmotifs, there was only a weak correlation between physiological and subjective measurements of emotion.

Based on the above, various levels of structure and modulation can be said to underpin the powerful emotion evoked by the operatic voice both *in* music and *as* music. These structures were explored psychoanalytically in Chapter 2, principally as the interaction between the various layers of opera, and the function of language and meaning in vocal *jouissance*. The neural processes underlying the reception of musical structures, such as anticipation and expectation, violation, tension and resolution, dissonance and consonance, were dealt with in the previous chapter. Given the neural significance of these musical structures in terms of evoking powerful emotion, including features such as rhythm, timbre and melody, they perhaps merit further attention with regard to the operatic voice specifically. If one accepts, as proposed here, that the intensity of the affective response to the operatic voice resides in the uniqueness of the underlying subjective dynamics of vocal *jouissance*, rather than any distinct neurobiological processes, then the emotion-evoking musical structures relating specifically to the operatic voice should be considered in terms of the voice's phonic materiality. For there is an affinity between the 'pure cry' of the pre-verbal infant and that of the operatic voice that has become detached from the language and meaning of the lyrics in its pursuit of vocal *jouissance*. As discussed by Pigozzi (2008: 49), the lallation of the pre-verbal infant and the vocalises of the singing voice are both located outside the meaning of language. She explains that the timbre of the voice, the quality of which is determined by the body, is located in the Real. The rhythm of the voice, which involves separation and segmentation, is located in the Symbolic. The melody of the voice, with its creative production, is located in the Imaginary. She goes on to explain that these individual elements overlap and that all three orders of Real, Symbolic and Imaginary are reflected within each element. This 'nesting' within each order was discussed in Chapter 2. Thus, as Pigozzi illustrates, the creative aspect of a voice's melody carries with it some intention from the Symbolic and is also related to the Real by virtue of the body producing the sound. Similarly, the timbre of the voice can be considered as what is understood of the Other (Symbolic) from hearing the voice, the quality of the voice's sound (Imaginary) and the body (Real) that is producing the sound. Because of this, Pigozzi affirms, there is always something elusive about the voice, an otherness that cannot be analysed, like the unconscious. This resonates with Lacan's (1998 [1973]: 104) statement that "the invocatory drive […] is the closest to the experience of the unconscious". Consequently, Pigozzi (2008: 50) affirms, the voice is an unconscious residue of the unsaid and the unsayable.

A further point made by Pigozzi (ibid.: 46) is worth mentioning, as it foregrounds the maternal link proposed here in both vocal *jouissance* and the transitional experience of opera. The pre-verbal infant takes pleasure in the meaning-less pure sound of his/her own voice. The infant's lallation and echolalia consists of fluid vowel sounds that belong to the shared pre-Oedipal world of unity with the mother. However, the paternal voice gradually exerts a separating function between the unity of mother and child. The child's pre-Oedipal lallation with its flow of vowels is segmented by paternal rhythm, in the form of consonants, then words and finally grammar, as the infant enters the Symbolic order of language. Pre-verbal lallation gives way to language. Nonetheless, *lalangue* remains as a substrate to meaning and language. Therefore, the singing voice can be said to contain both maternal and paternal elements. In the trajectory of the operatic voice towards vocal *jouissance*, the paternal language and meaning of the Symbolic is gradually undone in favour of an Imaginary maternal melody – the 'pure voice' of meaning-less vocalise and embellishment. This can be re-stated by paraphrasing Pigozzi's (ibid.: 31) remark about infant development in terms of the voice, which is based on Freud's (1941 [1938]: 299) distinction between an infant's 'having' and 'being' the breast, and is also related to Winnicott's (1953) separation-individuation process and weaning. A listener's object-relation to the operatic voice can be said to oscillate between two positions: an initial one that aims at *obtaining* the voice and a subsequent one that tends towards *becoming* the voice, but neither is actually achievable. This is because the voice, as *objet petit a*, is the cause of desire and is thus unattainable.

By combining current neuroscientific knowledge about the reception of music and psychoanalytic theory relating to vocal *jouissance*, it is possible to devise a conceptual neuropsychoanalytic topology of the ‘pure voice’, which is shown in Figure 4.1 below. This figure, like the similar ones in the previous chapters, is inspired by Lacan’s Borromean rings. Each ring represents one of the orders of the Imaginary, Symbolic and Real, respectively, which are indicated by the respective letters outside the rings. As already discussed, the ‘pure voice’ shown at the centre of all three rings refers to the phonic materiality of the voice, that is either a pre-verbal infant’s lallation or the meaning-less operatic voice that has become detached from language. The elements of Melody, Rhythm and Timbre in each ring represent the constituent musical features of the ‘pure voice’. The significance of each constituent musical feature of the ‘pure voice’ was discussed earlier. In terms of the reception of the ‘pure voice’, each overlapping area between the rings, except for the central area, contains a list of the main neural regions that are involved in the processing of the relevant two constituent musical features. The central area contains a list of the main neural regions that are proposed here as being involved in the processing of vocal *jouissance* evoked by the ‘pure voice’, that is the voice *as* music. These neural regions shown at the centre of the rings have been indentified in neuroscientific studies as being involved in the processing of music-evoked emotion, as discussed by Warren (2008). The table that appears below the image contains a list of the main neural regions that are responsible for processing the individual constituent musical features of the ‘pure voice’ shown in each ring.

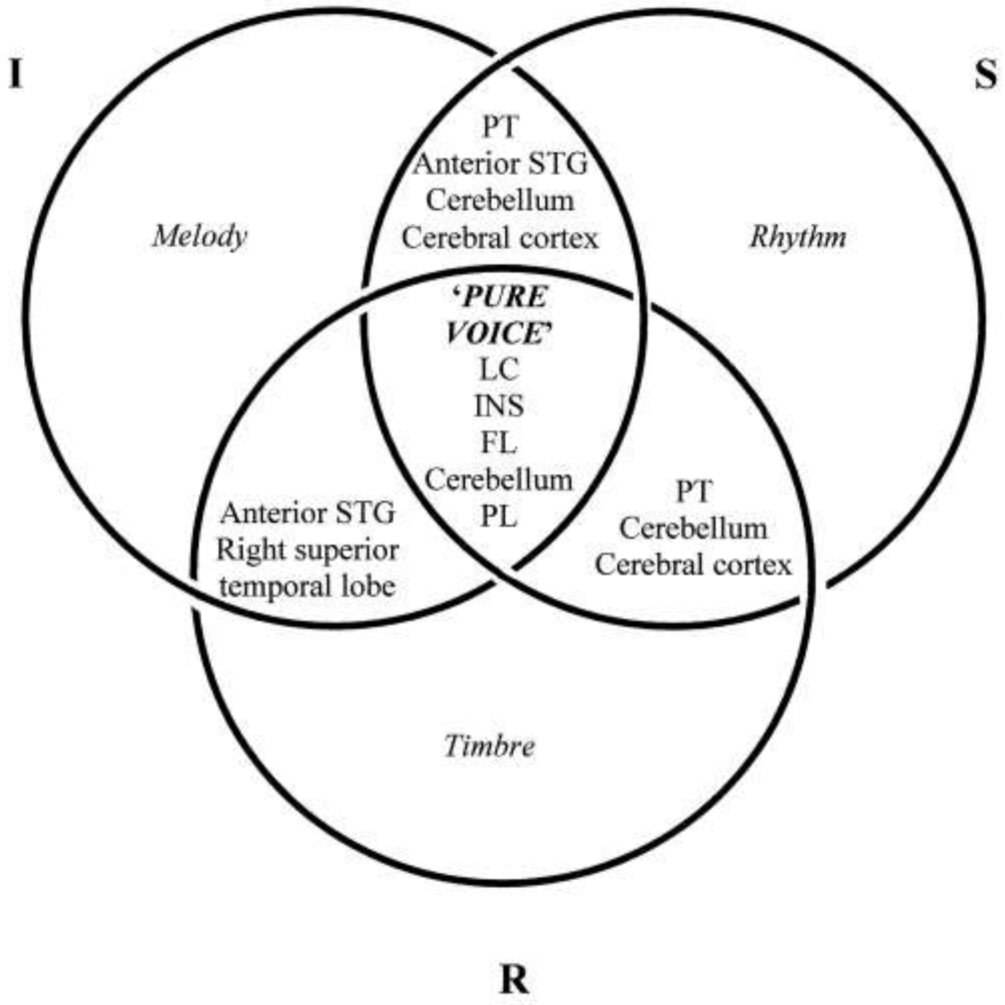


Figure 4.1 A conceptual neuropsychoanalytic topology of the 'pure voice'

Legend: FL = frontal lobe; INS = insula; LC = limbic circuit; PL = parietal lobe; PT = planum temporale; STG = superior temporal gyrus (based on Warren 2008: 34).

Melody	Superior temporal gyrus, planum polare (Patterson et al. 2002), left parahippocampal gyrus, bilateral ventral anterior cingulate, left medial prefrontal cortex (Green et al. 2008), bilateral inferior frontal gyri, medial thalamus and dorsal cingulate cortex (Mizuno and Sugishita 2007), amygdala, retrosplenial cortex, brain stem and cerebellum (Pallesen et al. 2005).
Rhythm	Parietal lobe, anterior superior temporal gyrus, planum temporal (Warren 2008), cerebellum, basal ganglia, motor areas (Halsband et al. 1993; Ivry and Hazeltine 1995; Ivry and Keele 1989; Ivry and Schlerf 2008; Janata and Grafton 2003; Levitin and Cook 1996; Sternberg et al. 1982), dorsolateral right prefrontal cortex and right inferior frontal gyrus (Chen et al. 2008).
Timbre	Right superior temporal lobe, anterior superior temporal gyrus and planum temporale (Warren 2008), superior temporal sulcus and superior temporal gyrus (Levitin 2007).

In concluding this section about the origin and nature of the powerful affective response to the operatic voice, a few key points will be summarised. Although all vocal music is processed by the brain in a similar way, the origin and nature of the emotion that is evoked by a particular music can only be understood in terms of a listener's subjective experience. Thus the uniqueness of the powerful emotional response to the operatic voice may be found in the specific underlying dynamics that characterise this subjective experience, rather than the neural processes alone. In other words, whilst the brain processes the distinct formal features of opera, articulated as various types of musical and vocal structures, the subjective quality and power of the emotion that is evoked derives from the unconscious material that is harnessed by these formal features and which contributes to the unique dynamics of vocal *jouissance*. Therefore, by combining theories of mind with information about the neural processing of music, the neuropsychoanalytic notions presented here allow the proposed qualitative uniqueness of the powerful affective response to the operatic voice to be identified and understood.

4.3 Does Enjoyment of the Operatic Voice Have Something Erotic about it?

It is perhaps of significance to note, for the purpose of opening this section, that the very first issue of the journal *The Opera Quarterly* contained an article entitled "Eros on the Operatic Stage: Problems in Manners and Morals" by Charles Michael Carroll (1983). It may also be of relevance to observe that, in searching the journal's archives of more than 100 issues since the first one in 1983, among all of the journal sections in addition to the articles, the terms 'erotic', 'erotics' and 'eroticism' appear in 118 texts, and the terms 'sexual', 'sexually' and 'sexuality' can be found in 272 texts. Interestingly, except for a few occurrences ('eros' = 1, 'eroticism' = 1, 'sexual' = 2, 'sexuality' = 1), these terms appear in the body of the texts rather than in their titles. These facts prompt an initial comment. Whilst eroticism and sexuality are evidently significant features of the operatic fabric, given that they appear in many of the discourses that deal with this musical genre, their effects extend well beyond their more obvious presence as themes, motivators and underlying elements in operatic plots, which are rather like distractions that function as somewhat of a screen. Carroll (ibid.: 40) describes a number of operas in which eroticism and sexuality are overtly present in the plots under various guises, such as the theme of seduction in "Don Giovanni" (1787), "Rigoletto" (1851) and "Samson et Dalila" (1877); potentially illicit relationships in "Così fan tutte" (1790), "Don Carlo" (1867) "Louise" (1900), "Otello" (1887) and "Pelléas et Mélisande" (1902); or illicit relationships as a central element in "La bohème" (1896), "Carmen" (1875), "Cavalleria Rusticana" (1890), "Faust" (1859), "La Gioconda" (1876), "Manon" (1884), "Norma" (1831), "Pagliacci" (1892), "Der Rosenkavalier" (1911), "Tannhäuser" (1845), "Thaïs" (1894), "Tosca" (1900), "La traviata" (1853), "Tristan und Isolde" (1865) and "Die Walküre" (1870). Paradoxically, as pointed out by Carroll, the storylines in all of these operas were 'sanitised' for the stage by the omission of direct references to pertinent sexual details that would help to make more sense of the plot. Yet ironically, as also observed by Carroll (ibid.: 41), there are instances of directness in which nothing is left to the imagination, such as Don Giovanni's 2,065 sexual conquests catalogued by Leporello, even though in this case the directness is tempered by a humorous tone. Delving a little deeper, beyond the obvious, a subtle eroticism can be found at work in the musical modulation to a minor key and the bassoon arpeggio that emphasise Leporello's words "*sua passion predominante è la giovin principiante* – his main passion is for the young beginner" (ibid.). There is abundant literature in the field of musicology that analyses musical eroticism in opera, but such analysis is beyond the scope of this thesis. Other than illustrating a further direction that can be taken to analyse the eroticism in opera, highlighting Robinson's (2002a) argument discussed in Chapter 1 against a purely textual reading of opera, this simple musical example shows the benefit of adopting an indirect line of enquiry, as will be the case in this section. For eroticism and sexuality in opera are arguably at their most palpable when they are conspicuously absent as such. This is not entirely surprising, since eroticism itself can be said to function through concealment and lack of immediacy, which results in subjectively experienced desire that heightens the enjoyment experienced through the physical senses. However, being in the sway of the circuitous structure of desire, eroticism involves a subjective onanism and phallic *jouissance*. It allows enjoyment by delaying or preventing the pleasure of satisfaction. In other words, eroticism thrives on lack. In order for it to exist, it must constantly maintain a state of subjective tension by preventing the ultimate (sexual) aim of satisfaction of the physical senses, which would result in that tension being discharged. The same erotic dynamics are at work in opera and its reception, as discussed at length in Chapter 2.

A similar tension characterises this section, which is a neuropsychoanalytic attempt at reconciling mental and neural processes, mind and body, to gain a better understanding of the erotic component in the enjoyment of the operatic voice. It builds on and is a natural development of Poizat's (1992 [1986]: 101) eroticism of the operatic voice as a disembodied object, based on the male fantasy of woman being the embodiment of lack, and Abel's (1996: 79) embodied though non-gendered sexual enjoyment of the voice in the form of the 'operatic orgasm', both of which contrast with Koestenbaum's (2001 [1993]) emphasis on the relationship between gay men, desire and opera (Law 1997: 149). In other words, this section is primarily concerned with the overlap, rather than the differences, between the subjective and the objective experience of eroticism in the reception of the operatic voice. As Carroll (1983: 41) remarks, the heart is popularly considered to be the seat of the emotions and is associated with desire, so that in Zerlina's aria "*Vedrai carino*" ("You will see, my dearest") from Mozart's "Don Giovanni", her beating heart, "*Sentilo battere, toccami qua!*" ("Feel it beating, touch me here!"), is at once an erotic symbol and a physical manifestation of her desire.

Despite the physiological inaccuracy of this symbol, it nonetheless sums up neatly the neuropsychoanalytic aim of this section.

As described in the previous chapter, the enjoyment derived from the operatic voice is processed by the pleasure and reward centres of the brain, like other basic biological drives such as eating and sex. It causes some of the same hormones to be released as those during sexual activity. In addition, as discussed in Chapter 2, it can sometimes evoke mental states of transcendence and ecstasy that, at least in terms of intensity, parallel those of sexual pleasure. However, these observations provide indications rather than definitive evidence that this enjoyment is similar to or overlaps with the neural processing of sexual pleasure. It may simply mean that some of the same neural processes are recruited by both activities, as will be discussed presently. Although there may be similarities in terms of the intensity of emotional response, which may prompt a listener to associate the two events in an affective experiential sense, in neurochemical terms this merely indicates that pleasure and reward are mediated and experienced in the brain in similar ways, whatever the stimulus. To put it another way, the enjoyment of listening to the operatic voice shares the same or similar neural pleasure-processing mechanisms as having sex or eating, or indeed any other pleasurable activity. In neural terms, the enjoyment that is derived from listening to the operatic voice relates as much to sexual pleasure as to the pleasure of eating something that is particularly enjoyable. Therefore, the inherent eroticism of music, as discussed elsewhere in this thesis, cannot be usefully identified in neural terms by drawing solely on the findings of neuroscience relating to the neurophysiological processing of rewards and pleasure, either in the case of music or other activities such as sex.

Perhaps more possibilities can be opened up by approaching the matter from the opposite direction. That is, by exploring the singing voice itself, the vocal object *per se*, as well as the subjectivity of a listener's response, namely the unconscious forces at work when a listener engages with the vocal object. Examining the inter-subjectivity of this engagement, namely the experience of relating to the vocal object as an individual listener, as well as an individual in the context of a group and collectively as a group (where the 'group' may represent an audience in the opera house, or operaphiles considered as a cultural body, for example), can yield useful insights that would not otherwise be accessible via neuroscience alone. The resulting insights and their resonances can be superimposed on the neuroscientific knowledge and allied with it.

This provides a more complete, multi-dimensional psychodynamic interpretation that combines at once subjectivity and neural function. In addition, it opens up conceptual possibilities that allow neuroscientific data to be interpreted from an individually meaningful perspective, as well as providing a creative starting point for hypotheses to be tested in further empirical studies. In this way, it becomes possible not only to explore the notion that the enjoyment of listening to the operatic voice has something erotic about it conceptually, but also to interpret neuroscientific findings in a way that makes subjective sense and corresponds to our 'gut feeling', our inner conviction that this has to be so for some reason that appears otherwise elusive. In other words, the unaccountable feeling and sense of the subjective 'truth' in the notion that enjoyment of the operatic voice has an erotic component may be accounted for by psychoanalytic theory, as a result of which it is possible to suggest, based on a conceptually-supported subjective conviction, that there may indeed be some form of overlap with the neural processing of sexual pleasure. Conversely, this would perhaps also allow for a claim to be made that the intense pleasure of eating something particularly enjoyable has an erotic component too.

If the brain can be said to provide the material means for the subjective mind to exist and function, where a finite number of neural mechanisms allow an infinite number of mental processes to unfold, then it is conceivable to suggest that these neural mechanisms are shared by a range of subjective experiences, many of which are quite distinct from each other. As an analogy, different musical genres are constructed from a largely similar stock of notes and scales and they are all perceived as music. Yet each genre stands out from the general collective of music and can be said to acquire meaning beyond music itself. Whereas a listener's brain allows music to be perceived (and it is perceived as such through a developmental learning experience, as explained in the previous chapter), its 'meaning' beyond the materiality of the sound itself is interpreted and only makes sense by virtue of a listener's subjective mind in relation to accepted styles, conventions, and so forth. In the same way, the composition of music originates in the subjective mind. Consequently, music composition and reception are essentially shared subjective experiences, even when these activities are performed alone. This inter-subjectivity is based on and made possible by the same auditory processes in the brain that are responsible for the reception of many other sounds. Whilst many other sounds beyond music may also be considered pleasurable, like bird song or the babbling of a stream, the subjective valency of the pleasure will be quite different to that of listening to a favourite operatic aria, for example. In each case, the dynamics at work in the subjective mind are not the same. Yet both sounds are pleasurable and they are processed by the brain largely in the same way. The answer to this may lie in the specialised neural regions that are recruited by the brain's pleasure and reward systems.

A functional Magnetic Resonance Imaging (fMRI) study by Sescousse et al. (2010: 13095) investigating how the value of erotic stimuli and monetary gain is processed in the brain identified common and distinct neural systems. The study was based on the premise that distinct primary reward-directed survival behaviours, such as seeking food or potential mates, are processed by the same set of neural regions, whilst newer areas of the brain that have evolved over time are involved in the processing of more recent secondary rewards, for example monetary gain. The researchers found that the subjective value of all rewards is encoded by the same neural areas, namely the ventral striatum, anterior insula, anterior cingulate cortex and midbrain. As detailed in the previous chapter, all of these areas are involved in the processing of music. Of particular relevance for this section, Sescousse and colleagues also found that the representation of specific rewards is processed by distinct areas of the orbitofrontal cortex, an area of the prefrontal cortex. Whilst the evolutionarily older posterior lateral orbitofrontal cortex processes erotic stimuli, the relatively newer anterior lateral orbitofrontal cortex processes monetary gain. In other words, the researchers identified a dissociation between the processing of primary and secondary rewards, based on a modular organisation of the brain that encodes the subjective value of a reward. Although it is beyond the scope of this thesis to confirm any similarity in the activation of the posterior part of the orbitofrontal cortex in response to erotic stimuli or to the operatic voice at salient moments of *jouissance*, this could perhaps be investigated in future empirical studies, comparing male and female operaphiles versus opera-naïve participants. At any rate, the neural specialisation for reward processing identified in the study conducted by Sescousse and colleagues may account in some way for the musical eroticism discussed by numerous authors (e.g. Dopp 2008, Downes 2006, Dreyfus 2010, Kierkegaard 1987 [1843]: 45-136, McClary 2002 [1991], Plato 1994 [385-370 BC]) and proposed here as underpinning the enjoyment of the operatic voice, in the form of vocal *jouissance*, or the 'operatic orgasm' (Abel 1996). As Sescousse et al. (2010: 13101) point out, other studies have found a neural overlap in the medial and posterior lateral orbitofrontal cortex for the processing of erotic pictures and other primary rewards, for example attractive faces, pleasant smells and tastes, as well as a similar overlap in other brain areas in response to secondary rewards. More significantly, Sescousse et al. (ibid.: 13102) found that the amygdala, which responds to the stimulus of erotic pictures but not to secondary stimuli, is more connected with the posterior and medial orbitofrontal cortex. As discussed in the previous chapter, the amygdala is also involved in processing the emotion evoked by music. According to the researchers, the purpose of specialised neural processing is that of assessing the value of different rewards in order to make predictions, whilst the common pleasure and reward systems are responsible for the general processing of the pleasurable experience when the reward is actually consumed. This meshes with the role of anticipation and prediction in the enjoyment of music, as discussed in the previous chapter. When the findings of this study are considered in combination with other research mentioned earlier, such as that by Salimpoor et al. (2011: 261) identifying distinct dopamine activity in the anticipatory and consummatory stages of music listening, or the key role of dopamine in sexual response highlighted by Komisaruk et al. (2008: 100), it then becomes plausible in neuropsychoanalytic terms to suggest that the enjoyment of music, and in this particular case the operatic voice *as* music, has a subjectively experienced component of eroticism that does not necessarily involve a neural overlap with sexual arousal or orgasm. In this way, the nuanced complexity of neurochemical and neurofunctional interactions can be seen to admit the notion that operatic vocal music may be processed as a primary reward on account of its inherent eroticism. The origin of this eroticism may be found in Money's (1997: 401) "songmap" mentioned in Chapter 1, which developed as an invitation to mate and provided an evolutionary link between the "lovemap" and the "speechmap". It may also lie indirectly in Panksepp's (1998: 278) theory of "separation distress vocalisations", and the consequent release of neurochemicals associated with "chills" (Panksepp and Bernatzky 2002: 144), mentioned in the previous chapter, pointing to the eroticism of an individual's earliest bond with the (M)Other and the enduring maternal primary process presence (Horton 1981: 127) that was discussed in Chapter 2. Furthermore, it may be connected with the fundamental vocal bond between the pre-verbal infant and the mother; the structuring role of the father's voice; the auditory aspect of the primal scene; the invocatory drive and desire; and the voice as "sexual embodiment of the word" (Pigozzi 2008: 11).

Having established a plausible neural basis for the subjective experience of an erotic component in the enjoyment of the operatic voice, a connection can be drawn in the same way between this eroticism and vocal *jouissance*. As discussed earlier in this chapter, there is evidence of a neural overlap between the processing of pain and pleasure (Leknes and Tracey 2008: 317), which would account for the bittersweet experience of vocal *jouissance*. According to Fields' (2006 and 2007) "Motivation-Decision Model", the interpreted meaning of subjective experiences results from unconscious decision processes that are based on the evaluation of an individual's homeostatic state, input from the senses and awareness of dangers and rewards, whereby survival takes priority over pain, or the greater pleasure of a reward may be achieved at the cost of some pain (Leknes and Tracey 2008: 314). There is an evident affinity here with Freud's (1920b) "pleasure principle" that was discussed earlier.

If one accepts that enjoyment of the operatic voice involves a component of eroticism, then it is not implausible to suggest that this may be processed as a primary reward, affording a greater (more intense) emotional reward than the 'painful' aspect of vocal *jouissance*. Put another way, the 'painful excess' of vocal *jouissance* enhances a listener's enjoyment on account of the neurochemicals that are released during the reception experience, as dealt with in the previous chapter and earlier in this one. In addition to the differential release of dopamine during the 'anticipatory' versus the 'consummatory' music-listening stages, as identified by Salimpoor et al. (2011) and described above, oxytocin and prolactin are also released. Whilst oxytocin release is associated with bonding experiences, such as that between mother and infant, and the release of the tranquilising hormone prolactin is associated with sad experiences, these hormones are also released during sexual intercourse and following orgasm, respectively (Levitin and Tirovolas 2009: 220). It would be interesting to establish, in regard to vocal *jouissance*, whether there is any connection in the music-listening experience between the differential dopamine release found by Salimpoor et al. (2011) and the findings of Sammler et al. (2010) that showed an increasing functional separation in the neural processing of music and lyrics in songs, as described earlier.

Therefore, the subjectively experienced 'pleasure in suffering' of vocal *jouissance*, with its attendant neurochemical processes, functions as a reward because of the unconscious meaning that it has for the listener. As Leknes and Tracey (2008: 318) affirm, meaning determines "the subjective interpretation of a sensory stimulus", so that "even suffering can be rewarding if it has meaning to the sufferer". In the reception of operatic vocal music, the meaning for a listener may derive from the subjective interpretation of the resonance between moments of vocal *jouissance* – the voice as a sensory and sensual stimulus – and the listener's inner, unconscious world. The essentially erotic qualia of operatic vocal music is determined by the phallic *jouissance* that drives the operaphile's repetition compulsion. The voice as *objet petit a* remains at a tantalising distance – it is out of reach and unobtainable. The operatic voice can only provide a fleeting encounter, which is pleasurable but essentially lacking and unsatisfying. Therefore, the eroticism of vocal *jouissance* lies in the ultimate unattainability of the vocal object, in the phallic *jouissance* and repetition that it involves. Through the combined effects of a number of elements in the reception of opera, at a conscious and unconscious level, such as the formal structure of music and the undoing of language and meaning by the singing voice, the result in neurochemical and neurofunctional processing terms can be likened to what Barthes (1997 [1973]: 10) describes as the "intermittence of skin flashing between two articles of clothing".

Taking this logic further to its natural conclusion, it is now possible to return to the subject discussed at the end of the last chapter, namely the possibility of an overlap between sexual pleasure and the enjoyment of the operatic voice, or put another way, the physical embodiment of eroticism. In this sense, a listener's enjoyment and resulting physical response, be it in the form of *frissons*, feeling 'choked up', or tearfulness, can be said to represent a sexual out-come of the 'operatic orgasm', as an induced embodiment of the intangible eroticism that features in the listener's object-relation to the singer's voice. Although the experience is admittedly lacking, given that the 'afterglow' is achieved at the expense of any real satisfaction or the sexual act itself. By extension, a listener's physical manifestations in response to the enjoyment of the operatic voice can also be looked upon as a remnant of sexuality, in excess of sexuality, and hence standing outside sex as such. All of this points to another ambiguity about the phallic nature of vocal *jouissance*, in addition to that mentioned in Chapter 2 between the fetish and *objet petit a*. The ambiguity relates to the possibility of a supplementary component in the experience of vocal *jouissance*, an embodied feminine *jouissance* that is of the Other (Lacan 1999 [1972-1973]: 73, 74). Whereas in the listener this *jouissance* of the Other remains a potential, a short-lived oscillation away from the phallic position, in accomplished singers it is a reality of singing, which results in the bodily sensation that Pigozzi (2008: 147) describes as "being sung" [my own translation]. In other words, singers experience their own voices as something supplementary beyond the *objet petit a*. This may be understood, Pigozzi goes on to explain, by considering that in a trained singer, good vocal production involves the whole body, which is played like an instrument. Although singing may be enjoyable for the singer, the tension and control that the activity requires are not pleasurable. As Pigozzi affirms, this feminine component of the singing voice is independent of the singer's biological gender, yet the voice is at the same time an inescapable marker of gender, wherein may have lain the attraction of the ambiguous transgender quality of the *castrato* voice (ibid.: 142-143), or the countertenor voice in modern times. In addition, Pigozzi (ibid.: 160) continues, this supplementary feminine component determines the uniqueness of each singer's voice – hence the operaphile's 'voice of measure' – in the same way that there is no universal Woman, each one being unique (Lacan 1999 [1972-1973]: 73). In the same way that the sexual nature of the operatic reception experience cannot be addressed and established directly by looking solely for an overlap in neural processes, the feminine aspect of the singing voice cannot be confirmed by the mere similarity between the vocal folds and the female genitals (see Figure 4.2 below).

Figure 4.2 The vocal folds (producing a sound at a pitch of 200 Hz)
(source: Ladefoged (1993) http://www.cogsci.jhu.edu/courses/625-F2004/ladefoged/vowels/chapter2/photos%20vocal%20cords/photos.html)

4.4 The Reception of the Operatic Voice: From the Neural Processing of Acoustic Input to the Subjective Experience of Vocal Jouissance – A Theoretical Formulation

Having addressed the three questions that this thesis set out to investigate, in this concluding section a neuropsychoanalytic theoretical formulation will be provided that draws on and synthesises a great deal of the information presented and discussed thus far. This theoretical formulation takes into account both the subjective dynamics and the neural processes that are involved in the reception experience. The formulation is purposefully conceived in broad terms, so that it covers the listening experience both in private, such as by means of recordings, and as a member of an audience attending a performance in the opera house or other public venues. The latter case includes live and recorded broadcasts of opera performances that are relayed to open-air 'big screens' or cinemas, for example. However, as Robinson (2002a: 47-49) affirms, the opera house is naturally enough the primary or privileged context, other contexts being supplementary, as discussed in Chapter 1. Given that this thesis focuses on the voice, which is ultimately the operaphile's focal point, other related considerations such as the visual elements of staged performances will only be touched upon in the formulation. This is largely in keeping with the rest of this thesis.

The reception of opera involves primarily the sense of hearing and secondarily, where applicable, the sense of vision. The auditory input is capable of evoking mental images, engaging memory and eliciting associations. The auditory input may be enhanced (or disturbed) by the presence of visual input, such as stage sets, costumes, special effects, the expressive movements of performers, and so forth. This visual input may be appealing, striking, or sometimes just detractive. In any case, it is essentially of secondary importance. The overall reception of an opera, or of a significant section of the whole work, or even of a complete musical number, such as an aria, duet and so on, can be said to involve three ongoing / repeated broad dynamic processes or phases that overlap and interact to varying degrees: 1) the reception itself; 2) processing and build up of tension; and 3) enjoyment with one or more episodes of climax/anti-climax. This bears a similarity to Abel's (1996: 86) description of the 'operatic orgasm', in which the initial foreplay serves to develop tension that eventually leads to a climax (*jouissance*). However, as discussed previously, these climaxes should be understood as being high points of enjoyment that sustain the overall eroticism of the experience, rather than providing any actual or lasting satisfaction as such. The three phases that constitute the reception of operatic vocal music, its processing and its enjoyment in objective and subjective terms, are set out below in the form of a proposed neuropsychoanalytic theoretical formulation.

Phase 1 - Initial reception

The auditory input, and the visual input (where present), is perceived by the ears and the eyes, respectively. The stream of sound is processed by the auditory cortex in the temporal lobe, as well as a supplementary auditory system in the cerebellum that allows an immediate affective response to the sound, which may include movement (Levitin 2007: 184-186). At this early stage, involvement of the mind is minimal, compared to the next two phases, given that the underlying neural process is initially geared to providing more of an instinctual response, such as fast reaction to a perceived threat that requires flight. The supplementary auditory system provides a more direct processing path for this purpose, activating the thalamus-amygdala circuit, as opposed to subsequent cognitive risk-evaluation processing through the thalamus-cortex-amygdala circuit (Huron 2006: 38, 226). The sound is only perceived as music when more anterior regions of the brain are engaged, resulting in increasingly refined cognitive appraisal, comparison in memory and affective response.

As detailed in Chapter 2, based on Levitin's (2007: 86, 91, 191) description, the incoming sound is first broken down or parsed by the brain, such as the timbres in the temporal lobes, pitch in the prefrontal cortex and Brodmann areas 44 and 47, and rhythm in the cerebellum and the cerebellar vermis. The lyrics are processed in the language areas of the brain, such as the areas of Broca and Wernicke, as well as other areas in the frontal and temporal lobes. The structure of the music is also processed in some of the same areas in the frontal regions of the brain that process language. Memory is also engaged to allow the sound to be recognised, which involves the hippocampus and areas located between the temporal, occipital and parietal lobes. As Warren (2008: 33) explains, the flow of information during this initial processing is bi-directional. Based on a hierarchical organisation from lower to higher neural levels, increasingly complex abstract 'sound image' representations are produced in the brain, such as instruments, voices and melodies, by comparison with information that is stored in memory. At this point, while the information stored in memory is being referenced, the mind starts to become fully engaged and personal memories and associations begin to surface too. This includes memories of any previous affective response to the music, or similar music, which may determine or influence the emotional response at the present time and in the future.

The initial reception phase is important in neural terms, as the parsing of the various features of the sound allow it to be recognised very quickly as music and whether it has been heard before. Recognition of a piece of music or voice occurs quite quickly too, as does the triggering of initial associations. We can usually tell within a relatively short space of time whether we like or dislike a piece of music. In the case of music that we have not heard before, our brains still perform a comparison with information stored in memory, in an attempt to make sense of structures, melodies, styles and so forth. In subjective terms, this phase relates primarily to the conscious mind. Increasingly higher levels of abstraction in neural processing result in a progressive involvement of a greater share of the listener's subjectivity and consequent emotional response, recruiting conscious and unconscious dynamics, as will be described in the next two phases.

Phase 2 - Processing and build up of tension

In this phase, neural processing occurs at higher levels, involving more anterior areas of the brain. Neural representations of the various features of the music are increasingly integrated and interpreted as melodies, keys, harmonies and so forth. For example, as detailed in Chapter 2, the superior temporal gyrus and planum polare are activated by melody, intervals, and contour (Patterson et al. 2002). The perception of major and minor keys activates the inferior frontal gyri, medial thalamus and dorsal cingulate cortex, whilst frontal and thalamic areas may mediate the identification of keys, with any conflicts being resolved by the cingulate (Levitin and Tirovolas 2009: 215). Harmonies and keys are mediated by the frontal lobe (Warren 2008: 34). In the case of vocal music, as mentioned earlier in this chapter and in the previous one, music and lyrics are processed in a posterior to anterior gradient in the left superior temporal sulcus, with initial integration at a phonemic level in the mid superior temporal sulcus (Sammler et al. 2010: 3575, 3576).

Various musical structures, such as temporal patterns, contribute to developing tension in the listener's conscious mind, building anticipation and expectation as the brain tries to predict what will come next, comparing information stored in memory (Huron 2006, 2008b; Huron and Margulis 2010). Moreover, the genre-specific musical macro-structure of an opera (e.g. the alternation of arias, duets, choruses and recitatives), as Lindenberger (2010: 121-124) suggests, functions as an "emotional communication system" that determines how this build up occurs over time during the course of an opera, as well as the peaks of affective response that are evoked by particular vocal structures. Intimate knowledge of an opera and its structure heightens the emotional response in a listener, as research has shown in the case of chills evoked by music (e.g. Panksepp 1998: 278). In addition to the tension of expectation and anticipation that is developed by these different musical and operatic structures, the integrated processing of music and lyrics means that there is an alternating predominance of the two, creating an intermittence between music and lyrics that sets up and contributes to the dynamics of eroticism and desire in opera.

This eroticism of intermittence (Barthes 1997 [1973]: 10) fuels the desire, which thrives on the frustration of satisfaction, in attempting to (re-)encounter the voice as partial object, the objectified voice that functions as the ultimately unattainable *objet petit a*. Because of this inherent eroticism in opera, neural processing may involve specialised circuits in the orbitofrontal cortex (an area in the prefrontal cortex), in particular the posterior lateral orbitofrontal cortex, which are activated via the amygdala in response to primary stimuli (i.e. eroticism) in order to assess and predict the value of the reward, as has been found in unrelated research (Sescousse et al. 2010: 13095, 13102). In addition to these specialised circuits, according to the same research, the subjective value of the anticipated reward (as is the case with all rewards) is also encoded in the ventral striatum, anterior insula, anterior cingulate cortex and midbrain. As detailed in the previous chapter, all of these areas are involved in the processing of music. The anticipation that develops during the build up of tension in this phase, which precedes the peak affective response that will be described in the next phase, results in increased dopamine activity in the caudate, as observed by Salimpoor et al. (2011: 261). The caudate is part of the striatum, in the mesolimbic reward system, which is linked to other areas that process associations, sensations and movement, and is related to stimuli-response and the reinforcement of rewarding stimuli. As these researchers affirm, dopamine activity in this area of the striatum may determine the anticipatory pleasure in response to music, or 'wanting' the musical stimulus.

With reference to the operatic voice specifically, and its intermittent predominance in relation to the orchestral music, this anticipation is also brought about by the building trajectory of vocal *jouissance*, which has the effect of gradually and increasingly undoing language, making the lyrics harder to understand, whereby the voice eventually becomes pure music devoid of meaning. The subjectivity of this phenomenon may be accounted for in neural terms by the findings of Sammler et al. (2010: 3575-3577), where processing of the phonemic or melodic features of the lyrics is closely bound to the processing of music up to the mid superior temporal sulcus, with increasing separation in processing of the meaning and structure of the lyrics in the left anterior superior temporal sulcus. This may perhaps explain why the aesthetic qualities of the voice and music are capable of evoking intense emotion independently of the 'mood' of the semantic content of the lyrics in opera, in other words the excess or superfluous phonic materiality of the singing voice as opposed to the meaning of the words. Furthermore, the ongoing partial overlap and increasing separation in the neural processing of music and lyrics may relate to a number of factors in the reception experience, such as increasing expectation and anticipation, a growing subjective sense of eroticism, as well as a greater involvement of unconscious forces brought about by the unique subjective dynamics that are elicited by the operatic voice. This forms the basis of the transcendent state that is evoked in the listener, who is 'transported' upwards along the trajectory of the operatic voice towards the bittersweet end-point of vocal *jouissance*.

Phase 3 - Enjoyment: climax and anti-climax

With separation in the processing of the lyrics and the music (including the voice *as* music), a point is reached in the higher registers of the operatic voice at which the words that are being sung can no longer be understood. The asemic singing voice is now enjoyed for its phonic materiality alone, its melodic expressiveness, pure emotion with no meaning in language, that is meaning beyond signification (Hamilton 2008). The voice transcends the boundaries of language (Tambling 1997: 267), undoing meaning to become the *objet petit a*, going beyond the pleasure principle (Freud 1920b) towards an apparently boundless enjoyment through desire. The listener is therefore able to (re-)encounter the lost vocal object, *objet petit a*, at least for a brief instant. The ethereal nature of the voice means that any (re-)encounter is inevitably fleeting, which sets up and reinforces the dynamics of desire, eroticism and phallic *jouissance*. If the reception experience occurs in the opera house, the visual elements of the scenic apparatus, which contributed in a supplementary manner to the trajectory of the voice towards the end-point of vocal *jouissance*, suddenly become insignificant as the listener closes their eyes in ecstatic bliss.

This subjective experience of vocal *jouissance*, or the 'operatic orgasm' to use Abel's (1996) expression, equates in neuroscientific terms to the 'consummatory' or 'liking' stage of listening to music. During this peak in affective response there is greater dopamine release in the nucleus accumbens, which is connected to other areas in the limbic system such as the amygdala, hippocampus, cingulate and ventromedial prefrontal cortex (Salimpoor et al. 2011: 261). These areas in the limbic region constitute the pleasure and reward systems of the brain. As detailed in Chapter 3, these systems are responsible for processing all basic pleasurable experiences, such as eating or having sex (Levitin 2007: 91), when a reward is actually consumed. In addition to dopamine, prolactin and oxytocin are also released in the brain, possibly as a result of cortical inhibition of the amygdala (mentioned by Huron in interviews with Farr 2008 and McCallumo 2007). The release of the tranquilising hormone prolactin is associated with bonding experiences, such as breastfeeding, but it is also present in a listener's tears of sorrow in response to music. These three hormones replicate the feeling of an intimate connection with others, such as bonding between mother and infant, sexual intercourse, or being praised. A listener's chills or *frissons* during peak affective response are controlled in part by endogenous opioids resulting from the release of endorphins, which may perhaps be related to a sudden decrease in opioid activity (Panksepp and Bernatzky 2002: 144).

The connection between these hormones and bonding experiences, such as that of infant and mother, or during sexual intercourse, may account for the moving yet comforting quality of music and singing when considered alongside Panksepp's (1995 and 1998) psycho-biological evolutionary theory of separation distress, which was outlined in the previous chapter. As Panksepp and Bernatzky (2002: 144) suggest, music and singing can evoke a sense of loss, as well as the possibility of reunion. As proposed here, this reunion relates to an individual's primary bond with the mother, the first Other. In other words, the qualities and dynamics of the operatic voice are capable of drawing on unconscious material in afterwardness, evoking at once the infant's distress at separation from the (m)Other upon entry into the Symbolic order of language, as well as the possibility of (re-)union with her through a fleeting (re-)encounter with the lost vocal object – namely the pre-verbal 'pure cry'.

A connection between Panksepp's separation distress theory and Beeman's (2005) work on the acoustic properties of infant cries has been drawn by Huron and Margulis (2010: 597) in relation to the operatic voice. The connection lies in the similarity between the energy peak of infant cries, at approximately 3-4 kHz, and that produced by the operatic 'singer's formant', which is in the range of 2.9 kHz to 4.1 kHz (Sundberg 1972 and 1987). Given that the features of music that are significant in evoking emotion include loudness, pitch, high and low notes (Levitin 2007: 71-72), as well as tension and resolution, dissonance and consonance (Trainor 2008: 599), the highly-trained operatic voice can draw on all of these features in a wide variety of combinations in order to achieve a practically endless range of nuanced expression.

Rhythm is a further consideration in the building of tension and emotion during the forward progression of the voice towards the goal of vocal *jouissance*, a process that in musical terms essentially involves "dissonance striving to resolve in consonance" (Rose 2004: 134). Freud's (1924b: 160) proposition that sensations of pleasure and unpleasure are determined by variations in the strength of rhythmic movement would appear to apply in this regard. The forward progression of the singing voice reflects the variations in the listener's desire, where rhythm provides a recurring stimulation, as well as a framework that allows for an awareness of feelings (Rose 2004: 135). It is the combination of the rise and fall of pitch, forward movement, crescendo, climax and anti-climax that occur along the way in the trajectory of the operatic voice – supported by the orchestral music, narrative and any stage apparatus – that underpin the eroticism in the reception of opera. The whole operatic experience involves a build up of tension and its subsequent release. A partly apt description is provided by Freud (1942 [1905 or 1906]: 305) in relation to drama, which arouses "sympathetic suffering" in order to "purge the emotions" by opening up "sources of pleasure or enjoyment in our emotional life", where the resulting affect is accompanied by sexual excitation and the sensation that the potential of our psychical state has been raised. However, this description does not account for the "traumatic character" of *jouissance* (Žižek 2007: 79), which in the reception of opera is brought about by the singing voice. It does not address the inherent dissatisfaction and lack in the phallic *jouissance* that is set up by the voice as *objet petit a* through the circularity of desire, which "makes man always search for what he has to find again, but which he will never attain" (Lacan 1997b [1959-1960]: 68). Nor does it deal with the nature of the object-relation between a listener and opera, which can be said to oscillate between two positions: an initial one that aims at *obtaining* the voice and a subsequent one that tends towards *becoming* the voice, but neither is actually achievable. This observation is based on Freud's (1941 [1938]: 299) distinction between an infant's 'having' and 'being' the breast, as well as Winnicott's (1953) separation-individuation process, transitional objects and phenomena, and the transitional experience.

The common denominator in the operaphile's reception experience may be found in the link with the mother as an enduring primary process presence in the solacing transitional experience of opera, as proposed in Chapter 2. Subjective and objective elements that support this notion, as discussed separately in previous chapters and jointly in this one, include the relationship between the singing voice and language; the eroticism of intermittence between the predominance of music and lyrics, where the phonic materiality of the voice ultimately prevails by undoing language; the singing voice as the unattainable *objet petit a* cause of desire and the resulting dynamics of phallic *jouissance*; the orgasmic end-point of vocal *jouissance* that may manifest physically in the form of *frissons*, a 'lump in the throat', or feeling 'tearful'. As such, Winnicott's theory of transitional experience serves as a unifying framework for the operatic reception experience. The voice becomes a lost object upon the infant's entrance into the order of language and consequent separation from the mother. The mother's voice may be incorporated by the infant to serve a transitional purpose, relieving anxiety by providing comfort during the separation-individuation process. Illusion is fundamental to the intermediate area of experience, between inner and outer worlds, in which boundaries overlap and become indistinct. A link with the mother persists throughout life, as do substitutive attempts to restore the union with her in the Imaginary Order, that is before the acquisition of language and entrance into the Symbolic Order. This link can be found, for example, in the transitional experience that is afforded by science, religion and the arts, including opera. The transitional experience of opera may be found in the link with the mother that is maintained when an adult listener (re-)encounters the lost vocal object in the intermediate space that is mediated by operatic illusion, eroticism and desire. This, in turn, (re-)creates a pre-verbal, pre-Oedipal holding environment where the voice (the 'pure cry') becomes devoid of meaning and can be safely enjoyed for its own sake, outside the order of language and without fear of castration.

This may account for the exalted position of the operatic *diva* and for Poizat's (1992 [1986]: 156-157) claim that the extent of emotional and financial involvement is perhaps greater in male operaphiles. It may also explain *why* the operatic voice can evoke intense emotion in the operaphile, complementing knowledge about neuropsychophysiological processes. The concluding view, at the nexus of both disciplines, would appear to suggest that the reception of opera involves a distinct subjective experience that draws heavily on the unconscious mind, even though the underlying neural processes are common to the reception of all music.

Conclusion

This chapter addressed the three research questions posed in this thesis by drawing together a number of threads from the psychoanalytic and neuroscientific material that was discussed separately in the previous chapters. Using this neuropsychoanalytic approach, each of the first three sections in this chapter set out to establish the following: 1) how and why the operatic voice is enjoyed; 2) the possible origins and nature of the intense affective response that is evoked in some listeners by the operatic voice; and 3) whether a listener's enjoyment of the operatic voice has an erotic component. Having dealt with these questions by considering subjective dynamics alongside objective neural processes, the last section of this chapter proposed a neuropsychoanalytic theoretical formulation to account for a listener's reception experience, culminating in the 'operatic orgasm' of vocal *jouissance*. This theoretical formulation synthesised much of the material that was presented and discussed throughout this thesis, weaving together the elements that contribute to the reception experience. These elements include the gradual undoing of language by the singing voice, which may be related to the increasingly separate neural processing of language and music, marking a distinction between the anticipatory and consummatory stages of listening to music and differential dopamine release; the role of hormones in mediating emotional response, which bears some connection with subjective experiences of intimate bonding; and factors contributing to the inherent eroticism of a listener's enjoyment in the form of vocal *jouissance*, as well as the possible role of specialised circuits in the brain for reward-evaluation prior to its consummation and enjoyment. A common denominator was identified in the link with the mother as an enduring primary process presence in the transitional experience of opera, which functions as a space of illusion that allows inner and outer worlds to be reconciled, providing a source of solace. The operaphile's enjoyment lies in the unique subjective dynamics – rather than any distinct neural processes – that are set in motion by the equally unique dynamics of the operatic voice, mediated by a constellation of auxiliary features that are specific to opera.

Grand Finale

This research explored the reception experience of operatic vocal music and the nature of its enjoyment, primarily (although not exclusively) in relation to operas of the eighteenth and nineteenth centuries. The broad contexts of the reception experience referred to live or recorded performances (of an entire opera or extended excerpts), either enjoyed privately by individuals or collectively as an audience. In particular, these reception contexts included the primary one of the opera house, as well as audio/audio-visual recordings (such as records, audio tapes, CDs, videotapes, DVDs, video clips and so forth) and streamed audio/audio-visual live broadcasts received on a television, radio, computer or other personal device, or relayed to a public venue such as a 'big screen' or cinema.

In addition to an enduring passion for opera, the basic motivation for this research was a desire to gain more insight into the nature of the operaphile's enjoyment of the operatic voice and the intense affective response that it can evoke. The intensity of this response can result in seemingly inexplicable physical manifestations such as *frissons*, piloerection, tearfulness, feeling 'choked up' or a 'lump in the throat'. Specifically, an attempt was made to adopt a 'holistic' conceptual approach in exploring the reception experience and the resulting evoked emotions. This task was undertaken by combining the application of relevant psychoanalytic theory with current neuroscientific findings about the way in which music is processed in the brain and enjoyed. In doing so, a parallel aim of this research was that of bridging an apparent gap between the objective approach of neuroscience and the subjective approach of psychoanalysis in dealing with the reception of operatic vocal music. However, given that neither discipline – alone or in combination as the inter-discipline of neuropsychoanalysis – has dealt with this topic in any significant way, as attested by the paucity of literature in each case, this research represents an original contribution to all three fields. This was achieved by adopting an initially 'complementarist' approach (as explained in Chapter 1), that is by dealing first with each field separately, and then applying both fields together within a neuropsychoanalytic framework. The latter allowed the combined strengths of each field to be leveraged jointly in a dual-pronged approach. As such, this research provides a synthesis of existing material from separate yet overlapping domains, a contribution to psychoanalytic theory that can inform future neuroscientific research on music, as well as an original neuropsychoanalytic theory formulation, which may prove useful as a springboard for further investigation in this area. The considerations, discussions and hypotheses developed in this thesis may also be of use indirectly to the fields of music therapy and emotion research in general.

In addition to the numerous benefits of this conceptual approach, such as the ability to consider the complex, multi-dimensional reality of opera as a whole, rather than examining discrete elements in isolation to avoid confounding factors, as neuroscience is required to do, there are nonetheless inevitable limitations. These include, amongst others, reliance on the accuracy of published empirical study findings, the inability to control study parameters after the fact, and the need for objective testing of the theoretical notions proposed in this research. Therefore, the propositions and hypotheses presented in this research would benefit from being tested empirically, as far as possible. Consequently, it is hoped that this research will inform and inspire future studies – ideally, beyond the confines of the psychology and neuroscience laboratories – to take into account the subjective *qualia* alongside the objective data when investigating the reception experience of (vocal) music, including opera.

Focusing on the actual benefits, rather than potential limitations, a common element that was instrumental in deciding to approach the research in this way is the significant role of language in opera and psychoanalysis, as well as the overlap that has been identified by neuroscience between the processing of language and music in the brain. Given all of the considerations described above, three specific areas/questions were explored by this research: 1) The origin and nature of the intense affective response evoked in some listeners by the operatic voice; 2) How and why the operatic voice is enjoyed; and 3) The proposed notion that enjoyment of the operatic voice has something erotic about it. As mentioned above, the objective of investigating these research areas/questions was achieved by dealing with psychoanalytic theory and neuroscientific findings separately at first and then bringing them to bear jointly within a neuropsychoanalytic framework. In order to organise and develop the exposition of materials, arguments, hypotheses and conclusions in a manner that would allow a logical progression, this thesis was articulated in four main chapters, as well as a general introduction (Overture) and this conclusion (Grand Finale), as summarised below.

Chapter 1 detailed the aims, scope and limitations of this research, in order to set out its overall framework. Background material was provided in the form of a condensed history of opera, which was followed by a discussion of the tension between words and music that has been a feature of opera from its inception. This background material was included because of its relevance to discussions in subsequent chapters relating to operatic structure serving as an emotional communication system (Chapter 4), the significant role of language in psychoanalysis (Chapter 2), and the overlap identified by neuroscience between the processing of language and music (Chapter 3). Related structural considerations dealt with the various ‘layers’ of opera and the constituent elements of each layer, providing a starting point for the subsequent psychoanalytic discussions and theory development in Chapter 2 and the final neuropsychoanalytic amplification in Chapter 4. Complementary background considerations were provided in an overview of pertinent elements of feminist and queer theory related to music and opera. The inclusion of these considerations helped to inform some of the discussions in subsequent chapters. The chapter concluded by dealing with the connections and overlaps between the disciplines of psychoanalysis and neuroscience. This served the dual purpose of providing further clarification of the neuropsychoanalytic conceptual framework of this thesis and as a preamble to the following chapters.

Looking through the lens of psychoanalysis exclusively, Chapter 2 identified and explored various dynamics in opera and their relation to the reception experience. This was achieved through the introduction, discussion and application of pertinent psychoanalytic theories of Sigmund Freud, Jacques Lacan and Donald Winnicott, amongst others. The initial discussions in this chapter dealt with the fundamental issues of possible approaches that can be used in applying psychoanalysis outside a clinical setting, their advantages and limitations, the approach used in this research, as well as the validity and validation of applied psychoanalysis in general. Following on from these discussions, reasons were sought for the relative silence of psychoanalysis on the topic of music, compared to other arts, by considering the influence that Freud may have had in this matter. Having provided this background information, the focus of the chapter shifted to examine psychoanalytic theory relating to the voice and the gaze as partial objects and their relevance to the operatic reception experience. This included a discussion of the synaesthetic-like phenomenon that occurs when the gaze and the voice merge and overlap. With relation to the centrality of the operatic voice in the reception experience, the significant function of desire was highlighted as driving the operaphile’s perpetual quest to (re-)encounter the lost vocal object. The circular path of desire and the ultimate unattainability of the vocal object were identified as prime factors in the inherent eroticism of the operatic reception experience, resulting in the phallic vocal *jouissance* of the ‘operatic orgasm’. This discussion also considered the role of gender. Looking next at the multi-layered structure of opera in more detail, resuming and amplifying the notions proposed in Chapter 1, relationships were explored between and within the orders of Symbolic, Imaginary and Real, in particular the way in which all three are in turn reflected within each order. In dealing with the abiding focus on the singing voice in opera, an attempt was made to clarify the relationship between the operatic voice, the fetish and *objet petit a*. This topic was subsequently extended in Chapter 4, by suggesting that the voice also has a supplementary feminine component that is not entirely phallic, providing a *jouissance* of the Other. Lastly, Winnicott's (1953) theories relating to transitional objects and transitional phenomena were reviewed in order to explore how opera creates an intermediate space of illusion that provides a transitional experience. It was suggested that this transitional experience can have a solacing function through an enduring link with the mother. All of the theories that were covered in this chapter subsequently informed the neuropsychoanalytic discussions and the concluding theoretical formulation in Chapter 4.

A similar monocular approach was adopted in Chapter 3, in accordance with the principle of 'complementarism' that was mentioned earlier. Looking exclusively through the lens of neuroscience, this chapter focused on empirical research dealing with the neural aspects of music reception, processing and enjoyment. As mentioned in the preamble to this chapter, neuroscience has largely concentrated on non-vocal music in an effort to eliminate, or at least reduce, potential confounding factors in empirical studies. Despite this focus on the part of neuroscience in all but a few cases, and the consequent paucity of material dealing with vocal music in general and opera in particular, an explanation was provided to justify the validity of extrapolating these findings to vocal music in conceptual terms. The justification was based on the fact that singers refer to the voice as an 'instrument', so that the singing voice can be conceived of as functioning both *in* music and *as* music. These separate yet coincident positions were dealt with by examining the neural overlap in the processing of language and the structure of music, as well as recent findings that identified a progressive split in the neural processing of the words and music in songs. This chapter covered a wide range of material by drawing on a number of scientific fields, beginning with background considerations relating to the origins of music and singing, hypotheses about their purposes and functions, as well as the roles of culture, society, memory and language in the reception of music. A number of significant functions of music were examined by drawing on the literature, such as the selection of mates, affect and behaviour regulation, cohesion during collaborative work, as well as bonding between mother and infant through the use of melodic infant-directed speech and lullabies. In this last scenario, research findings about the mother/infant dyad were of particular relevance to the psychoanalytic theory described in Chapter 2. As such, they helped to support subsequent discussions, including the neuropsychoanalytic theoretical formulation at the end of Chapter 4. This also applies to the material that was covered later in Chapter 3, such as the neural overlap between the processing of language and the structure of music, or the capacities for music and language that appear to be innate in human beings. A number of brain areas were dealt with in detail throughout this chapter, in particular when examining how music and its constituent elements are perceived, processed and enjoyed. Voice production and reception were discussed in terms of the differences and similarities between singing and speaking. The prolific research area of music and emotion was covered by looking at the differences between emotion that is conveyed by, perceived in or evoked by music. This provided the basis for a discussion relating to differences in the affective response evoked by music with and without lyrics among male and female listeners. Lastly, in an attempt to provide neuroscientific material to support the hypothesised erotic nature of the reception experience, a possible connection was explored between the enjoyment of listening to music and sexual arousal/orgasm by considering research in the field of human sexuality.

Whereas the previous two chapters employed psychoanalysis and neuroscience as separate yet complementary frameworks, in Chapter 4 the two disciplines were combined to explore and provide a parallel account of the operatic reception experience from a neuropsychoanalytic perspective. This achieved the ultimate purpose of this thesis, namely that of investigating in both subjective and objective terms the nature of the operatic reception experience, possible sources of the intense affective response of the operatic voice and the hypothesised eroticism that characterises the enjoyment of the reception experience. Therefore, this chapter was structured to correspond with the three research areas/questions posed in this thesis. Psychoanalytic theory was combined with neuroscientific knowledge, synthesising and amplifying material that was discussed in the preceding chapters. Various connections were proposed by jointly leveraging elements from both disciplines. These connections included the gradual undoing of language by the singing voice and the increasingly separate neural processing of language and music, with the attendant differential release of dopamine, distinguishing the anticipatory and consummatory phases of listening to vocal music. How hormones mediate emotional response and the relation with experiences of bonding, such as between mother and infant. The link between the hypothesised eroticism of the reception experience, vocal *jouissance*, and the possible role of specialised neural circuits that evaluate rewards prior to their consummation and enjoyment. All of these connections between the fields of psychoanalysis and neuroscience provided the basis for an original neuropsychoanalytic theoretical formulation at the end of the chapter that took into account both the subjective and the objective aspects of the operatic reception experience.

The theoretical formulation features a unifying maternal theme that is based on the suggested transitional experience of opera and its solacing effect for the operaphile. Given the neuroscientific evidence pointing to a primordial significance of the mother's voice even while an infant is *in utero*, as discussed in Chapter 3, an aural/oral bond can be said to predate a visual one, as proposed in Chapter 4. As examined in Chapter 2, psychoanalytic theory establishes the mother as an infant's first bond with the Other. On this basis, an enduring primary process presence of the (M)Other was proposed as underpinning the bittersweet enjoyment of the operatic reception experience, which can literally move an operaphile to tears. The unconscious realisation of loss underlying this physical response occurs when the object-voice is (re-)encountered in its asemic or 'pure' form, namely as the meaning-less phonic materiality of the singing voice. As a result of this realisation of loss of language and meaning, the operaphile's own voice becomes 'stuck in the throat', the void being filled by a '*globus hystericus*'.

Many other elements informed the neuropsychoanalytic theoretical formulation that closed Chapter 4. These elements were distilled from the research expounded throughout the chapters of this thesis and were subsequently related to each other. One example is the effect of acculturation on the understanding and appreciation of music, in the same way that language is learned in relation to its surrounding culture, which was examined in Chapter 3. It follows, as discussed in Chapter 4, that the structure of opera itself can function as a language that is learned, resulting in a communication system based on emotion (Lindenberger 2010: 120). Another example relates to the neural overlap that has been identified between the processing of musical structure and language syntax, discussed in Chapter 3, which provides an objective basis for the relationship between music and language in opera, and the trajectory of the operatic voice as it moves away from language and meaning, as dealt with in Chapter 2. This also stands in relation to the neursocientific finding of an increasingly differential processing of music and language (Sammler 2010), examined in Chapter 3 and developed in Chapter 4, and the point at which the singing voice detaches from the meaning of language, as suggested by psychoanalytic theory, which was discussed in Chapter 2 and amplified in Chapter 4.

This 'distillation process' applied to the research as a whole and involved comparing and contrasting a wide range of literature, which allowed strands of theory to be developed in a gradual and progressive accretion. This process can be illustrated by considering a recurring theme in this thesis, namely that of the 'layers' of opera. This theme was first introduced in Chapter 1 and represented synthetically in Figure 1.3 ("The 'layers' of opera and their dynamic interactions"). The basic figure, inspired by Lacan's Borromean knot, served as a reference point or anchor as the theme was further developed and built upon in subsequent chapters, progressively condensing an increasingly wider range of material. So, in Chapter 2, the same basic image appeared again (in Figures 2.5, 2.6 and 2.7 showing the constituent elements of opera), as the exploration drilled deeper to consider the constituent elements in each 'layer' of opera and the dynamic interactions between and within them. In order to do so, Lacanian theory was applied to investigate the triadic nature of each order, namely how the Symbolic, Imaginary and Real are in turn reflected within each order. The intention was that of achieving greater insight about the way in which the various parts of opera fit together and function, each contributing to the overall reception experience. This exploration of the structure of opera, in combination with the other theories that were discussed in the same chapter, such as those pertaining to the gaze and the voice, the role of desire, and the position of the voice in relation to the fetish and *objet petit a*, were intended to provide a full understanding of all facets of the reception experience from a psychoanalytic perspective. The wealth of neuroscientific material that was considered in Chapter 3 informed a further development of the same recurring theme in Chapter 4, this time from a neuropsychoanalytic vantage point. This was achieved by drawing on the diverse range of material that was covered in Chapter 3, such as the hypothesised origins and purposes of music and singing; evolutionary theories supporting or refuting a connection between music and language; the role of acculturation and memory; a biological basis of musical scales; the innate capacities in infants for music and language; the mother/infant bond that is mediated by language and music; the overlap in the neural processing of language and music; the integration/separation in the processing of music and lyrics; music and emotion; and the brain areas that are recruited in the processing of pleasurable rewards, including music.

Consequently, among the neuropsychoanalytic theories that were presented in Chapter 4, the recurring theme of the 'layers' of opera appeared once again, as schematically represented in Figure 4.1 ("A conceptual neuropsychoanalytic topology of the 'pure voice"). This was the final transformation of the same image that had appeared under slightly different guises throughout this thesis, serving as a consistent point of reference.

In providing this example to illustrate how the material in this thesis was developed, culminating in a neuropsychoanalytic perspective and theoretical formulation, the image based on Lacan's Borromean knot can be considered a visual representation of the 'distillation process' that has characterised this research. Similarly to the actual process of distillation in the chemistry laboratory, starting with a heterogeneous mixture of materials, the constituent components of the operatic reception experience have been condensed and identified. The separate 'distillates' that were obtained from the material presented in the first three chapters were then combined and further condensed in the last chapter. This produced a concentrate that represents the neuropsychoanalytic 'essence' of the operatic reception experience, which was expressed as a concluding theoretical formulation.

As a result of this 'distillation process', an overall conclusion can be drawn that synthesises and encapsulates all of the material covered in this research. Whilst the reception of opera may not involve distinct neurofunctional and neurochemical processes – which are common to the reception of all music – it is nonetheless capable of recruiting and harnessing specific subjective dynamics in the operaphile. This is most likely to occur in the operaphile, rather than the casual listener, given the acquired intimate knowledge of the structure of opera (which need not be technical or academic, but is always visceral). This specific acculturation, in turn, creates a predisposition for operatic music. These subjective dynamics may be triggered by the unique features of the operatic voice, in combination with a number of auxiliary elements that are idiosyncratic to opera. The resulting operatic space of illusion can (re-)create a pre-verbal, pre-Oedipal holding environment that maintains an enduring link with the mother. The eroticism of the operaphile's quest to obtain the lost vocal object is determined by the circularity of desire, which ultimately renders this quest impossible. Any fleeting (re-)encounter with the object-voice as the 'pure cry', that is after the meaning of language has been undone by the singing voice, provides the operaphile with the opportunity for unbounded enjoyment. As such, this enjoyment lies outside the order of language, the threat of symbolic castration having been eliminated, albeit for a brief and painfully ecstatic moment.

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