THE PLACE OF MUSIC IN HUMAN DEVELOPMENT AND EXPERIENCE

MULTIDISCIPLINARY EXPLORATIONS

By

LUISA BOADA BAYONA

DOCTOR OF PHILOSOPHY – PhD

Primary Supervisor: Professor Sonu Shamdasani

Subsidiary Supervisor: Professor Lionel Baily (MD)

UNIVERSITY COLLEGE LONDON

CENTRE FOR MULTIDISCIPLINARY AND INTERCULTURAL INQUIRY (CMII)

HEALTH HUMANITIES

History and Philosophy of Psychology and Music

I, Luisa Boada Bayona, confirm that the work presented in my thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

CONTENTS

ABSTRACT

This thesis employs a multidisciplinary approach to investigate the role of music in human development and experience. Adopting a sonic perspective, it explores the fields of biology, psychology, musicology, psychoanalysis, and philosophy to unravel their distinct understandings of music. By examining the ontologies of these disciplines, this research highlights both the possibilities and limitations within their frameworks for studying music. The argument put forth is that disciplinary singularities constrain a comprehensive understanding of music's role in development and experience, presumably entailing a synthetic understanding of music. This limitation becomes evident when comparing perspectives such as those of Donald Winnicott (1971) and the phenomenological approaches of music developed in this thesis, drawing inspiration from phenomenological traditions (e.g., Husserl, Merleau-Ponty, 1945), queer phenomenology (Ahmed, 2006), Latin American feminist and cultural theory (Anzaldúa, 2015), and environmental science philosophers (J.J. Gibson, 1979).

This study argues that the inherent polysemy and dynamic nature of music plays a pivotal role in human development, navigating tensions within universal structures and fluid, individual experiences. This exploration unfolds across chapters that critically re-examine definitions of music, introduce the concept of "Musicality" (Honing et.al. 2018) rooted in psychobiological components, and delve into "Communicative Musicality" (Malloch & Trevarthen 2009) as a crucial aspect of early human pre-verbal communication. Furthermore, this thesis explores the intersections of music, time, and phenomenology, emphasising the creative tensions between stable repetition and improvisation.

Drawing on psychoanalytic models and developmental theories, particularly those of Winnicott (1971), along with the incorporation of sonic perspectives, this research proposes a novel understanding of music that centres around its paradoxical nature of being both stable, due to the

psychobiological structures that facilitate music-making due to the culturally sensitive aspects where individuals are socialised. This paradoxical characteristic, shared with emotional development, sheds light on the intricate interplay of consciousness and unconsciousness, time, and embodied experiences. The implications extend to understanding traumatic experiences and acknowledging the potential of music to restore the social fabric and individual integrity.

IMPACT STATEMENT

This thesis offers a unique approach to music in human development and experience because it challenges the limitations of a singular disciplinary approach to the study of music by adopting a pioneering multidisciplinary perspective. By exploring the profound role of music in human development and experience, the thesis navigates through various disciplinary ontologies, acknowledging both their contributions and limitations. Unlike previous studies, which often advocate for a specific disciplinary lens, this thesis fluidly moves between musicology, neuro and evolutionary biology, psychology, philosophy, and psychosocial studies, establishing a cohesive foundation for understanding music as an integral aspect of human existence.

One significant contribution of this thesis is its exploration of music beyond its cultural manifestations. By incorporating the concepts of musicality and communicative musicality, the research traces a developmental trajectory reminiscent of Donald Winnicott's theories. It identifies music as a unifying force in human development and emotional experiences, bridging fragmented insights from different disciplines without synthesising or resolving their theoretical tensions. The elusive nature of music, juxtaposed with its stable roots in phylogenesis, emerges as central to comprehending both music and the complexities of human psychosocial experiences. By introducing dialogues between Winnicott, musicality, and communicative musicality, music emerges as a key element in early psychological development, emphasizing the establishment of the ego and the self. This thesis also argues that integrating a comprehensive musical input into Winnicott's theory continues throughout life, linking individual development with socio-cultural expressions.

A second contribution challenges traditional linear thinking prevalent in studies on music and development. Drawing on Latin and Ibero-American sociology, literature, Black feminism, and queer theories, the thesis introduces a fluid understanding of music that facilitates connections

across diverse fields. This multidisciplinary approach forms a mycelium of disciplinary communication, enriching the conceptual framework and contributing to a more nuanced comprehension of music and its role in human development and experience.

These contributions lead to essential insights into human development and experience. Firstly, the thesis proposes that music, musicality, and communicative musicality play a pivotal role in the process of self and ego development, influencing the fundamental psychological distinction between 'me' and 'not me.' Secondly, it underscores the transversal elements within music that are culturally situated, influenced by psychobiological factors, and expressed in profoundly individual yet collectively shared phenomenological experiences. Thirdly, the continuity between psychological development and cultural experience, anchored in Winnicott's developmental theory, offers a novel perspective on the interconnectedness of music and human development.

While appealing to psychologists, psychoanalysts, philosophers, cultural theorists, musicians, and neuroscientists, this thesis challenges disciplinary norms and may evoke controversy for its irreverent refusal to conform to a singular rationale. Beyond academia, the research aims to engage a broader audience, encouraging ethical use by scholars and practitioners alike. This thesis invites readers to explore the intersections of music, human development, and experience, embracing a multidisciplinary journey that transcends traditional disciplinary boundaries.

ACKNOWLEDGEMENTS

I am thankful to all of those who accompanied me on this journey, a sentiment that goes beyond the limitations of words and finds resonance in music

My most heartfelt gratitude to Professor Sonu Shamdasani, who believed in my work during a period when my ideas seemed daunting to pursue. Your kindness, generosity, and guidance over the past three years have been incredibly important in shaping my journey. May music forever be our heartbeat. May jazz always guide our futures.

I also would like to express my gratitude to Professor Lesley Caldwell, who guided me at the outset of this journey. Thank you for all your love and support, academically and otherwise.

Professor Lionel Baily, your reflections have significantly contributed to refining complex ideas, merci.

I want to thank my family, family-friends, friends, colleagues, teachers, lovers, therapists, astrologists and brujas. All of those who know that took part in this process and supported me emotionally, physically and financially, always and forever thank you.

A mis compañeras/companheiras de LAWA (Latin American Women's Aid) who do an amazing work to keep Latin Womxn safe. Your support and constant heartbeat of our roots, diaspora, and collective connection have been a lifeline for me on this journey. Infinitas Gracias / Muito obrigada.

Un especial agradecimiento to the cultural collective Marimbea, la musica del Pacifico Afro-Colombiano ha sido la banda sonora de esta tesis.

Thanks to my patients. I admire all of you for your courage and determination to navigate through difficulties and trauma. Thank you for letting me be a part of your journeys. Our work has inspired some of this thesis' ideas.

Thanks to The Gender and Health Humanities group, qUCL, CMII, and IAS for having safe queer places, and hosting my film screenings. Also, a special appreciation to all the cleaning, services, and security staff, who maintain our spaces clean and functional.

In Place of War. All of you are beautiful and were an inspiration during and post-pandemic. Keep fighting for justice and equality with art.

Finally, I extend my love to the people in Palestine and those enduring wars and dehumanising treatment worldwide. My thoughts are with all of those who fight for their survival and navigate oppression daily. Chapter 6 is especially dedicated to all of you. May music serve as a guide, offering us the strength to resist, the right to exist, and the hope for making more human and musical futures.

INTRODUCTION

Various perspectives on music offer insights into contradictions and paradoxes that lend depth to human existence. Music, with its distinctive expressive nature, transcends the mundane, embodying aspirations that reach beyond quotidian existence and often surpass the boundaries of human understanding. It can manifest as an oracle, an action, or a contemplative force. Music may encapsulate both past and future within the present moment, existing as a place yet omnipresent. It encompasses instinct and cultural expression, offering an ephemeral embodied experience waiting to be transcribed.

Scholarly texts often commence by asserting humanity's intrinsic musical nature (see e.g. Wallin, Merker & Brown, 2001; Sacks, 2007; Honing et.al., 2018). This assertion finds resonance in the rhythmic pulse of each heartbeat, the tempo carried by every breath, and the melodies woven into the narratives of historical revolutions.

The undeniable impact of music on human functioning and experience raises the central inquiry in this thesis: delineating the implications of music's role in human development and experience. To approach this central inquiry, the research starts with an examination of different definitions of music. Initially intended to establish a working definition of music, the research process soon reveals the inadequacy of a dictionary-like definition due to the complexities of music as both a subject of inquiry and an experiential phenomenon. This thesis argues that a literature review is insufficient, given music's multiple definitions shaped by specific disciplinary agendas (further explored in Chapters 1–3). Music can mean many things and most definitions are as relevant as others even though they often contradict each other.

The complexities inherent in defining music, as Chapter 1 argues, underscore its polysemic nature. Music maintains relatively stable structural components, such as rhythm, melody, and harmony, while concurrently adapting to individual and collective experiences, embodying a fluidity

contingent upon the musical encounter. The tension and paradox between stability and instability, which gives room for improvisation, becomes a central theme, calling for acknowledgement rather than resolution.

While prevailing discussions on the definition of music often focus on its cultural manifestations and its universal character (see Chapter 1 and e.g. Gracyk & Kania, 2011), this thesis argues that music transcends its status as a mere cultural product, moving beyond culturally specific songs and techniques for music making and performing. Music extends into various forms of interactions, development, behaviour, and communication, embodying the paradoxical interplay between structural components (rhythm, melody, harmony) and the polysemic nature of music. This thesis' approach recognises music as a fundamental aspect of human development and experience which implies an acceptance of its paradoxical and fluid character, transcending cultural expressions anchoring in the claim that music is about *being* human (further explored in Chapters 4–6).

To attain a broader perspective on music beyond its cultural manifestations, an exploration of foundational structural elements—rhythm, melody, and harmony—is undertaken, giving rise to the need for exploring the concept of *Musicality*. As discussed in Chapter 2, musicality encompasses the psychobiological underpinnings of music, aligning with evolutionary traits and sharing mechanisms with processes related to language development, memory processing, and emotional expression. These structural components are shifted from an abstract music theory and philosophy, as discussed in Chapter 1, to retrieve the body as a fundamental aspect of music development, behaviour, and experience. In Chapter 2, the contention is not about music's universal character or finding a definition, but the limitations inherent to the neuroscientific and psychological discourses about the materiality of experience and how the objects of study need to be quantified and visualised or else they do not exist. In other words, even though musicality contributes to this thesis' rationale in cantering the body as a fundamental aspect for understanding the role of music in human development, it is a concept that falls into reductionistic empirical

methods. Such a reductionist approach overlooks aspects that this thesis considers fundamental, namely the phenomenological and developmental aspects, which are further explored in Chapters 4–6.

A domain-specific variant of musicality derived from infant development studies introduces the concept of 'Communicative Musicality', coined by Malloch (1999) and Trevarthen (1999) (Malloch & Trevarthen, 2009), as explored in Chapter 3. Communicative musicality intertwines stable musical components with human interaction and emotional expression, emphasising the essential role of emotional interactions respecting stable musical qualities in parent-infant relationships. The study of communicative musicality poses a more specific question about the relationships and effects of musical aspects in human development and experience.

To further the study of communicative musicality in human development, the use of Donald Winnicott's developmental theory (1945; 1951; 1953; 1971) sheds light on how to navigate the intersection between human development and music, due to his approach on the rituals of care and emotional responses within the interactions between a primary caregiver and their baby. Although Winnicott does not expand on the relevance of the sonic environment and its implications on emotional development, this thesis claims that his developmental model appropriately connects to the polysemic nature of music explored in the initial three chapters. Winnicott's theory also connects to exploring the developmental and experiential role of music.

Winnicott's developmental theory is examined more in depth in Chapters 4 and 5. His idea of transitional phenomena facilitated by attuned and safe environments, which are crucial to ego development and creativity, is posited to extend beyond early life with the help of other ideas about transitionality and what this thesis also refers to as in-betweenness, the Zone of Proximal Development, or the Improvisation Zone (see Anzaldúa, 2015; Gratier & Apter-Danon, 2009; Vygotsky, 1978), dislocating individual and collective realities and fostering surprise, terror, and joy throughout the lifespan (Cortazar, 1980; García Lorca, 1933/2017; Freud, 1919). Transitional

spaces, anchored in musical trajectories of experience, become pivotal in ego development, offering individuals the opportunity to reorient themselves (see Chapter 5), connect with others, and explore diverse modes of existence. According to this thesis' claim, these moments of in-betweenness are likely to originate from musicality, bringing about temporal and spatial interplays which challenge perception and thus our understandings of reality.

Embracing a sonic perspective of human development and experience, as the last three chapters convey, underscores the importance of sound in shaping thought, language, and representation. Recognising music's role in providing continuity to the human experience highlights its unique function in facilitating the arborescent nature of experience, marked by impermanence, vastness, and uniqueness. The continuity of human experience delineates a developmental trajectory starting at birth and unfolding across the lifespan, ultimately extending into psychosocial spheres where music assumes a distinctive cultural character within the fabric of cultural experiences (Winnicott, 1967; 1971). As explored in Chapter 6, cultural experiences undergo a discernible evolution from early developmental stages to the more intricate spheres of cultural lore. In this context, the chapter illustrates instances wherein music serves as a conduit for elucidating the psychobiological (e.g., Van Der Kolk, 2014) and sociopolitical dimensions (e.g., Lederach & Lederach, 2011) inherent in the developmental and experiential aspects of music. These examples shed light on the intricate interplay of music within the broader context of cultural experiences, offering a valuable lens through which to comprehend the nuanced dynamics of human interactions and trauma.

The multidisciplinary approach of this thesis accentuates the significance of temporal elements, particularly rhythm and time, in the complex interplay between musical phenomenology, communicative musicality, and human development. It reinforces the profound influence of music on human experience, offering a nuanced understanding of the human journey. This exploration, as set out in Chapter 7, invites future research to delve deeper into the intricate realms of music psychology, promising fertile grounds for continued discovery and exploration.

Form, style, and methodology

This thesis is divided into two main parts. The first part, comprising Chapters 1–3, reveals the complexity of understanding music, emphasising the challenges and unviability of encapsulating this phenomenon within a categorical, abstract, and universal definition. Therefore, following the respective agendas of each approach, the initial part of the thesis elucidates how music can be understood from distinct but complementary viewpoints, each characterised by unique methodological and ontological considerations, and influenced by historical contexts as evidenced in the opening chapters.

The second part (Chapters 4–7) explores various disciplines that contribute to developing a multidisciplinary perspective on music, investigating developmental, phenomenological, and experiential approaches initially not incorporating music into their paradigms, as in the first part (Chapters 1–3). This exploration involves expanding upon the notions of music, musicality, and communicative musicality while revisiting the insights of the psychoanalytic developmental trajectory of Donald Winnicott. It is important to acknowledge that these psychoanalytic ideas, like the other theoretical frameworks explored in this thesis, have their own limitations and continue reinforcing this thesis' multidisciplinary and theoretically anarchic claim. This is an attitude that leads to the questioning of evidence and identities that, as critical scholar José Esteban Muñoz says, "do not fit into single pre-established archive[s] of evidence" (Muñoz, 1996, p. 9). By adopting this approach, the emphasis is put on what each theory has to offer, rather than focusing on one line of thought to understand a complex phenomenon.

Furthermore, the second part of the thesis integrates phenomenological perspectives, introducing further complexities to the scope outlined in Chapters 2 and 3, which primarily focused on neuroscientific and developmental psychology approaches. This section explores other disciplines, contributing to the development of a multidisciplinary perspective on music and advancing the

exploration of its developmental significance. Although these disciplines do not initially include music in their frameworks, this thesis argues that their inclusion sheds light on the constraints and gaps identified in the initial three chapters (Part I).

As a result, music, in all the complexities explored in this thesis, follows a trajectory that forks into different forms of understanding music and traces a developmental continuity with multiple manifestations throughout an individual's lifespan, maintaining a dynamic continuity from early life to cultural experiences. In this context, psychological, emotional, experiential, and psychosocial aspects are harnessed to establish such a developmental trajectory which respects a fundamentally paradoxical nature and the coexistence of the unsolvable tensions resulting from a multidisciplinary approach. This approach argues for understanding music as a complex phenomenon avoiding an exclusive adherence to any single theoretical framework, recognising music as a multifaceted phenomenon. Each theoretical perspective utilised in this thesis contributes unique insights, forming distinct analytical threads. However, it is crucial to acknowledge the inherent limitations of each discipline when integrated into a multidisciplinary discourse. Through such integration, this thesis explores each approach, respecting individual theoretical methodologies while critically evaluating the principal insights posited by each discipline. The amalgamation of insights garnered from these varied disciplines aims to facilitate a comprehensive exploration of music, establishing a developmental continuum that substantiates initial assertions regarding the developmental significance of music within the human experience. This significance emerges from the examination of commonalities, continuities, and tensions that are revealed within the epistemic plurality offered in this thesis. In this context, this thesis' form can be linked to an arborescent root (such as a rhizome[1], or a mycelium[2]), wherein the

[1] In a botanical context, a rhizome refers to a type of plant stem that grows horizontally underground, sending out roots and shoots from its nodes. Plants such as ginger and bamboo often spread through rhizomes (see e.g. Esau, 1977; Fahn, 1990; Raven, Evert, & Eichhorn, 2005; Taiz & Zeiger, 2010; Eshel & Beeckman, 2013).

[2] Mycelium is a root-like structure of a fungus consisting of a mass of thread-like hyphae which are the filamentous or branches of a fungus. Mycelium: Exploring the hidden dimension of fungi | Kew. (n.d.). Kew. https://www.kew.org/read-and-watch/fungi-hidden-dimension

comprehension of music branches out into diverse paths, some aligning with disciplinary trajectories and portraying a non-hierarchical structure to this thesis' disciplinary explorations. Within this arborescence, music is approached in this thesis as both an epistemological thing and a phenomenological subject.

Music as an epistemological thing

Conceiving music as an epistemological thing involves various disciplinary perspectives, each framing music within its distinct contextual boundaries. In this thesis, each discipline under scrutiny presents an epistemological stance on music that aligns with its respective disciplinary objectives. However, when these varied disciplinary viewpoints converge in multidisciplinary discourse, contradictions often emerge.

Philosopher and historian of science Hans Jörg Rheinberger (1997) argues that epistemic things in science are the research objects that constitute the object of inquiry. In this thesis, music is treated as an epistemic thing in Rheinberger's sense because it presents itself as characteristic, irreducible vagueness, because "paradoxically, epistemic things embody what one does not yet know. Scientific objects have the precarious status of being absent in their experimental presence; they are not simply hidden things to be brought to light through sophisticated manipulations" (p. 28). Music, as an epistemic thing, finds redefinition each time, becoming a new object, hence its fluid nature. Rheinberger supports this idea by asserting that "the new object, at the time of its inception, is still undefined. [At] the time of its emergence, you cannot do better than explain what the new object is by repeating the list of its constitutive actions. [The] proof is that if you add an item to the list you *redefine the object,* you give a new shape" (p. 29 original *italics*).

In a similar line of thought, Cross (2024) asserts that the methodologies of science are typically reductionist and "the extent to which inferences may be made on the basis of experimental results will depend on the extent to which operational reduction that guides the conduct of the experiment

constitutes a more, or less, comprehensive representation of the phenomenon in question" (p.228). Methodological reductionism thus does not necessarily carry scientific explanation. Science, then, is better conceptualised as the sciences, because the sciences "can guarantee neither absolute certainty nor comprehensive understandings of the world; and the sciences share commitments to methods rather than to specific kinds of knowledge." (pp. 228-229). Facts are available to be determined by application of methods; facts do not give understandings on their own. In that sense, a plurality of science approaches could be an elegant approach to study musical phenomena.

Some of the constitutive elements of music explored in this thesis are rhythm, melody, and harmony, but each of the first three chapters uses a disciplinary approach to understand this phenomenon and also uses music as a constitutive action for human development and experience, giving redefinitions each time. Moreover, this thesis does not only focus on the constitutive (structural) components of music, but on dynamic elements which integrate other disciplines and provide an overarching developmental hypothesis.

The primary contribution of this thesis lies in its double proposition to study, on the one hand, each discipline's approach to music, highlighting both the contributions and limitations inherent in their respective agendas and going beyond the pluralistic approaches to music (see Chapter 1). On the other hand, the thesis uses further theoretical approaches to human development and experience which originally do not take into account music as a developmental premise. Moreover, at a multidisciplinary level, the study aims to unveil alternative avenues for comprehending music. When unresolved tensions persist among the epistemological perspectives from diverse disciplines, it leads to the proliferation of new branches of inquiry, fostering novel explorations and understandings of music. Thus, the main contribution takes a pluralistic approach (see e.g. Killin, 2018) whilst suggesting a musically driven developmental premise originated in the discussion of disciplines such as psychoanalysis and phenomenology.

Music as a phenomenological subject

This thesis introduces an approach that considers music as a phenomenological subject, grounded in a broad phenomenological premise for understanding music. This phenomenological premise focuses on the role of individual perception and the ways experiences are communicated, proposing that these experiences have inherently musical origins. Conceiving music as a phenomenological subject involves not only acknowledging its polysemic and fluid nature, constitutive of the epistemological thing, but also the embodied experience, the vagueness, and the mysteries of its elusive essence. Like a cosmic whisper, it triggers an innate drive to restore lost integrity and signals when integrity is lost. Although it elevates reality when captured, this transformative power can detach it from its inherent meaning.

Resonating within the sonic sphere, experiences pave the way for new sonic discoveries, shaping novel psychosocial dynamics amidst a symphony of sounds and emotional sonic traces. Music transcends boundaries, perpetually offering fresh experiences characterised by constant growth. This character of the sonic sphere, far from being abstract, reclaims embodied and culturally situated experience as a core trope. However, it is ephemeral, and as with any experience, what remains are the after feelings of it, the embodied memory of the previously lived moment. By ephemeral, this thesis means both the transience of experience and the use of it as evidence for theoretical inquiry. That is, music as a phenomenological subject means moving into diverse modes of experience, marked by music as action (or musicking, according to Christopher Small's [1998] argument, also developed in Chapter 1), an engaged performance which sets the rhythmical paths of existence and perception of life and reality. José Esteban Muñoz's (1996) notion of ephemera as evidence can be related to how traces of experience of music as an epistemological thing are themselves part of the evidence for theoretical discussions.

> The notion of ephemera as evidence refers to a modality of anti-rigour and anti-evidence that far from filtering materiality out of cultural studies, reformulates and expands our understanding of materiality. Ephemera, as I'm using it here is linked to alternate modes of textuality and narrativity like memory and performance: it is all those things that remain after a performance, a kind of evidence of what has transpired but certainly not the thing itself. It does not rest on epistemological foundations but is instead interested in following traces, glimmers, residues, and specks of things. (Muñoz, 1996, p. 10)

Music as a phenomenological subject involves therefore the ephemeral nature of experience, composed by musical interaction within the body with oneself, others, and the environment in general (see Chapters 4–6). The ways in which musical experience is conveyed are not concretely material, but a materiality that is not solid—it is the felt material. It is not about having evidence immediately available, but the emotional territories of experience.

Muñoz's notion of "structures of feeling" helps to illustrate the material emotional evidence of music as a phenomenological subject of inquiry. By structures of feeling, Muñoz borrows Raymond Williams' approach which refers to how art "conveys, translates and engenders structures of feelings—tropes of emotion and lived experience that are indeed material without necessarily being solid. For Williams, the structure of feeling is a process of relating the continuity of social formations within a work of art" (cited in Muñoz, 1996, p. 10; and see Williams [1977] 1989, pp. 128-135). Such a phenomenological subject surpasses epistemology in terms of presenting "proper evidence" backed up by concrete materiality. Instead, emphasising the experimental as a performative aspect of the research rescues the anecdotal, the ephemeral, the narrative of meaning and experience (further developed in Chapters 3–5).

In this context, music serves as an eternal workshop, unveiling the world *de profundis*, pulsating at our core, nurturing self-love, profound communication, and connections with ourselves and others. Singing's allure and the discovery of one's inner voice guide us through life's intricacies,

fostering communal enchantment and deep resonance. In its broadest sense, music harmonises emotions, providing a vessel for personal and collective experiences to find voice and resonance in the world. As Claude Bernard says in *Philosophie: Manuscrit inédit* (1954) "[it is] the vague, the unknown that moves the world" (as cited in Rheinberger, 1997, p.11). In this thesis, it is music that moves the world.

Methodology – the research attitude and approaches to multidisciplinarity

This thesis presents an open-ended methodology informed by established approaches such as multidisciplinary and transdisciplinary analysis, symbolic interactionism, and ethnomethodology. However, it does not apply any of these as primary methodological resources. Instead, the thesis privileges an attitude that initiates the theoretical explorations suggested in the title. To explore the role of music in human development and experience, the thesis allows space for the author's autonomy, enabling theories to interact dynamically within the thinking and writing process. This approach is both creative and rigorous.

The methodologies informing this thesis, before, during, and after the writing process, include the multidisciplinary frameworks proposed by Choi et al. (2006) and Dalton et al. (2021). A critical discussion of these approaches' limitations is essential to justify the open-ended attitude and the need to decentralise knowledge from Western colonial thinking. This includes incorporating indigenous, decolonial, or culturally sensitive perspectives. Rivera Cusicanqui's (2010/2020) methodology is introduced to describe the prevailing research attitude and to introduce indigenous and decolonial Latin American thought. Despite their limitations within their sociological fields, symbolic interactionism and ethnomethodology provide clarity to overcome the constraints of Choi et al.'s (2006) multidisciplinary methodologies and support the exploratory research attitude that defines this thesis.

The thesis methodology is informed by three main approaches. The first is multidisciplinary (Choi et.al, 2006), and the second draws from Rivera Cusicanqui's (2010/2020) "Sociology of the Image"[3], adapting it to accommodate sonic themes and concepts instead of images. Both approaches inform this thesis, but their limitations allow the author's intuition to guide the integration of music as both an epistemological and phenomenological subject. Considering the limitations of the first approach and the possibilities of the second, symbolic interactionism and ethnomethodology (Denzin, 2017; Atkinson, 1988; Maynard & Clayman, 1991) are also discussed as a third input to open further analysis, though not as primary methodological templates due to their practical nature.

The multidisciplinary approach operates alongside specific disciplinary foundations to investigate the phenomenon of music. This approach examines music from various perspectives and theoretical standpoints, considering both its structural and dynamic elements to enhance understanding of human development and experience. The aim is to explore each theory with methodological and ontological rigour. It is crucial to clarify that this thesis does not seek to create a new theory but aims to study the phenomenon from different theoretical angles for a broader and deeper understanding. By adopting a kaleidoscopic method, the thesis introduces the novelty of converging diverse, occasionally conflicting models, all aimed at unpacking the multi-layered nature of music and offering a comprehensive understanding of the individual and societal implications of musical experiences.

[3] *Chi'xi* (Rivera Cusicanqui 2010/2020). Sociology of the image refers to a new teaching and research methodology developed at the University of La Paz, focused on bilingual Aymara students' daily experiences at the university and at home and the historical memories of their families. The goal is to guide them to pertinent sociological and political research and action, to overcome the ventriloquist quality of the social sciences, and to develop a more autonomous relation with the Euro-North American conceptual world. The lecture incorporates film and still images designed to challenge inherited knowledge and produce an alternative view of colonial iconography and popular religiosity. Even though this thesis focuses on sound, this method inspires the shifts and creative possibilities to develop new ways to conceptualise music.

Multidisciplinary studies, as described by Choi et al. (2006), "draw on knowledge from different disciplines but remain within the boundaries of those fields" (p. 353). It is characterised as a process that juxtaposes disciplines in an additive manner without altering their perspectives, as elaborated by Choi et al. (2006, p. 355). Further definitions and analyses of this concept can be found in Dalton et al. (2021). This approach thus consists of exploring the phenomenon of music while acknowledging and upholding the distinct approaches and methodologies inherent in each discipline. In their work on multidisciplinary ontology, Dalton et al. (2021) assert that multidisciplinary research operates as a complex system seeking to navigate the tensions existing between a given problem and the researcher. However, they underscore that the delineation of problems often "does not necessarily correspond to the boundaries of a discipline—particularly when considering increasing specialisation of various disciplines" (Dalton et al., 2021, p. 3).

Illustratively, this approach is similar to examining a painting by Giotto not only through the lens of art history but also within the frameworks of religious history and geometry. Another example can be drawn from practical healthcare settings, where multidisciplinary approaches are imperative; for instance, a client's evaluation involves input from diverse professionals, including nursing, social work, psychology, psychiatry, nutrition, and education (Choi et al., 2006). Subsequently, treatment plans are devised, considering multiple viewpoints, all aiming toward the client's best interests.

The second part of the thesis not only employs a multidisciplinary approach but also integrates a transdisciplinary framework. Transdisciplinary endeavours involve researchers from diverse fields collaborating closely on a shared problem for an extended duration, culminating in the creation of a collective conceptual model that integrates and surpasses individual disciplinary perspectives (Choi et al., 2006, p. 355; also see Rosenfield, 1992). For example, transdisciplinary approaches to human health are defined as methodologies that amalgamate natural, social, and health sciences within a humanities framework, surpassing the conventional boundaries of each (Choi et al., 2006,

p. 355; see also Soskolne, 2000). This approach operates across and extends beyond multiple disciplines. The transdisciplinary component of this thesis is the sustained analysis of multiple fields and the transgressing of conventional boundaries of each. This novel approach results in accepting different models and accepting their contradictions when applied to the study of music. When accepting the tensions, a more comprehensive form of understanding music emerges, but also opens the possibility to find a musical way of understanding human development and experience.

This two-way street where the studied phenomenon informs the disciplines through which the phenomenon is studied gives a circular feel to this thesis' form in a way that surpasses the traditional boundaries of each discipline. This form unfolds when tensions and paradoxes intrinsic to each discipline are examined, juxtaposed, and intentionally left unresolved—a characteristic indicative of multidisciplinarity and transdisciplinarity. Consequently, by adopting distinct disciplinary approaches, a novel method of investigating music emerges, one that perceives it as dynamic, continuously evolving, and foundational to human development and experience.

The multidisciplinary with the transdisciplinary sub-component is an approach that facilitates the establishment of connections among disciplines without amalgamating or synthesising them, as observed in interdisciplinary works (see Choi et al., 2006), thereby contributing to the creation of a complex framework to analyse intricate phenomena. For instance, in examining the ethnomusicological and philosophical perspectives on music (as presented in Chapter 1), limitations in discussions concerning the universality of music become apparent. Internal tensions arise from abstract declarations positing music's universality since the definitions provided resemble dictionary entries, positioning music outside the realm of human experience and cultural subtleties. Another approach to resolving this tension involves acknowledging that all music cannot be defined in any single way, hinting at the fluidity of definitions tied to human experience. In this sense, music can be understood as a polysemic concept (further developed in Chapter 1).

The polysemic nature of music, as an epistemological thing and phenomenological subject, is a novel way to conceptualise music inspired by the second methodology employed in this thesis which comes from Bolivian indigenous thought and its place in academic settings developed by sociologist Silvia Rivera Cusicanqui (2010/2020).

Choi et al. (2006) and Dalton (2021) offer a multidisciplinary methodology that provides a nuanced understanding of different forms of knowledge, epistemologies, and paradigms. This approach allows these paradigms to be read and understood without compromising their disciplinary agendas. However, their focus on healthcare systems and the compartmentalisation of knowledge can instrumentalise and limit the integration of knowledge derived from everyday life and social practices beyond academic endeavours. This thesis aims to approach music as both an everyday and local practice, decentralising knowledge only stemming from Western academic and scientific discourses.

Choi et al.'s (2006) methodology serves as a guide for the disciplinary explorations in this thesis. However, this thesis also includes discussions about human experience, specifically regarding music as an activity intrinsic to human life. While methodologies like those of Choi et al. (2006) are useful, they are limiting in defining and understanding music as a developmental phenomenon. Relying solely on these methodologies confines epistemologies and ways of knowing that are not necessarily academic or that critique academic canons to categories of disciplinary analysis. This limitation constrains the understanding of music to Western ethnocentrism, which this thesis seeks to challenge by not privileging a single methodology or way of understanding music. The inclusion of epistemic plurality in multidisciplinary research requires the researcher to connect disciplines and suggest queer and decolonial ways to navigate these disciplines as explorations and experiments in an open-minded yet rigorous manner.

While this thesis is largely written within the confines of Western ethnocentrism, it employs sociological methodologies such as symbolic interactionism and ethnomethodology to offer insights into its approach for decentralizing and questioning Western and colonial perspectives on music. Symbolic interactionism examines the relationship between individual behaviour and social organisation, exploring how selves emerge from social structures and situations. Ethnomethodology focuses on the routine, taken-for-granted expectations in social orders and distinguishes between scientific and everyday activities. Both perspectives highlight the role of symbols and common meanings in linking individuals to social structures, sharing similarities with the structural-functional perspective but differing in their focus on individual interactions (Denzin, 2017).

Ethnomethodologists argue that sociologists must depict the taken-for-granted affairs of actors in any social order. They highlight the challenges sociologists face in aligning concepts with observations and suggest using the documentary method of analysis. This method involves placing events in a temporal sequence and assuming common vocabularies. Data from interviews and questionnaires are seen as collaborative products, requiring an understanding of routine meanings held by subjects. Ethnomethodology emphasises the impenetrable barrier between scientific and everyday conceptions of reality. Scientists construct rational models of action that everyday actors never fully live up to (Denzin, 2017). Denzin (2017) argues how ethnomethodology elaborates on the differences between scientific and everyday rationalities, constructing models for analysis everyday human actions and interactions.

Both symbolic interactionism and ethnomethodology have faced criticisms for their biases at theoretical, methodological, and phenomenological levels (see Atkinson, 1988; Maynard & Clayman, 1991). However, the attitude they invite as a generative approach to understanding individual and social symbols, practices, behaviours, and interactions is what this thesis favours. For future studies with different communities, these methodologies could be an interesting

approach for studying musical interactions and developmental approaches to music and music-making. Another relevant contribution from Denzin's analysis on symbolic interactionism and ethnomethodology is the idea that these methodologies, when integrated, focus on the meanings given to social objects during face-to-face interactions. They suggest that events challenging normal interpretations create pressures to integrate these events into the flow of interaction, with frustration and groping observed based on the importance of the object. Fundamental objects in interactions are those that must be negotiated, while taken-for-granted objects receive early attention and cease to be problematic once their meanings are established.

The interaction process cannot be fully classified a priori, with the self being the most significant object for interpretation. Meanings brought into the situation and the situation itself also play crucial roles. The problem of meaning remains vague, but it can be empirically studied through expectations for action and the shifts in meaning during interactions. Interaction can be measured by the frequency of joint actions and the emergent effect of disrupted plans. Interactions that flow along non-interpretative lines are judged less emergent, highlighting the dynamic nature of social interactions.

Denzin's suggestion to both tolerate tensions and find value in these tensions as generators of shifts in meanings aligns with this thesis's approach. The idea that paradox presents a fundamental developmental shift allowing people to creatively engage with the world suggests that new ways of living are possible. This thesis claims that these tensions and paradoxes are inherently musical (see Chapters 4-6). Thus, the attitude brought by these two methodologies lies in the relevance of considering the dynamic nature of experience and social interactions. This attitude sets the tone for more radical approaches to understanding music and its place in human development with 'out of the box' perspectives that permit thinking and exploring the phenomena creatively. Similarly, these approaches are privileged in Latin American decolonial studies (e.g., Silvia Rivera Cusicanqui) and queer social and feminist studies (e.g., Sara Ahmed and Gloria Anzaldúa, see Chapters 4-6).

Silvia Rivera Cusicanqui, Sociology of the Image

Within the multidisciplinary framework and the transdisciplinary components that structure this thesis, the second key aspect of its methodology—understood here as a method focused on actions and behaviours aimed at addressing the research problem—is primarily inspired by Rivera Cusicanqui's "Sociology of the Image" (2010/2020). This method shapes the core of the thesis's approach to engaging with multiple disciplines, influencing the creation, selection of texts, and overall perspectives presented throughout the work. It provides a framework that transcends disciplinary confines and methodological limitations, leveraging the strengths of both to explore complex phenomena in innovative ways. This method operates through three fundamental actions: "to *wonder*, to *figure out*, and to *communicate*" (Rivera-Cusicanqui, 2010/2020, p. xvi, original *italics*).

Initially, there's a sense of curiosity stemming from an unconventional perspective, that is, "to wonder". This viewpoint, similar to the poetic observation of the *flâneur*—a wanderer—embodies a mindset of transit and exploration, enabling the connection of disparate elements. Rivera Cusicanqui's notion of the peripheral gaze is applied to the conceptual inquiry, allowing theories to captivate and surprise the researcher. In this thesis, the peripheric gaze begins by seeking relevant literature and, through the exploration of diverse disciplines, looks for potential connections between theories while embracing discrepancies and tensions without necessitating resolution or synthesis. This approach embodies a sense of irreverence, a hallmark of Rivera Cusicanqui's decolonial perspective, challenging Eurocentric tendencies to construct binaries and seek synthesis amid tensions.

As introduced by Rivera Cusicanqui, the concept of paradox is central to South American Indigenous thought. This thesis explores paradox through various lenses—including Latin American sociology, psychoanalysis, literature, and queer phenomenology—not only as a thematic

focus but also as a tool for understanding phenomena and experiences in complex, multifaceted ways. In other words, accepting the paradox involves redefining music as an epistemological entity that is fluid, contradictory, and challenging to fully grasp. Simultaneously, music remains undeniably real in its experiential nature and this thesis claims that this experiential reality contributes greatly to human development.

What Rivera-Cusicanqui calls the peripheral gaze encompasses a bodily way of perceiving. It encourages a heightened state of alertness, grounding the exploratory nature of research. In this perspective, being alert during research involves engaging thought and perception with the entire body. This thesis investigates the theoretical exploration of creativity, embodied perception, and multiple temporalities, which have also served as guiding points throughout the research process. Rivera Cusicanqui's peripheral gaze, irreverence, and embodied perception shape both the theoretical framework and the author's personal situated experience.

The second practical principle suggested by Rivera Cusicanqui is "figuring out," which involves tracing the clues. When undertaking multidisciplinary and transdisciplinary research, these clues are diverse, necessitating openness and patience. This process connects the researcher intimately with their subject of inquiry. Following these clues embodies a focused perspective, like concentrated auditory attention, a "focalised gaze/[audition]". This approach entails "discovering metaphorical connections between research topics and lived experiences" (Rivera Cusicanqui, 2010/2020, p. xvi).

The third practical principle advocated by Rivera Cusicanqui, "to communicate", involves both speaking to and conversing with others. It encompasses the expressive and dialogic dimensions where the author's voice is expressed, acknowledged in the organisation, and credited in authorship. This principle involves various formats such as writing, film creation, or assembling collage-like structures. In this thesis, the process of researching—wandering, focusing, and communicating—did not follow a linear trajectory. Consistent with the discoveries of non-linear,

non-binary, and non-disciplinary conceptualisations, and affected by the embodied perception of the thesis' author, navigating back and forth within theoretical frameworks and experiences was fundamental to the research process, allowing a natural, organic, and rhythmic evolution.

This method hinges on trusting the autonomy of the researcher and their perception, involving a comprehensive observation or listening with the entire body. It is a comprehensive endeavour challenging conventional knowledge and authority: observing with the whole body involves feeling with the skin, listening with the back, and sensing with the feet. These actions reposition the focus of sight and hearing. To observe with the entire body means "activating other organs in the process of visual perception: it implies embracing a multidimensional view of the image, where sight loses its dominance just as it begins to perceive" (Rivera Cusicanqui, 2010/2020, p. xix). Rivera's method has established a rhythmicality to this research process, which allows to wander within and between disciplinary approaches in a freer way. It also has inspired the unique way in which this thesis understands music and has given room to the author's embodied experience, thought processes, and phenomenological subjectivity to set the thesis' free jazz style.

The works of Denzin (2017), Atkinson, (1988) and Maynard & Clayman, (1991) on ethnomethodology and symbolic interactionism provide a rich tapestry of perspectives that can be juxtaposed with Silvia Rivera Cusicanqui's "Sociology of the Image". This comparative analysis reveals both convergences and divergences in their approaches. Denzin (2017) explores symbolic interactionism and ethnomethodology, focusing on how individuals create and interpret meanings through social interactions. Symbolic interactionism emphasises the role of symbols and language in constructing social reality, while ethnomethodology examines the methods people use to make sense of their everyday lives, highlighting the taken-for-granted rules and norms underpinning social interactions. Both Denzin and Cusicanqui underscore the importance of everyday interactions and the construction of social reality. However, Cusicanqui's approach is more

explicitly political and decolonial, utilising visual and cultural representations to challenge dominant narratives, a dimension less central in Denzin's work.

Atkinson (1988) offers a critical yet sympathetic review of ethnomethodology, acknowledging its contributions and limitations. He critiques its narrow focus and advocates for a broader sociological framework, emphasising the need for empirical studies to uncover the underlying structures of everyday interactions. Both Atkinson and Cusicanqui value empirical investigation and the detailed study of everyday life, aiming to reveal hidden structures and meanings. Nonetheless, Cusicanqui's methodology is more holistic, integrating visual analysis with a strong emphasis on indigenous and feminist perspectives, whereas Atkinson's critique centres on methodological rigour and broader theoretical integration.

Maynard and Clayman (1991) highlight the diversity within ethnomethodology, discussing its methodological and theoretical innovations. They review a range of empirical studies to illustrate the application of ethnomethodological principles. Both Maynard and Clayman and Cusicanqui appreciate the diversity and adaptability of their methodologies, valuing detailed empirical studies and the examination of everyday practices. However, Cusicanqui's approach is explicitly decolonial, integrating visual methodologies to challenge dominant cultural narratives, a focus not specifically emphasised by Maynard and Clayman.

Cusicanqui's "Sociology of the Image" is distinguished by its decolonial perspective, which aims to decolonise knowledge and challenge dominant narratives through visual and cultural analysis. Her holistic methodology integrates historical, sociological, and anthropological dimensions, emphasising the importance of images and visual representation in understanding social reality. Cusicanqui adopts a critical epistemological stance to address issues of internal colonialism and the representation of subaltern groups. Her use of images as a central methodological tool sets her apart from the other approaches, which primarily focus on verbal and textual analysis. Deeply rooted in decolonial theory, her work seeks to liberate and empower marginalised communities

through the reclamation of visual and cultural narratives, integrating multiple disciplines to address issues of internal colonialism and social justice.

In summary, while Denzin, Atkinson, as well as Maynard and Clayman provide valuable insights into the study of social interactions and ethnomethodology, Cusicanqui's "Sociology of the Image" offers a unique, decolonial perspective that emphasises the power of visual representation and the need to challenge dominant cultural narratives. Her approach is more explicitly political and holistic, integrating multiple disciplines to address issues of internal colonialism and social justice.

Contents

PART I comprises Chapters 1–3, which discuss the general disciplinary definitions of music, musicality, and communicative musicality. This part explores the multiple ways of understanding music and its structural components from different viewpoints.

Chapter One explores the definitions of music from sociocultural, historical, and philosophical perspectives. This chapter outlines the main definitions of music as studied by anthropology, philosophy, musicology, and ethnomusicology. The chapter describes the general disciplinary debates on music and criticises the universalisation of its definitions. Music, in all its complexity, changes and can be defined from multiple angles, some of which will be discussed (see Blacking, 1977; Blacking & Byron, 1995; Currie & Killin, 2016; Davies, 2012a, 2012b; Godt, 2005; Gracyk & Kania, 2011; Hamilton, 2007; Levinson, 1990; Merriam, 1964; Nettl, 2001; Scruton, 1997). Music serves different cultural and psychological purposes, e.g., experiencing, communicating, and sharing emotional expression.

The chapter is divided into three main sections. The first section (1.1) addresses a general account of the definitions of music and the discussions around its universal character—one of the most relevant multidisciplinary debates. These definitions (e.g., Blacking, 1977, Blacking & Byron, 1995;

Currie & Killin, 2016; Davies, 2012a, 2012b; Godt, 2005; Gracyk & Kania, 2011; Hamilton, 2007; Levinson, 1990; Merriam, 1964; Nettl, 2001; Scruton, 1997) lead to determining the structural components of music, further discussed in the second section (1.2). Section 1.2 provides a general account of the structural organisation of music. The third section (1.3) suggests that according to the definitions and components set out in the first two sections, music conveys meaning through a shared encounter. This section questions static and universal definitions and reframes the notion of music as an activity that goes beyond its abstraction and universalisation. In other words, it emphasizes understandings of music as processual. For this purpose, it will use theoretical inputs from Latin American sociology (Rivera Cusicanqui, 2010/2020) and contemporary musicology (Small, 1998).

Chapter Two approaches music from phylogenetic viewpoint which covers neurodevelopmental and evolutionary perspectives. Using the term musicality to refer to this understanding of music, this chapter addresses the psychobiological definitions of music and its evolutionary antecedents. These definitions lead to thinking of music beyond its cultural manifestations (as developed in Chapter 1). This approach uses the term of musicality to mark, psychobiological, and evolutionary approaches. This chapter, like Chapter 1, looks at the structural components of music (rhythm, melody and harmony), but from a psychobiological perspective, which harnesses each element within the psychobiological correlates and evolutionary antecedents. The first section (2.1) defines musicality and the theoretical approaches considered in the chapter and develops two main historical sources that have set the foundations of this psychobiological perspective. The first is the psychological approach to music of Carl Stumpf (1911a). The second is the evolutionary approach to music, set off by Darwin (1871). The second section (2.2) studies the structural components of music (rhythm, melody, harmony) and takes these historical antecedents further (developed in section 2.1) in relation to contemporary research in music psychology, neuroscience of music, and evolutionary musicology, which is spread across particular cognitive developmental

areas such as memory, language, and perception. The third section (2.3) critically revises this psychobiological perspective and opens a discussion around phenomenology and emotional systems as understood from a psychoanalytic viewpoint, which are not considered in this perspective. It opens the discussion for the dynamic components which are covered in the second part of this thesis (Chapters 4–6).

Chapter Three approaches music from an ontogenetic viewpoint and recounts the musical structures in early infant development. This chapter studies musicality from a particular developmental approach, which according to researchers Colwyn Trevarthen (1999) and Stephen Malloch (1999) (Malloch & Trevarthen, 2009), musicality has additional characteristics in humans which go beyond informing a musical phenotype and beyond nourishing or meeting essential survival needs (Trevarthen, 1979, 1999; Malloch, 1999). Musicality is concerned with the unique way humans move and experience their world, their bodies, and one another. They extend their range of functions from general psychobiological characteristics to a more specific use, which Malloch introduced as communicative musicality (1999). This concept addresses the specific characteristics of musicality in humans that originate at a stage before speech develops, when infants and their primary carers interact, and is a fundamental aspect of extra-verbal communication. This chapter is divided into four sections which set out the background (3.1), emergence (3.2), and the structural components and characteristics (3.3) of communicative musicality and the conclusions (3.4) outlined from this chapter's main contributions.

PART II comprises Chapters 4–6, which set out the components of music, not in a structural form as in Chapters 1–3, but what this thesis refers to as the dynamic components. For this purpose, the developmental, experiential, and psychosocial standpoints are explored and tied down to the multiple angles of music explored in the first three chapters.

Chapter Four draws on the limitations presented in Chapters 1–3, which do not expand in depth into the developmental and experiential accounts that the second part of the thesis explores. This

chapter suggests a way of looking at music from a developmental and phenomenological standpoint, using theories that generally do not include music as a fundamental factor in their rationale. This chapter has the dual purpose of suggesting new ways of conceiving music and seeing development and phenomenology in a musical way.

The first aspect that became apparent throughout the research is self and ego development. In this thesis, the hypothesis that music has a fundamental developmental significance is formulated primarily through the psychoanalytic lens, but this paradigm is insufficient to understand the developmental nature of music in relation to self and ego development.

A crucial aspect of thinking about human development musically is a series of moments characterised by being liminal, paradoxical, and transitional. According to the findings of this thesis' research, these periods of in-betweenness, or *nepantla*, are transitional moments crucial to individual and collective experience where all the elements described in the first three chapters collide. It is in these transitional moments that music can take place in all its complexity and kaleidoscopic fluidity. Drawing upon insights from psychoanalysis, cognitive development, psychology of perception, phenomenology, and literature, this chapter investigates the ontogenetic trajectory of human musicality and its developmental impact on the psychosomatic being. These disciplines serve as other lenses to study music as an intangible force that harmonises psychosomatic life.

Chapter Five discusses an account of the experiential nature of music, which is another aspect derived from the limitations found in the first three chapters. This thesis finds that experience is a strong feature of music, musicality, and communicative musicality and uses psychoanalytic theory and phenomenology to study this experiential factor of music. Both psychoanalytic and phenomenological paradigms, when put together in relation to studying music and human development, carry contradictory rationales regarding the mind's structure and functioning. However, this chapter aims to listen to what each discipline would say about this thesis' approaches

to music. These ideas are complemented by multiple approaches which help to understand the theoretical tensions without trying to solve them. On the contrary, this chapter aims to show the possibility of the coexistence of contradictory models and the potential of this paradoxical coexistence to bring further, nuanced, and novel understandings of music and human development. One of the commonalities found in the study of these paradigms is the complexity attributed to time and temporalities of experience, which is connected to a musical factor derived from the previous chapters' investigations. This chapter also serves as a bridge to continue the dual study of music and human development and experience but from a psychosocial perspective.

Chapter Six continues studying the developmental significance of music and draws the trajectory from early development into psychosocial development and the elapse that Winnicott (e.g. 1971) proposes between play and cultural experiences. This chapter returns to the cultural aspect of music and explores it, not as a static universal abstract definition like in Chapter 1, but as a dynamic, contextual, and profoundly human phenomenon. This chapter provides some examples of how music is used as a means of psychosocial and trauma healing and the significance of understanding music as a fluid phenomenon rooted in human evolution, psychology, and socio-cultural experience.

Chapter Seven offers the final remarks, suggestions for future research, and conclusions of the thesis.

PART I

MUSIC, MUSICALITY, AND COMMUNICATIVE MUSICALITY

CHAPTER ONE

MUSIC

Defining a general and generalisable concept of music is both complex and problematic insofar as there is not just one definition but many (see Currie & Killin, 2016). The word *music* is a concept originated in Western culture to define and describe a human practice. Music as a concept is a social construct that is defined and theorised within the Western-music framework of reference. That is, most theoretical accounts come from academic definitions developed in Western traditions. It does not mean that music does not exist as a human practice across different cultures, but its discursive categories are located in the West. Most of these accounts of music have derived from analysis of the Western tonal music and then compared to other expressions of music in other cultures (Rehding, 2000; and see Cross 2014; Hamilton, 2007; Scott, 2003). The Western focus for understanding and developing the concept of music also faces difficulties in the cognitive-cultural approaches, as Cross (2014) says, for example:

> the overwhelming majority of the cognitive-scientific research that has been conducted on music has been carried out using Western music on Western listeners, based on the Western model of music as aural commodity. We must look beyond the Western model if we are to be able to develop ways of exploring music that can allow us to understand how it can have value as a therapeutic tool (...) ethnomusicological studies have demonstrated repeatedly over the past century, the Western model of music is only one amongst many possible notions of music, and in any case is likely to be remarkably recent (see, e.g., Goehr,

> 1989). If we are to develop cognitive-scientific understandings of the types of process that may be implicated in the communicative, dialogic, music-making that characterizes much music therapy, we must look beyond the Western model for clues as to how what we might think of as music can be communicative. (p. 812)

A Western frame of reference indicates that music is a concept structurally composed by particular characteristics such as rhythm, melody, and harmony which delimit the boundaries of its own definition (Gracyk & Kania, 2011 see e.g., Chapters 1, 3 and 7). Definitions of music are in some cases more inclusive than others, but having multiple definitions allow for diverse ways of understanding both the concept and human practice. Traditionally, music has been studied from disciplines within the humanities, giving it a broad spectrum for analysis and developing a research agenda for such disciplines as anthropology, musicology, and philosophy. For example, philosophical questions are concerned with the value, aesthetic, nature, and experience of music (see e.g., Kania, 2017). In addition, ethnomusicology's general query focuses on the social organisations and cultural ties of musical expressions. In this field of study, a definition of music depends on both the place and studied group (see Nettl, 2005, 2010). Moreover, in the past century, the study of music has broadened even further to the psychological and natural sciences, making the understanding of music richer at an academic level and therefore even more in need of a complex view beyond encapsulating definitions.

This chapter describes the general disciplinary debates on music and criticises the total universalisation of its definitions. In all its complexity, music changes and can be defined from multiple angles, some of which will be discussed in this chapter (see Blacking, 1977; Blacking & Byron, 1995; Currie & Killin, 2016; Davies, 2012a, 2012b; Godt, 2005; Gracyk & Kania, 2011; Hamilton, 2007; Levinson, 1990; Merriam, 1964; Nettl, 2001; Scruton, 1997). As will be discussed, music serves different cultural and psychological purposes, e.g., experiencing, communicating, and sharing emotional expression.

The chapter is divided into three main sections. The first section (1.1) addresses a general account of the definitions of music and the discussions around its universal character—one of the most relevant interdisciplinary debates. These definitions lead to the determination of the structural components of music, further discussed in the second section (1.2). Section 1.2 provides a general account of the structural organisation of music. The third section (1.3) suggests that according to the definitions and components set out in the first two sections, music conveys meaning through a shared encounter. This section questions such static and universal definitions and reframes the notion of music as an activity that goes beyond its abstraction and universalisation. For this purpose, it will use theoretical inputs from Latin American sociology (Rivera Cusicanqui, 2010/2020) and contemporary musicology (Small, 1998) and ethnomusicology (Turino, 2008; 2009).

1.1. Definitions

Defining music presents a constant paradox and an inherent difficulty to describe in detail because most people throughout different cultures and contexts can recognise a musical piece, yet it is a highly subjective concept, and its definition may escape consensus (Alperson, 1994). In addition to its paradoxical nature, music's definition poses a philosophical question because it presumes the knowledge and value of its target (i.e., music) and therefore concerns positioning the question of a definition within a frame of reference that studies the phenomenon. Examining the concept of music involves abstracting it from its practical execution, referring to the techne or the actual

activity of making music. Typically, this process of abstracting the concept of music for academic study is a common practice within the Western academic framework[4].

In the academic definitions of music, the main debate lies on the premise that music is a universal phenomenon. Most of the traditional definitions assume that to determine its universal character, music requires a close-ended unitary definition, determined by necessary and sufficient conditions that delimitate the object of study (see e.g., Godt, 2005; Kania, 2011 and discussions in Hamilton, 2007; Levinson, 1990; Nettl 2001; Scruton, 1997).

1.1.1. Philosophy and Anthropology

One of the most widely known definitions is that of the music philosophers Theodore Gracyk and Andrew Kania (2011) who provide a definition and an extensive state of the art of musicology (the study and research of music), and overview of the subdisciplines of music such as composition, and other disciplines such and philosophy and other specialist papers focusing on music analysis. The authors aim to offer a concept of music that can be shared by different people and provide explicit boundaries for judging whether something is music or not. Gracyk and Kania's (2011) definition is:

> Music is (1) sounds, (2) intentionally produced or organized (3) either (a) to have at least one basic musical feature, such as pitch or rhythm or (b) to be listened to for such features. (p. 11)

Condition 3a (to have at least one basic musical feature) captures most music across time and space, and 3b (to be listened to for such features) captures other but not all contentious pieces that

[4] This is a large subject out of the scope of this thesis, transversal to wider socio-political issues that have influenced theoretical discussions, debates, academic references, and thought development. For further references about the Western academic reference in relation to music please see Nettl (1983).

are arguably and arbitrarily included or excluded as 'music'. These controversial pieces include avant-garde, modernist, and postmodern musical experiments such as John Cage's Williams Mix[5] or Yoko Ono's toilet piece/Unknown[6] (see Currie & Killin, 2016 and Godt, 2005). These contentious pieces do not meet the listed criteria and deliberately flout the features that, according to Gracyk and Kania, define music[7]. The controversy about an arbitrary inclusion or exclusion of certain pieces for not meeting certain criteria relates to the idea that the concept of music can be solely defined by its structural components without considering a set of dynamics, concepts, or intentional reframing of a composer's conception of music. In that sense, this debate occurs in reference to the distinction (and usually exclusion) between sound (sonic) art and soundscapes as conceptual and intentional organisations of sound for specific purposes not necessarily related to music but to the relationship of an individual or a group of individuals to a sonic situation. Even in sound production and engineering, a musical piece is 'designed' for specific purposes and targeting listeners or environments. For example, the sound of a song that will be played in a club is much more compact, with a predominance of lower tones and stronger bass beats[8]. This means that there are elements of music that pertain to situations or spaces beyond the music piece but no less important to the whole musical project.

A second definition, similar to that of Gracyk and Kania's (2011), is from historical musicologist Irving Godt (2005) who defines music as follows:

> (1) Unwanted sound is noise. (2) Music is humanly organised sound (3) organised with intent (4) into a recognisable aesthetic entity (5) as musical communication (6) directed

[5] TRACK 1: John Cage: Williams Mix (1952/1953)

[6] TRACK 2: Yoko Ono, Y. Toilet piece/Unknown

[7] An account of such features (rhythm, melody, harmony) will be discussed in the next section of this chapter and for detailed reviews see Gracyk and Kania (2011, chapter 3), Scruton (1997, pp. 19-79), Davies (2001, pp. 45-58), Hamilton (2007, chapters 2 and 5).

[8] D. Sicilia, personal communication, March 20, 2021.
Also visit artist's site https://www.danielasicilia.com/home

> from a maker (7) to a known or unforeseen listener (8) publicly through the medium of performer (9) or privately by a performer as a listener. (10) As far as I know, technologists have never found a human society that does not have music. (p. 84)

Godt's definition includes other variables such as aesthetics, communication, and a level of interaction between a listener and a performer that contrasts Gracyk and Kania's definition. Both definitions, however, attempt to be as rigorous, abstract, and inclusive as possible, but the authors fail in recognising that their definition only applies to the type of music of their context, with the biases and reasoning of their contextual reference. That is, by providing a definition that abstracts and universalises musical practices and assuming that this definition applies to all known musics, the authors are denying the possibility that music may be represented and framed differently in other contexts outside the Western frame (cultures sharing European cultural ideas and philosophical foundations). Such definitions present a cultural bias that excludes multiple possibilities to engage in musical activities that are less concerned with definition and focus more on the experiential and social dynamics of music (e.g., Afro-Colombian Pacific coast music). This bias also occurs within the Western tradition (e.g., John Cage) in which perspectives on musical development where women have been influential have also been excluded. An example of this exclusion has been highlighted in *Sisters with Transistors*, a 2020 documentary film that talks about the role of women in the origins of electronic music[9]. In summary, closed-ended definitions tend to be rigid and exclusive rather than flexible and inclusive.

A third and also influential definition of music is from the philosopher Jerrold Levinson. Though less orthodox than the previous definitions (Godt, 2005; Gracyk & Kania, 2011), Levinson (1990),

[9] For an example about contentious pieces and origins of electronic music with a gender perspective see e.g., Rovner, L. (Director). (2020). *Sisters with Transistors* [Documentary Film]. Anna Lena Films. https://sisterswithtransistors.com/

who is aware of the difficulties and limitations of providing a universal definition, defines music as follows:

> Sounds temporally organised by a person for the purpose of enriching or intensifying experience through active engagement (e.g., listening, dancing, performing) with the sounds regarded primarily, or significant in measure, as sounds. (p. 273)

Levinson's account is more inclusive than the previous definitions because he considers shared engagement and the causality of being affected by sound. Although emotional response is discussed by Levinson, he claims that it is not a sufficient element to establish a definition of music because there are no emotional responses related specifically to musical experiences and therefore emotions are not exclusive to a definition of music. Additionally, Levinson (1990) claims that his definition covers all that it should "e.g., classical music, folk music, party music, avant-garde music, opera, the varied phenomena studied by ethnomusicologists—and nothing it should not (including Muzak)" (pp. 273–274). Once more, the exclusion of certain types of sounds or genres such as Muzak (background music) for not meeting the criteria established in his definition—particularly the enriching or aesthetic quality of a musical piece—puts this definition again in the arbitrary position of exclusivity by claiming that something has or does not have aesthetic intent or engagement. This argument lacks support because according to Levinson, Muzak is a non-humanly organised sound. If sounds are not directly humanly organised—for example through a programmed algorithm or computerised sounds—we can ask, how are they organised in the first instance, if not humanly and intentionally? There is also the contrary case where non-humanly created sounds are perceived as musical by the human ear, such as sounds in the forest. An example of this is the Sonic Forest project, a film project advocating for tree and forest conservation in Latin America. The film's soundtrack weaves together sounds from nature and music from the

local communities that resemble environmental sounds[10]. Technically, most of the sounds from nature are not human made, but it is largely agreed that such sounds induce engagement and aesthetic responses just as Levinson's music definition does. Levinson claims that not all sounds are music, and although this assertion can be true, the issue with this argument is determining where the limits of music are, which is arguably more of a psychological issue than an ontological one. His claim is supported by the distinction of what music *is*, and what can be *treated* or *regarded* as music. For example, the whirr of a blender is not an instance of music, but it could be such if produced for a certain purpose. John Cage's Zen-inspired reflections suggest that all sounds *are* music, but Levinson argues that all sounds can be treated *as if* they were music.

Levinson's account of music facilitates the necessity of referring to a sonic expressive activity. The problem is that, just as the other authors, his claim regards music as a sterile and objective concept, disregarding and operationalising the subjective and dynamic dimension of music, qualities that are essential to define it. At the end of a chapter where Levinson defends his claims on objectivity and conceptual conquest about music's definition, he writes a statement which is contradictory to his argument, but which excellently illustrates the subjective, dynamic, and complex character of musical engagements favoured in this thesis:

> Some music enriches primarily through conveying emotional content, some more through stimulating the ordering faculties of the mind. Some music exercises the imagination in virtue of its representational aspects, some music satisfies particularly by giving sense of tradition and shared community. Listening to some music seems to provide insights into the mysteries of the psyche; listening to other music makes one more pleasurably aware of one's body; other music makes one feel bodiless. And some music seems capable of

[10] For more information on the Sonic Forest project visit https://standfortrees.org/sonic-forest-film/

Also visit Cucusonic—another example that takes recordings from different locations in Colombia and musicians make music with those sound patterns: https://cucusonic.net/

effecting real and relatively permanent alterations in the outlooks and attitudes of listeners. (p. 278)

The fourth definition concerns the work of music and aesthetics theorist Andy Hamilton (2007), another influential scholar whose work has been largely devoted to understanding and defining music. Hamilton offers another unitary but less orthodox definition which draws on the work of Roger Scruton (1997, pp. 19–79). Hamilton (2007) claims that music is an art—a practice involving skill or craft whose ends are essentially aesthetic—whose material is sounds that exhibit tonal organisation. The author distinguishes between *acoustic*, *aesthetic,* and *acousmatic* accounts, which reflect some of the definitions and analyses of music in the twentieth century. They regard the properties of sound in unitary definitions, which try to convey what music is and what it is not according to its sound properties. Hamilton claims that traditional concern was more inclined to theories of sound as tone, but in the twentieth century sounds other than tonal sounds were included in the repertoire of composers and musicians: for instance, sound-art or aural-arts which include poetry, radio, and other avant-garde sonic arts that treat sound as having conventional and linguistic meaning. Previously quoted Jerrold Levinson (1990) is an example of these modern twentieth century theories.

Hamilton (2007) claims that *acoustic* characterisation is related to physics where range and properties of sound relate to space. While this kind of technical definition is often used in universal definitions of music, Hamilton argues that music's acoustic properties are physical characteristics but too atomistic and therefore not enough to define music. He thinks instead that *aesthetic* and *acousmatic* accounts must be combined with any *acoustic* account for an inclusive and richer definition of music. For Hamilton (2007), the *aesthetic* conception regards music as "a practice involving skill or craft whose ends are essentially aesthetic and which is the necessary object of

aesthetic attention, with sounds regarded as tones" (pp. 10-11)[11]. This aesthetic conception of music supposes an "intensifying or enrichment of experience through active engagement" (p. 12). Active engagement introduces what Hamilton refers to as the *Humanist* view that claims that music is "a human activity grounded in the body and bodily movement and interfused with human life" (p. 6). Hamilton stresses the relevance of human action in music—and music's origins in dance, ritual, and gesture—arguing against abstract or purely formalist conceptions of music (Kane, 2008). The *Humanist* view relates to intentionality and embodiment in the perceptions of tones and rhythms, and such perceptions require human involvement to differentiate them from mere sequences of sounds. In the case of rhythm, as opposed to pure time-points, successions are infused with human gesture and grounded in the body. Hamilton's experiential element which is central in this thesis and will be addressed in the following chapters related to the way in which early life interactions are embodied, experienced, shared, and musical.

The term *acousmatic* is the least familiar of the three terms explored by Hamilton (2007). It is a term that was originally coined by philosopher Roger Scruton (Hamilton & Scruton, 1999, as cited in Hamilton, 2007) who refers to the experience of sound as a manifestation of the experience with the art of music:

> The person who listens to sounds, and hears them as music, is not [necessarily] seeking in them for information about their cause, or for clues as to what is happening. On the contrary, he is hearing the sounds *apart* from the material world. They are detached in his perception and understood in terms of their experienced order: this is . . . the acousmatic character of musical experience . . ., the notes in music float free from their causes. (Hamilton, 2007, p. 96, original *italics*)

[11] Hamilton (2007) offers a detailed revision of the concepts Acoustic, Aesthetic, and Acousmatic as well as a historical trajectory of the discussions and place of those terms in relation to music.

Acousmatic therefore refers to the embodied acoustic experience, the listener's response to sounds as abstracted from their worldly cause, i.e., an aesthetic end and tonal material together in an experiential and subjective form which is different from language and extracted from an embodied and possibly shared experience. Hamilton objects to Scruton's account in saying that music cannot be conceived of as relying upon metaphorical tones because sounds and music are felt in the body, they are vibrations heard and processed by the ear (Kane, 2008), hence presenting a worldly cause, not a metaphorical one. Hamilton (2007) proposes a dual explanation for the existence of music, highlighting both intentional and material causes. According to this perspective, the listener is aware of music on two levels: one as a realm of intentional tones and the other as a set of tones with physical properties. Consequently, musical listening can be characterised as both acousmatic and non-acousmatic. The acousmatic aspect relates to the listener's response to the auditory aspect of sound, while the non-acousmatic dimension pertains to the embodied and contextualised response to music. In other words, the listener's engagement with music involves responding to both the intentional, abstracted realm of tones and their material, physical attributes, indicating that musical experiences are not detached from their real-world origins. Hamilton's claim supports this thesis' standpoint in its assertion that an embodied experience of music cannot be separated from its worldly cause because whatever music's *raison d'être,* it is linked to actual acoustic occurrences and experienced within contextual and embodied frames of reference. Hamilton drew on these experiential elements in his aesthetic and humanist conceptions of music.

Hamilton (2007) also differentiates between the *imperfectionist* and *perfectionist* views of aesthetics of music. The *imperfectionist* view preferences the virtues of spontaneity and process in musical production because they involve immediate and direct transmission of the musical idea. The *perfectionist* view stresses the timeless permanence of a musical work over and against its empirical manifestations—it argues that while performance is variable and uncertain, the "musical work" is permanent. For Hamilton (2007) (and this is perhaps his major claim and contribution),

improvisation is intrinsic to the musical result and fundamentally impacts the aesthetic effect: "there is a genuine phenomenon of an improvised feel" (p. 202)[12]. Hamilton's point on the aesthetic and creative natural essence of improvisation is crucial to this thesis. The relevance of improvisational forms is further developed in Chapters 3 and 4 of this thesis where the improvisational character of early caregiver-infant communications in the form of preverbal dynamics, in which playful imitations and creations of novel fragments occur, is considered and framed as a form of "instant composition" in Hamilton's sense of the term. Chapter 3 also explores how these preverbal moments are musically creative and improvisational (see also Malloch & Trevarthen, 2009, Chapter 14)[13].

Hamilton's aesthetic essentialism is similar to Levinson's claim about the level of aesthetic engagement a musical piece can produce. Their radical essentialism is dangerous because considering pieces of music as objects in themselves with a "quota" of aesthetic value may cause issues of hierarchical dominance between different musical expressions, endangering diverse ways to engage musically. Instead of focusing on what type of music is more aesthetically engaging than others, it may be more fruitful to focus on what contributions acoustic, aesthetic, acousmatic, and humanist essential aspects of music and musical engagement might bring to human experience, and how imperfectionist and perfectionist forms of musical activities inform the ways music can be conceived, preserved, and created as object, concept, and creative action simultaneously. Hamilton's contributions are, however, a valuable beginning for introducing more fluid conceptions of music. The last part of his book is precisely concerned with a discussion on improvisation in music, which shifts to a musical experience that allows less static music definitions and opens the discussion with other disciplines which have traditionally maintained less unitary

[12] For a further discussion and relevant accounts on improvisation and philosophy see Alperson (2010).

[13] Hamilton's interest in improvisation and musical experimentation has opened the model of philosophy of music to those contentious pieces (e.g. Yoko Ono's 1971 toilet piece/unknown) which have been often arbitrarily excluded in the more traditional universal definitions like those discussed before in this chapter.

and more context-dependent frames of reference (e.g., ethnomusicology). In improvisation, Hamilton asserts, there is room for spontaneity and creativity, not solely memory and habit. Improvisation is concerned with the process, not with a form of work-composition, i.e., not a potential *product,* though it can be when recorded and written (see Hamilton, 2007 for further analysis).

1.1.2. Musicology and Ethnomusicology

Similar positions to those of Hamilton's related to the aesthetic, experiential, and creative or improvisational aspects of music can also be found in ethnomusicology and musicology studies. Bruno Nettl (2001), Alan P. Merriam (1964), John Blacking (1977) and Blacking and Byron (1995), and Turino (2008) are some of the most relevant authors who have been influential both in ethnomusicology and musicology. In ethnomusicology, music is considered as both an object and a cultural practice which is itself situated within a particular social organisation. Most ethnomusicologists have been traditionally concerned with investigating musical practices and cultures outside the Western traditions[14] (see Nettl, 2010). Bruno Nettl (2010) and Wallin et al. (2001) acknowledge the difficulty of defining music in a way that is equally valid for all cultures as the philosophical accounts discussed before attempt to do. Nettl also suggests that all cultures have something that to Europeans and Euromericans sounds like music, or at least a kind of musical communication that each culture distinguishes from speech, which leads to a similar

[14] Ethnomusicology is dedicated to studying how music is created, its cultural significance, and how these dimensions vary across different cultures. This field has worked to dispel the notion that non-Western music is "primitive" compared to Western music, challenging negative stereotypes and acknowledging the diversity, complex systems, and cultural value of musical traditions worldwide. Research in ethnomusicology has demonstrated, for example, that some rhythmical structures in African music are much more complex than Western classical and popular music, or certain melodic structures are much more complex in certain regions in India or the so-called Middle East—Southwest Asia and northeast Africa (Music and the Brain, 2015). Most contemporary studies in ethnomusicology are also concerned with Western music traditions as well as cross-disciplinary comparative studies concerned with human and non-human musical behaviour (see Nettl, 2010, and Honing, 2018).

discussion about music's universal character. In the case of ethnomusicology, the discussion seems to be more about the presence of a communication phenomenon that is similar in different cultures but varies in context and content. Different to the philosophical type of universals, Nettl (2010) claims that universals exist in musical sound, conceptualisation, and behaviour of the earliest musics which explain the link between musical practices and ritual practises, thus providing information about early social organisations. Such universals, says Nettl (2010), help to understand the origins of music but he is wary of the difficulties of setting universals in a theoretical discussion. According to Nettl (2010), the question about universals should remain of interest to ethnomusicologists and the field needs to be open to a greater exchange of data and views with other fields such as biomusicology, for example.

Another influential author in ethnomusicology is Alan P. Merriam who, in his seminal book *The Anthropology of Music* (1964), frames the study of ethnomusicology into three main claims: i) music from non-Western traditions should be studied and appreciated; ii) the preservation of other types of music is relevant and ought to be considered as a constant element of human experience; iii) music as a form of communication informs about human communication in general. Merriam argues that ethnomusicological studies are not only concerned with sound or music as an object separated from the humans making it. He believes that music should be treated as human behaviour:

> The human behaviour which is a prerequisite for producing sound . . . Some individuals behave in certain ways because they are musicians and because the society stereotypes musical behaviour. Those who are not musicians are influenced in certain ways because music has emotional and even physical impact, and the behaviour at one musical event differs from that at another musical event because of the conventions of the cultural system. (Merriam, 1964, p. 14)

Ethnomusicologist John Blacking (1973) claimed something similar, but he specifically concentrates on musical nature and behaviour, which he defines as "humanly organised sound" (p. 10). In his book, *How Musical is Man?,* Blacking (1973) explicitly proposes the question about universals in music in the musicological tradition. He indicates the bridge between ethnomusicology and biology on the basis of a study of musical systems not analysing patterns of sounds as things in themselves or abstractions that explain those patterns, as musicologists and philosophers were traditionally concerned with. Instead, he claims that musical styles do not have their own terms but the terms they deploy are the terms of the society and culture of which they are a part of[15]. According to Blacking (1973), musical creation and performance are:

> generated first and foremost by the human capacity to discover patterns of sound and to identify them on subsequent occasions. Without biological processes of aural perception, and without cultural agreement among at least some human beings on what is perceived, there can be neither music nor musical communication. (p. 9)

For example, when considering the musical traditions in different contexts, the ways of transmission are not the same. Notation, for example, is not the only way to pass musical knowledge generationally, considering societies that do not use or need notation to preserve their musical traditions (the case of musical dynasties and oral traditions in the Colombian Pacific coast is a clear example[16]). What remains, following Blacking's argument, is a combination between the cultural matrix and human psychobiological capacities**.** By using this argument, Blacking sets out a position about universals where music is a local matter as well as a human disposition, but also

[15] For Blacking (1973), ethnomusicology has expanded the knowledge of different musics of the world, but he also argues that ethnomusicology should be more than an "orthodox child" of musicology because it has the power of revolutionising the world of music and music education, but does not yet benefit from the appropriate methods that give justice to its potential as a discipline.

[16] See e.g., Le Guess Who? (2021, March 3). *Afro-Colombian Culture & Community in Buenaventura, by Marimbea - Reports from Other Continents* [Video]. Youtube.
https://www.youtube.com/watch?v=Lhi2NRYJyP4&ab_channel=LeGuessWho%3F

criticises capitalist culture which asserts that not all people are musical and that some musics are better than others (for more elaboration on this criticism see Blacking, 1973 Chapters 2 and 3). Blacking's thinking is setting a line of research which could develop a method in ethnomusicology focused on non-Western practices and collaborative networks of music making (e.g., musicking), less loaded with power relationships about abstract definitions. These ways are related to considering music as an active element of people's lives and experiences, providing agency for the individuals involved in the musical practice and an experiential factor which also positions music within the subjective-collective continuum of human experience.

Blacking (1973) also recognises a biological component besides the ethnomusicological by claiming that many of music's processes are to be found in the constitution of the human body and in patterns of interaction of human bodies in society. In that sense, it could be assumed that all humans share some common grounds that make music possible, something that, from the 1980s, will become a matter of debate between the social and the natural sciences on the study of music as a behaviour versus music as a cultural practice (see e.g., Honing, 2018). Blacking's biological claim assumes that music could be seen as a constant of human experience and could therefore be seen as a human universal. The cultural aspect, however, is not exclusively dependent on the biological aspect, and therefore a universal definition of music is both reductive and limiting. In Blacking's thinking, "human response to music is deep, primeval and at least partly genetic: it is neither reducible to nor is an epiphenomenon of anything, except the very nature of humanity itself" (Blacking & Byron, 1995, p. 1). Blacking reaches a midpoint between universal and contextual, but the universal aspect is understood as a biologically determined factor instead of an abstraction of music as a sterile concept previously discussed in the philosophical conceptions of music.

After John Blacking's theoretical developments, ethnomusicology took over the twentieth century, particularly in Great Britain and the United States. Respecting the context-dependent dominant

tradition in ethnomusicology, the inquiry into universals is extended to biological and psychological (cognitive) elements (see e.g., Nettl, 2005). This interdisciplinary attitude reciprocally shaped the biological interest in understanding music, but since then most theoretical developments on ethnomusicology have become caught up within the evolutionary Darwinian discourse, which has brought important discussions about the science of music but also a set of problems such as scientific and biological reductionism. As will be discussed in Chapter 2 on Musicality, the interdisciplinary accounts of music took the definitions of music beyond philosophy and anthropology, which meant that the inclusion of human experience, meaning, emotions, perception, and cognition added a valuable complexity to defining music. The complexity that music is altogether subjective and collective, local and universal, and physical and cultural demands a heterogeneous definition. Additionally, the physiological approach to music brings the body as a central aspect of music creation, perception, and appreciation. The difficulty with disciplinary heterogeneity is that it carries the baggage of each disciplinary tradition and the larger disputes underlying the natural sciences and humanities (see e.g., Currie & Killin, 2016). This difficulty of multidisciplinarity is transferred to the types of universals used to define music, meaning that not all universalisations can be criticised as reductive or inappropriate. There are universals concerning music and its cultural variances, and those universals regarding the way in which humans process sound cognitively and cerebrally. The latter are more likely to predict universal elements because they are concerned with physiological anatomy, not with cultural bias. Musical elements present in human behaviour and the psychobiology of music are subjects covered in this thesis through the concepts of musicality and communicative musicality in Chapters 2 and 3.

1.1.3. Non-universal accounts of Music

Besides the issues brought from new interdisciplinary models for studying music, a definition of music cannot be static nor respond to only one crystalised definition that arbitrarily includes or

excludes music pieces. Moving on to a generative and constructivist definition seems more appropriate—a definition that includes the intimate human experience of music, determined by multiple elements such as biology, emotions, social, and temporal engagements. In more contemporary definitions, shaped by the previously mentioned works on musicology and ethnomusicology, the universalisation of a definition of music gets progressively criticised. In contemporary philosophical works, the work of Stephen Davies (2001, 2012a, 2012b) is an example of this change of attitude. Davies challenges the traditional definitions (e.g., those of Godt, 2005 and Kania, 2011) and suggests that across the globe, what Western-informed cultures call music serves a variety of functions and takes diverse forms. Davies (2012a, 2012b) primarily criticises the musical universals assumed and their implication that a single definition applies to all music. However, Davies' definition is still operating on the basis that music can be approached as a concept on its own, without mention of the embodied and usually shared experience brought about by music.

Social scientists Adrian Currie and Anton Killin (2016) provide an elegant solution offering a pluralistic approach which considers the complexity of music research putting forward a need to resolve some tensions within the past and current theoretical discussions about music and music research. The authors discuss the current interdisciplinary nature of music research, with the inclusion of scientific discussion into the definition. They claim that given the plurality of legitimate research questions about music, there is a need for integration and for considering a pluralistic conception of music. That is, Currie and Killin (2016) suggest that a unitary definition, divorcing disciplines, and contextual realities is unviable. Instead, the authors accept that music is a broad human phenomenon and can be studied from different angles leading to the study of aspects that can be either antagonistic or more susceptible to integration. Their solution is to study the antagonisms and integration possibilities by constructing models which consider the dynamics of different aspects of music:

> Music is sometimes considered a product of intentional action, particularly in anthropological and (some) philosophical settings. Music is sometimes considered an object with particular formal features by, for instance, Western history or analytic theory- but in cross-cultural settings the *lack* of such features is emphasized. Music can be an expressive function of society/culture but can also be considered as a cognitive trait, or in terms of neural mechanisms. Music's various features matter, more or less for different agendas: those of psychology, music theory, anthropology and so on. (Currie & Killin, 2016, p. 16, original *italics*)

The authors' pluralistic approach coincides with this thesis' standpoint because it reflects the complexity of music, as well as the different interests and approaches given to researching it, which enriches the possibility for a transformative and auto-generative conceptual representation of an activity that involves many areas of human life. Moreover, this pluralistic approach is not only conceptually inclusive while accepting that not all definitions are correct or viable (logically, practically or philosophically), but it also allows for a broader discussion regarding the elements involved in music which do not necessarily represent music as a cultural product. For example, in this thesis, there are different elements present in the preverbal infant when interacting with their caregiver which are claimed to be musical for the rhythmical and melodic behaviour in the sound interaction. Although it could be argued that those interactions are not music (see e.g., Davies, 2012a, 2012b), a pluralistic approach will allow this thesis' claim that such interactions are indeed musical, and could be the forerunners of relevant developmental milieus such as self, emotional and language development, socialisation and later in life, music creation and skill learning (see the following chapters of this thesis).

A pluralistic approach allows making those connections between human development and musical features because it accepts that there is more than one legitimate and non-equivalent concept of music, i.e., it allows contradiction. Accepting contradiction and multiplicity is accepting a level of

complexity which makes justice for a concept that is immensely convoluted as a practice (techne) and as a concept that condenses several elements charged with cultural and academic variances.

Another relevant author that aligns with this thesis' approach is Turino's (2008; 2009) ethnomusicological proposal which introduces a framework for understanding music making as a process within four distinct fields: participatory performance, presentational performance, high fidelity recording, and studio art recording. Each field has specific social functions. For Turino, music making, when seen as participatory performance, provides alternative societal values for people living in capitalist societies. Participation in performance creates social spaces for change, alternative, sustainable ways of living. Turino's idea stems from his work in Peru and Zimbabwe and his teaching role in ethnomusicology. His critique of cultural essentialism and cultural relativism is relevant for critically examining other societies' understandings of music without isolating these perspectives from the practices of Western society. In his words:

> In my quest to provide alternative models to think with, I have often stressed difference. Only recently have I realized that this approach is counterproductive in terms of my ultimate goal. Because of popular notions of "cultural relativity," which is ultimately founded on holistic, essentialist conceptions of "culture," my students can grasp that Conimeños understand and practice music and social relations in very different ways than they do, and yet not take such alternatives seriously as models for their own lives - "Conimeños are from a different culture, fine, what has this really got to do with me and where I live?" Underlying their questions about these other people and places there is often a deeper question, "what can we do with all of

> this that you are telling us?" Essentialist notions of "culture" and the idea of cultural relatively are both an easy explanation for alternative ways of being as well as an easy excuse not to engage with these distant alternatives for living in deeply personal ways (Turino, 2009 p.96).

Regarding his approach to music, he also stresses the relevance of an ethnomusicological perspective:

> For me, one of the central social functions of ethnomusicology is precisely to engage our students and readers with alternative possibilities for music making, to be sure, but also more generally for living. We tend to do this by teaching about the contexts where we and our colleagues made our own personal discoveries, in my case among indigenous people in Conima, Peru, and among musicians in Zimbabwe. When I teach these examples I stress how indigenous people in these places conceptualize and approach "music" in a very different way - as a social and spiritual activity rather than as an art object that can copyrighted or purchased. I teach these ideas as drawing from and contributing to broader patterns of social priorities and habits of thought and practice that contrast with capitalist ethics and priorities in positive ways. (Turino, 2009 p. 96).

Turino highlights the potential of participatory music making to serve as a model for sustainable living, advocating for a shift in social values and practices through the lens of ethnomusicology. By understanding and promoting these alternative practices, we can work towards more sustainable and cooperative communities. His work is further referenced at the end of the chapter

where discussions around complex frameworks and alternative approaches to music and society take place.

1.2 Components of Music

This section sets out a general overview about music's components: rhythm, melody, harmony. In a similar way to the previous section, music's components, just as the universal definitions, are understood as discrete elements that are static in defining music's identity within a Western frame of reference. However, this thesis' approach takes on the useful aspects of each component as a categorial map, but argues that these characteristics are open-ended, subject to change and redefinition. These characteristics could be thought of as nominative identities of music where a set of elements provide a defining category (similar to other identity features such as race or nationality), but music's components can be also thought of as a logical relationship where patterns and characteristics interact in complex ways forming interactive axes that function like templates for new combinatory processes. These interactive axes present dynamic identities that do not crystalise or exclude meanings in musical form, structure, or presentation. Rather, they describe the nature and functioning of each component, its limitations, and possibilities for thinking about interactions and transformations when considering musical aspects beyond the sole cultural dimension and beyond the traditional theoretical nomenclature. In that sense, this thesis has a preference for a conception of music that relies more on the shared actions and interactions that provide meaning to a contextual collectivity than the theoretical abstractions of the word.

As Levine (1995) says in his jazz theory book: "there is no one single set of standard chord symbols. The lack of a universally agreed-upon set of symbols is not a bad thing at all. Jazz is a living, breathing, growing, constantly evolving art, and its changing terminology reflects this" (p. 9) (see also Schuller, 1968). Similar to Levine's approach to jazz, this thesis' approach to music

recurs to the paradoxical Rivera Cusicanqui 2010/2020) and the evolving psychosocial engagement (e.g. Turino, 2008).

Music and education researcher Natalie Sarrazin (2016), Roger Scruton (1997), and Gracyk and Kania (2011) list a number of elements that commonly conform the structure of music. Sarrazin (2016) provides a working definition claiming that music is above all made of sound and time[17]. Music, when considered as an intentionally organised art form whose medium is sound and silence, is formed by core elements such as rhythm, melody, and harmony, as well as their dynamics and the qualities of timbre and texture.

1.2.1. Rhythm

Rhythm is broadly considered by theorists, composers, and performers as the *sine qua non* of music (see Cooper & Meyer, 1960 for a historical account). Theorists have written about temporal organisations of music with a focus largely concerned with meter (the frequency of patterns) and phrase structure (formal organisation) than with rhythm itself. The basic modes of temporal organisation in music can be differentiated into the structural components of tempo, beats, pulse, meter, and rhythm (for further elaboration on each element of rhythm and further discussion see Caplin, 1988; Cooper & Meyer, 1960; Lester, 1986; London 2001, 2012; Lerdahl & Jackendoff, 1983).

Rhythm is sometimes considered the strongest component of music because it provides the grounds for the organisation of sound and silence in music (see e.g., Sarrazin, 2016). Rhythm is derived from physical temporal manifestations and cognitive notions of time related to

[17] For further discussion on the definitions of music please see the first section this chapter and Blacking, 1977; Blacking and Byron, 1995; Currie and Killin, 2016; Davies, 2001, 2012a, 2012b; Godt, 2005; Gracyk and Kania, 2011; Hamilton, 2007; Levinson, 1990; Meriam, 1964; Nettl, 2001; Scruton, 1997).

predominant features of nature that respond to cycles and functions in and outside the body. Time is also strongly charged with symbology and mythology and connected with psychological functions, presenting a strong element for rhythmic structures (for further elaboration on this subject see Ravignani et al., 2017). In the musical context, rhythm, used interchangeably by some authors with similar terms such as *pulse*, *beat,* or *meter* (Sarrazin, 2016 and see Davis, 2011, p. 19), frequently refers to a pattern of sounds of different lengths. For other authors, however, rhythm is the whole experience of a mixture of these components (pulse, beat, and meter) (Crossley-Holland, 2020).

In the theoretical discussions relevant to this thesis (Hamilton, 2007; Lester, 1986, Schuller, 1968; Scruton, 1997), it is important to set out the theoretical distinction between meter and rhythm and how the qualities of rhythm in the temporal disposition (grouping and accents) organise perceptual qualities of rhythm. These considerations serve to understand how the structural organisation of rhythm may affect human responses and how different qualities of rhythm (e.g., free rhythm) are more suitable for understanding the rhythmical organisation in early caregiver-infant interactions.

Rhythmical organisations are conventionally seen as the patterning of exact sound lengths matching structured musical forms (Davis, 2011). Rhythm tends to be equated to meter (the frequency of recurring patterns), giving the physical theoretical explanation. However, rhythm is independent of meter in two different ways. According to musicologists Cooper and Mayer (1960), rhythm can be defined as the way in which one or more beats are grouped in relation to an accent. First, rhythm can exist without there being a regular meter (e.g., Gregorian chant or recitativo secco); and rhythm, theoretically, is independent of pulse (the steady beat measured in bpm). Second, rhythm varies within a given metric organisation (e.g., iambic grouping can occur in duple or triple meter). As argued by Cooper and Meyer (1960), "rhythmic groupings have generally been treated as if they were metric units. However, since these groups can be found in various different meters, they are not themselves the same as meters" (p. 7).

There can also be rhythm without meter, as in the 'free rhythm' of some Oriental and folk music and Jewish Sephardic Cantillation[18] as well as in what has been called the 'measured rhythm' of Gregorian chant[19] and more contemporary examples such as King Crimson's 21st century schizoid man[20] or Pink Floyd's Interstellar overdrive[21] (Cooper & Meyer, 1960, p. 4). Cooper and Meyer (1960) also assert that although meter tends to be regular, irregularities may occur without destroying the sense of metric organisation. This often happens because the irregularities are temporary and because in the architectonic model, if there are irregularities in one level, the other levels tend to be regular, so the whole rhythmic phenomenon is not disturbed. Free time, or free rhythm, is an instance that provides performers a playful and less constrained way of exploring time without necessarily being chaotic or non-rhythmical. Similarly, an association can be drawn with the free-timing style in caregiver-infant communications because they present stable and playful time-figures but are not chaotic or necessarily arhythmical as this thesis shall discuss in future chapters (see Chapter 3 on communicative musicality and Chapter 4 on musical development).

Rhythm, as elucidated in Justin London's entry in *Grove Music Online* (2001), is a fundamental component of music that structures time and organises musical events. London traces the etymology of "rhythm" from its Greek origins, highlighting its evolution through various languages and its central role in music. He emphasises rhythm's importance in creating temporal frameworks

[18] TRACK 3: Rory White Song of songs for audio file and see the singer's performance in the following link: Rory, W. (2012). *Song of Songs (Hebrew Sephardic or Mizrachi Cantillation manner) Rory White* [Video]. Youtube. https://www.youtube.com/watch?v=TsCkANslvDU&ab_channel=RoryWhite

[19] TRACK 4: Gregorian Chants – Benedictine Monks, and for music theory explanations see: Torsell, P. (n.d.). *Chant Talk, Ep. 2 - Introduction to Chironomy (conducting Gregorian Chant) & Rhythm* [Video]. YouTube. https://www.youtube.com/watch?v=aU-epezE8iI&ab_channel=PatrickTorsell

[20] TRACK 5: King Crimson - 21st Century Schizoid Man (Including "Mirrors")

[21] TRACK 6: Pink Floyd - Interstellar Overdrive

within which musical elements interact. The entry discusses several key theories, including metric theory, which focuses on regular, repeating patterns of beats organised into measures and governed by time signatures, and non-metric theory, which explores rhythms that do not conform to regular patterns, such as free rhythm found in certain folk and modern classical music. Cognitive theory examines how listeners perceive and process rhythmic patterns, delving into psychological and neurological aspects, while ethnomusicological theory studies rhythm in different cultural contexts, highlighting the diversity of rhythmic practices worldwide.

According to London (2001; 2012), Western music theory traditionally emphasises metric rhythm, often prioritising regularity and predictability. This focus can be seen in the prominence of time signatures and the hierarchical structuring of beats. However, this perspective has been criticised for its limitations. Western conceptions of rhythm often overlook the rich rhythmic diversity found in non-Western musical traditions. Ethnomusicologists argue that this bias can lead to a narrow understanding of rhythm, failing to appreciate the complexity of rhythmic practices in cultures where non-metric rhythms are prevalent. Some scholars challenge the notion that rhythm must be based on regular movement or repetition. London gives an instance using Eiichi Tosaki's work, which suggests that rhythm can be understood as a form of structure or composition, rather than merely a sequence of beats (in London, 2001). Cognitive theories of rhythm, while insightful, may not fully account for the subjective and cultural dimensions of rhythmic perception. The way individuals experience rhythm can vary significantly based on cultural background and personal experience. A more inclusive approach to rhythm, recognising the diversity of rhythmic practices globally, can enrich our understanding of this essential musical component.

London's *Hearing in Time: Psychological Aspects of Musical Metre* (2012) offers an exploration of musical metre, emphasising on a cognitive psychology approach. His book builds on the foundational concepts giving insights into how humans perceive and interact with musical time. London (2012) distinguishes between rhythm and metre as a key foundation of his work. Rhythm, according to

London "involves patterns of duration that are phenomenally present in the music, and these patterns are often referred to as *rhythmic groups."* (p.4 *original italics*), whilst metre "involves our initial perception as well as subsequent anticipation of a series of beats that we abstract from the rhythmic surface of the music as it unfolds in time" (p.4). Metre, London continues, "is more than just a bottom-up stimulus-driven from attending. Metric behaviours are also learned – they are rehearsed and practices. For musical rhythms are often stereotypical, stylistically regular, and hence familiar" (p.4). He begins by defining meter as a method of counting time in music, which involves time signatures and the rhythmic "feel" or "groove" of a piece. This understanding of meter is crucial for musicians as it helps them play rhythms accurately by guiding their motor behaviours and timing. Rhythm is described as involving patterns of duration that are phenomenally present in the music, while metre involves the perception and anticipation of beats that are abstracted from the rhythmic surface. This distinction is important as it highlights the different roles that rhythm and metre play in our musical experience.

The book also addresses the interaction between metre and rhythm, exploring how these elements influence each other in musical contexts. London introduces the concept of metric well-formedness constraints, which limit the temporal range and organisation of patterns of metric entrainment. These constraints help explain why certain rhythmic patterns are more easily perceived and processed than others. Additionally, London considers the rhythmic practices of various non-Western cultures, including African and Indian music, and introduces the concept of maximal evenness to account for metres that involve uneven beats or beat subdivisions.

London's (2012) central thesis is that musical metre is a form of entrainment, where listeners synchronise their attention and actions to the rhythmic patterns of their environment. This concept is grounded in extensive psychological research on temporal perception, cognition, and motor behaviour. London argues that our ability to follow musical metre is a specific instance of a broader cognitive skill: the capacity to synchronise with regularly recurring events. This

perspective aligns musical metre with other rhythmic activities, suggesting that the cognitive processes involved are not unique to music but are part of a general human ability to perceive and respond to temporal patterns. From a psychological and cognitive standpoint, metre is seen as a perceptually emergent property. It involves the synchronisation of biological activity with recurring events, a process known as entrainment. This means that metre is not just a musical concept but a form of behaviour where our attention and motor actions are synchronised with musical rhythms.

The practical implications of metre are significant. Both listeners and performers use metre to guide their perception and actions. Metric behaviours are learned and practised, which influences how we perceive and perform music. This learning process starts from early childhood and continues as we develop our musical skills. This idea coincides with this thesis' main hypothesis that music has developmental significance (see Chapters 4-6 of this thesis).

London also places meter in a broader context, considering it from an evolutionary perspective. He suggests that the ability to predict and synchronise with rhythms is an evolved cognitive capacity that has significant implications for our success as a social species. While musical sounds are not part of our normal sound world, they derive much of their expressive power from their ecological significance.

Another significant contribution of London's book is its detailed examination of the perceptual and cognitive constraints that shape our experience of musical metre. London identifies "speed limits" for metre, noting that the inter-onset interval for metric elements must be greater than 100 milliseconds and less than 1.5 to 2 seconds. These constraints are supported by evidence from neurobiology and psychological studies, which show that our ability to make durational discriminations and categorisations is tempo-dependent (see London, 2012 Chapter 2 for a detailed analysis). London also distinguishes between rhythms, or patterns of duration, and metres, which

he describes as complex patterns of expectation and attention. This distinction is crucial for understanding how listeners perceive and interpret different rhythmic structures.

Another relevant contribution of London's book is that his main music-theoretic inquiries focus on how to represent meter and what constitutes a well-formed metre. London introduces circular representations for metre to capture the stable aspects of metric entrainment, showing how various levels interrelate and change over the course of a piece. These representations help frame a set of well-formedness conditions (WFCs) for metre, integrating empirical research on temporal perception and cognition with rhythmic practices observed in various musical cultures.

London's well-formedness conditions for metre include specific temporal limits for different metrical levels and accommodate both isochronous (I) and non-isochronous (NI) metres (see e.g. London, 2012 - Chapter 10). These conditions eliminate the need for distinctions between additive and multiplicative metres and between metre and hypermeter. They emphasise maximal evenness, which provides an optimal arrangement of attentional energy and coordinates peaks of attention with short attentional intervals.

The many metres hypothesis is proposed to mediate between abstract tempo-metrical types and the timing behaviours encountered in real-world musical contexts. This hypothesis suggests that our metrical patterns of attending stem from encounters with expressively varied rhythms, which are integrated into the metric framework itself. London argues that greater rhythmic competence involves the ability to reproduce or discern a greater number of tempo-metrical types and categorical differences within each type.

In his final thoughts, London reflects on the similarities between NI and I meters, the importance of subdivisions, and the relevance of psychological research in rhythmic perception and cognition to everyday musical practice. He concludes that hearing metrically engages one of our most basic

perceptual and behavioural capacities, allowing us to synchronise attention to music and experience it collectively.

London's approach is notable for its interdisciplinary nature, drawing on research from cognitive psychology, music theory, and ethnomusicology. This breadth allows him to provide a comprehensive account of musical metre that is both theoretically robust and empirically grounded. However, a critical approach might argue that the book's focus on cognitive constraints could overlook the cultural and contextual factors that also shape the experience of musical time (see Chapter 3 of this thesis for a more detailed discussion). While London acknowledges these factors, his primary emphasis on cognitive universals may not fully capture the diversity of rhythmic practices across different musical traditions.

London's integration of cognitive psychology with music theory provides a rich framework for exploring how humans perceive and interact with musical time. As he states, "our ability to follow musical metre is simply a specific instance of our more general ability to synchronise our attention to regularly recurring events in our environment" (London, 2012, p.3). This perspective not only deepens understandings of musical metre but also highlights the broader cognitive processes that underpin engagement with rhythm and time.

Another relevant work is *The Generative Theory of Tonal Music* (GTTM), developed by Fred Lerdahl and Ray Jackendoff (1983), which integrates rhythm with melody and harmony, proposing rules for how listeners intuitively understand musical structures. The authors propose a comprehensive framework for understanding tonal music, drawing on principles from linguistics, particularly generative grammar, to elucidate the cognitive processes underlying musical perception and structure.

The core of Lerdahl and Jackendoff's (1983) theory is the concept of a generative grammar for music, which aims to formalise the rules and structures that govern the organisation of tonal music. This approach is analogous to Noam Chomsky's generative grammar in linguistics, which seeks to describe the implicit knowledge that enables speakers to produce and understand sentences in a language. Similarly, Lerdahl and Jackendoff's theory attempts to model the mental representations and processes that allow listeners to parse and interpret musical compositions.

One of the key strengths of *A Generative Theory of Tonal Music* is its rigorous analytical framework. The authors introduce a set of well-defined rules and principles that describe how musical elements such as pitch, rhythm, and harmony are organised into coherent structures. These rules are intended to capture the intuitions of experienced listeners, providing a formal account of how tonal music is perceived and understood. For instance, the theory includes detailed analyses of hierarchical structures in music, such as the grouping of notes into phrases and the nesting of these phrases within larger sections.

Lerdahl and Jackendoff's definition of tonal music offers a formal description of the musical intuitions of a listener well-versed in a particular musical idiom. Their approach delves into how listeners unconsciously comprehend music through four hierarchical systems. The first system involves segmenting a piece into motives, phrases, periods, and larger sections, creating a coherent grouping structure. The second system pertains to the regular alternation of strong and weak beats at various hierarchical levels, forming the metrical structure. The third system, known as time-span reduction, organises time-spans hierarchically, identifying the most structurally significant events at each level. Finally, the fourth system, prolongational reduction, describes patterns of tension and relaxation within the music. These systems collectively aim to explain the cognitive processes behind musical understanding, drawing parallels to generative grammar in linguistics. Their theory provides a comprehensive framework for understanding how listeners perceive and interpret tonal music.

Lerdahl and Jackendoff's approach to rhythm is centred on the concept of metrical structure. They define metrical structure as the hierarchical organisation of beats into patterns of strong and weak beats, which listeners intuitively perceive in music. This structure is crucial for understanding how rhythm functions within a piece of music.Their approach also involves the concept of time-span reduction, which links rhythm and pitch by organising musical events into a hierarchical tree structure. This structure identifies the most structurally significant events at each level, helping to explain how listeners perceive the relative importance of different rhythmic events within a piece.

Lerdahl and Jackendoff's (1983) work also offers a multidisciplinary approach, integrating insights from music theory, cognitive psychology, and linguistics. This multidisciplinary perspective allows the authors to address fundamental questions about the nature of musical understanding and the cognitive mechanisms that support it. Their theory has been influential in shaping subsequent research in music cognition, inspiring numerous studies that explore the psychological and neural bases of musical perception (see Chapter 2 of this thesis for further and more contemporary explorations on cognitive approaches to music).

However, *A Generative Theory of Tonal Music* has also faced criticism. Some scholars argue that the theory's focus on Western tonal music limits its applicability to other musical traditions (see e.g. Hansen, 2021). The emphasis on formal rules and structures may not adequately capture the diversity and complexity of musical practices across different cultures. Additionally, the theory's reliance on introspective judgments about musical intuitions has been questioned, with critics suggesting that more empirical validation is needed to support its claims. Criticising the lack of empirical validation is a frequent practice in the natural sciences, but this thesis welcomes different approaches in order to diversify standpoints and facilitate fluid epistemologies of music.

Despite these critiques, Lerdahl and Jackendoff's work remains a foundational text in the field of music theory. Its innovative approach and comprehensive framework have provided valuable tools for analysing and understanding tonal music. As the authors themselves acknowledge, their theory

is not intended to be the final word on the subject but rather a starting point for further exploration and refinement. In this regard, *A Generative Theory of Tonal Music* continues to be a vital resource for scholars and researchers seeking to unravel the complexities of musical structure and cognition.

Lerdahl and Jackendoff's and London's works offer significant contributions to the understanding of rhythm, musical structure, and cognition, yet they approach these topics from different perspectives and with distinct methodologies. Both works integrate insights from cognitive psychology and music theory. Lerdahl and Jackendoff draw on principles from generative grammar in linguistics to model musical understanding, while London incorporates psychological research on temporal perception and entrainment to explain musical metre. This interdisciplinary approach is a common thread, as both sets of authors emphasise the cognitive processes underlying musical perception. Lerdahl and Jackendoff explore how listeners intuitively understand tonal music structures, whereas London examines how listeners synchronise with rhythmic patterns and perceive metre. Additionally, both works are grounded in empirical research. Lerdahl and Jackendoff's theory is supported by analyses of musical examples and introspective judgments, while London's arguments are supported by psychological studies and neurobiological evidence.

However, there are notable differences between the two. Lerdahl and Jackendoff's work is primarily concerned with the hierarchical organisation of tonal music, including pitch, rhythm, and harmony. Their theory aims to formalise the rules that govern the structure of tonal music. In contrast, London's focus is specifically on musical metre and the psychological aspects of how it is perceived and processed by listeners. Methodologically, Lerdahl and Jackendoff employ a formal, rule-based approach to model the generative grammar of music, drawing heavily on linguistic theory. London's methodology is more empirical, relying on psychological experiments and studies to support his claims about temporal perception and entrainment.

Cultural considerations also differentiate the two works. While both acknowledge the diversity of musical practices, London's *Hearing in Time* places a greater emphasis on non-Western musical

traditions and the variability of rhythmic practices across cultures. Lerdahl and Jackendoff's theory, on the other hand, is more focused on Western tonal music and its structural principles. The theoretical foundations of the two works further highlight their differences. Lerdahl and Jackendoff's theory is built on the concept of generative grammar, aiming to describe the implicit knowledge that enables listeners to understand music. London's work is grounded in the concept of entrainment, exploring how listeners synchronise their attention and actions to rhythmic patterns.

Lerdahl and Jackendoff's *A Generative Theory of Tonal Music* explores how listeners intuitively understand and process musical structures. Their emphasis on the cognitive processes underlying musical perception relates to Donald Winnicott's (1960; 1965) exploration of the psychological processes that shape human development. Winnicott's concept of the "holding environment", where a caregiver provides a supportive space for an infant's development, could parallel the idea of a structured, supportive framework within which listeners make sense of music. Both theories highlight the importance of a stable, predictable environment—whether in early childhood or in musical structure—for cognitive and emotional development.

London's *Hearing in Time: Psychological Aspects of Musical Metre* also relates to Winnicott through the concept of entrainment. The way listeners synchronise with rhythmic patterns, a process that involves both cognitive and physiological entrainment. This concept of entrainment can be related to Winnicott's ideas about the relational dynamics between a caregiver and an infant. Just as an infant's sense of security and development is fostered through consistent and responsive caregiving, listeners' understanding of musical metre is facilitated by predictable and coherent rhythmic patterns. London's focus on the psychological aspects of musical perception aligns with Winnicott's (1960; 1965; 1971) emphasis on the environment necessary for emotional development.

In essence, while Lerdahl, Jackendoff, and London are not directly influenced by Winnicott, their work shares a common interest in the cognitive and psychological processes that underpin human experience. Both sets of theories underscore the importance of structured, supportive environments—whether in music or in early childhood development—for fostering understanding and growth (see Chapter 4-6 for a detailed analysis of Winnicott's contributions to music and human development).

In sum, rhythm is constituted by modes of temporal organisation which establish the structure of rhythm (e.g., tempo, beat, pulse, meter), but these elements do not define rhythm as a whole. Sometimes these elements are not dependent on rhythm, or rhythm is not entirely dependent on these factors. Moreover, rhythm is not a form of measurement, but a phenomenon rooted in external and internal sources of sound and silence in combination with a receiving end that tends to process, group, and make sense of those more or less stable, regular sounds. Rhythm is, therefore, the simultaneous situation that joins an external or an imaginary stimulus with the psychophysiological receptive, interactive apparatus that 'makes sense' of the stimuli. Rhythm cannot therefore be completely physical (external or internal), nor completely psychological: it is both. In its paradoxical nature, rhythm could be perceived as a whole experience where all the items and sources are not differentiated in the overall experience but able to be categorised or distinguished if thought of or looked at in detail (related to the Heraclitan paradox explained in section 1.2.3. Harmony). Viewing rhythmical stimuli as separate phenomenological situations allows for rational (theoretical) consideration of each component individually, but also as an undifferentiated experience. Rhythm may be felt sometimes as more engaging or more physical and sometimes as more imaginative and psychic, marking tendencies towards one or more of its sources or constitutional elements. Rhythm could be denominated as the skeleton of music and a way through which musicians connect to one another providing a structural matrix that grounds the musical experience and facilitates more spontaneous interactions within a containing

framework. This thesis relates this type of set up with the developmental theory of Donald Winnicott (1971) where there is a holding and hopefully good enough environment where the infant creates the world in the play situation. A safe environment facilitates psychic and emotional development as it stimulates and allows active engagement with complex mental processes and others. This connection between the musical environment and development is carried forward as a core aspect of this thesis (in Chapters 4 and 5).

1.2.2. Melody

The Encyclopaedia Britannica (2021a) describes melody as an aesthetic product of a given succession of pitches in musical time, implying rhythmically ordered movement from pitch to pitch[22]. According to some authors, melody is often inseparable from rhythm (Scruton, 2011). Culturally, the shapes, lengths, and intervals vary widely and, just as music, makes it very difficult to give a general account that distinguishes genuine melody from a mere sequence of pitches. Melody, however, is something we hear in a sequence of pitched sounds, and it is not a material property of the sound sequence itself (e.g., we can hear melody in birdsong). In the Western classical tradition, the most representative example is that of the melisma, "the melodic organization that extends 'horizontally' through a sequence of pitches—from melodies, which are bounded individuals, with a beginning, a middle and (usually) an end" (Scruton, 2011, p. 27)[23].

[22] Pitch in music refers to a position of a sound within a larger sound matrix. These sounds may be higher or lower in pitch depending on the vibration frequency of the soundwaves producing them—e.g., 880Hz is perceived as high pitch and 55Hz as low pitch; Hz: cycles per sound (Encyclopedia Britannica, 2021b). The current standard pitch is a' = 440Hz—adopted since 1939 (Britannica, 2021b). In Western music, melody was considered until the late 19th century to be "the surface of a group of harmonies" (Britannica, 2021a), i.e., a melody has underlying chords that can be deduced from the melodic succession.

[23] Melisma technique is a flourish or a horizontal melodic run, it can be found in Gregorian chant and contemporary pop music, heavy metal guitar solos and jazz improvisation (e.g, C. Parker and J. Coltrane) as well as in world music, Arabic or Chinese musics (see Voicecouncil, 2012 and Classics Explained, 2018).

There are two characteristics of melody. The first is the internal constraint exerted by every note on every other, i.e., notes are interdependent within the melodic whole. As Scruton (2011) argues, "a melody is a sequence in which no note can be altered without changing the character of the whole" (p. 29). The second characteristic is the boundary the melody has—usually beginning and end or half-endings (as it often happens in Baroque music). Beginnings can be on time, or anticipatory (up-beat), but the melodic structures are usually case-sensitive in the melodic character as a whole. Endings are often referred to as closures based on an analogy to syntactic close in language. This analogy, however, determines that in the Western classical tradition the "sense of ending" in the melodic line may be reinforced at the rhythmical and harmonic levels too (Scruton, 2011).

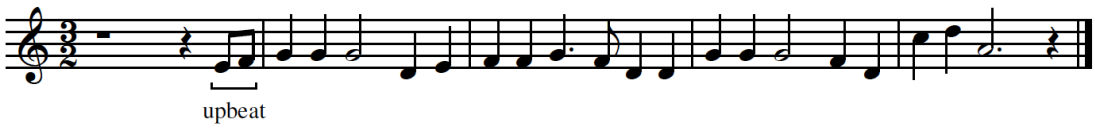

Figure 3.4 English folk song, "Daughter in the Dungeon"

Figure 1. Example of an up-beat beginning (Scruton, 2011, p. 29).

Scruton (2011) argues these two characteristics of melody (interdependent notes within the melodic whole, and the traditional boundary of beginning, middle and end) are not fixed elements of the sound sequence, i.e., they are experiences registered at a phenomenological level but sometimes may differ from what is written and performed (see also Schuller, 1968). For example, a melody can pass over the diatonic scale without generating a sense of closure (listen to e.g., Debussy's *Prélude à l'aprés-midi d'un Faune*[24]), or a melody may feel like an upbeat beginning, but it

[24] TRACK 7: Debussy: Prélude à l'aprés-midi d'un Faune | François-Xavier Roth & London Symphony Orchestra.

is part of the main melody (see e.g., Londonderry Air music sheet in *Figure 3.5. In* Scruton, 2011, p. 29). Under Wagner's first act of Wagner's Die Meistersinger von Nürnberg[25], melodic boundary structures weakened over the course of the nineteenth century, and a new melisma emerged. This new melisma is characterised for emerging episodes from a continuous musical line. For example, in Elgar's violin sonata[26], the melodies usually break off or are overlaid by new beginnings (listen also to e.g, *Don Juan* by Strauss[27]). Similar examples can also be found in the context of early caregiver-infant interactions where the communications present upbeats, over layering, and boundaries (or narratives as named in communicative musicality—see Chapter 3 of this thesis).

Alexander L. Ringer's entry on "Melody" in *Grove Music Online* (2001) provides an in-depth exploration of the concept of melody, tracing its historical development and examining its theoretical foundations. Ringer claims that melody, understood as a sequence of musical tones perceived as a single entity, has role as one of the most recognisable and expressive elements of music. The entry explores the etymology of the term "melody," noting its origins in the Greek word "melōidía," which refers to a singing or chanting of a tune. This historical perspective is crucial for understanding how the concept of melody has evolved over time. Ringer (2001) discusses how different musical traditions have approached melody, highlighting the diversity of melodic practices across cultures. He points out that while Western music often emphasises the horizontal dimension of melody, other traditions may integrate melody with rhythm and harmony in more holistic ways.

Ringer (2001) defines melody as pitched sounds arranged in musical time according to cultural conventions and constraints, is a universal human phenomenon traceable to prehistoric times. In some cultures, rhythmic considerations have historically taken precedence over melodic

[25] TRACK 8: Wagner - Die Meistersinger von Nürnberg, Act 1/3

[26] TRACK 9: Elgar Violin Sonata (Nicola Benedetti and Alexei Grynyuk)

[27] TRACK 10: Strauss: Don Juan / Petrenko · Berliner Philharmoniker.

expression. This is evident in parts of Africa, where percussive sounds of undetermined pitch are used for communication and as pacemakers for physical activities, both in daily work and ritual dance. The early history of melody, while scientifically significant, does not alter its phenomenology as recorded in historical annals. Melody likely developed from simple voice inflections to conjunct trichordal patterns and combinations of minor thirds and major seconds, leading to widespread pentatonic melodies (a five-note scale). Pentatonicism offers extensive opportunities for motivic elaboration, particularly with the interval of the fourth, fundamental to many instruments' tuning. Primary concerns with melody have often been linked to verbal and pre-verbal modes of social interaction (see also Chapters 2 and 3 of this thesis).

Ringer (2001) also brings attention to the relationship between melody and language. This relationship is complex and not fully understood, but the cultural foundations of 'logogenic melody'1 are well established. Universal manifestations of the melodic impulse often centre on the descending minor third, as seen in children's singsongs and the calls of Alpine shepherds. The infant's first cry, a fundamental instance of pitch modification, demonstrates how pitch-differentiated pre-verbal utterances are used by infants to communicate needs and emotions (see Chapters 2 and 3 this thesis). Observations of natural phenomena, such as birdsong, suggest an evolutionary continuum from pathogenic to logogenic forms of pitched vocal behaviour.

Ringer (2001) also examines the structural components of melody, such as intervals, scales, and modes. These elements provide the framework within which melodies are constructed, and their specific configurations can vary between different musical cultures. For instance, the use of microtones in Middle Eastern music or the pentatonic scales in East Asian music illustrate the rich variety of melodic structures globally. Ringer's entry underscores the importance of these structural elements in shaping the character and expressiveness of melodies (see pp.3-4).

The character of a melody is determined by its range, ambitus (pitch spread), contour (linear design), and syntactic structure concerning contrast, repetition, variation, and development. The smallest melodic-rhythmic unit, the motif, requires at least two distinct pitch levels. Motivic materials are arranged in phrases, with characteristics defined by the specific melodic idiom. Larger, songlike melodies typically avoid extensive motivic differentiation, while instrumental themes from the mid-Eighteenth century onwards favour sharply profiled, contrasting motifs arranged for structural development. Schoenberg compared a melody to an "aphorism," advancing rapidly from problem to solution, whereas a theme resembles a scientific hypothesis requiring proof (Ringer, 2001). The investigation of melodic phenomena has been influenced by historical perspectives and changing stylistic contexts. Despite warnings against the misconception that scales precede music, the myth of scalar priority persists. Scales are derived from existing melodic practices, and musical notation has narrowed Western understanding of melody, which is inherently aural.

Melodic styles are identifiable by their vocabulary, grammar, syntax, and idioms related to function and social class. Melody can reflect physical behaviour, rational thought, or subconscious complexities. It is integral to the culture from which it originates, sharing national characteristics and responding to social and functional needs. Melodic expression has been a feature of Western music since the Renaissance, with political movements also influencing melody.

Melodic texture involves every aspect of musical order, not just pitch arrangements. Periodic structure was influenced by textual requirements, dance rhythms, and functional harmony. Rhythmic devices gained importance in defining motifs as harmonic concepts overshadowed melodic tension. Scholars like Lach and Kurth have studied melody from different perspectives, focusing on structural and energetic aspects.

A significant portion of the entry is dedicated to the cognitive and perceptual aspects of melody. Melodic unity is an intrinsic psycho-acoustical function within a specific historical and cultural context. Ringer (2001) explores how listeners perceive and remember melodic patterns, drawing on research from cognitive psychology and neuroscience. He discusses the role of memory in melodic recognition and the ways in which the brain processes and organises musical information. This cognitive perspective is essential for understanding why certain melodies are more memorable or emotionally impactful than others (see Chapter 2 for a more detailed analysis).

Ringer also addresses the role of improvisation in melody, particularly in genres such as jazz and Indian classical music, where spontaneous creation and variation of melodic lines are central to the performance. This aspect of melody highlights its dynamic and creative nature, as well as the skills required for effective improvisation (see Chapter 4 for improvisational character of human communication).

Historically, approaches to the study of melody have been influenced by prominent authors such as Rudolph Réti (1951), Victor Zuckerkandl (1956), Leonard B. Meyer (1956), and Eugine Narmour (1989; 1992). Rudolph Réti's *The Thematic Process in Music* (1951) is a pivotal work that delves into the complex mechanisms of thematic development in Western classical music. Réti's analysis is grounded in the belief that thematic processes are fundamental to understanding musical composition and its expressive power. Réti begins by defining the thematic concept as a core element in the comprehension of musical art. He argues that themes are not static entities but dynamic processes that undergo various transformations throughout a piece. This perspective shifts the focus from isolated themes to the continuous development and metamorphosis of thematic material.

Réti (1951) explores the idea of thematic homogeneity and metamorphosis. He examines how composers like Beethoven and Schumann employ thematic transformation to create unity and diversity within their works. For instance, Réti analyses the thematic plan of Beethoven's Ninth

Symphony, demonstrating how a single thematic idea can generate a vast array of musical material through processes such as imitation, variation, and transformation. This section underscores the historical origins of thematic development, tracing its evolution from simple imitation to complex transformations.

The book also addresses the relationship between thematic processes and musical form. Réti identifies two primary form-building forces in music: thematic evolution and thematic resolution. He argues that these forces interact to shape the overall structure of a composition. By examining specific types of structural consistency and thematic key relations, Réti provides insights into how thematic processes contribute to the coherence and integrity of musical forms.

Réti's approaches the concept of melody through the lens of thematic development. Réti defines melody not just as a sequence of notes, but as an evolving thematic process that undergoes transformation and development throughout a piece. He emphasises that melody is integral to the thematic unity of a composition, where motifs and themes are continuously varied and developed to create a cohesive musical narrative. Réti's understanding of melody involves the idea of thematic metamorphosis, where initial musical ideas are transformed and reinterpreted in various ways. This process of thematic development is crucial for the structural coherence and expressive depth of a piece. He argues that the thematic process is a fundamental element in understanding the art of music, as it links the compositional technique with the listener's perception and emotional response.

The author also considers the psychological aspects of thematic perception, questioning whether the thematic process is a conscious or subconscious activity for composers. He suggests that while some aspects of thematic development may be deliberate, others might emerge spontaneously

from the composer's intuitive grasp of musical material. This discussion highlights the interplay between conscious intention and subconscious creativity in the compositional process.

In the final part of the book, Réti evaluates the broader implications of the thematic process. He reflects on the historical roots and growth of the thematic principle, as well as its eventual decline in certain modernist compositions. Réti's analysis extends beyond the technical aspects of thematic development to consider its aesthetic and philosophical dimensions. He argues that the thematic process is not merely a compositional technique but a fundamental principle that shapes the expressive and structural aspects of music.

Overall, *The Thematic Process in Music* offers a comprehensive and insightful exploration of thematic development. Réti's work is notable for its detailed analytical approach and its ability to connect technical analysis with broader aesthetic and philosophical questions. His emphasis on the dynamic nature of themes and their transformative potential provides a rich framework for understanding the complexity and depth of Western classical music. This book remains a significant resource for music theorists, analysts, and anyone interested in the intricate processes that underpin musical composition.

Another key work on melody is Victor Zuckerkandl's *Sound and Symbol: Music and the External World* (1956), which is an exploration of the philosophical and psychological dimensions of music. Zuckerkandl approaches music not merely as an art form but as a fundamental aspect of human experience that bridges the internal world of emotions and the external world of sound. Similar to this thesis' approach, which explores how the connection between internal and external realities is mediated and indeed facilitated by musical elements, Zuckerkandl (1956) also addresses the relationship between music and the external world. He contends that music has the power to reveal aspects of reality that are not accessible through other forms of perception. By engaging with music, listeners can gain insights into the nature of existence and their own inner lives. This idea

is linked to the notion of music as a form of symbolic representation, where the patterns and structures of music reflect deeper truths about the world and human experience (see Chapter 5).

Zuckerkandl (1956) examines the nature of musical sound, arguing that music is a unique form of auditory perception that transcends mere physical vibrations. He posits that musical tones are not just sounds but symbols that carry meaning and emotional content. This symbolic nature of music allows it to communicate complex emotional states and ideas without the need for words. Zuckerkandl's perspective is deeply influenced by phenomenology, particularly the work of Edmund Husserl, which emphasises the importance of subjective experience and intentionality in understanding human consciousness (see Chapter 5 of this thesis).

A central theme in Zuckerkandl's work is the concept of musical time. He argues that musical time is distinct from ordinary, chronological time because it is experienced subjectively. In music, time is not a linear progression but a dynamic flow that can expand, contract, and create a sense of presence. This idea is illustrated through detailed analyses of musical examples, where Zuckerkandl shows how composers manipulate temporal structures to evoke different emotional responses. He suggests that this manipulation of time is one of the key ways in which music can create a sense of movement and life (see also Chapter 4-6 this thesis).

Throughout the book, Zuckerkandl (1956) emphasises the importance of the listener's active engagement with music. He argues that the meaning of music is not inherent in the sounds themselves but arises from the interaction between the music and the listener's perceptual and cognitive processes. This interaction is what allows music to be a powerful medium for emotional expression and communication.

Zuckerkandl's (1956) approach to melody in *Sound and Symbol: Music and the External World* is deeply rooted in his phenomenological perspective on music. He views melody not merely as a sequence of pitches but as a dynamic, living process that unfolds over time. Zuckerkandl emphasises the

experiential and symbolic nature of melody, arguing that it is a fundamental way in which music communicates meaning and emotion. Zuckerkandl posits that melody is a temporal phenomenon, experienced through the flow of time rather than as a static entity. He suggests that the essence of melody lies in its movement and the way it creates a sense of direction and progression. This movement is not just a physical sequence of notes but a psychological journey that engages the listener's perception and emotions. Zuckerkandl's analysis highlights the importance of the listener's active engagement with the melodic line, as it is through this engagement that the melody's expressive power is realised.

Furthermore, Zuckerkandl explores the symbolic dimension of melody, proposing that melodies function as symbols that convey deeper meanings and emotions. He argues that the patterns and structures of melodies reflect the inner workings of the human mind and emotions, making melody a bridge between the internal world of the listener and the external world of sound. This symbolic nature of melody allows it to communicate complex emotional states and ideas without the need for verbal language.

Zuckerkandl's approach to melody is characterised by its emphasis on the temporal, experiential, and symbolic aspects of melodic perception. He views melody as a dynamic process that unfolds in time, engaging the listener's perception and emotions, and functioning as a powerful symbol of human experience. This perspective offers a rich and nuanced understanding of melody, highlighting its central role in the communicative and expressive power of music.

Another relevant approach to melody stems from Leonard B. Meyer's *Emotion and Meaning in Music* (1956). In his seminal work, Meyer explores the intricate relationship between music, emotion, and meaning. Meyer approaches this subject through the lens of psychological and philosophical analysis, aiming to understand how music evokes emotional responses and conveys meaning to listeners.

Meyer (1956) addresses the fundamental question of how music, an abstract art form without explicit semantic content, can elicit strong emotional reactions. He proposes that the emotional impact of music is largely due to the listener's expectations and the ways in which these expectations are influenced by the music. This idea is rooted in the concept of "expectation theory", which suggests that music creates and fulfils or frustrates expectations, leading to emotional responses. Meyer argues that these expectations are shaped by cultural conventions and individual experiences, making the emotional experience of music both universal and highly personal. This is a paradox that is explored in the following chapters (4-6) and presents a fundamental aspect for this thesis hypothesis which regards the relevance of music at both universal and personal levels in human development and experience.

A significant portion of Meyer's book is dedicated to the principles of pattern perception and the psychological processes involved in listening to music. Meyer (1956) discusses how listeners perceive and organise musical patterns, drawing on Gestalt psychology to explain how the mind groups musical elements into coherent wholes. He introduces the concepts of "good continuation", "completion", and "closure", which describe how listeners anticipate and resolve musical phrases. These principles help to explain why certain musical structures are more satisfying or emotionally compelling than others.

Meyer (1956) also defines the role of deviation in musical performance and composition. He argues that deviations from expected patterns, such as unexpected changes in harmony, rhythm, or melody, are crucial for creating emotional tension and interest in music. These deviations can be subtle or dramatic, but they all serve to engage the listener's attention and evoke emotional responses. Meyer provides numerous musical examples to illustrate how composers use deviation to create meaning and emotional impact.

Meyer (1956) explores how listeners derive emotional and aesthetic experiences from music, particularly focusing on melody. Meyer posits that the emotional impact of music is largely due to

the listener's expectations and the subsequent fulfilment or violation of these expectations. He argues that melody, as a sequence of pitches, creates patterns that listeners learn to anticipate based on their cultural and musical experiences. Meyer (1956) explains that when a melody conforms to these learned patterns, it satisfies the listener's expectations, leading to a sense of resolution. Conversely, when a melody deviates from these patterns, it creates tension and surprise, which can also evoke strong emotional responses. This interplay between expectation and deviation is central to Meyer's understanding of how melody conveys emotion and meaning.

In addition to his psychological analysis, Meyer (1956) addresses the philosophical implications of his theories. He considers the nature of musical meaning, arguing that it is not inherent in the musical sounds themselves but arises from the interaction between the music and the listener's cognitive and emotional processes. This perspective challenges traditional views of musical meaning as something fixed and objective, instead highlighting its dynamic and subjective nature.

Drawing on Meyer's (1956) foundational ideas, Eugene Narmour's, *The Analysis and Cognition of Basic Melodic Structures* (1989) and *The Analysis and Cognition of Melodic Complexity* (1992), present a theory of melodic perception and analysis through the Implication-Realisation (I-R) model—a detailed framework that explains how listeners perceive and process melodic structures. In *The Analysis and Cognition of Basic Melodic Structures*, Narmour (1989) introduces the I-R model, positing that melodies generate expectations (implications) which are either fulfilled or thwarted (realisations). This dynamic interplay forms the basis of melodic perception, governed by cognitive principles rooted in the human brain's innate capacity to process sequential patterns. Narmour's model includes rules describing how melodic intervals create expectations, such as small intervals implying continuation and larger intervals suggesting a change in direction. These rules are derived from empirical observations and are organised into "parametric scales" that classify melodic elements by their perceived stability and tension.

A significant contribution of this work is its emphasis on the psychological underpinnings of melodic perception, integrating insights from cognitive psychology to explain how the brain processes melodic information. This interdisciplinary approach grounds Narmour's (1989) theoretical claims in empirical research, providing a robust framework for understanding melodic cognition. He argues that the cognitive mechanisms underlying melodic perception are similar to those involved in other forms of pattern recognition, such as language processing. Additionally, Narmour demonstrates how the I-R model can be applied to analyse various musical styles, offering valuable tools for music theorists and analysts.

In *The Analysis and Cognition of Melodic Complexity*, Narmour (1992) extends the I-R model to more complex melodic structures. He introduces an elaborate symbology representing cognitive operations involved in melodic perception, identifying sixteen archetypes that combine to form approximately 200 complex structures. This symbology allows for detailed analysis of how listeners assimilate and encode complex melodies. Narmour provides over 250 musical examples from various historical periods and non-Western cultures to demonstrate the pan-stylistic scope of his model.

This sequel continues to emphasise the psychological underpinnings of melodic perception, integrating cognitive psychology insights to explain how the brain processes melodic information. Narmour's interdisciplinary approach remains a robust framework for understanding melodic cognition, arguing that the cognitive mechanisms involved are similar to those in other forms of pattern recognition. He also addresses the implications of his theory for musical analysis, demonstrating the I-R model's application across a wide range of musical styles.

Despite its strengths, Narmour's theory, including his earlier works, have faced criticism for its focus on cognitive universals, which some scholars argue may overlook cultural and contextual factors shaping melodic perception (see e.g. Martin, 1977; Royal 1995; Cuddy & Lunney 1995). While Narmour acknowledges cultural conventions, his primary emphasis on cognitive principles

may not fully capture the diversity of melodic practices across different traditions. The complexity of the I-R model's rules and parameters can also be challenging to apply, particularly for those without a background in cognitive psychology. Nonetheless, Narmour's work remains foundational for scholars and researchers interested in the analysis and cognition of melodic structures, offering valuable insights into the cognitive mechanisms underlying melodic understanding.

Melody, as a core structural element of music, can be operationally defined as a sequence of sounds or notes in a time-lapse, often subject to rhythm for organising pitches and form. Melody varies in expressions, such as melismatic or syllabic forms, and engages listeners by creating expectations, anticipation, and feelings of resolution. This narrative sense in melody, more accentuated than in other musical elements, provides organisation and conveys what musician Marcus Paus (2017) describes as the manifestation of the musically subjective. Beyond its structural description, melody imparts character and identity to music, akin to the structured narratives and melodious lines observed in caregiver-infant communications (see Chapter 3 on communicative musicality).

1.2.3. Harmony

The third core structural component of music is harmony. While rhythm and melody are accountable for making a piece of music memorable (e.g., the opening of Beethoven's 5th Symphony[28] or the opening phrase of La Bamba[29]), harmony is what transforms a common, predictable tune into a challenging, rich, and sophisticated one. Harmony, however, is much more than adding levels of complexity to an original plain melody. Firstly, because harmony is present in rhythm and melody even though these elements were introduced as independent subsections.

[28] TRACK 11: Beethoven: Symphony No. 5, First movement (Benjamin Zander, Boston Philharmonic Orchestra.

[29] TRACK 12: Ritchie Valens - La Bamba.

Theoretically, harmony can be defined as "a composite product when individual music voices group together to form a cohesive whole" (MasterClass, 2021). In an orchestra, for example, the bassoon plays one note, while the horn plays a different note, and the viola plays yet a different note which altogether sound like a cohesive whole. Those notes follow a harmonic convention leading to an understanding that harmony occurs when these individual parts are heard and put together following a logical reference.

Even though Hellenic conceptions of harmony are not theoretically or practically relevant anymore, the Heraclitean approach to harmony is valuable in this thesis for its rich philosophical ideas surrounding tensions and paradoxes. These themes are relevant in this thesis, not only for the intimate relationship between music and human development, but also for the particular aspects brought about by the tensions that Heraclitus described in his conception of harmony.

For Heraclitus, harmony is a dynamic situation where interrelation is intimate and not dualistic. In Heraclitan harmonic perspective, unity is to be found in opposing extremes, i.e., unity is found in the difference (Fragments 50 and 51 in Heraclitus & Kirk, 1954). Heraclitus conception of Harmony is probably Stoic (e.g., god as establisher of measure in the world) (for a detailed account and original Cosmic Fragments compilation see Heraclitus & Kirk, 1954). Heraclitus' spiritual position determines his ultimate claim about harmony and unity, which relies on the Logos and Zeus (for a detailed account see Wheelwright, 1959). Heraclitus' notion of harmony opposites is ultimately one and the same thing; however, unity is to be found in the opposing extremes that are interdependent, and difference is to be found underneath the surface level. "the All is divisible and indivisible . . . 'listening not to me but the Logos it is wise to agree that all things are one' (Fragment 50). Furthermore, Heraclitus uses the image of the stretched bow and lyre (Fragment 51) and the goes on to explain (fragment 54) that there is a hidden 'under the surface' nature of the universal connexion, which is characterised by nuances and differences: 'An unapparent connexion is stronger than an apparent' (Heraclitus & Kirk, 1954, p. 222) and 'the real constitution

of things is accustomed to hide itself" (Fragment 123, p. 227). The dynamic nature of apparent stability or tension between the opposites. An example of unity and plurality coexisting is as Heraclitus puts it: "If all existing things were to become smoke, the nostrils would distinguish them." (Heraclitus & Kirk, 1954, p. 23).

Harmony shows an inevitable relationship to opposites which seems to be a relevant element in the Hellenic conceptions of harmony as well as in rational thinking. For Lippman (1963), Heraclitan harmony stands for unity. In this thesis, inspired by this Heraclitan thought process, harmony refers to the natural coexistence of different parts, opposites or not, resolved or unresolved, but correspondent. The Heraclitan paradox is illuminating insofar as it establishes the tension between permanence and transience and the need for both to create an understanding of the world and make sense of experience. This is a relevant contribution to this thesis, conceptualised in the following chapters, because the musical aspects of early human communications, more than measurements and perfect ratios, reveal a capacity for mutuality and a joint effort to adjust to the other's needs, expressing through responsive sounds that all participants are connected and receiving messages from one another, i.e., fitting together. In that sense, what is perfect about harmony is not a static compliance of proportions, but what brings understanding and correspondence between the parts involved. A similar example was given in the section on rhythm, where 'free rhythm' is a common practice and does not necessarily mean chaotic non-coordinated arhythmical stuff. On the contrary, it is an expression of rhythm which requires active listening and connecting deeply with themselves and others while feeling and responding to the present-time changes organically. The free expression of rhythm, melody, and harmony, even though it tends to be tainted by cultural and cognitive constraints, presents a genuine encounter which has been explored further in popular music, more concretely in jazz. The reason why jazz is brought into the conceptualisation of harmony is because there is a paradoxical nature to it that can be associated with the Heraclitan idea of unity and plurality within the harmonic structure.

Harmony as a structural component of music is contentious insofar as it is intrinsically embedded within Western culture and music theory. It is important to highlight that harmony is not a perennially present aspect of music in cultures other than Western culture. However, music theorists (see e.g. Cohn et al, 2001) highlight that harmony's complexities derive from tensions revolving around consonance and dissonance.

Cohns et al.'s entry on harmony in *Grove Music Online* provides an extensive and detailed examination of the concept, tracing its historical development, theoretical foundations, and practical applications in Western music. Harmony, defined as the simultaneous combination of different musical notes, is a fundamental aspect of Western music theory and practice. The theoretical foundations of harmony are discussed in depth, with a focus on the principles of consonance and dissonance. Consonance refers to combinations of notes that are perceived as stable and pleasing, while dissonance involves combinations that create tension and a desire for resolution. The entry explains how these principles have been understood and applied in different historical periods, from the modal harmony of the Renaissance to the tonal harmony of the Baroque and Classical eras. The development of functional harmony, which assigns specific roles to different chords within a key, is a central theme. This system, codified by theorists like Rameau (1722; 1726; 1737) and later expanded by figures such as Schenker (1954), forms the basis of much Western music theory.

The entry also addresses the practical applications of harmony in composition and performance. It discusses the role of harmonic progressions in creating musical form and structure, illustrating how composers use sequences of chords to shape the overall narrative of a piece. The use of harmonic modulation, or the change from one key to another, is highlighted as a crucial technique for creating contrast and maintaining interest in longer compositions (Beethoven, and Wagner, see pp 13-14).

The theoretical and practical studies of harmony differ mainly due to their historical origins. The theoretical study began with mathematical speculations on tonal systems, while the practical study evolved from figured bass into a theory of free composition. Theoretical harmony claims to be scientific, rooted in the idea that numbers and proportions are fundamental principles. Zarlino (1558/1968; 1573/1983) and Rameau (1722; 1726; 1737) both prioritised the major triad, but through different methods and scientific bases.

Hauptmann (1853/1888) introduced a dialectical and idealistic foundation, viewing musical phenomena through Hegelian dialectics. Riemann attempted to link physical and dialectical explanations, eventually favouring historical explanations of harmony. The 20th century saw a shift towards psychological approaches to musical cognition.

Efforts to explain the minor triad through physical properties were less successful. Helmholtz and others struggled to find a satisfactory physical explanation, leading to various hypotheses about the intelligibility of intervals. Kurth (1913) proposed psychological explanations, viewing triads as states of tension. Riemann's theory of harmonic functions aimed to address the challenges of explaining minor chords and secondary degrees. He suggested that secondary degrees can represent primary degrees, using the concept of 'apparent consonances'. The theories of function and fundamental progressions are seen as complementary, addressing different aspects of harmonic relationships and historical development.

Writings on harmony are considered practical if they serve purposes beyond mere theoretical explanation, such as supporting political or nationalist agendas. Typically, "harmonic practice" refers to writings aimed at educating performers and composers, a tradition that has persisted since the advent of harmonic tonality and is reinforced by institutions like conservatories and universities (see Cohn et.al 2001). Practical musicianship often implicitly includes a theory of harmony. The distinction between theory and practice is blurred, as even speculative works can offer practical compositional instruction. Practical harmony primarily prepares students for

improvisation, composition, and analysis. In the 17th century, it focused on training continuo players, while in the 18th century, it also became part of composition training.

The origins of practical harmony training trace back to 16th-century counterpoint treatises. By the 18th century, thorough bass realisation was integral to composition training. Rameau's theory of fundamental bass became a foundation for harmonic training, and by the late 18th century, concepts like non-harmonic tones and scale-degree representation emerged.

Harmonic analysis, involving fundamental basses under compositions, became central in the 19th century. Roman-numeral analysis, introduced by Weber (1851), became widespread, though it was later challenged by Riemann's theories of dual principles and tonal functions. Despite Riemann's influence, Roman-numeral analysis remained prevalent.

In the 20th century, Schenker's (1926/1996; 1935/1979) empirical approach to harmony influenced practical harmony, particularly in the United States. His methods, along with those of Mitchell (1939/1965) and Piston (1933;1987), emphasised analytical over normative approaches. The late 20th century saw the reintroduction of contemporary music into harmony manuals, reflecting a broader recognition of diatonic tonality as a living tradition.

Harmony, both in music and in the wider sense, is characterised for a simultaneity that creates states of agreement and coherence between the parts involved in causing pleasing sensory states. Harmony is a complex situation involving structured elements and dynamics of resolved and unresolved tensions. The simultaneous nature of harmony becomes irrelevant when harmony is thought of as a reciprocal correspondence between different tones or melody lines. This reciprocity between the tones, the paradoxical nature of solved and unresolved, and the dynamic of correspondence are relevant aspects in this thesis because they are also fundamental elements present in pre-verbal infant-caregiver communications. It seems that in early psychological development the structure of harmony is retained as it has been conceptualised since Hellenic times. Harmony therefore could initiate from an intuitive sonic notion (a natural response to how

sounds are organised and if the sound produced is pleasing or not) which is informed by how the body processes sound patterns, and how humans respond psychologically to the sound patterns that are simultaneous (harmonic) or not (melodic). The sound pattern organisation and its pleasing after feeling is culturally informed too, it is thought through and operationalised in conventions that generate the rules from which music can be organised and embellished with those culturally agreed properties. In other words, there is an aesthetic quality of harmony belonging to its own internal coherence, a correspondence that makes sense for the parts involved and gives the personality to a piece of music or communicative style.

1.3 Discussion: Music as a talisman concept—the making of diverse musical epistemologies

The previous sections discussed relevant definitions of music drawing on the conceptual debates in philosophy and musicology. The first section provided a literature review organised from the most orthodox definitions on the universal character of music to more open-ended accounts of the concept of music. The second section provided a structural definition of music's components and how a structural model is helpful to characterise such a complex phenomenon. This final section argues that neither the total abstraction of music from the subjective experience and its contextual framework nor the complete subjectivation of its essence are useful for understanding music's complexity. Instead, the coexistence of multiple definitions provides an opportunity to think about music beyond its conceptual abstraction and beyond offering a single definition. With a complex definitory matrix, music can have a place in other contexts beyond the cultural practices, such as early caregiver-infant communications, which are the focus of this thesis.

Prominent debates to define music relate to its universality, i.e., finding a generalisable concept whose abstraction provides a 'one fits all' definition. Defining music in such a way is more suggestive to the authors' need to explain music through detaching the object studied from its essence than a critical and contextual observation of the phenomenon studied. Persistence on universalisation indicates limitations in accepting a horizontal coexistence of plural epistemes (methodical forms to produce knowledge) concerning music's nature and definitions. For example, accepting the contradiction that music is a contextual matter but also a situation more or less stable across cultures—possibly due to the psychobiological substrates related to these practices, i.e., musicality (see Chapter 2)—is accepting that providing one definition is not as relevant and politically loaded as universalisations tend to exclude and set limits to facilitate conceptual clarity. Traditionally, music is conceptualised as being made of certain elements or components such as rhythm, melody, and harmony. These elements are essential to form a structural definition, relevant for placing music within a rational matrix for discussion, criticism, and education (see e.g., King et al., 2016), and can be seen as lighthouses that guide cultural and often creative processes. However, as clearly outlined throughout this chapter, music and its experiential dimension extend beyond structural definitions. It is important to recognize that various definitions of music—while serving purposes such as knowledge production, as seen in operational definitions used in scientific contexts—may also be political and rhetorical, aiming to privilege or reinforce specific perspectives. In this thesis, the emphasis is placed on lived musical experience rather than on establishing a definitive definition of music. Understanding the relevance of musical experience means looking at it beyond its foundational structure, i.e., understanding it structurally, dynamically, and phenomenologically. Opening other ways to hear music also goes beyond textbooks, and therefore needs consideration not as a static concept but as a generative living phenomenon, i.e., shifting from 'mono' to 'stereo' allows for paradoxes to take place in dynamic tensions between individual and collective experiences.

To finish this chapter, there are two new concepts that are useful to further understand the complex matrix that this thesis proposes and complement the idea that music's definition needs to be thought of beyond its structural boundaries while remaining a common human experience. The first concept, *ch'ixi* (Rivera-Cusicanqui, 2010/2020), is used in this thesis to suggest a polysemic nature of music which supports the thesis' hypothesis that psychic development is greatly affected by musical encounters in early life. If music is conceived solely as an abstraction of a cultural expression, as most of the definitions provided suggest, it would not be possible to introduce a musical form of communication in early infancy because it would not be understood as "music" and therefore ought to be excluded from a close-ended definition. *Ch'ixi,* an Aymara concept, supports the idea that music's definitions can coexist in tensions without the need of a resolution and supports the possibility of considering music in other scenarios such as early caregiver-infant interactions. The second concept, *musicking* (Small, 1998), supports the idea that music cannot be defined as an abstraction of the techne because 'to music' is an action that involves a whole performative experience.

Music thought as *ch'ixi* means to think of music as a talisman concept. A talisman concept, according to sociologist Silvia Rivera Cusicanqui (2010/2020), refers to a concept that allows us to speak beyond the emblematic identities of the concept itself. A talisman concept has a spectrum of collective availability that make words polysemic. *Ch'ixi* is an Aymara term that is a version of the 'motley' (mestizo). *Ch'ixi* is a possibility for reconstructing the motley lexicon of *mestizaje*—a racial mix, a colour

> The word *ch'ixi* has many connotations: it is a colour that is the product of juxtaposition, in small points or spots, of opposed or contrasting colours: black and white, red and green, and so on. It is heather grey that comes from the imperceptible mixing of black and white, which are confused by perception, without ever being completely mixed. The notion of *ch'ixi*, like many others (*allqa, ayni*), reflects the Aymara idea of something that is and is not

> at the same time. It is the logic of the included third. A *ch'ixi* colour grey is white but is not white at the same time; it is both white and its opposite, black. (Rivera Cusicanqui, 2010/2020, p. 65, original *italics*)

Ch'ixi is a word of undifferentiation, and the potential of undifferentiation is that it joins opposites. Music, thought of as *ch'ixi*, i.e., as a talisman concept, gives the possibility of undifferentiation made of distinct elements and defining music as a tension of being both concept and experience, sometimes universal and sometimes not. It is therefore unhelpful if music is not considered as a multiple and sometimes contradictory situation—the definition cannot be static because it will destroy the very nature of its essence. In music, there are aspects which cannot be explained or framed in formal language or thought of as rational conventional logic of *either/or*. The Aymara paradox allows tensions and possibilities of signification that can also be related to the Heraclitan paradox on harmony and the tension of unity containing plurality (see subsection on Harmony in this chapter).

Thinking of music as *ch'ixi* does not refer to making a *hybrid* definition of different authors. The concept of *hybridity* used by decolonial theorists, following the work of Néstor García Canclini, expresses the idea of the fusion, the unknown and harmonic blend of colours or social groups. For Rivera Cusicanqui (2010/2020), *ch'ixi* is not a fusion or a synthesis in a Hegelian sense. *Ch'ixi* is an antagonism, an unresolved contradiction, and therefore difference sustains a contentious character. In that sense, there are heteronomies in the epistemological essence, and it is therefore an epistemology of resistance and emancipation:

> The 'heteronymic pairs' of which Silvia speaks point us to ways of looking and talking that reveal the double face, ambivalence, contradiction, and reversal that always organises things not into clear binaries, but rather into spaces with sliding boundaries and flickering edges, spaces where things exist and then cease to be, where they mutate, invert, or are

> contaminated by new relationships, uses, and meanings. This heteronomy evolves into a heterodoxy of thought and practice. And it reveals an analytical mode trained by ambiguity, by the cycles and transformations of things. This training allows Silvia to understand the 'oblique and convoluted' paths and effects of Indian [indigenous] resistance (Gago, 2020 in Rivera Cusicanqui, 2010/2020, p. xxii).

Similar conceptualisations to the decolonial thinking of Rivera Cusicanqui can be found in feminist, lesbian, and critical musicology from the 1990s (e.g., Susan McClary, 1991; also see Scott, 2003)[30]. Critical musicologist Derek Scott (2003) argues that the rise of critical musicology prompted a re-evaluation of musicology as a sterile field of inquiry, leading to the emergence of the "new musicology" (a term coined by critical musicologists in the United States in the 1990s). This new paradigm shifted the understanding of musicology not as an autonomous field but as a transposition of various signifying systems (Kristeva, 1982, cited in Scott, 2003, p. 4). According to Scott (2003), critical musicologists consider musicology as an intertextual field that, like ch'ixi, offers a more productive and interesting epistemological framework for researching. This perspective involves examining music within a broad range of discourses, contexts, and their modes of functioning. For instance, questions about music and sexuality (relevant to feminist and lesbian musicology in the 1990s) cannot be isolated from political, biological, psychological, psychoanalytical, and aesthetic discourses. British critical musicology, as exemplified by scholars like Ashton (2003), Christensen (2002), Lippman (1963), and Scott (2003), highlighted one of the significant issues in musicology: the collapse of the binary divide between pop and classical music. This division, rooted in the longer historical separation between high and low arts inherited from Hellenic traditions, underscored socioeconomic relationships with music. In response to this crisis, there arose a need for a model that could address issues of class, gender, generation, and ethnicity

[30] Complementary reading about ethnomusicology and differnt conceptions of music along the lines of Silvia Rivera's thinking can be found in: **Agawu, 1995; Feld, 1982; Marett, 2005; Seeger, 1987**

in music while interrogating notions of genius, canons, universality, aesthetic autonomy, and textual immanence (Scott, 2003, p. 5). Scott asserts that above all, musicology must respond to "the multiplicity of music's contemporary functions and meanings (e.g., the drama/art/music/film/video/digital software mixtures variously described as time-based arts and multimedia arts)" (Scott, 2003, p. 5). These challenges can be effectively addressed through the intertextual methodology.

Critical musicology reflects on and boldly criticises instrumental approaches for being unaware of the social configurations that influence these definitions. Politically and socially aware approaches are essential for fostering more accurate discussions about music, music theory, and analysis. However, critical musicology remains confined to ethnocentric notions of Western musicology and conceptualisations of Western music. This thesis addresses such ethnocentricity by recognising it and utilising useful aspects to critically engage with existing discussions. Additionally, it introduces other approaches that operate under different mindsets, such as Rivera Cusicanqui's sociological proposal. An approach that understands music as *ch'ixi*, i.e., music as a talisman concept, which can be studied *intertextually*[31] (the transposition of various signifying systems; see Scott, 2003) within a critical attitude, necessarily implies including the centrality of the body, of emotions and feelings. It also implies the revision of the conceptual taxonomies of music as well as their historical and philosophical contexts where the discussions emerge from and determine ways of signification and representation. Thus, opening the possibilities of understanding music as a phenomenon that is related to wider psycho-social spheres. While music can appear to be

[31] Intertextual methodology refers to an approach in research and analysis that recognises and explores the interconnectedness and mutual influence of various texts or discourses. In this context, "texts" can be broadly interpreted to include not only written documents but also any form of cultural expression, such as music, art, films, videos, and other media. Intertextuality emphasises the idea that no text or cultural artefact exists in isolation; rather, it is shaped by, responds to, and references other texts within a larger cultural context. Researchers using intertextual methodology seek to uncover these interconnections, examining how different texts or cultural elements influence, enrich, or challenge each other. In the context of critical musicology, for example, an intertextual approach might involve analysing how a musical composition interacts with or responds to broader cultural, social, or political discourses. It could also involve studying how music draws on and contributes to a network of interconnected cultural meanings and symbols.

understandable in terms of the trappings of intertextuality, such attempts tend to betray the unacknowledged and ethnocentric logocentrism at the heart of the postmodern project. In this thesis, the roots of music's cultural expressions are located at the beginning of life and facilitate the process of psychic development. Considering music as polysemic allows for thinking of it not as a sterile concept with cultural manifestations or as a metaphor to define human processes but as a core aspect of being human. The work of music researcher Christopher Small (1998) encompasses some of these ideas by highlighting that the essence of music is to be found not in the works of music themselves but in the social action involved in a musical performance. Small suggests changing 'music' as a noun to 'musicking' (i.e. 'to music') as a verb. This change emphasises on a performative aspect rather than a conceptual one. Musicking as an activity means to take part in any capacity in a musical performance. Small points out a similar criticism to the Western thinking about abstractions when defining music than those discussed in this thesis:

> Music is not a thing at all but an activity, something that people do. The apparent thing "music" is a fragment, an abstraction of the action, whose reality vanishes as soon as we examine it all closely. This habit of thinking in abstractions, of taking from an action what appears to be its essence and of giving that essence a name, is probably as old as language; *it is useful in the conceptualising of our world, but it has its dangers. It is very easy to come to think of the abstraction as more real than the reality it represents* [emphasis added], to think for example, of those abstractions which we call love, hate, good and evil as having an existence apart from the acts themselves, a kind of universal or ideal lying behind and suffusing the actions. This is the trap of reification, and it has been a besetting fault of Western thinking ever since Plato, who was the one of its earliest perpetrators. (Small, 1998, p. 2)

Small (1998) therefore defines *musicking* as follows: "*to music is to take part, in any capacity, in a musical performance, whether by performing, by listening, by rehearsing or practicing, by providing material for performance*

(what is called composing), or by dancing." (p. 9, original i*talics*). Music, in short, is highly dependent on its context and the human encounters involved in it.

Similarly, Thomas Turino (2008, 2009) presents an approach to music that emphasises participatory performance, which involves active engagement from all participants, with no clear distinction between performers and audience. This type of performance fosters social bonding, cooperation, and egalitarianism, focusing on sociality and enjoyment rather than hierarchy or competition. Turino argues that participatory performance provides a model for sustainable living by promoting community and habit change towards more cooperative and egalitarian values. He contends that participatory performance offers a powerful experiential model for developing alternative, sustainable ways of living, contrasting with the competitive and hierarchical nature of capitalist societies by promoting cooperation and social bonding. According to Turino , ethnomusicologists can play a crucial role in promoting sustainable living by highlighting the social and cultural practices of participatory music making. By teaching and sharing these practices, they can help students and readers envision alternative ways of living. Turino emphasises that addressing global issues like climate change requires cultural change and habit formation, and participatory music making can contribute to this by fostering new social habits and values.

In his book *Music as Social Life: The Politics of Participation*, Turino (2008) explores the profound role of music and dance in personal and social experiences. He develops a framework to understand the social functions and political implications of music, focusing on how it fosters community, identity, and social movements. Turino discusses the fundamental properties of music and dance that make them essential for connecting with our lives, communities, and the environment. He argues that music is a powerful medium for expressing emotions, building social bonds, and creating a sense of belonging.

Turino (2008) distinguishes between participatory performance, which promotes social bonding, cooperation, and egalitarianism, and presentational performance, which features a clear distinction

between performers and audience and often aligns with capitalist values of competition and profit. He explores how music and dance contribute to the formation of individual and collective identities, discussing the concept of "habits of the self," which are shaped by cultural practices and social interactions. Turino introduces the ideas of cultural cohorts, groups of people who share similar cultural practices and values, and cultural formations, larger social structures that encompass multiple cultural cohorts and influence broader social and political dynamics.

Turino (2008) also examines the role of music in political movements, using examples such as the Nazi Party and the American civil rights movement, illustrating how music can be a tool for both oppression and liberation, depending on its use and context. He contrasts the motivations of love (intrinsic enjoyment and social bonding) with those of money (commercial success and profit) in music making. Turino advocates for participatory music making as a model for sustainable living and social change, arguing that it fosters community, cooperation, and egalitarian values, providing an alternative to the competitive, hierarchical structures of capitalist societies. He highlights the potential of music to drive cultural change and support social movements, fostering new social habits and values that contribute to more just and equitable societies.

Music as Social Life: The Politics of Participation is a thought-provoking exploration of the social and political dimensions of music. Turino's detailed analysis and rich ethnographic examples illustrate the profound impact of music on personal and collective identities, social bonds, and political movements (see also Chapter 7 in this thesis).

The idea of music as a word signifying different things or activities can also be related to Wittgenstein's claim on meaning. In later Wittgenstein, *Philosophical Investigations* (1953), meaning and reality in language are a fluid-structure intimately bound up with everyday practices. The meaning of a word is its use and not the word itself, in an abstract sense. Meaning is conveyed not through *what people* say but *how* is it said and the *context in* which the word is said. Hence "naming

something is like attaching a label to a thing" (p. 8), and consequently, there are different kinds of words whose functions are as diverse as the functions of objects.

Additionally, words are not just words, but their use and context have intonations and gestures that convey words' meaning. Therefore, the underlying reasoning is that depending on how words are used, their meaning depends on the combinatory possibilities between different tones of voice (expressiveness) and the context in which these words operate. For example, the word 'this' in Wittgenstein's (1953, p. 8) illustration of building materials means 'stone', i.e., the word 'this' signifies the description of a particular object and the action related to that object at that time. Another example: Imagine a word game where A asks, and B reports the number of 'slabs' (i.e., building blocks) in a pile. The report might run: 'five slabs'. But what is the difference between 'five slabs' and the command 'five slabs!' which in another context from a previous example means 'bring five-building stones!'. Therefore, the difference is the part played in uttering the words in that game (Wittgenstein, 1953, p. 9).

Music as well can be understood differently depending on how the word is used, defined, in what context, and what tone frames the reference. As seen in this chapter, there are diverse forms of defining music, but a relevant inference is that detaching the word from its context and action by using a tone that strives for universalising a definition splits-off the polysemic, changing, and paradoxical nature of music. Another conclusion drawn from both Rivera Cusicanqui (2010/2020) and Wittgenstein (1953) is that, in this thesis, music needs a setting for contradiction, changeability of meaning, and paradox. The scope of the definition extends to musical experiences not traditionally defined as music. For example, the words 'musicking' and 'musicality' broaden up the context and reference of 'music' as a cultural product and its uses, going beyond the structural definition to permit the understanding of musical experiences as forms of communication as essential elements of early life's psychic development.

A final remark about the definition of music is that beyond a polysemic (Rivera Cusicanqui, 2010/2020) or contextual (Wittgenstein, 1953) nature of the concept/action (Small, 1998; Turino, 2008, 2009) of music, there is something else about musical experience that surpasses the word's connotation. In music's complexities, there are pre- and extraverbal aspects that remain engrained in ourselves and, as Small claims, the meaning of music is to be found in the totality of the musical performance, i.e., in the place where relationships happen. These relationships are enormously complex to be expressed in words, but that does not mean that our minds are not able to encompass those relationships. Musicking provides a means for understanding, articulating, and expressing an understanding of human relationships. Thus, the act of listening is not just to the musical performance but to the whole relational experience taking place in that performance, connecting with what is happening there and then. Music as *ch'ixi* and musicking allow the interactions of multiple layers of understanding music (conceptually, structurally, and phenomenologically) and respect the tensions between these layers, deconstruct its universal character, and place it in a contextual set of references that understand that paradoxically, music is shared action that reveals convoluted relationships between people, intimate and collective experiences, and physical and emotional systems.

In sum, the concept of music presents different approaches in its definitions that go from close-ended universal definitions to more generative open-ended definitions. The main inflexion for discussion focuses on music's universality and weather it can be defined with a generalisable concept applicable for all musics. Mostly, the discussion needs to separate the universal character of music as an activity and finding an abstract definition which universally and timelessly defines 'music' as an immanent concept detached from contextual and multiple origins. This chapter has argued that essentialisation of the concept of music is useful for understanding and transmitting musical knowledge (e.g., music education), but it does not encompass the whole of music neither as concept nor action. The conceptualisation of music and its structural characterisation (music

consisting of different components: rhythm, melody, harmony) provides a clear pedagogical framework about what music is made of, and it is useful for referring to musical engagement in contexts other than the cultural expression of music (e.g., musical interactions in early caregiver-infant communications).

Music, in short, cannot be detached from its contextual basis and its definitions are highly dependent on what goes on when people are musicking. It can be an abstraction and an essential, even mysterious source of artistic creation, but it is also a concrete bodily and a present-time experience: music has the possibility of being both subjective and collective, powerfully attached to relationships and socio-political matters (see e.g., Lordi, 2013; Scott, 2003). Music, seen as a talisman concept, i.e., a polysemic concept, is capable of containing all the complexities that make itself as construct and action possible, even though these complexities are contradictory or unresolved. Apart from the conceptual tension of music being both concept and action, universal in expression but not in its epistemological characterisation, there are two final relevant connections drawn from this chapter: (i) the emotional aspects brought about in music performances, and (ii) the experiential aspect of musical engagement. The next chapter discusses the psychobiological elements that make music a common human practice, and the emotional responses in which these elements bring about their connection to music and musicking.

CHAPTER TWO

MUSICALITY

This chapter addresses the psychological and biological definitions of music and its antecedents (2.1), its components and central discussions around the evolutionary discourses on the study of music (2.2), and the way music plays a role in human cognitive, physiological, and emotional systems (2.3).

2.1. The concept of Musicality

Musicality is a specific term coined in the late twentieth and twenty-first century by a group of researchers (e.g., Honing, 2018; Malloch & Trevarthen, 2009; Trevarthen, 1999; Dissanayake, 1995; 2000; 2004; 2009; 2011; 2012; 2021) used to convey the psychobiological components of music. Musicality is distinct to music as the art of sound or the cultural medium for the artistic expression of sound (see Chapter 1 of this thesis). Such a distinction was necessary for researchers who study the psychobiological origins of music to set out the argument that music has its origins in and is preceded by musicality.

Over the past decades, it has become clearer that humans share a predisposition for music, just like we have for language. A growing body of research supports this view from developmental and cognitive psychology (Smith & Trainor, 2008; Trainor, 2008; Trehub, 2003), biology (Fitch, 2006; Wilson & Cook, 2016), neuroscience (Peretz & Coltheart, 2003; Peretz & Zatorre, 2005) and music cognition (Deutsch, 1982; Hallam, Cross & Thaut, 2016), and more advances in medical technologies have allowed more accuracy in documenting the psychobiological correlates of music through systematic research (for systematic reviews, see Blood & Zatorre, 2001; Chanda & Levitin,

2013; Juslin & Västfjäll, 2008; Koelsch, 2014; Salimpoor et al., 2013). All these cross-disciplinary studies indicate that human's capacity for music has intimate relationships with cognition and underlying biology, particularly in reference to the perception of music (Honing, 2013, 2018).

Until recently, music was viewed as a cultural product, and its evolutionary and biological manifestations were often overlooked (see e.g., Repp, 1991, in Sundberg et al., 1991; cf. Honing, 2018). Moreover, such a view, as seen in the previous chapter on music, indicates a Western perspective of music, which confers its definition either to a conceptual abstraction or the technical skills acquired by professionals through years of practice (see, e.g., Blacking, 1973). As argued by music cognition and computational scientist Henkjan Honing (2018), solely cultural explanations do not explain the presence of music in all known cultures and time periods, let alone in other species. In other words, the claimed universality of music belongs more to a biological disposition than a philosophical definition of cultural practices. Increasing evidence demonstrates that all humans and not only trained individuals share a predisposition for music in the form of musicality. In this context, musicality is defined as "a spontaneous developing set of traits based on and constrained by our cognitive abilities and their underlying biology" (Honing, 2018, p. 26). Recognising melodies and perceiving beats are essential features of musicality (Honing, 2012; Trehub, 2003). Chapter 3 (on Communicative Musicality) explains that even infants are sensitive to such features, which are common across cultures (Savage, et al., 2015; Trehub et al., 2015). Academic approaches to musicality aim at identifying cognitive, biological, and mechanistic underpinnings for rhythmic, melodic, and harmony cognition as key ingredients of musicality and asses to what extent these are unique to humans, providing insights about biological origins.

The previous chapter argued that finding a single definition of music is difficult, and there is little agreement on how music manifests across cultures and whether certain expressions could be considered music or not. There is even more debate on musical instances across species. Some authors (e.g., Wallin et al., 2001) agree, for example, that the songs of birds, humpback whales,

Thai elephant orchestras, or the duets of gibbons are instances of music. Others (see Honing, 2013; Honing, 2018, p. 22) argue instead that human listeners use a musical frame of reference that may make things seem musical, but it is only because these stimuli are processed by this musical frame of reference that is shaped by perception and cognition. Instances of music may be found everywhere, and the musical frame of reference is shaped and biased by perception and cognition. However, these biases do not mean that rhythmical patterns and harmonic sequences do not occur. Musical instances are not separated from human perceptual and cognitive systems, but elements present in musical instances occur independently to cognitive and perceptive systems. This interrelation is ultimately what makes the human musical frame of reference strong and influential in many areas of life. Musicality, therefore, refers to the innate abilities that make music production and appreciation possible (Blacking, 1969). A central tenet of musicality is rooted in human biology in a form that is broadly shared by members of all human cultures.

The field of musicality uses two methodological approaches to find the origins of music. One approach studies the origins of music through its structure and finds key similarities and differences in musical form in different cultures. As seen in the previous chapter, there is not a single definition of music and its universal character derives from the presence of similar practices across cultures. Such similarities suggest underlying cognitive and biological mechanisms that shape musical behaviours (e.g., Honing, 2018; Savage et al., 2015; Trehub et al., 2015). Another approach is the study of musicality, i.e., to study the origins of music by identifying the underlying cognitive and biological mechanisms as well as their functions and developmental course in human and non-human animals (comparative approaches). Musicality helps to bridge the study of music as a cultural phenomenon and the investigation of its biological mechanisms. In all its complexity, musicality serves as an umbrella term for all psychobiological and evolutionary conditions, functions, and possibilities that allow humans to perceive, produce, and engage with music (see

Brown & Jordania, 2013; Honing, 2018; Lomax & Berkowitz, 1972; Nettl, 2005; Savage et al., 2015).

The term musicality as a field of enquiry was established formally at the beginning of the 2000s when the 2014 Lorentz Workshop "What Makes Us Musical Animals? Cognition, Biology, and the Origins of Musicality" was held in the Netherlands. The workshop gathered academics from around the world working in these areas and discussed the interdisciplinarity of the nascent field.

Honing then edited a book *The Origins of Musicality* (Honing et al., 2018) that collects the papers written during and after the workshop. Honing and his colleagues are currently undertaking research in different areas (e.g., music perception and cognition; musical patterns in birds and primates; cultural coevolution in humans) as a means of determining how musicality, in Honing's sense, is relevant for understanding not only psychobiological development, but also its evolutionary origins, functions, and structures. Honing's musicality (also known as biomusicology) emphasises the biological, perceptual, and cognitive aspects of music—the cultural artefact.

The word musicality, however, has a longer trajectory before the Lorentz Workshop, whose intent was to consolidate isolated research with similar interests in a broad subject that did not have a clear place within academia. The workshop emphasised the biological and cognitive models to gain a better understanding of music from these perspectives—biomusicology. Musicality, in the general dictionary definitions, refers to: (i) a sensitivity, talent, or knowledge of music; (ii) the quality of being musical; or (iii) the quality of having a pleasing sound (Merriam-Webster, n.d.). These broader definitions help to frame the type of questions the word conveys, such as sensitivity, quality, and pleasure behind musical qualities. The first known use of the word dates to approximately the mid-nineteenth century (~1850), which coincides with the first known researcher who wrote about the origins of music, philosopher Carl Stumpf (1883/2013). Additionally, the term musicality has been largely used by neurodevelopmental researchers, and musicologists (e.g., Malloch, 1999; Trevarthen, 1999) long before the 2014 workshop. In fact, "The

earliest instances of discussing musicality in German occurred in the context of the rising interest in the development of the individual subject in idealist philosophy [see e.g., Michaelis, 1805]" (Kursell, 2018).

> The interest of the growing bourgeois society in music as part of its educational ideals not only brought forth a greater quantity of musically trained individuals, but also more cases of failure. Robert Schumann addressed the education toward what he called musicality in an appendix to his *Album for the Youth (1854)*. Musicality for him was the ability to understand music and to (re)produce it in a meaningful rather than merely mechanical way. Stumpf however did not study expert judgement for the sake of improving the quality of musical performance. Nor did he take the idealist concept of talent as a natural gift as his point of departure as proposed in Kant's *Critique of judgement*. Stumpf was using music for understanding the mind. (Kursell, 2018, original *italics*)

The German word for musicality (*Musikalität*) connoted excellence in musical talent and thus a level of music proficiency above average (Kursell, 2018, see p.329), but this introduction of musicality as meaningful ways to perform music or as psychological aspects (e.g., Stumpf as one of the first theorists to address music as a psychological situation) have paved the way to introduce musicality as a fundamental aspect for understanding music and musical elements in human development. The following sections discuss Carl Stumpf's (1883/2013), and Charles Darwin's (1871/2013) conceptual impact on contemporary studies of musicality, the origins of music, and the biological, perceptual, and cognitive approaches to it.

Although this chapter focuses more on the traditional definition of musicality derived from neurocognitive studies, it is important to mention a last notion of musicality that relates to other dimensions of musical behaviour, which are further explained in Chapter 3. Music therapist Daniel Perret (2005) defines musicality as a quality of our musical expression. Perret approaches music from a therapeutic and spiritual point and claims that musicality is rooted in evolution, but he does

not take the same path as the biomusicology authors (e.g., Honing, 2018). Perret claims that musicality is like an 'audible fingerprint' where we all have a common set of elements but experience and subjectively process them. The audible fingerprint truly reflects our inner self, our psycho-energetic being. The author regards musicality as movement and embodied living, not as bio-components—such a view positions musicality in a psychic and spiritual place where Perret draws parallels with the different properties of the earth, water, fire, and air as powerful ancient metaphors to explain how musicality and human experience of music are what brings movement to the body. Thus, life is tied up with emotional (moving) systems that activate the energy of body life. Perret's take on musicality is then used as a music therapy model, particularly for children diagnosed with autistic spectrum disorders. He uses sound as a healing feature. Perret's view might differ from the focus of the biomusicology approach, but it relates to three elements usually regarded as core components of musicality described by both musicality research and the infant research tradition, namely movement, dance, and emotional transmission and recognition. Movement is defined in musicality as a form of vitality related to affective levels of experience (see Trevarthen, 1999, Malloch & Trevarthen, 2009, and Chapter 3 of this thesis). These elements outlined by Perret, are similar to the Intrinsic Motive Pulse (IMP) defined by Trevarthen (1999) as the internal moving force where musical behaviour and engagement originate (see Chapter 3 of this thesis).

The work of Ellen Dissanayake in the context and use of Musicality

Ellen Dissanayake is a relevant author in this thesis, particularly for her approach to musicality, which closely aligns with the perspectives this thesis adopts in examining music, musicality, and communicative musicality. Ellen Dissanayake's hypothesis on music and musicality presents a comprehensive framework that situates these behaviours within an evolutionary context, arguing that they serve fundamental adaptive purposes for humans. Drawing from fields such as evolutionary biology, anthropology, psychology, and musicology, Dissanayake proposes that

musicality is deeply ingrained in human biology and culture, emerging as a critical mechanism for social bonding, emotional communication, and survival. She states, "Musicality is a psychobiological capacity that underlies all human communication, including music. It has evolved to become a universal characteristic of human nature" (Dissanayake, 2009, p. 18).

Central to her argument is the notion that music and its associated behaviours, such as rhythm and melody, evolved as a means of fostering emotional connection and social cooperation. She identifies caregiver-infant interaction as a primary context where this communicative function is evident. Through behaviours like rhythmic vocalisations and melodic exchanges, infants and caregivers establish strong emotional bonds, a phenomenon she refers to as "communicative musicality". This early use of musicality not only aids in attachment but also lays the groundwork for more complex musical behaviours later in life. For Dissanayake (2009), such interactions reveal the universality of music and its roots in human evolution.

Moreover, she challenges the idea that music is merely a form of entertainment or an aesthetic pursuit without functional value. Instead, she emphasises its role in rituals and communal activities throughout human history, highlighting its capacity to strengthen group identities and enhance social cohesion. According to her view, music's ability to synchronise emotions and actions among individuals would have been particularly valuable for early human communities, ensuring survival by fostering cooperation and collective effort: "Music's ability to synchronise emotions and actions among individuals would have been particularly valuable for early human communities, ensuring survival by fostering cooperation and collective effort" (Dissanayake, 2009, p. 22).

Dissanayake's hypothesis has significant strengths, particularly in its interdisciplinary approach. By integrating insights from diverse fields, she offers a holistic perspective on the origins and functions of music. Empirical evidence supports her claims, as studies of infant-directed speech—commonly known as "motherese"—demonstrate the rhythmic and melodic qualities that align with her theory of communicative musicality. Cross-cultural research further bolsters her

argument, as music's presence in all known societies suggests its universal importance. Additionally, framing music as an evolutionary adaptation offers a plausible explanation for its enduring presence and centrality in human life. Dissanayake's hypothesis opens numerous avenues for future research. Advances in neuroscience could help identify the neural mechanisms that link musicality to social bonding and emotional regulation. Cross-cultural studies might refine our understanding of music's varied roles in human societies, while continued interdisciplinary collaboration could yield deeper insights into its evolutionary significance. Dissanayake's work is further developed in future sections of this chapter and other chapters (3 and 4), given the relevance to this thesis' hypothesis and her contributions to developing it.

The following sections provide a historical review of the main influences that constituted the field and study of musicality and further discussions take place around the epistemologies and possibilities of studying music from a different angle to that of Chapter 1.

2.1.1. Context of Musicality Part I—Carl Stumpf: The Origins of Music and Psychology of Tone

Carl Stumpf's contributions to the fields of music psychology and musicality remain foundational, providing key insights into the psychological origins of music and the sensation and perception of tone. His groundbreaking studies, including *The Origins of Music* (1911) and the two-volume *Tonepsychologie* (1883), laid the groundwork for systematic exploration in these areas. Notably, *The Origins of Music* was not translated into English until 2012, renewing interest in his theories among English-speaking researchers and fostering a broader understanding of the psychobiological underpinnings of music. Stumpf's work centred on themes of musical judgement, sensation of

tone, and auditory perception, laying the groundwork for understanding music as a psychological phenomenon rather than solely a physical one.

In the nineteenth century, however, Stumpf's innovative perspective faced significant challenges. Both psychology and musicology were still nascent academic disciplines, and studying music from a psychological standpoint was doubly hindered by a lack of prior research and institutional support. Stumpf utilised Western music's structured system as a control condition to examine musical judgement, analysing errors to gain insights into perceptual and cognitive processes. His approach diverged from earlier reliance on physics and physiology, emphasising psychological and analytic methodologies over anatomical explanations (Kursell, 2018). Before Stumpf, the study of sensation and perception was largely approached through the lenses of physics and physiology. Early pioneers such as Ernst Wilhelm Weber and Gustav Fechner, who founded psychophysics, developed experimental methods to measure sensory perception (Hoffmann, 2001, 2006; Kursell, 2018). However, their focus remained rooted in the physical and physiological aspects of sensory processes, with limited attention to auditory perception. Fechner (1860) himself acknowledged the inadequacy of contemporary methods for reliably measuring acoustic phenomena in relation to mental data.

Stumpf built upon Hermann von Helmholtz's work (1875/2009, Mion & Martini, 2021), which connected sound components and auditory perception. While Helmholtz approached tone perception physiologically, asserting that additional tones emerge from physical processes in the ear, Stumpf explored the psychological responses to such tones. His deductive methods demonstrated how individuals perceive and interpret tones, revealing variations in the ability to analyse musical intervals. Stumpf identified *amusia*[1] as a phenomenon where some individuals could not distinguish between tones, providing insights into cognitive differences in musical perception (Kursell, 2018).

Stumpf's research highlighted that the capacity for musical analysis is not universally innate but develops with exposure and training. He argued that sensation precedes analysis, with musically untrained individuals often remaining at the level of undifferentiated sensation. This concept, termed "fusion", reflects a judgement tendency rather than a property of sound. Stumpf's distinction between sensation, cognition, and the acoustic properties of sound has informed the development of music psychology, particularly regarding neurocognitive approaches.

Stumpf's exposure to non-Western music, facilitated by early phonographic recordings, provided further insights into music psychology. These recordings enabled him to examine unfamiliar musical systems, leading to the hypothesis that amusia and musical perception are universal phenomena influenced by psychological, rather than purely cultural, factors. The technological advances initiated during Stumpf's tenure, including the preservation of global musical traditions, have since evolved into fields like music education and cognitive neuroscience of music. Music technology, from phonographs to modern digital platforms, has significantly impacted music learning and cognition, offering tools to explore the psychological processes of musical perception. These advancements, rooted in Stumpf's early experiments, have influenced contemporary approaches to music education, particularly in understanding how technology facilitates cognitive and developmental processes in musicality.

Stumpf also explored the relationship between music and language, positing shared psychological and neurocognitive mechanisms. He distinguished song from speech in terms of transposability, asserting that music allows for the organisation and transposition of tones, unlike the fixed nature of speech. Contemporary research supports Stumpf's view, revealing neural overlaps between music and language processing while recognising their distinct developmental trajectories. Scholars like Peretz (2018) highlight how both music and language involve shared brain networks, though each follows unique paths influenced by evolution and cultural development.

Stumpf's insights are echoed in modern studies of amusia, which now emphasise understanding underlying mechanisms rather than categorising the condition as a deficit (see e.g. Hyde et al., 2006; Peretz, 2006). Research in cognitive neuroscience, such as Patel's OPERA hypothesis (2012), aligns with Stumpf's premise that music and speech processing involve overlapping yet distinct neural systems. This perspective has reshaped theories about the evolutionary origins of music and language, suggesting that musicality may precede language as an ontogenetic precursor to communication (e.g., Jackendoff, 2009).

Stumpf's contributions laid the foundation for multiple disciplines, including music psychology, cognitive neuroscience of music, and biomusicology. His assertion that the origins of music are diverse, encompassing psychobiological and sociocultural interactions, remains influential. Stumpf demonstrated that musicality extends beyond performing or interpreting music, encompassing fundamental psychological processes of perception, cognition, and sound analysis. His work underscores musicality as a universal aspect of human development, integral to understanding the interplay between innate predispositions and experiential learning. Through his research, Stumpf highlighted that music is not merely a physiological phenomenon but a profound expression of human cognition and culture. His insights continue to inform contemporary studies, illustrating the enduring relevance of his ideas in exploring the complex nature of musicality and its role in human evolution and development. Stumpf did not specifically use the word musicality, but it is partly thanks to his contributions that musicality can be considered an aspect of human development which shares neuropsychological mechanisms with other processes, such as language, and refers to aspects that precede expression and music analysis. Additionally, musicality can now be understood not as a talent some people are born with, but an essential aspect of human development, as claimed in this thesis.

2.1.2. Context of Musicality Part II—Darwin, Neo-Darwinism and Evolutionary theory

Another significant figure on the development of musicality, as a concept and an aspect of human development, is Charles Darwin, particularly his works *The Descent of Man* (1871/2013) and *The Expressions of the Emotions in Man and Animals* (1872). Darwin's hypothesis of the origins of music appears in the *Descent of Man* (1871/2013, see pp. 70–78). His first claim is directly related to the origins of language, and Darwin posits music as a predecessor of language in the origins of music communication. Language, according to Darwin, is a high mental power that developed through the production, imitation, and variation of various natural sounds. For Darwin (1871/2013), progenitors of humans probably first used their voice in producing musical cadences, i.e. in singing, as do some gibbon apes, for example. As the voice was used more and more, vocal organs were strengthened and perfected, giving rise to the power of speech.

The power of singing and the regular use of the voice leads to Darwin's (1871/2013) second claim that those progenitors of humans may have been especially excited during courtship to express various emotions such as love, jealousy, and triumph. Darwin believes that "It is, therefore, probable that the imitation of musical cries by articulate sounds may have given rise to expressive of various complex emotions" (p. 72). According to Darwin, musical cries and musical behaviour, particularly within the context of courtship, have a significant effect on the origins of language. In Darwin's framework, music serves a dual purpose, contributing to communication and promoting courtship, thereby ensuring sexual selection[32].

Following his hypothesis about the origins of language located in non-verbal production, imitation, and variation of different sounds, Darwin formulated a third claim, namely, the relationship between the continued use of language and the development of the brain. Darwin (1871; 1872)

[32] Preferences of mate selection to preserve the species via sexual reproduction. See Darwin 1871/2013; 1872

claimed that musical features in humans serve as forerunners for the communication of emotions and for the communication of complex trains of thought in general. Advancement of the power of language would have reacted on the mind itself by enabling and encouraging it to carry on long trains of thought. A complex train of thought cannot be carried on without the aid of spoken or silent words, like a long calculation without the use of algebra figures (see p. 75). Although Darwin (1871/2013) does not elaborate further on the specific ways in which sounds, musical production, and language affect complex mental processes, he found the complexity of thought processes harnessed to language development. This idea is particularly relevant in this thesis because Darwin's claims affirm that thought and language (major developmental milieus) are preceded by musical features used by early humans or even their ancestors. Additionally, Darwin (1871/2013) did not only say that there is a developmental and evolutionary continuity between musical behaviours, language, and thought development, but also that those musical expressions are the communication means for complex emotions.

Similar to other arts, music acts as an ornament to attract the mate, just as colours and feathers in birds. In sum, "I cannot doubt," says Darwin (1871/2013):

> that language owes its origins to the imitation and modification, aided by signs and gestures, of various natural sounds, the voices of other animals, and [hu]man's own instinctive cries. When we treat of sexual selection we shall see the primaeval [hu]man, or rather some early progenitor of [hu]man, probably used his voice largely, as does one gibbon-apes at the present day, in producing true musical cadences, that is in singing; we may conclude from a widely-spread analogy that this power would have been especially exerted during the courtship of the sexes, serving to express various emotions, as love, jealousy, triumph, and serving as a challenge to their rivals. (p. 44)

The imitation of sounds is another relevant contribution of Darwin's (1871/2013) hypothesis on musical behaviour related to his central claim on sexual selection. By means of imitation, musical

behaviours become more complex and relevant in the communicative repertoire for humans. That is, there is a survival value upon imitative behaviours. For example, imitation would have served as a challenge to rivals when apes and other human-like species imitate the growl of another animal to alert their fellow monkeys to the nature of the expected danger. Furthermore, Darwin (1889) elaborates on birds singing and their imitative behaviours and makes comparisons with human singing and music production: "birds should sing from emulation as well as for the sake of charming the female. . .. Singing is to a certain extent, . . . an art, and is much improved by practice. Birds can be taught various tunes, and even the unmelodious sparrow has learnt to sing like a linnet. They acquire the song of their foster parents, and sometimes that of their neighbours" (p. 372). In sum, Darwin (1871/2013) claimed that music precedes language carrying emotional messages at a very primitive level (possibly related to either a common ancestor with birds or a homoplasy of environmental exposure), and that music is acquired via imitation from foster parents.

A final claim made by Darwin (1871/2013) related to music (and the arts in general) regards the aesthetic value of these activities. By sense of beauty, Darwin (1871/2013) referred to the pleasure given by certain colours, forms, and sounds. Regarding sounds, Darwin, like Stumpf, was acquainted with Helmholtz's (1875/2009) hypotheses and says: "Helmholtz has explained to a certain extent on physiological principles, why harmony and certain cadences are agreeable. Sounds frequently recurring at irregular intervals are highly disagreeable, as everyone will admit to the irregular flapping of a rope on board ship" (1891, p. 77). In relation to regularity, patterns are employed by most humans and other animals, and numerous species seem pleased by similar colours, graceful shading forms, and regularity of sounds. Although the taste for the beautiful varies widely across the world, "powers of imagination, wonder, curiosity, and undefined sense of beauty, a tendency to imitation, and the love of excitement or novelty could hardly lead to capricious changes of customs and fashions" (p. 78). The pleasure caused by these elements,

independent of their local cultural expressions and systems of the value of the beautiful, suggests Darwin is shared and stable across humans.

All the elements outlined by Darwin (1871/2013) remain cornerstones in general definitions of musicality and have been influential in the neuroscience of music and infancy research (see, e.g., Honing, 2018). Most contemporary theorists on the subject assume that music has an adaptive function, though not necessarily to favour sexual selection (see, e.g., Honing, 2018; Peretz, 2006). Contemporary debates can be divided into five groups. The first three groups claim that music has an evolutionary function and serves specific developmental aspects. The other two groups claim that music does not have evident evolutionary functions but agree that music is relevant to humankind.

(i) The *first group* of researchers claim that music has an evolutionary function (see, e.g., Honing, 2018). This group focuses on Neo-Darwinian methodologies: searching for similar behaviours in closely related species and other species not evidently related to humans. This group does not necessarily agree with Darwin's sexual selection hypothesis regarding musical behaviour (to alert from dangers or to attract mates). They focus on ancient musical behaviour and demonstrate the evolutionary function by defining a musical phenotype (the observable characteristics of an individual or group as a result of the interaction between genetic profile—genotype and the environment). When researching a musical phenotype, the evolutionary component has become more central in the study of common elements that are present in music and human musicality and their manifestation in other (closely related or unrelated species). That is, in studying similar behaviours and expressions in both humans and other animals, it is possible to draw evolutionary lines that help understand the location and functions of musical behaviour.

The methodology of a neo-Darwinian assumption—a phylogenetic model of music—has two premises. The first premise claims that if closely related species (e.g., humans, apes, walruses and sea lions) exhibit similar solutions to similar problems, they are probably engaging similar mechanisms. The logic behind this premise is that of a phylogenetic model that infers if two closely related species share a musical trait, their Last Common Ancestor (LCA) also has the same trait. This inference *by homology* serves to trace the origins of traits in phylogenetic terms, allowing for an instrumental understanding of the trait, its function, and evolutionary development. The most studied group of comparative cross-species research are monkeys, such as macaques and marmosets, which present an animal model for understanding brain functions in domains from audition to vision, language, and music (see, e.g., Merchant, et.al. 2014).

The second premise claims that the case of distant or unrelated species that share similar traits (not homologous) contributes to understanding the underlying mechanisms of musical traits. *Homoplasy* or convergent evolution are the terms to refer to the presence of a similar trait in distant species whose LCA does not present the trait. For example, birds produce vocalisations characterised by brief elements ("notes") that vary in form, complexity, and frequency, often presenting rhythmic regularity. This trait is a homoplasy with musical elements present in humans and might inform about elements in the evolutionary trajectory of perception and cognition instead of a genetic route. Thus, homoplasy gives an account of how environmental exposure affects and shapes perception and behaviour by means of imitation. For example, the use of flutes that resemble "birdsongs" become part of a behavioural and cultural repertoire of how humans perceive and incorporate forms from the direct environment. Both homology and homoplasy (or analogy) combined form the methodology for studying music's underlying genetic history and neurocognitive mechanisms and determine the core components of musicality, further developed in the next section of this chapter (Honing 2018, p. 6; for further analysis on neo-Darwinian methodologies see also Fitch, 2018).

(ii) The *second group* of researchers also agree that musical behaviour has an evolutionary function and develop their theoretical models by demonstrating that the key aspects of musical behaviour are essential for human development in their first stages of life and subsequent social and cultural behaviours. The caregiver-infant music-like interactions enhance caregiver-infant bonds, ease the burdens of caregiving, and promote infant well-being and survival (Dissanayake, 2008; Trehub, 2003). Similar to Darwin's claims, this view sees these vocalisations as having paved the way for language, higher cognitive abilities (thought), and music. This group is one of the first to develop a musical theory related to human development and socialization and considers the function of musical behaviour to be of a survival kind combining physical and emotional relevance. This group set up a whole area of research under the name of Communicative Musicality which is key in this thesis for the links it proposes between emotional and physical development and further cultural expressions (see e.g., Malloch, 1999; Trevarthen, 1999, and Chapter 3 this thesis).

This group of researchers links Darwin's evolutionary argument to their hypothesis that musicality is essential in an individual's physical, emotional, and socio-cultural development (i.e., ontogenesis) by combining anthropological and biological viewpoints. For example, cultural anthropologist Ellen Dissanayake (1995, 2000/2015) studies the communications before speech, as well as the cultural processes involving artistic production and development. Dissanayake agrees with the neo-Darwinian evolutionary theories and suggests that the innate disposition for musicality has an ontogenetic trajectory which is preceded by two anatomical changes in human phylogenesis, namely walking upright and the development of intelligence due to the evolution of the prefrontal cortex. The first anatomical change, walking upright or bipedalism, implied changes in the pelvic area that brought issues in parturition, which resulted in natural selection favouring infants born in a premature state. Hominid babies became much more helpless than other primates, demanding caregivers and possibly other members of the species to be entirely devoted to their care, making humans a gregarious species. The dependency for survival fixed these particular interactions

between caregivers and infants, which meet with the enlarged brain and the newest cerebral areas in evolution, the prefrontal cortex, allowing to process these interactions in intricate patterns of communication (Dissanayake, 2009; Damasio, 1999; 2010; Panksepp, 1998; Panksepp & Bernatzky, 2002; Panksepp & Trevarthen, 2009). The interactions favoured by the evolutionary conditions of the helpless infant and the complex cognitive processes acquired in the prefrontal cortex were the breeding ground to favour musicality, through which humans communicate their needs and emotions. In the shared and responsive interactions, humans create emotional bonds and start a process of self-formation that is later shared in cultural forms (see Chapters 4 and 5 of this thesis).

The work of Dissanayake (2009) adds an important level to the evolutionary and the anthropological traditions in that she claims the capacities for eventual music originated not in sexual display, as claimed by Darwin, but in love and mutuality. Dissanayake does not elaborate in the psychic dimensions of her claim, but she is clear about the emotional dimension which happens in a shared experience that is generated from the survival dependence when humans are born (as an immature species). This shared experience may create a space in the mind necessary for the recognition of oneself and therefore others, but that recognition is possible through empathic and harmonious interactions. The following chapters (4 and 5) will put forth the ideas that psychoanalysis has to add to this specific moment of musicality and its place in the mental apparatus.

(iii) A *third group* of researchers supports an adaptationist view on music and musicality but emphasises social bonding as the primary reason for the existence of musical behaviour in humans. Authors like Robin Dunbar (2004, 2012b) Ian Cross (2001), or Tarr et.al. (2014), claim that musicality allows social bonding between members in early human groups. In this social-boning

perspective, there is a shift from two-way communication (between mates or between caregiver-infant pair) to group communication.

Across cultures, music is often a group activity; it is very common for people to come together to make or listen to music at the same time. There is a tendency to share similar emotional states, to feel a sense of real connection to the people around, and to the identity or message that the music projects. Church music, music festivals, or concerts are examples of these behaviours (Music and the brain, 2015). Social bonding theory of music's origins claims the key function of music and the primary reason of musicality is to strengthen bonds between group members via shared emotional experiences. The emotional aspect of musicality reflects in more cooperative or prosocial behaviour between group members even outside musical contexts. Hagen and Bryant (2003) suggest that group musical displays allow groups to indicate to each other their cohesion and stability, affording groups which can engage successfully in such displays. Merker (2001) suggests that music is an indicator of coalition strength. Prosocial behaviour then enhances the group to function as a cohesive social unit. For example, conflict within human groups may reduce the group's ability to deal with environmental or other groups challenges; musical activities may reduce conflict and make the group more aware and able to cope with challenging experiences. Music reinforces cooperative behaviour within the group through group ritual activities, promoting a sense of "groupishness" that is likely to enhance prospects of group survival in addition to being effective in situations of inter-group conflict (Brown, 2000). The contrary is also possible to increase division at intergroup levels using musical means to encourage aggression and rage (see e.g., Clayton, 2008).

Music is thought of as significant at a social level not only for the collectiveness and cohesion of social bonds, but it is significant in human evolution by virtue of its embeddedness in social interaction and its effect on the formation of group identity (Kogan, 1997; Dunbar, 2004). The importance of music in the negotiation of ideologies of gender and identity is also a relevant field

of inquiry that favours social bonding theories and demonstrates the relevance of music in human interactions. Particular focus has been allotted to the study of the use of music in maintaining and adapting cultural identity in migrant and diasporic cultures (see, e.g., Shelemay, 1998; Slobin, 1993, 2003; Turino, 1993). Sociologists and social psychologists have discussed the deployment of musical resources in the realisation of individual identity. Roseman's (1991) notion of 'sociocentric self', for example, is an interesting idea that refers to an interactive self that does not end at the boundaries of the individual. Another example is the inference that the beauty of interconnectedness with community and nature is offset by concern for the integrity of self (see Clayton, 2008).

Social bonding theory also finds a relationship between language and broader communicative skills. For example, Mithen (2005) presents a view of music and language as having common origins and suggests that music had an evolutionary efficacy on the formation of social bonds. Mithen claims that music is no more than a primaeval relic that may have been functional for earlier species of hominids but whose functions have come to be appropriated by language.

Cross (see, e.g., Cross 1999, 2005) also subscribes to the notion of music's social bonding effect but suggests that music, by virtue of its polyvalent significances, can contribute positively to individual fitness within the group by facilitating communicative interactions that cannot be conducted linguistically, a view also presented in Morely (2013). To Cross (1999; Yi, 1999), music's powers of entrainment[33], together with its "floating intentionality"[34] renders it an extremely

[33] "Entrainment is an important characteristic of interactions between brain rhythms and refers to the coupling of two independent oscillatory systems in such a way that their periods of oscillation become related by virtue of phase alignment" (Cummins, 2009). Entrainment in the context of music and musicality occurs when the behaviours (and attentional foci) of two or more people become periodically aligned in time (see also Cross, 2014).

[34] According to Cross (2014), the experience of music happens as an intentional event. Meaning is conveyed through what is experienced and embodied, but the experience of music depends on each individual—music is rarely consensually determined. Similarly, the subjective phenomenon of music and its epistemology is discussed in Chapter 1 of this thesis, for music cannot be defined in one way, nor is the sole concept detached from a phenomenological dimension. In Chapter 3 of this thesis, there is also a mention of intentionality that addresses the philosophical engagement with intentionality in music and musicality. "When people engage with music through listening or

efficacious communicative medium in public presentations and management of situations of social uncertainty (Cross, 2014). According to Cross (2014), the experience of music happens as an intentional event. Meaning is conveyed through what is experienced and embodied, but the experience of music depends on each individual – music is rarely consensually determined. Similarly, the subjective phenomenon of music and its epistemology is discussed in Chapter 1 of this thesis, for music cannot be defined in one way, nor is the sole concept detached from a phenomenological dimension. In Chapter 3 of this thesis, there is also a mention of intentionality that addresses the philosophical engagement with intentionality in music and musicality. "When people engage with music through listening or performing, they are likely to experience it as meaningful: as embodying or conveying meanings that may be more or less specific. However, they are unlikely to agree precisely what the music means" (Cross, 2014, p. 814). Literature on phenomenology of music relies on the influence of Husserl, Heidegger and Merleau-Ponty. Phenomenology of music shifts from sight to sound and claims for non-linear temporal figures of past-present-future stretching within the same experience when listening to music. For a detailed revision of phenomenology of music, see Ellis Benson (2011) and Chapter 5 of this thesis. Hence, music and musicality can be regarded as possessing attributes that complement those of language, postulating that music and language are likely to have coevolved as complementary aspects of the human communicative toolkit, differentiated only by the degree to which they can specify meaning unambiguously.

Besides music's communicative function, other psychosocial correlates that could be considered part of human musicality relate to the role of music in altered states of consciousness and its

---

performing, they are likely to experience it as meaningful: as embodying or conveying meanings that may be more or less specific. However, they are unlikely to agree precisely what the music means" Cross, 2014, p. 814.

Literature on phenomenology of music relies on the influence of Husserl, Heidegger, and Merleau-Ponty. Phenomenology of music shifts from sight to sound and claims for non-linear temporal figures of past-present-future stretching within the same experience when listening to music. For a detailed revision of phenomenology of music, see Ellis Benson (2011) and Chapter 5 of this thesis.

mediation between humans with the super-natural (i.e., a spiritual dimension). Ethnomusicologists (see Clayton, 2008) have asserted that music, in its ritual dimension, has a key role in altered states of consciousness and spiritual engagement, including trance, possession, ecstatic listening, and healing (see Racy, 2003; Roseman, 1991; Rouget, 1985; van der Kolk, 2014). Émile Durkheim (1912/2008) wrote about this social function of music and claimed that music awakens religious thought in collective action: "a state of effervescence which changes the conditions of psychic activity" (pp. 422). Vital energies are over-excited, passions become more active, and sensations stronger. There is as Clayton (2008) calls a "sur-plus of affect" that is the end in itself, one of music's functions. Thus, music's function is not only a list of behavioural or evolutionary aspects; its power to arouse, move, and engage us is a function itself [35]. All these psychophysiological responses pertain to musicality for it is in this overlap between the functions of music and their bio-psycho-social correlates where music and musicality express their polysemic, paradoxical, and multifunctional nature.

A final remark that gives continuity of the social bonding theory and the evolutionary correlates of musical behaviour is that it fits with relative pitch perception theory. Relative pitch perception, one of the most studied features of human music behaviour, allows voices to blend across different pitch ranges. For example, men and women can sing the same melody in unison, even though they sing in different registers. Furthermore, the steady beat of music creates a shared mental framework for group coordination for singing, playing instruments, or dancing (*Music and the Brain*, 2015). Music also has a lot of repetition within its structure which has been recently studied by music cognition theorist Elizabeth Margulis (2014). Different from language where we are told not to repeat ourselves, in music repetition is celebrated; for example, in the song "I Want to Hold

[35] This can be related to Lorde's notion of the erotic: "The erotic function for me in several ways and the first is in providing the power which comes from sharing deeply any pursuit with another person. The sharing of joy, whether physical emotional, psychic, or intellectual" (Lorde, 2017, p. 26).

your Hand" by The Beatles[36] invites the listener not to listen passively but to join in, sing along, and share in the feelings and messages of the song. Social bonding theory facilitates thinking about the origins of music and musicality in a way that connects the essential needs of humans to socialise, bond, and share experiences. Collective actions have the power to change behaviour and healing (see, e.g., Van der Kolk's work, 2014 and Chapter 6 of this thesis).

Adaptationist theories present numerous possibilities for studying music's bio-psycho-social correlates, origins, and function. Most research has focused on the evolutionary discourse, largely embedded in the historical significance of Darwin's new evolutionary theory in both the natural and social sciences. This emphasis coincided with the period when music was beginning to be recognised as a significant subject of academic inquiry. Due to the polysemic nature of music, tracing its origins and establishing specific functions supposes an epistemic difficulty. However, some of those aspects are relevant for building the multidimensional theory developed in this thesis, which involves aspects of music that are cultural (see Chapter 1), aspects that are psychobiological and social in evolutionary terms (this chapter), aspects of communication (Chapter 3), and emotional development (Chapter 4).

(iv) The *fourth group* of researchers present a non-adaptationist view and disagrees with the claim that musical behaviour has an evolutionary function but argues that not having a concrete evolutionary function does not mean music and musical behaviour are unimportant in human development, cognition, and culture. Psychologist and linguist Stephen Pinker (1997) has developed this claim that music has no biological function. Pinker's main theoretical framework he uses to follow this claim is William James', a significant figure in the establishment of North American psychology. According to Pinker (1997), music's origins are something unplanned and hidden, by-products of having a complex hearing system. If so, other animals with complex

[36] TRACK 13: The Beatles – I Want to Hold Your Hand.

auditory systems (e.g., birds) would perceive and probably reproduce music in the same ways humans do. In support of his argument on the non-adaptive functions of music, Pinker drew upon James' radical empiricism rationale. However, James' radical empiricism posits that the significance of concepts lies in their relationship to perceptual particulars (see James, 1968). This aligns more closely with the approach taken in this thesis, contending that conceptual knowledge is insufficient for grasping "the fullness of the reality to be known" (James, 1976, p. 245) in the context of music. It seems that Pinker used James' argument, decontextualising it from his approach to empiricism and critical revision of concepts such as consciousness and perception.

Following this reading of James and this thesis general approach, music considered as a epistemological thing, challenging the notion that it is an external artefact waiting to be discovered; rather, music is actively generated. Echoing Reybrouck's standpoint (2001), the understanding of music through cognitive approaches does not necessarily lead to an exploration of music as an ontological category but rather serves as a tool for adapting to the sonic environment. This assertion maintains that while cognitive approaches shed light on the essential psychobiological foundations of music, they fall short of capturing the subjective experiences that continually shape the epistemological foundation of music. James, however, claimed that perhaps musical behaviour (musicality) arose not due to its survival value but as a result of other mental abilities. This idea is still in discussion today and further developed by Pinker. In his book *How the Mind Works* (1997), Pinker claims that many mental functions have been a direct target of natural selection, music however is a prime example of an important aspect of life that has not been shaped by biological evolution. For Pinker, music is an invention that is prevalent and strong in humans because of the strong links between music and pleasure: "music appears to be a pure pleasure technology, a cocktail of recreational drugs that we ingest through the ear to stimulate a mass of pleasure circuits at once" (p. 528).

Pinker suggests that music taps into five brain functions which have adaptive functions and are ancient, universal, and spontaneously developing. These five functions originally had no connection with musical behaviour, and when activated the commonality is the consequent pleasure. By co-activating multiple brain functions that trigger the pleasure circuits, a concentrated dose of pleasure is provided that is likely to be preserved in humans without it being adaptive. According to Pinker, the first brain circuit activated is that of language. When speaking, the voice moves up and down, creating speech melody, and rhythmical patterns of timing, sense, and phrasing. The second circuit is that of auditory scene analysis, which is what gives the ability to mentally separate the sounds reaching each ear even though the sounds arrive as a mixture. When listening to music, we use these mechanisms of separation (e.g., the ability to separate guitar and voice)9. The third circuit is that of processing emotional vocalisations. Music provides auditory stimuli (e.g., pitch and rhythmic patterns) that can resemble emotional sounds such as growls, screams, or sighs. The fourth circuit is habitat selection. Music can have patterns that simulate environmental sounds and stimulate awareness of safe or unsafe environments (e.g., thunder or wind). The fifth circuit Pinker suggests is motor control. Music makes people move and dance, activating the centres of walking and running.

Pinker's main idea is that when people listen to music, the pleasure felt arises because all these five mechanisms have adaptive functions. In other words, the brain analyses music using mechanisms that evolved for other reasons, such as language or emotional vocalisation processing. Thus, pleasure occurs in attribute to music but not because of music. Pinker does not claim that music is not valuable, but his account of music evolution claims that musical behaviour is purely a cultural invention. In that sense, music is understood by Pinker as a by-product of other evolutionary functions. Pinker's famous analogy of music as a cheesecake is related to a function from the *Pleistocene* (approximately twelve thousand years ago); when sugar and fat were scarce, it was advantageous to prefer high-calorie food when it was available. Just like sugar, fat, and alcohol,

arts are conceived by Pinker as by-products of other adaptation functions—motivational systems that give pleasure (Pinker, 1997; *see also* Sacks, 2008; Peretz, 2006).

Following Pinker's argument, palaeontologist and evolutionary biologist Stephen Jay Gould (1991; 1997a; Jay Gould & Lewontin, 1979; Jay Gould & Varba, 1982) terms these evolutionary by-products 'spandrels' or 'exaptations'. The term spandrel is borrowed from the architectural concept meaning the designation of spaces and forms arising as necessary by-products of other decisions in design and not as adaptations for a direct utility (see Jay Gould & Lewontin, 1979). In other words, Pinker and colleagues, consider music to be an incidental peculiarity of the nervous system with no teleological significance. This view of music has parallels with the use of fire by early humans, which made it possible for them to cook food and obtain warmth, and also had an important biological and cultural impact (see e.g., Goudsblom, 1995; Wrangham & Conklin-Brittain, 2003).

Pinker (1997) and Gould's (1991; 1997a) argument does not demonstrate that music is not adaptive. Music could be an adaptive function of other mechanisms (e.g., language or emotional communication), but for economic reasons, the more mechanisms are involved in a single process, the larger the purposes a trait serves, and the more likely to be preserved it gets. In other words, if a trait involves more than one purpose, the system will prioritise that function because it meets more needs in the system, hence whether an adaptive function or not, for the brain it does not matter much as long as the trait is present and functional. To argue that music has only accompanied human evolution (both biological and cultural) because it activates the pleasure circuits in the brain reduces the functionality only to one element—pleasure—and, as highlighted before, reductionisms in music and musicality are not epistemologically nor phenomenologically viable. In that sense, Pinker might be right to argue for a pleasurable function of music, but he is extracting this function from a complex phenomenon that involves more than one cerebral circuit as well as social, cultural, psychological, emotional, and relational processes. Additionally, Pinker

does not take into account other emotions concerning pre-verbal communicative functions, psychological, and subjective experiences and the interrelatedness of early social interactions, i.e., childcare, and emotional interactions in early life and collective musical experiences. Pinker's approach to music reduces musical behaviour to the motivational system, and it is a significant contribution, but music and musicality have different components which relate to different categories other than the pleasure circuits. As a linguist, Pinker argues that the by-product of music came about as a spandrel for language and is maintained in time through pleasure. However, in this thesis, music and musicality are part of the developmental continuum on which language is included because it concerns early communicative functions and neurodevelopmental overlaps, but the radical reductionism and the logically wrong assumption that music is a by-product of evolution only because it triggers the pleasure circuits in the brain is not a sufficient argument. To understand music and musicality, it seems necessary to look at its possible cultural and biological evolution, as well as the psychological reasons and phenomenology, emotional, or even spiritual nuances of music and its psychobiological correlates.

(v) The *fifth group* presents another non-adaptationist view of music's origins and musicality. The theorists Björn Merker, Ian Morley, and Willem Zuidema (2018) respond to Honing (2018) and Fitch's (2018) argument that music's functions have evolutionary purposes and present constraints to their theory. These constraints argue that the evolutionary perspective cannot rely on the antiquity of a trait because complex products of cultural history, as in the case of music and language, can be transmitted not genetically, but culturally. Many of the present-day traditions extend back over many thousands of years of transmissions of learned cultural lore. Such transgenerational transmission does not require the intervention of natural selection. Moreover, according to the authors, to go in search of an evolutionary explanation of those characteristically cultural aspects would be a mistake. Instead, the generational transmission is dependent on learning and such a learning process implies studying the gradual unconscious transmission that

extends over many generations and restructures the cultural corpus in ways that increase its salience expressive economy, communicative generality, and power, all of which turn on enhanced communicability and learnability in various ways. This process allows the management of larger amounts of cultural content without change in neural resources and lets the cultural products exploit existing peculiarities of neural organisation. Cats, for example, seem to respond to the human voice, and the voice has evolved in a way that exploits pre-existing mammalian networks (Merker et al., 2018, p. 51). To the authors, cultural expressions evolve tailored to a pre-existing physiological constraint. For example, a three-second line length in poetry is the same timespan of auditory echoic memory or even the length of human breathing.

Merker et al. (2018) claim that some major structural features of music widely found across cultures might be a consequence of cultural evolution. That is, the fact that an old and universal behaviour or practice is present in a species does not necessarily respond to genetic reasons. The body and the sensory experiences are key because they will shape cultural forms and expressions which will be transmitted for generations. Bringing the body and generational learning-transmission processes is important in this thesis because those sensorial experiences are where the ego and the self come about. What the authors explain at a cultural level may occur at individual levels too, where the material for the sensorial experiences is stored in the form of mnemic prints—memory traces that become the raw material from which the psyche will emerge. This thesis argues that those mnemic prints are foremost auditory and musical for the characteristics of the interactive and therefore communicative form in the first human exchanges (developed in detail in Chapters 3 and 4 in this thesis). The authors stress the importance of learning and transgenerational transmission of cultural patterns responding to unique anatomies of the human audio phonatory system and unique perceptual-cognitive processing. The capacity for vocal learning and the innate song templates are engaged with the auditory physiology, making a strong cultural trait which can be transmitted transgenerationally. This view, however, does not appear contradictory to

contemporary evolutionary discourses, as they stress the relevance of learning cultural forms that strengthen through generational exchanges and are constrained by the neurophysiological makeup. Favouring musical behavioural repertoires implies already evolutionary tendencies whether the aim is originally musical. For example, the original evolutionary purpose of the auditory system is that of maintaining equilibrium, but hearing became a prominent function of the auditory system as the environmental demands prioritised hearing as a useful trait. Cultural reasons for maintaining a trait are no less important within an evolutionary account because cultural aspects are as relevant for the species as are the genetic ones.

These authors' non-adaptationist views are of value to this thesis because they put emphasis not on the exact origin of a trait, music in this case, but on how cultural practices such as music are founded and constrained by bio-physiological aspects that have evolved for other purposes. Musicality may have both biologically defined purposes and cultural functionalities, which makes it a very strong, powerful, and perdurable trait. This can be an economic principle when survival teams up with pleasure and social bonding in an open-ended generative situation. For survival, for example, the baby cries and someone responds and provides food; hence, the baby survives and is satisfied. The pleasure ignited from the satisfaction of needs, generates emotional bonds through positive reinforcement, which then will allow the building of a repertoire of learned social behaviours that respond to the context in which the infant is ascribed. Authors may differ in the take between adaptationist versus non-adaptationist views, but in the end, these views are not ultimately contradictory even though they generate different approaches to a determined phenomenon.

Even though these five groups of researchers are diverse and form a large portion of contemporary research on musicality, it is interesting that the largest and most influential reference is Darwin. Evidently, Darwin set a paradigm of thinking about life, genetics, animals, and music. However, many disciplines also got caught up in the evolutionary discourse and theories have become

"Darwinised", including the social sciences such as North American Ethnomusicology, for example (see e.g., Nettl, 2001; Dissanayake, 2009). Furthermore, the major contribution of this is that there are no theories of musicality to date that offer an account without accepting the Darwinian paradigm. In this thesis, Darwin's contribution supposes a relevant aspect for thinking about music beyond its cultural frame of reference and therefore a possibility that the continuity between a musical developmental trajectory and cultural musical practices opened up, thanks to Darwin's thoughts on music origins. Moreover, Darwin's theories had an effect on the idea that musical behaviours are directly related to thought processes, emotional communication, and language development, which are essential for thinking about the role of music in human development and experience.

Paradoxically, although Darwin's frameworks are essential to the development of a theory of musicality, reducing the arguments to evolutionary accounts or only to scientific discourses as the only valid theoretical reference implies referring to musicality only as behavioural or cognitive processes due to the scientific approaches. These scientific methodologies normally challenge psychoanalytic standpoints, which is the approach this thesis uses to postulate a great portion of the developmental hypothesis (see Chapters 4 and 5). In that sense, Darwinian, and neo-Darwinian methods are essential, but discussions about musical behaviour and innateness cannot be reduced to a Darwinian framework. As mentioned numerous times, music is a complex situation not reducible to only one frame of reference or approach. In other words, what opens the door for thinking of music beyond cultural expression by considering a set of psychobiological aspects, closes the door for paradigms like psychoanalysis, phenomenology, or queer theories to contribute to understanding music beyond its cultural expression.

In contemporary research, there is a general tendency to adhere to the evolutionary accounts of music, which originated in the light of Darwin's natural selection theories. Whether the position favours an evolutionary function or not, these theories all operate under the premise that evolution

in a Darwinian sense is a universal truth. Some authors (e.g., Honing et al., 2018) claim that music's functions and origins have direct evolutionary correlates for sexual selection, communication, and social purposes. Others (Jay Gould, 1997b; Pinker, 1997) claim that the strong presence of musical behaviour in humans is due to its correlation to other behavioural functions that have evolved and gave a way for music to be invented. Music is conceived as an evolutionary accident that became relevant for the strong correlates with communication and pleasure brain circuits.

Contemporary research offers integrative perspectives where both cultural invention and biological correlates coexist. Gene-culture coevolution theories claim that there is not enough evidence for a concrete evolutionary function of music or musicality, but these are behaviours that are essential for humans (see e.g., Merker, et al., 2018; Patel, 2010; Tomlinson, 2015). These authors valuably decentralise the idea that evolutionary functions are the only way to legitimate aspects of human existence. According to them, there is no consensus about the survival value of music and Darwin is regularly quoted to support their argument: "as neither the enjoyment nor the capacity of producing musical notes is faculties of the least direct use to man in reference to his ordinary habits of life, they must be ranked amongst the most mysterious with which he is endowed" (Darwin, 1971, p.43). This quote, however, seems to contradict the previous group of researchers who also quote Darwin to support their argument. Music, as Oliver Sacks (2007) asserted in his seminal book *Musicophilia*, is an evolutionary mystery.

The kernel argument of integrative accounts is that there is a constant feedback loop between cultural inventions and biological evolution. A cultural invention can gradually change biology in lasting ways, changes that can be inherited biologically from one generation to the next. An example of gene-culture coevolution is dairy consumption. For most mammals, milk is just for babies and young children who produce the lactase enzyme which breaks down lactose. The gland normally switches off when children mature. Approximately 11,000 years ago, humans began to herd cattle and made food like cheese out of milk. A few thousand years later, a genetic mutation

that allowed adults to produce lactase spread throughout Europe. A cultural practice led to a lasting genetic change, opening a new food resource to the early Europeans which in turn affected their ability to grow and spread. Such behaviour changed genes, which reciprocally affected behaviour. It is a loop, rather than a one-way arrow from genes to behaviour. How might gene-culture co-evolution relate to music? In an essay about music and evolution Aniruddh Patel (2010) suggested that music may have originated as an invention among human ancestors, based on mental capacities that evolved for other reasons. He had a non-adaptationist view of music's origins and compared the invention of music to the ability to control fire, a product of human ingenuity, not a biological evolution. The control of fire started as an invention but became universal because it provided things that humans valued deeply. It allowed humans to cook and fend off predators and to stay warm (see e.g., Wrangham, 2003). Patel claims that music may have become universal because music like fire also provides things that humans value, but these things are mental rather than physical.

The integrative approach combines the abovementioned ideas and provides multidisciplinary approaches to investigate the correlation between social and phenomenological functions of music and genetic change. The correlation between culture and genetic changes explains the sociobiological matrixes of music and musicality and their multipurpose functionality in individual and collective life. In their complexity and versatility, music and musicality serve to provide emotional power and shared emotional meaning, while also aiding memory processes for remembering long sequences of information (as seen before with Darwin's account on music and language) but also culturally important stories. For example, Australian aboriginals use 'songlines' to remember paths across the land and navigate long distances (Chadwin, 1988). Most cultures recognise the emotional power of music and use it for ritual purposes (as seen in the social-bonding theory group).

Gene-culture coevolution seems to be a favourable approach for understanding the biological substrates of music and that implies looking at, for example, the brain specialisations for synchronised, simultaneous, and rhythmic actions. The gene-culture coevolution approach generates discussions about music's uniqueness and, for example, in relation to language, music has a distinctive feature of simultaneity and turn-taking patterns. In language, the exchange of information is exclusively in turns: one person speaks, and then the other person speaks. Music contains the turn-taking aspect as well as the synchronic simultaneous aspect—one can sing, play, and dance at the same time with others doing all three as well. If this coordination did promote social bonding in early human groups, then perhaps our brains have become specialised for tightly synchronised, rhythmic actions with others. The following section will describe musicality and the particular neurocognitive correlates of music in terms of the components that make music possible as a cultural practice.

2.2. Core components of musicality

Within the cognitive neuroscience of music framework, biomusicology, and music psychology, there are elements that constitute the theoretical structure of musicality and compose its objects of study. Honing (2018) outlined the core components of musicality. These proposed core components stem from music psychology and neo-Darwinian approaches and set out a structural matrix for musicality. In the previous chapter, the section of components helped to set out a working definition of music for this thesis. This section takes on those basic components and outlines the psychobiological correlates to provide the structural working definition of musicality. The literature on musicality's components is not as organised as it is in music (see Chapter 1 in this thesis) for various reasons. First, musicality is a more recent field of enquiry, and the interdisciplinary nature of this field also brings different approaches. Natural and psychological

sciences usually study phenomena in atomistic fashions, providing detailed definitions and information about one specific subject in a very specific sample of subjects. Hence, it is difficult to find bodies of work that provide metatheories or even epistemological paradigms that serve as platforms for discussion. This section, therefore, will outline some of the most relevant psychobiological correlates of music and provide general accounts of each component.

These potential basic components proposed in the recent literature of biomusicology are: (i) within the category of rhythm: *temporal processing,* regularity, beat perception (Honing, 2012; Cate et al., 2016), and *metrical encoding of rhythm* (Fitch, 2013); (ii) within the category of melody: *melody perception, processing,* and *tonal encoding of pitch* (Krumhansl & Toiviainen, 2003; Peretz & Coltheart, 2003); and (iii) within the category of harmony: *relative pitch perception* (e.g., contour and interval analysis; Justus & Hustler, 2005; Trehub, 2003) and *harmony* cognition *and perception*. Some of these core components, according to the biomusicological perspective, are evident in closely related species (e.g., Macaca mulatta), implying convergent evolution and therefore inform a more solid phenotype of musicality, facilitating the development of an integrated neurocognitive model of musicality (See Honing, 2018, Chapters 9 and 10).

2.2.1. The neurocognitive correlates of rhythm: Temporal processing and regularity of beat perception

Temporal processing is a cognitive correlate to rhythm in music, directly related to memory processes. Music perception and performance rely on temporal processing where each event situates in time in relation to surrounding events which are grouped together to overcome memory constraints (Drake & Bertrand, 2003). Temporal structures vary significantly from one culture to another, and the specific perceptual cognition of temporal processing differ depending on the individual's exposure and experience. However, there are functional universals irrespective of the

individual's cultural exposure, age, acculturation, or musical training. Rhythm perception and performance is generally studied in adult musicians and non-musicians through comparative methods. Similarly, comparative approaches are also carried out in children and infants to identify functions that indicate similarities in temporal processing. Studies (see e.g., Drake & Bertrand, 2003) identify, but are not limited to, five temporal processes that appear as candidates for 'temporal universals' within psychological and cognitive sciences. These processes appear when individuals listen to, engage with, or produce music. Although the authors aim at defining 'universal' temporal processing elements, they are also aware of the charged cultural egocentricity when suggesting generalisable principles that only come from studies conducted in the Western tradition with Western music, and Western analysing standards. However, within the five paradigms, the authors suggest that their 'universal' character should be transposable into other cultures and open to adjustment if that is not the case for future studies.

Music, according to Drake and Bertrand (2003), is defined as the art of organising events in time. For them, *temporal processing* is an essential component of music that opens an opportunity to investigate the perceptual and cognitive temporal processes that make such activity possible (p. 22). The authors claim that temporal processing is always limited by memory space and processing time. That is, for example, if a computer were to reproduce musical rhythm, the program would record the precise duration, put it in the lookup table, and recall these values *n* times making a metrical stable pattern. Humans are able to reproduce musical rhythms so they can sound satisfactorily similar to the computer model. However, the human perceptual system does not operate in the same way as a computer. The most evident difference is concerned with memory limitations—human memory is limited while a computer's is not. Another precision for studying temporal perception and cognition is that sound events do not usually occur in isolation but in conjunction to other events where sound is bounded in a sequence. Each event becomes real in relation to other surrounding events instead of its specific characteristics. Taking into account

temporal sequences, the task of situating an event in a surrounding environment is simple when the sequence is short in duration and contains a limited number of events (three to four intervals). As the sequence becomes longer, problems related to memory space and processing time arise. This information coincides with studies in infant development where caregivers direct their speech and song in shorter and simpler intervals than they do with other adults (see e.g., Trehub, 2003).

Drake and Bertrand (2003) suggest five elements for temporal processing. The *first element* of temporal processing is divided into segmentation and grouping. Humans tend to group those events that have similar characteristics or those that occur close in time into perceptual units. This segmentation into perceptual units leads to the closure of one unit and an opening of the next. Studies support this claim by demonstrating that listeners usually segment sequences as a function of the surface characteristics (timbre, pitch, intensity, duration, etc). For example, the occurrence of a longer temporal gap or a larger change in pitch leads to the segmentation of the sequence at that point and beginning a new perceptual unit (Drake & Bertrand, 2003, p. 24).

The *second element* is a predisposition towards regularity. Temporal processing is better for regular than irregular sequences. Like the computer's example, the human perceptual system compares each new interval with preceding ones and categorises it as the same. Human temporal processing is relative, not absolute; hence, the coding tends to smooth out sequences making them appear as precisely the same. This occurs if the intervals and sequences remain within a "tolerance window" (usually by 10 per cent of regularity)—if sequences pass this window's thresholds, irregularities will be detected:

> Active search for regularity: (…) humans tend to spontaneously search for temporal regularities and organise events around the perceived regularity. This is an economic tendency to reduce the need and use of resources to process a sequence. (Drake & Bertrand. 2003, p.25)

A *third element* is synchronization with musical sequences. People tend to find the underlying regularity of a musical piece (pulse). The task used to detect this is by asking people to tap in the time with a musical sequence in what they think goes best with the music. According to Drake and Bertrand's (2003) study, participants who accomplish successful taps that coincide with the music within the 10 per cent window are considered successful in synchronisation.

The *fourth element* is called the temporal zone of optimal processing, The rate of temporal sequences is another important factor for temporal processing because:

> People tend to listen for important events occurring at equally spaced moments in time, and the rate at which they search for relevant information is specific to each individual. Thus, the search for temporal regularities occurs at a particular rate. A zone of optimal processing has been demonstrated with numerous paradigms and types of sequences. The results are concordant: sensitivity to change is highest if events occur about every 600ms, with a range stretching between about 300 and 800 ms interonset interval (IOI). (Drake, & Bertrand, 2003, p. 27)

The *fifth element* identified is the predisposition towards simple duration ratios—this element is concerned with the perception of 'longer' and 'shorter' durations. Longer intervals tend to be perceived twice as long as the same intervals, and shorter intervals tend to be perceived and produced twice as short as the same intervals. This means that humans tend to categorise sounds in clear-cut passages from one category to another. That is, the tendency is to find an organisation favouring predominantly binary ratios instead of ternary or more complex interval ratios. A consequence of this is that, for example, people are better able to reproduce rhythms containing 1:2 ratios than those containing 1:3 (or more complicated) ratios. Although there are cognitive tendencies of classification and simplification that seem applicable to human brain functioning in general, this paradigm, particularly applied to music perception, seems to refer specifically to

Western music listeners. It is out of the scope of this thesis but seems relevant to study if this tendency for binary classification is general and cross-cultural.

These five experimental paradigms for temporal processing support a psychologically embedded way of temporal processing that optimises regularity perception and cognition. The main characteristic for this cognitive temporal processing model is the tendency to perceive stable patterns, which leads to the conclusion that regularity is something that provides a sense of security—hence the need for simpler tasks and engagement with shorter ratios. In this thesis, such a cognitive tendency with a psychological and emotional sense of security is related to reassurance in identity and the self-developmental process. As argued later in Chapters 4 and 5, these musical elements and their musicality correlates, e.g. rhythm and temporal processing, are essential in the self-development of an individual.

Beat perception and synchronisation are another group of fundamental neuropsychological traits of musicality specific to rhythmic response. *Beat perception* is a cognitive ability that allows the detection of regular beats (or pulse) in music and allows the *synchronous* response to this pulse during music playing or dancing. Synchronic bodily movements (e.g., foot tapping) in response to timed patterns is a widespread behaviour in humans. (Merchant, Grahn, Trainor, Rohrmeier & Fitch, 2015). Beat perception and synchronisation imply a present or imagined beat which evoke particular perceptual patterns in individuals via cognitive processing. Both characteristics are spontaneous and intuitive, present in young infants, and individuals do not need training to perceive and motorically entrain (the coupling of two independent rhythms in the brain) to the beat in musical patterns (see e.g., Phillips-Silver & Trainor, 2007; Winkler et.al., 2008). Rhythmic entrainment is a complex phenomenon that depends on the dynamic interaction between auditory and motor systems in the brain. Recent studies support the notion that timing mechanisms in the brain depend significantly on the time intervals perceived. These intervals can be relative or absolute (Merchant & Honing, 2014; Zatorre, Chen & Penhune, 2007; Phillips-Silver & Trainor, 2005). In relative timing, time

intervals are measures relative to regular perceived beat whereas in absolute timing, the intervals are encoded discretely, like a stopwatch. In relative timing, entrainment is possible but not in absolute timing. Complex entrainment abilities of humans may have evolved gradually across primates whereas beat-based mechanism is most developed in humans. Studies demonstrate that humans entrain rhythmically to isochronous stimuli with almost perfect tempo and phase matching (Repp & Su, 2013). Tempo matching means that the period of movement equals the musical beat period. Phase matching means that rhythmic movements occur near or at the onset times of musical beats. These characteristics are correlated to the motor cortico-basal ganglia thalamo-cortical circuit (mCGBT circuit):

> It is clear that the human mCBGT circuit is engaged not only during motoric entrainment to a musical beat, but also during the perception of simple metric rhythms. This indicates that the motor system is involved in the representation of the metrical structure of auditory stimuli. Furthermore, this motoric representation is predictive and can induce in auditory cortex an expectation process for metrical stimuli. The predictive signals are conveyed to the sensory areas via oscillatory activity, particularly at delta and beta frequencies. (Repp & Su, 2013, p. 291)

There is consensus that the motor system makes use of multiple levels of neural representation during beat perception and synchronisation. Non-invasive data (fMRI, EEG PET scans) compared with recordings from non-human primates shows that the Supplementary Motor Area (SMA), the putamen, and probably all of the relay nuclei of the mCBGT circuit use different encoding strategies to represent the temporal and sequential structure of beat synchronisation. Interval tuning could be a mechanism used by the mCBGT to represent the beat tempo during synchronisation.

Both temporal processing and beat perception indicate the musicality of rhythm and coincide with the five elements that Drake and Bertrand (2003) outline in their study. These correlates of rhythm

indicate embodied responses that have a continuity with psychological processes of synchronisation and preferences for regularity when engaging with musical stimuli. These natural responses have been found very early in infancy and other non-human primates (see e.g., Samson & Ehrlé, 2003) which supports the evolutionary function of musicality, at least in the rhythmical aspect. Furthermore, these findings are relevant for this thesis because they demonstrate that musical traits are present and important from the beginning of life, possibly not only in its concrete aspect of favouring musical engagement, but also for the relation of these traits in synchronous interaction, coherent motor movement, entrainment, and a phenomenological experience of time (further developed in Chapter 3 on Communicative Musicality).

2.2.2. The neurocognitive correlates of melody: Relative pitch, perception, and melody cognition

Cognitive neuroscientist Aniruddh Patel (2005) defines melody cognition from a perception viewpoint:

> [A] tone sequence in which the individual tones are processed in terms of multiple structured relationships. This definition emphasises the active role of the mind in melody perception. That is, melody (like a spoken sentence) depends on a listener's perceptual system to convert a 'mere sequence of sounds' into a meaningful mental experience. (p. 325)

The author argues for the complexity of hearing melody and outlines the cognitive richness of hearing melody suggesting thirteen ways of hearing which include:

(i) *instrument identity* (e.g., piano vs violin);

(ii) *grouping* (segmentation into units larger than single tones);

(iii) *beat and metre* (psychological more or less isochronous pulse train that when grouped form meter);

(iv) *scale structure* (numerical ratios between fundamental frequencies of tones that define pitch intervals);

(v) *contour* (overall pattern of ups and downs in a sequence of pitch intervals);

(vi) *parallelism* (motivic similarity between different parts of a melody);

(vii) *intervallic implications* (sensitivity towards the patterning of successive pitch intervals in a melody);

(vii) *tension vs resolution* (melodic perception is an unfolding sense of tension vs resolution over the course of the entire melody);

(ix) *ornamentation* (some pitches serve to ornament others);

(x*) implicit harmony* (melodies are horizontal successions and harmonies are the vertical succession of tones, i.e. chords—chords play roles and reflect relationships between individual tones);

(xi) e*xpression* (mechanical performances of a melody strictly adhere to the relative time values, human performances are never mechanical and show variations in timing and amplitude which help communicate the structure of the music and the performer's artistic and emotional interpretation;

(xii) complexity (Listeners have intuitions about structural complexities); and

(xiii) *meta-relations* (listeners hear basic perceptual relations and relations between these basic relations).

This (non-exhaustive) list means that even simple tunes engage a large number of mental operations that serve to structure the relationships between tones and to show that melodic engagement involves much more than a pleasurable encounter to sonic stimuli. These processes cascade every time an individual is exposed to melodic-like successions and indicates their relevance in human functioning as well as the flexibility to adhere and interpret sound chains, which demonstrate the non-mechanical or static nature of melodic processing.

Relative pitch perception has been identified as a key aspect of melody and subsequent harmony cognition. It refers to the capacity to recognise similarities in transposed melodies (up or down pitch shifts). Humans recognise pitch shifts without major effort (e.g., the happy birthday tune can be recognised when played by a piccolo flute or a double bass). Recognising transposed melodies is a component of musicality. Musics from different cultures rely on transposability and the creation of musical patterns and studies on six-month-old infants support the appearance of this ability (Plantinga & Trainor, 2005). Plantinga and Trainor's study showed that after hearing a melody repeatedly, six-month-olds prefer a new melody and get bored with the old one. Similarly, excitement occurs when the transposition of the original melody's pitch is presented to the babies. These examples lead to the conclusion that an important part of melody's identity is not the absolute but the relative pitch. What makes a melody recognisable is the pattern, not the specific pitch in which a tune is created. Furthermore, studies in comparative psychology (with birds and capuchin monkeys) show that this ability is uniquely human (see e.g., Plantinga & Trainor, 2005). Cognitive neuroscience research (see Plantinga & Trainor, 2005) study the brain centres involved in relative pitch, finding that temporal lobes (core, belt, and parabelt) are essential in single and multiple tonal frequency processing. Robert Zatorre's (2003) studies suggest that there is a predominance of the right auditory cortex which imply slower narrow-band processes (e.g., tonal patterns) than other left-brain specialised auditory nuclei better for broad-band rapid processing (e.g., speech). Non-invasive methods (e.g., fMRI), however, have demonstrated that music cognition relies on both sides of the brain and that it is a mistake to think that the whole process

is only a right brain specialisation. A complex cognitive task, such as melody cognition, relative pitch perception, and music cognition in general, engages brain regions that interact, not just an isolated area. For example, the visuospatial region is found to be involved in relative pitch perception as well, a region also involved in mental rotation (the capacity to determine if two figures are related if one is a rotated version of the other). Like mental rotation, relative pitch perception interprets sensory patterns in terms of the relations between elements (*Music and the Brain*, 2015). According to these findings, it can be inferred that musicality involves networks outside auditory regions. In that sense, music and melody perception are not about the auditory system, but connecting sound to other processes in the brain and body (e.g., planning, remembering, imagining, and feeling).

Krumhansl's (1990) work is relevant in the study of pitch organisation, offering an extensive analysis of how cognitive processes underpin musical perception. Her monograph synthesises empirical findings with theoretical frameworks, creating a robust foundation for understanding how humans perceive, organise, and interpret pitch structures in music. Krumhansl's (1990) contributions focus on the cognitive science of pitch organisation, particularly regarding tonal hierarchies, key perception, and the dynamic interaction between memory and pitch cognition.

Krumhansl's (1990) work is grounded in the premise that pitch organisation is not merely a feature of acoustic phenomena but is shaped by cognitive processes influenced by cultural and musical context. Central to her argument is the concept of tonal hierarchies, which posits that certain pitches are perceived as more stable or central within a tonal context. This hierarchy is not static but dynamic, influenced by factors such as musical key, the progression of harmonies, and the context provided by preceding pitches. Krumhansl's application of the probe-tone technique—a method where participants rate the "fit" of a probe tone within a given tonal context—provides empirical support for the existence of these hierarchies. Her findings reveal consistent patterns of

pitch stability, with tonic, dominant, and mediant tones rated as most stable, thereby affirming theoretical models of Western tonal music.

A significant aspect of Krumhansl's (1990) analysis lies in her investigation of key perception. Using multidimensional scaling techniques, she constructs key profiles that quantitatively represent the psychological relatedness between keys. Her research demonstrates that listeners possess an implicit knowledge of key relationships, which corresponds closely to the circle of fifths—a theoretical construct used in Western music theory. This cognitive mapping of keys underscores the interactive nature of perception, memory, and learned musical conventions. Importantly, Krumhansl's findings highlight that even listeners without formal training exhibit sensitivity to these key relationships, suggesting that such cognitive structures may arise from exposure and enculturation rather than explicit instruction.

Krumhansl (1990) also delves into the temporal aspects of pitch cognition, addressing how listeners integrate pitch information over time to form coherent perceptual units. This is particularly evident in her exploration of harmonic progressions and modulation. She illustrates that listeners track changes in tonal centres, adjusting their perception of tonal hierarchies as the music unfolds. This dynamic adaptation reflects the interplay between short-term memory, which processes immediate auditory input, and long-term memory, which stores abstract representations of tonal structures. Her work suggests that tonal perception is inherently temporal, relying on the brain's capacity to update and reorganise pitch information in response to new musical stimuli.

Another critical contribution of Krumhansl's (1990) paper is her discussion of the universality and variability of pitch cognition. While much of her research focuses on Western tonal music, she acknowledges that different musical systems may employ alternative pitch organisations. For instance, her findings on tonal hierarchies and key perception may not directly apply to microtonal or non-Western scales. Nevertheless, the cognitive principles she outlines—such as the influence

of exposure, memory, and context on pitch perception—are likely to hold across diverse musical traditions, albeit manifesting differently.

Krumhansl's (1990) integration of psychological theories with music theory is a hallmark of her approach. By linking empirical data with theoretical constructs, she bridges the gap between cognitive psychology and musicology. For example, her key profile data correlates with harmonic tension and resolution patterns described in classical music theory, offering a scientific basis for these intuitive concepts. Moreover, her use of experimental methods, such as the probe-tone technique and multidimensional scaling, demonstrates the utility of rigorous empirical approaches in addressing complex musical questions.

Despite its strengths, some critiques of Krumhansl's (1990) work pertain to its Western-centric focus. The reliance on Western tonal music as the primary framework for studying pitch organisation raises questions about the generalisability of her findings to non-Western musical traditions. Furthermore, while her experiments provide robust evidence for tonal hierarchies and key perception, they do not fully address the neural mechanisms underlying these phenomena. Subsequent research in cognitive neuroscience has sought to complement her findings by exploring the brain regions and neural pathways involved in pitch processing, such as the auditory cortex and prefrontal areas implicated in working memory. Krumhansl's analysis of tonal hierarchies, key perception, and the temporal dynamics of pitch organisation offers profound insights into the cognitive processes underlying musical understanding. By combining empirical methods with theoretical depth, she establishes a framework that continues to influence research in music cognition, psychology, and related disciplines. Her work highlights the intricate interplay between cultural exposure, memory, and perceptual processes, affirming the centrality of cognitive science in explaining the complex phenomenon of musical pitch.

Additionally, other elements being studied related to the neuropsychological correlates of melody perception and cognition, most of which conclude that there are brain specialisations and cognitive processes that make melody perception and cognition a strong component of musicality. For example, in experiments on tonal cognition conducted by Carol Krumhansl and Petri Toivianen (2003), it is concluded that listeners develop a sense of the key from a piece of music and the sense of tonality undergoes dynamic and subtle changes as exposure to musical stimuli takes place. The sense of key in a piece of music develops as certain ques appear. Such studies not only demonstrate the evident neuropsychological correlates of musicality present in melody perception and cognition, but what is more relevant to this thesis is that such correlates are to be found in early stages of life and therefore have a significant function in neuropsychological development. Moreover, processes involved in melody perception and cognition involve more subtle and fine-grained specialised processes, which, as this thesis argues, can be associated with less evident but more sensitive involvement of aural processing that affects cognition in less apparent or abrupt ways than other perceptual tasks (e.g., visuo-spacial).

2.2.3. The neurocognitive correlates of harmony

Based on observations from different disciplines (e.g., ethnomusicology, developmental psychology, and animal behaviour), Tramo et al. (2003) hypothesise how basic principles of the theory of harmony reflect physiological and anatomical properties of the auditory system:

> Basic properties of the auditory system governing harmony perception include: (i) the capacity of peripheral auditory neurons to encode temporal regularities in acoustic fine structure and (ii) the differential tuning of many neurons throughout the auditory system to a narrow range of frequencies in the audible spectrum. Biologically determined limits on these properties constrain the range of notes used in music throughout the world and the way notes are combined to form intervals and chords in popular Western music. When

> a harmonic interval is played, neurons throughout the auditory system that are sensitive to one or more frequencies (partials) contained in the interval respond by firing action potentials. (Tramo et. al., 2003, p. 127)

For consonant intervals, the fine timing of nerve responses contains representations of harmonic related pitches in addition to the pitches present in the actual interval. For dissonant intervals, the nerve fibres do not contain strong representations of constituent notes. When too close together, partials cannot be resolved, interfering with one another and causing coarse fluctuations in the firing of neurons resulting in perception of roughness and dissonance. Basic physiological properties of the auditory and cognitive systems determine why some combinations of simultaneous tones sound more harmonious than others. Acoustic features of consonant and dissonant intervals are translated into distinctive patterns of neural activity.

Tramo et al. (2003) use Pythagoras's logic regarding the questions about the nature of harmony for understanding the mathematics and physics of auditory perception. However, from a neurobiological perspective, a question is raised of whether there are physiological and anatomical properties of the auditory system and related cognitive systems that determine the degree to which simultaneous notes sound harmonious. For Tramo et al. (2003), a harmonic interval is vertical and horizontal and refers to two or more notes sounded simultaneously—harmonic intervals start in *dyads*, then three or more notes played simultaneously make up a *chord*, and three notes are a *triad*. Vertical dimensions span in approximately at a hundredth of a second (120 beats per minute) and horizontal dimensions encompass successive tones (i.e. melodic or harmonic progressions). Some intervals are considered consonant (e.g. fifths and major triads) and dissonant (minor, seconds, diminished triads) (see also Chapter 1 this thesis). Psychologists have allotted different perceptual attributes and meanings to these terms. For example, consonance stands for harmonious, agreeable, and stable. Dissonance peers up with disagreeable, unpleasant, and in need of resolution. These basic concepts apply to a wide range of musical styles studied in the Western culture, where

most of these studies have been conducted, e.g. contemporary pop and theatre, European (Baroque, Classical, and Romantic) music, children's songs, and forms of ritualistic music (church, anthems, processionals). The overlap in their harmonic structure incorporates commonalities in musical phonology and syntax (see Tramo et al., 2003, p. 128). Many psychologists and musicologists define the model of consonance as the absence of annoying features such as roughness in both musical and non-musical sounds (see e.g., Terhardt, 1984 and von Helmholtz, 1875/2009). However, psychoacoustic experiments contradict this theory by demonstrating that consonance is more about the distance between tones and the relationships available in cognitive processing of music. In other words, it is not about absence but how the tones are placed and related temporally in a perceptual framework:

> The frequency selectivity throughout the auditory nervous system is finite, simultaneous pure tones are separated by small frequency differences. A minor second, for example, cannot be separated or 'filtered out' from one another. Therefore, the waveforms are effectively summed, and the pitch of the tone combination matches their mean frequency. (Tramo et al., 2003, p. 138)

For consonant intervals (fifth and fourth), the pattern of major and minor peaks in the autocorrelation is perfectly periodic, with a period related to a fundamental bass. The pattern is obtained because these stimuli have a unique, clearly defined fundamental period. By contrast, for dissonant intervals (minor second and tritone), no true periodicity is seen in the autocorrelation function. While some peaks occasionally stand out at specific delays, indicating a pseudo period, either there are no consistent peaks at multiples of this pseudo period, or the amplitudes of these peaks decay rapidly with increasing multiples of the pseudo period (Tramo et al., 2003, p. 135). The observation and studies conducted suggest that consonance of harmonic intervals reflects regularities in the temporal fine structure in the range of tenths to tens of milliseconds. Apparently, neurons in the auditory system represent this information using a time code. Galilei (1638/1914,

pp. 145–146) was one of the first known authors to suggest this hypothesis of temporal coding in the auditory periphery as the physiological basis for consonance (See Tramo et al., 2003)[37].

Most of the discussions revolving around the correlates of harmony are grounded in consonance and dissonance. Contemporary researchers such as Harrison and Pearce (2020) offer a thorough analysis of consonance and dissonance, exploring their cognitive, perceptual, and compositional underpinnings. The authors aim to bridge the gap between theoretical models of consonance and empirical findings, providing a framework that integrates perceptual and cultural perspectives on this fundamental aspect of music theory and cognition.

The authors centre on the concept of simultaneous consonance, referring to the perceived pleasantness or stability of sounds occurring together. Harrison and Pearce (2020) examine the historical and theoretical foundations of consonance and dissonance, beginning with their roots in acoustic phenomena, such as harmonicity (the alignment of overtones) and sensory dissonance (the perception of beating and roughness between frequencies). These acoustic principles form the basis for many theoretical models of consonance, which traditionally explain its perception as rooted in the physics of sound.

One of the notable strengths of Harrison and Pearce's (2020) work is its emphasis on individual differences in consonance perception. The study highlights how factors such as musical training, cultural background, and individual auditory sensitivities influence consonance judgments. Musicians, for example, often display heightened sensitivity to harmonic relationships and may

[37] Galileo did not refer to his reflection on harmony as temporal coding, but his work explored the idea that consonant musical intervals, such as the octave, fifth, and fourth, can be understood in terms of simple numerical ratios. For example, the octave corresponds to a 2:1 ratio of frequencies, while the fifth corresponds to a 3:2 ratio. Galilei's investigations into the mathematics of music helped lay the groundwork for the scientific understanding of harmony and consonance. He emphasised the importance of empirical observation and mathematical analysis in uncovering the underlying principles governing musical phenomena. Galilei's most relevant contribution was examining the philosophical approaches to music available at his time and using his characteristic scientific and empirical approaches. While Galilei's contributions to music theory were not as extensive as his contributions to physics and astronomy, his insights into the mathematical foundations of consonance played a significant role in shaping subsequent developments in the field of musicology and particularly bio-musicology.

evaluate consonance in more nuanced ways compared to non-musicians. Similarly, cross-cultural studies reveal that listeners from different musical traditions exhibit distinct patterns of consonance perception, reflecting the influence of cultural exposure on cognitive processing.

The article also addresses the role of consonance and dissonance in music composition. Harrison and Pearce argue that composers exploit listeners' cognitive and perceptual tendencies to create tension, resolution, and emotional effects. Consonance is often used to establish stability and closure, while dissonance introduces instability and drives musical progression. The balance between consonance and dissonance is a defining feature of many musical styles, and the authors provide examples from Western classical music, jazz, and other genres to illustrate how these elements are employed in diverse compositional contexts.

One of the most innovative aspects of the study is its exploration of consonance and dissonance as dynamic and context-dependent phenomena. The perception of consonance can vary depending on the musical context, such as the surrounding harmonic progressions, rhythmic structure, and temporal dynamics. For instance, a dissonant chord may be perceived as consonant when resolved within a broader harmonic framework. This context-sensitive approach challenges static definitions of consonance and highlights the importance of considering temporal and relational aspects in understanding musical perception.

Another approach is that of Anglada-Tort et al. (2023) which explores the dynamics of oral transmission and its role in shaping the evolution of music. The authors use a novel experimental approach, combining large-scale iterated singing experiments with computational modelling, to examine how cultural transmission mechanisms influence musical structure and content over time. This work contributes to a growing body of research on cultural evolution, specifically focusing on music as a transmissible and evolving artefact.

The study centres on oral transmission, a process through which music is learned, performed, and passed on through generations without reliance on written notation. The authors employ iterated

learning paradigms, wherein participants learn and reproduce musical material in a chain-like fashion, simulating how musical traits evolve through repeated transmission. This approach captures the cumulative transformations that occur as melodies are transmitted from one individual to another, shedding light on the mechanisms underlying the evolution of music in oral cultures.

A key finding of the study is that transmission biases, such as those favouring simplicity and stability, play a central role in shaping musical evolution. The authors demonstrate that over successive iterations, melodies tend to become more regular and predictable, reflecting cognitive constraints on learning and memory. This process aligns with broader theories of cultural evolution, which propose that cultural artefacts adapt to the cognitive and perceptual capacities of their users. In the case of music, this adaptation results in structures that are easier to learn, remember, and reproduce, promoting their persistence within a population.

To quantify these changes, the study utilises computational models that track the evolution of melodic characteristics, such as pitch intervals, contour, and rhythmic patterns. The findings reveal systematic trends, including the reduction of melodic complexity and the emergence of stylistic conventions over time. These trends are consistent across diverse participant groups, suggesting that the observed transmission mechanisms are robust and not dependent on specific cultural or musical backgrounds.

A notable contribution of the study is its exploration of individual and cultural differences in transmission patterns. The authors analyse how participants' musical training, cultural exposure, and cognitive capacities influence the transmission process. For instance, musically trained individuals exhibit greater fidelity in reproducing melodic details, while non-musicians introduce more variability, leading to greater simplification and transformation. These findings underscore the interplay between individual cognition and cultural context in shaping the trajectory of musical evolution.

The study also highlights the emergent properties of oral transmission, such as the convergence of melodies toward culturally familiar structures. Even in the absence of explicit stylistic constraints, participants' reproductions gravitate toward patterns characteristic of their cultural musical environments. This phenomenon suggests that cultural exposure implicitly shapes transmission, contributing to the emergence of distinct musical styles and traditions.

Beyond its implications for understanding music evolution, the research offers insights into broader processes of cultural evolution. The authors draw parallels between the transmission of music and other domains, such as language, visual art, and tool-making, emphasising the shared cognitive and cultural mechanisms underlying these phenomena. The iterated learning framework provides a versatile tool for investigating the dynamics of cultural transmission across diverse contexts.

Interestingly, as seen in the previous chapter, the theories on harmony are transposed to various spheres such as planetary organisations, physics and mathematics, psychology, aeroacoustics, and spiritual realms. All of them seem to agree that regularities and ratios or distances between the tones that reflect the range of distances and relationships and how these are perceived by the auditory system, processed, and represented in the human mind. Most of the attributions, whether agreeable or unpleasant, are derived from these physical characteristics that conclusively assert that the more regular and clear the distances are, the more consonant and therefore coherent and pleasant are to the human ear. Then, besides the observational account of these perceptual matrixes, theories on harmony perception and cognition are dressed up with value systems that reinforce moral judgements about the consonance and dissonance of tones. Hence, harmonic values, processing, and perception become a hierarchical model that reflects moral judgement of good and bad, celestial or demonic, and so on. Most of this judgement depends on cultural exposure (as Stumpf mentioned in his studies on the origins of music—see Chapter 1 this thesis). Harmony is a more complex process to study due to the overlaps between the neurological and

cultural aspects. Its complexity represents how music and musical experiences do not only involve different brain areas in dynamic interaction, but different areas of experience and existence, where human experience of music becomes an actively engaged, culturally located, and fundamentally paradoxical situation.

2.3. Discussion

This chapter has outlined the main aspects to define musicality as a recent concept for studying the underlying biological, neurological, and psychological aspects of music. Most of these aspects derive from Carl Stumpf's (1911a) psychology of music and Charles Darwin's (1871/2013) evolutionary theory. Central aspects of musicality can be determined by its structural components, those that demonstrate the psychobiological correlates of rhythm, melody, and harmony. However, those mechanisms are not the only way to determine musicality because there are other components which can outline the dynamics of musicality within the psychobiological towards the cultural aspects of music. Within the most salient elements outlined in the definitions of musicality, there are constant aspects such as the continuity or relationship between music and language and the idea that musical behaviour is a means of pre- or non-verbal communication of basic needs and emotions. Also, the relationship of musical behaviour to aid long and complex trains of thought, the relation of musical behaviour to the activation of pleasure circuits, and the crucial role of musical behaviours in processes of socialisation and group cohesion.

The *structural* components of musicality correspond to the elements that concretely correlate psychobiology of the structural components of music (see Chapter 1). However, there are other *dynamic* components that involve not only the neuropsychological correlates of music but a whole range of experiences that are central in the understanding of musicality as something that brings the body to the centre of the discussion about music and a situation that guides a musical

phenomenology. The common elements found in the literature on musicality, beginning with Stumpf and Darwin, constitute the dynamic aspects which are a part of the physiological constituents of musical behaviour, but not concretely defined by sequences of physiological actions. Imitation is a recurrent element. As learning and memory processes are directly involved in musical behaviour, imitation constitutes a salient behavioural trait for guaranteeing the preservation of such behaviour. Phenomenologically, imitation can be related to awareness of the other and oneself in an active instance of reciprocity, which is a key developmental aspect also known as mirroring in psychoanalytic literature (further developed in Chapter 4).

The relationship between music and language is another aspect transversal to most of the literature revised. Whether music precedes language or not has a separate trajectory with shared elements with language or is a consequence of language; it is relevant to see the correlates they have in common and the centrality of their shared communicative nature. There are rhythmical, melodious, and harmonic trajectories in operation when subjects communicate both non-verbally and verbally. Musicality, however, is particular for of non-verbal communication that is present and constant in the body intercommunication, between body and psyche, and between individuals. One aspect of such non-verbal communication is that of transmitting emotions, since Darwin (1871/2013) to most contemporary studies of musicality (see e.g., Honing et.al., 2018) argue for both the emotional contents in musical behaviours and the emotional responses to external musical stimuli.

The communicational aspect of musicality leads to another recurrent element in the literature, which is related to socialisation or social-bonding. Communication of thought, information, or emotion implies that both the sender and receptor are sharing information (e.g., between neurons or between individuals). Humans, due to their immature state at birth, depend on others to meet the necessary demands for survival. Those demands establish emotional interdependency and sharing which makes us a gregarious species (see e.g., Dissanayake, 2008). Moreover, musical

behaviours assure transmission and reception of information in effective ways but also secure early communication when verbal language is not yet developed. Social synchronisation is a part of the social aspect of musicality and requires a capacity to keep a regular beat to some external time giver (namely beat perception and synchronisation). Human rhythmic abilities did not arise to synchronise with a metronome (not originally) but to other people in groups with a mutual interest in making music together. The social element is not isolated from imitation (or mirroring), communication of thought or emotion, nor is it detached from pleasure and embodied shared experiences which are the next two nodal elements retrieved from this chapter.

Although the most dedicated study of pleasure in relation to music is provided in Pinker (1997), his argument does not account the complexities of musicality and is logically problematic. However, his emphasis on pleasure circuit activation is essential for musicality and the preservation of musical behaviours throughout evolutionary history. When listening to music or engaging in musical activities (e.g. caregiver-infant non-verbal communication), physical and psychological systems are activated and reinforced by hormones involved in feeling pleasure or satisfaction. Just as Darwin (1871/2013) and most theories on harmony claimed (see Chapter 1), pleasurable or agreeable feelings arise when regular patterns and harmonies occur. Activation of pleasure circuits are also present in social synchronisation and collective sharing of musical encounters. Pleasure, however, cannot only be reduced as a physical hormonal reaction, as in other instances in this thesis, the phenomenological experience is also relevant in that equation. In the following chapters, the issue of pleasure will be discussed not only within the psychoanalytic frame of reference (e.g., Freud, 1911) but also in the socio-political place of pleasure and erotic politics in the signification of pleasure and musical engagement (e.g., Lorde, 2017).

Finally, the body is transversal to musicality as it is the receptacle of music. Music, in abstract definitions, exclude not only different forms of engagement with sonic experiences but tend to marginalise the body—a critical dimension of musical experiences (and experiences in general). To

understand music as fundamental to human experience, it is necessary to look at it both as a cultural and psychobiological situation placing the body's centrality in human musical experience.

Academic discussions about psychobiological aspects of music introduce biological and psychological sciences into musicology agendas. Although these theorisations bring issues responding to their academic agendas, the relevance of considering music as a psychobiological situation is a shift from defining music as an abstract, crystallised element to retrieving the body as the primary source and resource of music. Cultural expression of music would not be viable without the ears, skins, and organs that receive the vibrations that the brain processes, activating circuits associated with language, pleasure, creativity, and motor systems, and then associated with memories and cognitive processes. Considering the body and its musicality implies a shift in how the body is placed within musical engagement.

Bodily reactions to music can be evident when tapping the foot to the beat of a song, or in less evident internal (psychophysiological) responses such as biochemical reactions. These *physiological responses* include heart rate, blood pressure, blood volume, blood oxygen, respiration, skin conductance, muscular tension, temperature, gastric motility, pupillary and startle reflex, and biochemical responses (Hodges, 2016, p. 185). *Physical responses* are natural, external, observable, and reflexive, such as chills, facial gestures, foot tapping, finger snapping, body swaying. *Psychophysiological responses* include both physical and psychological responses and the role of the mind in these. In music therapy, for example, the psychophysiological responses are of interest and interventions between *stimulative* and *sedative* music are used to cause or induce particular responses. If a client is lethargic, for example, the music therapist may start working with slow music, gradually increasing tempo and loudness bringing the clients to level along with the energy. These attributes coincide with the cognitive neuroscience studies that explain how the brain processes sounds and beats in ways that correspond to both stimulation and sedation and the spectrum in-between.

Music psychologists are also interested in psychophysiological responses but particularly in musical emotions (see Hodges, 2016; Hallam, Cross & Thaut, 2016). *Valence and arousal* are the aspects of positive and negative feeling about the music played. There has been disagreement among music psychologists between cognitivist and emotivist positions regarding musical emotions. Current research supports the coexistence of both positions agreeing that musical emotions can be perceived and other times emotions can be felt. Contemporary research is focusing on connecting psychophysiological responses to musical emotions. For example, in one study, 18 adults were chosen to represent happiness, sadness, and fear while monitoring cardiovascular and respiratory activity. Cardiovascular responses did not change significantly but respiratory activity did—the longest mean breath length occurred during sad excerpts, intermediate lengths during fear, and shortest during happy ones (Hodges, 2016, p. 186). Respiratory changes may also occur due to entrainment with tempo differences.

Other theories on bodily engagements to music can be found in queer musicology where the body is not seen, from a merely physiological viewpoint as previously, but as socio-political place for performative experiences of gender identity. Although this subject will not be covered in depth in this thesis, it is relevant to see how the body and its relationship to music is a relevant issue for socio-political action which questions the *status quo* of the role of the body and musical embodied experiences. These socio-political questions are relevant because they challenge traditional definitions and traditional ways to see and represent the body. Within queer musicology, musical experiences are necessarily embodied and political:

> I gave a talk on lesbian composers (the possibility, the prohibition) at a work-in-progress colloquium, and though no one usually attends these events, this time the whole department showed up in force. They came to quibble, to enforce standards. I could see standards in the smile of the lovely young straight woman, a scholarly star who teaches the Schoenberg seminar. She told me (in rarefied diction I dare not imitate) that music was

> independent of the body. In response I wanted to strip her naked and lick her body head to toe while humming Bessie Smith's "I've Been Mistreated and I Don't Like It." The upholder of standards used the word civilized, a word that usually means I will soon be mortified. (Brett, et al., 2006, p. 3)

Most of queer studies arise from the lack of representation of women and LGBTQ+ people in musicology, music composition, performance, and theories and therefore the political aspect is never detached from personal and collective experiences, including the body as a concrete performative political statement (for further analysis see Brett et al., 2006; Lewis, 2009; Maus & Whiteley, 2018).

These *dynamic* components show the continuity among neurophysiology, psychology, and socio-political factors that encompass aspects of socialisation crucial in the musicality-music continuum. They underscore the extensive complexity of music. In this thesis, the essential role of complex conceptual matrices is emphasised in determining epistemologies beyond the identities of the concept itself, as discussed in Rivera Cusicanqui's work on *ch'ixi* (2010/2020) and elaborated upon in Chapter 1. This approach involves considering the defined concept as more complex than merely its structural characteristics. In the case of musicality, the neuropsychological correlates do not explain the totality of the concept if its phenomenology is not considered in the definitions. For example, musicality cannot only be reduced to its evolutionary accounts, nor to the brain circuits that musical engagement activates (e.g., pleasure circuit). As seen in the case of neural correlates, musicality involves simultaneous firing of multiple fine-grained reactions throughout the body that result in perception and cognition of the series of tones and patterns interpreted in music and music-like sounds and behaviours. The complex psychobiological mechanisms by which humans perceive and understand musical stimuli have been brought up by the musicality academic agenda, but musical experiences cannot be reduced to neurocognition, nor can the centrality of these neurocognitive and psychobiological processes be neglected. Musicality has

positioned the body as a fundamental aspect of musical experiences. However, these neurocognitive approaches often constrain spontaneous emotional and phenomenological epistemologies of musicality. That is one of the reasons this thesis adds emotional development to both concepts of music and musicality because it seems relevant and necessary to include musical experiences as core aspects of human development and understand music as a broader human spectrum between biology and culture.

The research on musicality suggests that the neurocognitive aspects of music processing are more complex and sensitive than ever thought of before. Through the studies and available quantitative and brain imaging techniques, questions regarding the brain correlates and the origins of music are starting to make more sense neurologically. However, it is important to recall that not all explanations come from the scientific field. There is a tendency to legitimate theories only through experimental designs or concrete evidence (e.g., brain scans), leaving outside other forms of understanding how music works and its effects in human development. Most of the studies and theories of musicality serve to give potency and agency for understanding that music is not solely a cultural product detached from a psychobiological trajectory, nor is it an abstract situation isolated from its biological actions and responses. Musicality theories show how humans engage musically both in receiving stimuli from external sources or in producing the stimuli themselves to communicate information that may not be communicated through formal language. Communication outside formal verbal language occurs due to immature cognitive systems as in the case of infants, or because there are more subtle emotional or physiological interactions that involve processes distinct to those involved in linguistic tasks (e.g., intercellular communication, or looking at someone without the need to say anything).

The second issue is related to the psychobiological responses and determinants of music. These theories advocate for the centrality of the body, particularly the brain in musical processing. This is crucial because the abstract definitions shift to an embodied situation that bring to the discussion

phenomenological implications and ways of understanding musical engagement more in line as to what is said in Chapter 1 about the action and experience of music. While the contributions from musicality highlight the body's significance in the origins and development of musical behaviour and cognition, their insights often become confined within scientific agendas. This thesis contends that comprehending musical engagement as an embodied situation needs moving beyond "neurocentric" discourses and emphasising the body as an epistemic musical engine. In other words, musical engagement is an embodied situation that encompasses the entire body, extending beyond the brain and the limitations of its measuring techniques and its statistics.

Embodiment is intimately related to emotional aspects of embodied experience. In neurobiological terms, the work of Damasio (1999), Panksepp (1998), and Van der Kolk (2014) add an additional feature to emotional dimensions of musical engagement. Even though these aspects do not touch specifically on musicality, they place what this thesis would call the dynamic or phenomenological components of musicality. Beyond the structural aspects, explained by its psychobiological correlates, these aspects also inform an approach that touches on people's musical experiences. The following chapters explore these phenomenological and embodied dimensions more in depth, particularly when claiming that musical engagement and behaviour favour self-developmental processes both at individual and social levels.

CHAPTER THREE

COMMUNICATIVE MUSICALITY

The two previous chapters examined that musicality, as a concept and field of inquiry, has been influenced by discussions about the origins of music across disciplines as diverse as anthropology, musicology, biology, and psychology. These interdisciplinary discussions led to the separation of music as a cultural product to musicality as a psychobiological predisposition. Various authors (see e.g. Fitch, 2018) have assumed a set of universal characteristics present in musicality that has elements grounded in biology, some of which are shared with other animals, for example, rhythm with apes and melody with birds, and elements grounded in cognition which inform the ways in which humans perceive and process aural stimuli. These shared biological elements seem to serve primarily for nurture and survival and have been used in the investigation of the evolutionary aspects and biological functions of both music and musicality.

However, according to Colwyn Trevarthen[38] (1999) and Stephen Malloch[39] (1999) (Malloch & Trevarthen, 2009), musicality has additional characteristics in humans which go beyond informing a musical phenotype and beyond nourishing or meeting essential survival needs (Trevarthen, 1979, 1999; Malloch, 1999). Musicality is concerned with the unique way humans move and experience their world, their bodies, and one another. They extend their range of functions from general psychobiological characteristics to a more specific use, which Malloch introduced as 'Communicative Musicality' (1999). This concept addresses the specific characteristics of musicality in humans that originate at a stage before speech develops, when infants and their primary carers interact, but continues being a fundamental aspect of extra-verbal communication.

[38] Developmental researcher and psychobiologist. Emeritus Professor of Child Psychology and Psychobiology at the University of Edinburgh.

[39] Psychologist and psychoacoustic researcher. University of Edinburgh and University of Sidney.

This chapter is divided into four sections which set out the background, emergence, and characteristics of communicative musicality.

3.1. Background of Communicative Musicality

The term communicative musicality arose from the work of a group of infant researchers, psychologists, and cultural anthropologists (Bateson 1979, Trevarthen 1980, 1999, 2003) in the 1960s who were interested in the process of language acquisition as well as the behavioural displays and complex interactions that take place between caregivers and their infants. They challenged prevailing developmental models that characterised infants' and children's behaviour as simple, emphasising the notion that these behaviours stemmed from a perceived lack of abilities for conveying meaning, particularly shown in the lack of verbal language. Infants, according to these prevailing views, had not yet developed functions such as reasoning, intelligence, and physical fitness, which meant that their preverbal communicative skills were not acknowledged as steps of the development of higher psychological processes (Locke, 1794; Watson, 1925, and for detailed reviews see Heywood, 2014; Maynard and Thomas, 2004)[40].

Under the influence of Wilhelm Wundt's experimental psychology (1902/1910; Rieber, 2012, p.1222), the prevailing view asserted that sounds, such as babbling, produced by infants outside verbal language were considered devoid of meaning. Meaning, according to Wundt's language acquisition theory, results from the child's ability to learn the language and possess consciousness or self-awareness; therefore, it depends on a series of cognitive abilities which the pre-verbal child has not developed. However, Wundt's language acquisition theory now appears problematic in its

[40] These conceptions of infants and children as defective were influenced by earlier conceptions of childhood established in the eighteenth and nineteenth century. For systematic and historical reviews and analyses see Ariès (1962); Mynard and Thomas (2004); Heywood (2018).

assumption that pre-verbal language and interactions lack meaning, because, as argued in the emergent theories from the 1960s, these preverbal communications both convey meaning and enable other psychological processes to emerge, such as that of language. As pre-verbal communications were assumed to be devoid of meaning, they were overlooked in psychological studies and certainly not related to musical features. When musical features were discussed in psychology, they appeared in studies related to adult cognitive and representational processing of sounds and music, which omitted or neglected scholarly investigation of early infant communication, e.g. in Gestalt psychology, cognitive sciences, and neurology (see e.g. Stumpf, 1911a; Lipps, 1926; Von Helmholtz, 1875, Graziano & Johnson, 2015). Cognitive studies of music also failed to engage with early infant communications as relevant to the development of musical abilities and other psychological processes such as self-development which involve emotional maturation and early socialisation. These two developmental aspects are further discussed in the Chapters 4 and 5.

The views from the 1960s, which differed from traditional approaches to childhood, were influenced by Piaget's model that argued children were 'little scientists' who discover the world by sampling and testing hypotheses that grow more complex as the infant conquers developmental stages (Piaget, 1927/1977; 1936/1952; 1937/1954; 1945/1951; 1947/1950).[41] Piaget influenced the study of childhood and psychological processes, particularly those related to language acquisition and development, an increasingly central focus of scientific enquiry throughout the

[41] There are mixed views about Piaget's developmental stages. For example, in an article in the *Journal of Psychological Sciences* (1996), researchers K.W. Fisher and R.W. Hencke argue that Piaget's views integrate the stage model with the idea that infants and children are active agents that construct their own world where there is a dynamic role in physical and social contexts in that construction. A more integrated view of Piaget's work could get closer to the developmental claim the authors criticise. Piaget's views shifted from the 'tabulae rasae' (Locke, 1794) and Watson's lumps of clay (1925) which claim that children do not have any agency or knowledge when they are born, and perception or conditioning are the only factors that shape their minds. Piaget viewed children as active agents in their own development and recognised the importance of the environment in the developmental process. The position of Fisher and Hencke is closer to the position this thesis takes, which sees infants as active and engaged agents of their development. Fischer, K., & Hencke, R. (1996). Infants' Construction of Actions in Context: Piaget's Contribution to Research on Early Development. *Psychological Science, 7*(4), 204-210. Retrieved July 21, 2020, from www.jstor.org/stable/40062946.

twentieth century (see Heywood, 2014; Fischer & Hencke, 1996) [42]. Since Piaget, research has moved away from conceiving infants as isolated organisms to seeing them as interacting and communicating beings. The study of prelinguistic communication began as a specific field of inquiry in research in the United States and Great Britain in the 1960s (see, Bullowa, 1979).

The importance of active interaction, engagement, and communication in sharing states between the infant and caregiver signalled the most relevant difference both from traditional views and those of Piaget. The characteristics of sharing and interacting began to be seen by researchers as elements that support the claim that forms of communication involving behaviours, expressions, and sounds all convey meaning, though they are not yet language. That is, these studies of the earliest communications extended from considering the main means of communication as language to include extra-verbal or pre-verbal communication such as pointing, moving, and vocalising into a repertoire just as important as language (Bullowa, 1979). As the study of infant communication shifted from more traditional approaches, a series of independent studies on infant behaviour and development took off in different directions (H. Papoušek 1967; Trevarthen 2003). These studies produced evidence that children have many talents and are actors and actresses with expressive and receptive sociability well before they learn to talk (H. Papoušek, 1967). They explored a particular type of sociability that is expressed as soon as the baby is born and goes beyond not only what any young animal needs for protection and nurturing (Trevarthen, 2003), but also beyond their appetite for knowledge or epistemophilia (Donaldson. 1991). These accounts highlighted the early presence of intentionality in infants (Trevarthen, 1979; 1999) and claimed that children have remarkable perceptual skills and habituations to repetition when they perform in

[42] The study of language was largely influenced by the nineteenth-century precursors and the establishment of psychological and behavioural sciences which were focused in studying psychological processes and their development, mainly preoccupied with language development, learning, and education in children (see Heywood 2018 for historical review; and Munger 2003 for a detailed review of the history of psychology).

engaging and genuine environments (Bullowa, 1979, Papoušek, 1967; Trevarthen, 1999; Malloch & Trevarthen, 2009a).

The foundations set in the 1960s by the views of infant development, music perception, and cognition directed attention to caregiver-infant pre-verbal communications, and suggested there is a much more purposeful and emotional elements in early infantile development that traditional conceptions, such as those of Wundt, Piaget, and their followers, had overlooked. Babies, for example, show an active interest in the human voice and intentionally seek responsive company (DeCasper & Fifer, 1980). The infancy researcher and psychiatrist Margaret Bullowa (1979) edited a pioneering book, *Before Speech*, collecting infant research of the 1970s, which focused on communication and language acquisition. There, she referred to "a child's 'communicative competence'"(in Malloch and Trevarthen, 2009a, p. 2), an area of study which extended in the following decades into analyses of both infants' vocalisations and of the styles of speech used by their caregivers to respond to them. These communications were later named 'motherese,' Infant-Directed Speech (IDS), or Child-Directed Speech (CDS) (Beebe et al., 1985; Papoušek, et.al., 1992; Gratier & Apter-Danon, 2009). Bullowa's book registered a significant shift in research on preverbal communications and interactions between infants and their caregivers.

One relevant feature in the pre-verbal communications detected by the researchers in Bullowa's (1979) book was identifying rhythmical and melodious turn-taking patterns. Identifying these patterns led to the conclusion that early communications provide developmental signals that are the substrate for later language acquisition and other aspects of social and psychological development (Bullowa, 1979, p.12). That is, preverbal communications, also referred to as non-verbal communications or 'protoconversations' (Bateson, 1971), are much more than random sounds; they are full of content and may help to discern how an infant uses them to engage with the world and its objects, i.e., persons, and things. Bullowa and anthropologist and linguist M.C. Bateson (1971; 1975b) analysed a series of video recordings of infants interacting with their

caregivers in their first half-year and they found a series of behavioural displays such as sucking, head and limb movements, coos, and ocular movements which they later described as 'music-like' or 'dance-like' because they were organised and showed coordination between the infant and the caregiver (Papoušek, 1999, Trevarthen, 1999; Malloch & Trevarthen, 2009a). Rhythm and movement were identified as central (Bateson, 1979) amongst the rich behavioural displays, and they, in turn, became central in the early works of Malloch (1999) and Trevarthen (1999), and set the foundations for the theory of communicative musicality.

Anthropologist Peter Byers explains how the sharing of information works:

> the information carried by interpersonal rhythms does not move directionally from one person to another. Thus, the information cannot easily be conceptualized as 'messages' since the information is always simultaneously shared and is always about the state of the relationship. (1976, p.160)

With this emphasis, Byers was setting the scene for future multidisciplinary approaches to the study of infant communications (Malloch & Trevarthen, 2009a; Honing, 2018). Byers emphasised the dimension of sharing in the communications between mothers and infants and pointed out that communication is about a relationship which happens in the present and simultaneously carries information at many different levels: physiological, social, and cultural. The relevance about Byers' ideas is that these levels of message contents are not developmental milestones that the infant must achieve one after the other, rather they occur simultaneously and are messages that transmit information about physiological and emotional states within the dyadic interaction and convey meaning for the dyad. The initial message content can be related to informing caretakers about physical needs, and as the baby grows, about more complex repertoires such as emotional states and culturally informed ways of expression. One of the ways for making communication effective is via repetitive behaviours. Repetitions are informed in constant patterns which are perceived from physiological patterns such as breathing or heart-beating and essential needs like

hunger or elimination that also function in cycles of repetition. Furthermore, the responses from the carer to the infant's psychophysiological rhythmicities, such as smiles or playful interactions, form the cycle of meaning patterns. There is, in other words, a rhythmicality to timed experiences that occurs across the natural and the human world reinforcing the centrality of rhythm in human existence (Osborne, 2009). Apart from the bio-physiological messaging, there is also an exchange of information about one another when carer and infant interact and about the culture in which the dyad is embedded. Constancy and repetition are core elements related to the rhythmicity perceived and performed in different stances of life (physiological and behavioural), which reinforce human internal (mental) rhythmicity as Chapters 4 and 5 in this thesis discusses.

In a recent paper, Darabi et al. (2024) present a neurologically motivated simulation of ensemble performance, focusing on the critical role of common timing in predicting and coordinating behaviours. The study utilises a dynamic systems approach to model sensorimotor synchronisation (SMS) tasks, where individuals synchronise their movements with external rhythmic stimuli. This research highlights the importance of common timing mechanisms in facilitating precise coordination among ensemble members.

The authors demonstrate that common timing allows for accurate prediction of rhythmic events, which is essential for synchronised performance. By simulating various ensemble scenarios, the study reveals that shared temporal frameworks enable individuals to anticipate and adjust their actions, thereby enhancing collective performance. The findings underscore the neurological basis of timing in ensemble settings, suggesting that common timing is a fundamental aspect of coordinated behaviours. The paper provides significant insights into how common timing mechanisms underpin the ability to predict and coordinate actions, offering a valuable contribution to the understanding of collective performance dynamics and the rhythmicity and mutual coordination that Byers and Bullowa, Malloch and Trevarthen, and others have been studying over the past decades.

Byers and Bullowa (1979) argue that these shared encounters are critical because they occur in real and present time, so that meaning is made there and then within the dyadic interaction. The encounters are about sharing and making experiences together and not so much about the sequence of events or the contents related to the information. If the communication is related to hunger or to singing a nursery rhyme, it does not matter as much as the fact that it is a moment of sharing and reciprocity. The relevance of Byers' (1976) contribution is that he pointed out a state of 'togetherness', signposting what in later years will become a fundamental aspect of studies of infant development and of communicative musicality. However, the contents of the messages are important because the quality and type of information shared by the dyad is influential in the way carer and infant play and engage emotionally. Byers (1976) agrees that the 'message' conveyed within these interactions is difficult to conceptualise because it is not as explicit as words, and this remains a general issue for the systematic study of aspects of early and preverbal development as it does in the study of music itself.

In their study, Watzlawick and Beavin (1967) explore the formal aspects of communication, focusing on the structural elements that underpin effective interaction. The paper explores the pragmatic aspects of communication, emphasising the importance of context and the relational dynamics between communicators. The authors argue that communication is not merely about the exchange of information but also involves the interpretation of messages within a given context. The study identifies key principles of communication, including the notion that all behaviour is communicative and that communication can be both verbal and non-verbal. Watzlawick and Beavin (1967) highlight the concept of metacommunication, which refers to the communication about communication, and its role in clarifying and regulating interactions.

Furthermore, the paper discusses the implications of these formal aspects for understanding human behaviour and interaction. By examining the underlying structures of communication, the authors provide insights into how misunderstandings and conflicts can arise and how they can be

resolved through effective metacommunication. Their work contributes significantly to the field of communication studies by elucidating the structural components that facilitate effective communication. This paper related to Byers's ideas about non-verbal interactions as forms of communication.

Similarly, Bullowa (1979) further explains the nature of sharing in infants' interactions with their caregivers and argues they have a meaning which the carer spontaneously interprets and responds to, thereby forming organised performances that could be called 'rhythmical'. For infants to enter into the 'sharing of meaning', they have to be *in* communication with another person, and Bullowa argues that this has a rhythmical, time-based performative aspect. Sharing of meaning refers to the moment of interaction between infant and adult where the infant communicates something and the adult responds accordingly; both are attending to, creating, and experiencing together. Establishing a particular communication can be compared to tuning into a carrier wave as when tuning in to a radio station (Bullowa, 1967; 1979). Bullowa (1979) argues "This [shared aspect] is probably the key to rhythm sharing underlying also fully elaborated inter adult communication, even though it is often overlooked in our preoccupation with details of the codes for transmission of messages" (p. 15). Sharing of meaning is similar to concepts such as holding, mirroring, and attunement which are further explored in the following section and in Chapter 4. Although Bullowa's book is primarily concerned with the onset of language acquisition, the elements raised as characteristic of infant-caregiver communications (rhythm, sharing, performance, and experiencing together) are fundamental elements in the future work on communicative musicality.

Another relevant background contribution that this thesis finds central to the theory of communicative musicality is that of the infant researchers Hanuš and Mechthild Papoušek (H. Papoušek, 1977; Papoušek & Papoušek, 1987; 1989) who introduced the idea of mother-infant interactions as musical, explicitly stating that these interactions have musical elements, as opposed to what linguists (Snow, 1972; Garnica, 1977; also in Papoušek et.al., 1992) claimed as

'suprasegmental' or 'paralinguistic' elements (Batliner & Schuller, 2013; Gussenhoven, 2016). The contribution of the Papoušeks was a fundamental link which contributed to the exploration of preverbal communication as a complex developmental situation that has meaning (Bullowa, 1979) and whose organised formal features resemble those of music (H. Papoušek, 1977). The Papoušeks further claimed that what they identified as 'musical' features present in early infant communications were a means specifically for communicating emotional states, just as music does. This is a crucial finding as it draws a parallel between the characteristics of caregiver-infant interactions and those of musical practices. It is a parallel that Trevarthen (Malloch & Trevarthen, 2009a) and the field of biomusicology (see Honing et.al., 2018; Peretz, 2001; Peretz & Zatorre, 2003) further explore, concluding that music's origins have a biological substrate which is connected at a cerebral level with pathways (limbic system, cerebellum, prefrontal cortex pathways) related to emotional states. Studies in music perception (Trehub & Trainor, 1998; Peretz, 2001) further suggest that perception of emotion in music starts early in life between infants and their caregivers, playing an important role throughout the lifespan in terms of emotional regulation and communication (see Peretz, 2001, p. 114). Chapters 4, 5, and 6 in this thesis discuss the emotional states expressed in infantile preverbal speech as fundamental for the cultural expressions of music.

The Papoušeks (1987; 1989) defined caregiver-infant interactions as inherently musical, emphasizing the interactive nature of these innate musical skills. They argued that the shared sense of time between adults and infants is crucial for creative and emotional sharing, as well as for learning cultural and natural conversational language, foundational elements of communicative musicality. Additionally, the Papoušeks asserted that the caregiver's 'intuitive parenting' serves as a vital external stimulus for the child's investigative motivation and cognitive development, regulating inner states of arousal and physiological maintenance. Their study documented didactic adjustments in mothers' and fathers' speech to 3-month-olds, revealing modulations in tempo, tone, and syntactic complexity. This supports the assumption that baby-talk contributes to didactic support for infant communicative development (Papoušek M, Papoušek H & Haekel, 1987) and

emotion recognition development (Trehub & Trainor, 1998; Trehub & Nakata, 2001-2002; Peretz, 2001, p. 116).

3.2. The early works of Colwyn Trevarthen and Stephen Malloch

Infant researcher and psychobiologist Colwyn Trevarthen (1980; 1999) has substantially contributed to the hypothesis about musicality in infant-directed speech (IDS). In his paper 'Musicality and the Intrinsic Motive Pulse' (1999), Trevarthen theorises about the origins of musicality in what he calls the 'Intrinsic Motive Pulse' (IMP), which he argues originates in the biological substrates and rhythms (similar to Byers and Bullowa's rhythms) that make the organism move and strive for survival and interact with others. The IMP refers to the urge to transmit physiological needs via movement, sound, and an urge to transmit emotions and feelings. Trevarthen claims it is the motor of communicative behaviour, goal-defining purposefulness or intentionality, and creativity (1979; 1999), and shows how the IMP is related to rudimentary forms of communication which direct efforts to survive and connect with others. In emphasising the source of musicality, Trevarthen (1999) asserts that the IPM generates outputs characterised by repetitive movements with precise rhythms and accelerations "[a]n intrinsic motive process drives the action and awareness of the purposeful and aware subject" (p.158). Audible gestures that lend meaning, memorability, and shareability to music, he argues, stem from the IMP, serving as a source of 'created poetic' time (Trevarthen, 1999, p.158).

The IMP, the impulse for moving and feeling, elicits a sympathetic response from the caregiver to establish a shared intersubjective encounter—a dyadic interaction. Malloch and Trevarthen (2009; 2018) claim that both the impulse (IMP) and the sympathetic response have 'musical' characteristics originating in sensorial experiences and in the perception of rhythmic patterns found in biological cycles. Seeing, walking, hearing, and touching, for example, present modalities

of the rhythms that humans experience, perceive, and then replicate in their interactions. These musical rhythmical characteristics are also transmitted and experienced in footsteps, muscular tensions, the vocalisations of emotion, and thought in cries and calls, and, later, in articulated song and speech (Trevarthen, 1976;1999). Most of the evidence supporting the theory of the IMP and later of communicative musicality, comes from audio-visual microanalyses, observations, and studies (Bateson, 1979; Bullowa, 1979), which are primarily focused on observing the movements, orientations of attention, and sympathetic expressive responses of infants—either at play, engaging through musicality with an adult, or when responding to fragments of recorded music (Baruch & Drake, 1997; Papoušek, 1993, 1996; Trehub et al., 1993; Trehub, Schellenberg, & Hill, 1997; Trevarthen, 1979, 1980, 1999).

The IMP as a source of musicality is part of human nature sourced by the experience of *acting,* the generative images of *moving,* and the *sense of time* that movement (the time it takes to walk, jump, hit, or think) cultivates. Musicality is embedded in human cerebral nature because the generative impulses and the cerebral images created by one's own movement mark experiences and preferences towards others that move and respond sympathetically. Sympathetic *sharing* is part of innate musicality because musicality itself is an innate talent for communicating *in* company. The IMP involves a "future creating process by which subjects may anticipate what might happen and when" (Malloch & Trevarthen, 2012, p.250). Trevarthen explains how the IMP is the motor of communicative behaviour and intentionality, but he does not elaborate in demonstrating the connection between IMP and creativity which is something Chapter 4 discusses further.

Trevarthen (1999) also relates the transmission of emotional information to movement because the primordial source for integrating the movement of body parts, predicting accurate movements to reach objects, anticipating sequences in space and time, and controlling sensory input-output dynamics is located in the brain's reticular and limbic core (Trevarthen & Aitken, 1994). The body maps in the brain, according to Trevarthen (1999),

> are indispensable if motor outputs and sensory inputs are to move and guide the body and its parts in such predictable, controlled ways, and some-fully integrated core mechanism must activate, knit together and sequence the functions of the innumerable somatotopic assemblies of neurons in cortices, nuclei and tracts of the brain, and finally this mechanism must take in referent information to keep track of what it is 'doing'. (p.160)

Trevarthen identifies the system which keeps the neuromotor organisation as the 'Intrinsic Motive Formation', and the body-moving rhythmic and emotionally modulated system is the Intrinsic Motive Pulse (Trevarthen, 1999). He provides evidence from embryology (O'Rahilly & Müller, 1994) and brain science (Turner, 1985; 1991), and uses Malloch's (1999) investigation on caregiver-infant interactions to support his theory in which he claims life starts with movement, body impulses, and regulatory systems that are linked with a bodily image and the limbic system. Trevarthen's IMP is a musical impulse that moves the body and involves neurochemistry relating to emotional processing; it is musical because at the physical level, the IMP starts with regular progressions of timed events that reinforce the way in which humans process timed lapses of events cognitively and communicatively. His ideas are related to more recent studies in neuroscience about the body-sensory mapping or 'cortical homunculus'[43] (Seriès, Stocker, & Simoncelli, 2009), and the advances in the theory of interoception[44] (see e.g. Critchley & Garfinkel, 2017). Studies have also found a particular link between beats, rhythm, and the body in terms of how rhythm is felt physically and how it moves us or makes us move (Phillips-Silver & Trainor, 2005), the correlation between heartbeat, rhythmicity, and fear perception (Critchley & Garfinkel, 2017) and the emotions that motor engagement elicits in social interactions (Cross, 2001; Di

[43] Disambiguation: "(in early biological theory) a miniature human being thought to be contained within each of the reproductive cells." Martin & Martin (2015). Homunculus. Concise Medical Dictionary, 2015-01-01. In modern neurobiology the word homunculus "is used to describe the various maps of the body in the brain" (Kabat-Zin 2018)

[44] Interoception refers to emotional feeling states that arise from physiological changes from within the body. It also describes the afferent signalling, central processing, and neural and mental representation of internal bodily signals (see Critchley & Garfinkel 2017)

Pellegrino, et al., 1992; Jeannerod & Frak, 1999; Rizzolatti & Arbib, 1998; Trevarthen, 1999). When people interact socially, for example, the cerebral motor images of the body in action efficiently serve to represent other bodies and their intentions in behaviour. The scientific data supporting motor images that give prospective regulation to action also explains "how motor actions and their intentions are conveyed sympathetically or mirrored imitatively and co-operatively between subjects" (Trevarthen, 1999 p.164). This characteristic of motor timed actions—the IMP—is an element that Malloch will use in conceptualising communicative musicality.

Psychoacoustic researcher Stephen Malloch (1999) introduced the term 'communicative musicality' in reference to the displays and interactions between infants and their caregivers, which he understands as musical and transmit emotional states as the infant grows in the first months of life. These shared communications originate from the cluster of psychobiological predispositions (Trevarthen's IMP) and from birth onward become more sophisticated allowing the infant to develop systems of communication that inform the emotional states and needs for relating, moving, and sharing with others that go beyond the physiological needs. Malloch (1999) took on Trevarthen's concept of IMP as a foundation for defining *pulse*, which he proposes as the first musical characteristic that involves rhythmical timed sense of shared behavioural events. In addition to pulse, Malloch (1999) expanded Trevarthen's IMP theory to include other musical characteristics (quality and narrative) found in the recorded carer-infant interactions, which are elaborated in the next section (3.3). He took the data gathered at Trevarthen's lab in Edinburgh in 1979 and analysed these audiovisual recordings, defining the musical features of early mother-infant communications. At the same time Trevarthen (1999) was studying human musicality and the IMP, he was also looking for explanatory theorisation about the origins and motives of musicality.

The early works of Malloch (1999) and Trevarthen (1999) set the framework for communicative musicality which is defined as the art of human companionable communication, consisting in

innate abilities for being able to move sympathetically with one another. As Malloch (1999) states, "It [communicative musicality] is the vehicle which carries emotion from one [person] to the other" (p. 48). Malloch & Trevarthen's (2009; 2018) results of almost two decades of collaboration were related with the claim that infants have an intentional, purposeful engagement with others who correspondingly feel and move their body in ways that resemble music, mirroring, and responding to the affects and emotions of the infant. In this way, they pick up a goal defining purposefulness. The infant's intentionality to engage with the outside world via its communicative musicality has consequences for language and psychosocial development, which Bullowa (1979) outlined and Malloch & Trevarthen have taken forward in their general argument by analysing the data gathered in their original observations and by revising literature of studies and theories related to their discoveries. For example, Malloch and Trevarthen suggest that the functional social aspects of communicative musicality guide the mastery of language acquisition and emotional communication; speech and language depend on motor skills and on emotional communication of gesture and vocalisation—both characteristics of communicative musicality (Delafield-Butt & Trevarthen 2013). These correspondent behavioural cues and cooperative communication involved in infant directed speech and its relationship with language development has also been confirmed in the behavioural and brain sciences (e.g. Lebedeva & Kuhl, 2010; de Boer & Kuhl, 2003; Besson & Schön, 2003; Falk, 2011; Falk & Kello, 2017; Honing et al., 2018).

Intentionality is one of the concepts that Malloch and Trevarthen have been exploring to further develop what the infancy researchers in the 1960s and 1970s were outlining. Intentionality has been typically studied from the point of view of attentional processes (see e.g. Lamont & Greasley, 2009), i.e. from a cognitive-behavioural point of view. Malloch and Trevarthen's approach to intentionality is grounded in both a philosophical understanding which defines it as an aspect of

consciousness representing an experience or a perceptual reaction directed towards something[45], and the contemporary cognitivist intentionality which focuses on attention directed towards something which exists in the material world (see Malloch & Trevarthen, 2018). Both approaches to intentionality seem contradictory as one defines a represented experience, and the other refers to an action of attentional engagement towards a concrete external phenomenon. This apparent contradiction can be seen as a definition of two parts of the same psychological process, one referring to an internal situation and the other to an external one. Therefore, the paradox can be seen as a complementarity because humans have the capacity to both perceive and represent things, independent of its source—internally or externally. What is problematic about these approaches to intentionality is that none of these views considers the unconscious, in a psychoanalytic sense, as a topography and dynamic in the theory of the mind. Disregarding the unconscious can bring an epistemological and possibly an ontological problem because it is a reservoir of symbols and experiences that motivate behaviour. Not considering the unconscious leads to a model that operates on the assumption of consciousness as the leading mental-behavioural process. The detailed theoretical discussions on intentionality are out of this thesis's scope, but they present a philosophical conundrum to the 'problem of intentional inexistence' (see, e.g. Brentano, 1874; Crane, 2013). Intentional non-existence refers to the internal motivational forces or objects that do not exist outside the mind, such as fantasies or hallucinations, which are the fundamental sources of mental life from a psychoanalytic perspective. The intentional non-existence is a theoretical problem that also brings issues to Daniel Stern's conceptual ideas as he takes the unconscious as a given in his theory of affect attunement and vitality affects while simultaneously claiming that the fundamental units of the mind coincide with the external reality and the actual lived experiences, before forming objects and representations (see section 2.3.3 in this chapter). Stern's theories are greatly influential to Malloch and Trevarthen's work. Further

[45] Malloch and Trevarthen's approach to Intentionality is influenced by Husserl's phenomenology (see Tragesser, 1984; Husserl, 1999)

developments on intentionality and a possible solution to the epistemological problem about consciousness and unconscious is provided in Chapters 4 and 5 in regard to the descriptive unconscious and the phenomenology of music.

Audiovisual micro-analyses techniques used in the studies conducted by Malloch (1999) and Trevarthen (1976; 1999) showed that expressive movements and interactive timed responses are the foundation of a primary intersubjective communication deriving from voluntary performative actions which serve as regulatory mechanisms to the body and felt emotions. More recent studies on what Malloch and Trevarthen called 'intentionality' or 'goal defined purposefulness' are concerned with the relation of musical preverbal interactions with psychological process such as attention development and sustained attentional functions. These studies have demonstrated that infants listen with perceptive preferences to the sounds of speech, singing, and music, revealing that infants pay attention to those perceptual stimuli which have 'musical' qualities (e.g. rhythmical patterns) over other kinds of stimuli (Trevarthen, 1999; Phillips-Silver & Trainor, 2005, 2007). These perceptual preferences are the foundations for Malloch and Trevarthen's argument that intentionality and active engagement are present in very young infants—newborns or, some claim, even in the womb (Trevarthen, 1999 and Malloch & Trevarthen 2009). The issue of consciousness will be developed in the Chapters 4 and 5 in relation to the psychoanalytic accounts and with this thesis' hypothesis related to self-development and experience.

Trevarthen and Aitken (2001) review research evidence on the emergence of self-awareness in infancy and relate this process to the IMP. The authors conclude that the correct function of the integrated neural motivating system is essential for the development of the infant's 'purposeful consciousness' or 'intentionality' and their ability to cooperate with and learn from another person's interests and actions. In studies derived from the broader spectrum of musicality, i.e., not specific but transferable to communicative musicality, clinical correlations have been studied within the cognitive neurosciences in relation to neurological conditions such as amusia, dementia,

and Alzheimer's (Kontos & Grigorovich, 2018; Peretz & Zatorre, 2003) and rhythm processing (Phillips-Silver & Trainor, 2005). It also has been studied in other fields such as language processing and development (e.g. Turker et al., 2017), education, music education (King & Himonides, 2017), perception, and cognition (Cook, 1998; Peretz, 2001; Peretz and Zatorre, 2003). Communicative musicality has also been studied from anthropological and social cognition perspectives relating the socio-emotional factors of communicative musicality with their role in processes of socialisation, ritual, and group engagement (see e.g. Dissanayake, 2009; Cross, 2014; Huron, 2001), and the role of communicative musicality in socio-political spheres (e.g. zones of conflict and post conflict) (Osborne, 2009, Chapter 15 in Malloch & Trevarthen, 2009a). Overall, the 'infant's intersubjectivity' has been demonstrated as essential to ordinary development and to have a correlation in major mental health issues such as postnatal depression, language impairments, auditory processing impairments, and potentially with pathologies whose aetiology has been recently demonstrated to be related to early attachment and emotional issues such as Borderline Personality Disorder (see e.g. Scott, Levy & Pincus, 2009; Bateman & Fonagy, 2010; Sharp & Fonagy, 2015).

In conclusion, the authors have been collaborating and exploring this concept over the past decades as the concept itself has been further expanded within the academic interdisciplinary field. Some of their subsequent works have been devoted to observing the emotional, social, and clinical implications of communicative musicality. For example, Malloch (1999) suggests that when the ability to share emotions is impaired, communicative musicality is 'less musical' than when this ability is not compromised. This was based on instances where he observed vocal exchanges between birthgivers with post-natal depression and their babies, where the regularity of timing is slower than non-depressed mothers interacting with their babies. Pitch[46] has also been found to

[46] Pitch refers to the quality of sound and it is determined by the rate of the vibrations that produce the sounds; the degree of lowness or highness in a tone in respect to a range of other tones (see Malloch 1999; Langer & Banson 2015). Stainsby and Cross (2016) argue that pitch is not only reducible to vibrations and physics, but they also define

be flatter in these cases of post-natal depression and entrances in vocal gestures out of time as opposed to the results in the other studies (see e.g. Robb, 1999 in Malloch, 1999 and see *Figures 1, 2* and *3* below).

3.3. Components of Communicative Musicality

The theory of communicative musicality identifies the elements of *pulse*, *quality,* and *narrative* as attributes present in human communication and used in music to allow coordinated companionship. This section will discuss each of the elements as suggested by Malloch (1999) which constitute the foundations of the particular focus he and Trevarthen give to the whole field of human musicality. They demonstrate their claims and the components of communicative musicality through the microanalysis of video-recordings of caregivers interacting with their infants, concluding that early infant communications have musical features and constitute affective sharing. The detailed analysis of audio-visual recordings discussed here with measuring tools and qualitative data is an additional step confirming the original hypotheses regarding observed regular, emotional, and corresponding behavioural patterns of interaction between infants and their caregivers.

3.3.1. Pulse

Pulse is the first element of communicative musicality. It is "the regular succession of expressive 'events' through time" (Malloch, 1999 p. 32). This definition derives from the spectrographs analysed by Malloch where he found that within the interactive moments between a mother and

pitch as the psychological attribute that allows the ordering of sounds on a frequency-related scale, derived from the acoustic signal entering the auditory system. This perception is underpinned by dual processes based on the place of excitation within the cochlea and the extraction of temporal structure.

her six-week-old infant, there is a regular pattern in their recorded vocalisation. The spectrograph shown in *Figure 1* (Malloch, 1999 p. 33) is divided by vertical bar-lines and the time-lapse between each bar shows regularity and overall a coordinated communication between mother and infant (see Malloch, 1999 pp. 33-47 for a detailed analysis). Pulse is a fundamental element in the theory of communicative musicality because it shows the coordination and correspondence in the caregiver-infant communications.

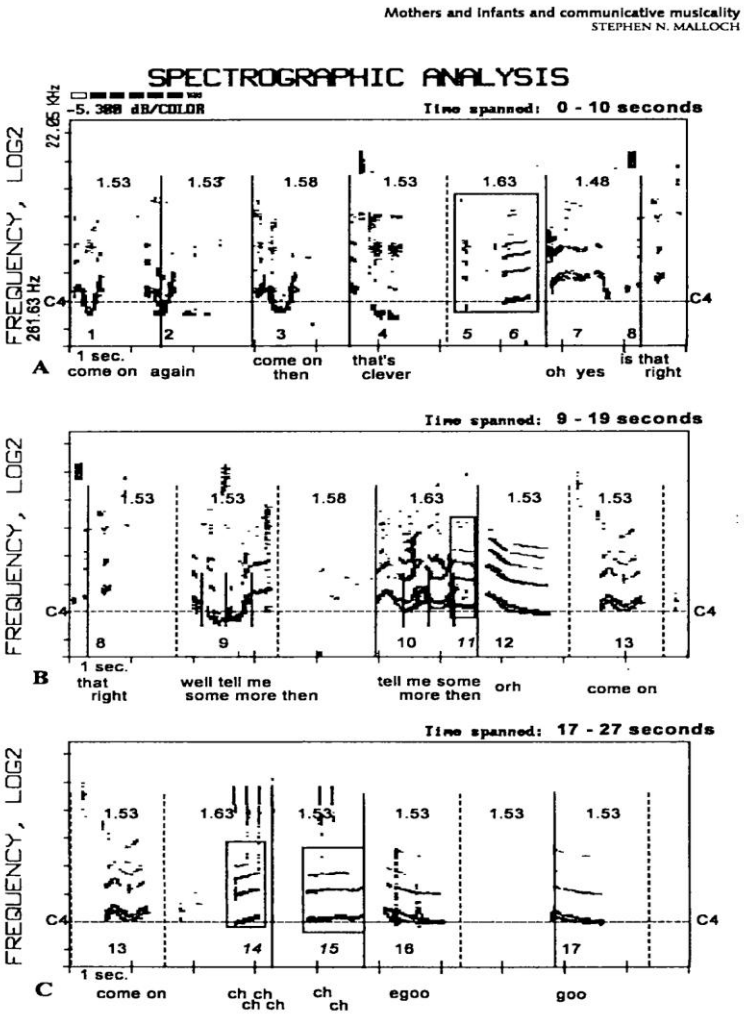

Figure 1. Laura (6 weeks) and her mother vocalising together.

33

Figure 1 Spectrographic analysis of a mother and her 6-week-old infant vocalising together (Malloch 1999, p.33).

Figure 1 shows three ten-second recorded vocalisations. The vertical bar-lines mark the timing in seconds of the vocal exchange intervals. The dash-line bars correspond to important moments during the course of the interactions (temporal landmarks) and the boxes in seconds 5, 6, 10, 11, 14 and 15 are moments when the infant vocalised. Often the mother allows timed space to allow the baby to respond, and both mother and baby show accurate small-scale timings. The regularity of events reveals an approximate average of 1.53 seconds between each bar-line, demonstrating the periodicity created by both mother and infant to negotiate, and it could be argued, to play with their turn taking.

The regular succession of discrete behavioural events—coos, syllables, utterances, and gestures—represent the IMP. *Pulse* is therefore a presentation of Trevarthen's (1999) IMP, the fundamental drive for human intentionality to reach out to others. Trevarthen associated pulse with movement by suggesting that the initial way in which babies reach out and connect with others is via bodily movements.

Trevarthen's IMP and Malloch's integration of pulse as a component of communicative musicality reinforce the idea of feeling continuity and replication of similar rhythmical patterns that start in human biology and are connected with neural circuits. These circuits are linked with motor and emotional systems, preceding the way humans coordinate their bodies, reach out to others, and coordinate the different levels of actions and timing. 'Brain time', suggests Trevarthen (1999), is manifested in most notions of time that humans have, which seem reinforced by how the species represent life and its cycles and the way it makes and creates music (see Bjørkvold 1992), informed by the fundamental rhythmical and motivational patterns present in early infant-caregiver

communications. For example, the regularity of seasons, the regularity of a heart beating or walking, the continuity of time in the calendar are instances of the ways regularity, rhythm, and therefore pulse become a fundamental aspect of life because rhythm is mutually reinforced by external and internal causes which are expressed via pulse in communicative musicality.

2.3.2. Quality

Quality is the second component of communicative musicality and refers to the melodic and tonal quality produced by the infant-caregiver interactions and "consists of the melodic and timbral contours of the vocalisations (equivalent to the contour and speed of the bodily gestures)" (Malloch, 1999 p. 38) or "contours of expressive vocal and body gesture, shaping time with expressive movement" (Malloch & Trevarthen, 2009a, p. 23). The methods for measuring melodic and timbral contours are different to the spectrographs used to measure pulse time intervals because spectrographs do not reveal high resolution frequencies. According to Maloch, quality is composed by two elements: melodic or pitch contours and timbre quality . The first element, that of melodic contours, is measured from pitch-plots which is a method for graphing the pitch of the vocalisations, i.e. the quality and rate of the vibration that produces a particular sound. This method allows the investigation of how expressive movements of the caregiver-infant vocalisations move in frequency and space. Brown (1991; 1992 in Malloch, 1999, p. 38), conducts experiments using computerised spectrographs that produce a constant pattern in the frequency log to display the f0 of the recorded signals of the recordings, enabling the analyses of pitch behaviour during caregiver-infant vocalisations. The analyses and pitch plots cohere with the pulse and rhythmical qualities because in the important temporal moments, the frequency and intensity of the voice changes.

In *Figure 2*, caregiver and infant methodically explore pitch-space, for example the mother's pitch starts at a middle-C frequency with changes in the second 7, 15, and 20 seconds. There are consistent changes in regular intervals of approximately 7 seconds with correspondent changes in the infant's vocalisations. According to Malloch (1999), "These infant vocalisations are 'musically logical'—particularly during songs sung by the mother" (p. 39). According to the author's qualitative registers, pitch, rhythm and loudness are accompanied by movements which play important motivational and emotional roles within the communicative cooperation.

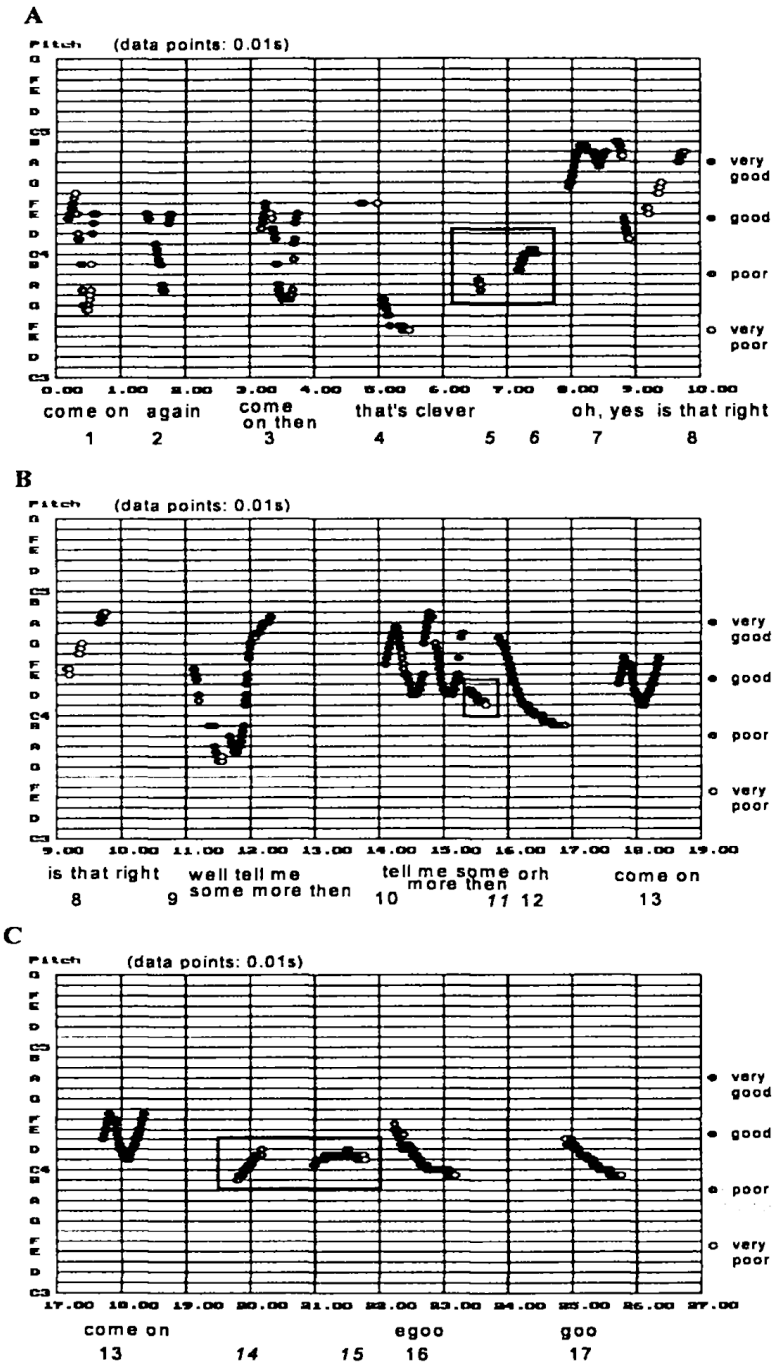

Figure 4. Pitch plot of Laura (6 weeks) and her mother, taken from data represented in Figure 1.

39

Figure 2. Pitch-plots extracted from *Figure 1* (Malloch, 1999, p. 41).

The second element of quality, that of timbre quality, refers to the distinctive quality of sound in music or the voice (timbre is also commonly known as tone colour or perceived tone quality) (Malloch, 1999). As timbre is a perceived quality of sound, it is more difficult to measure. Malloch measured the relative loudness with a technique developed by Pollard & Jackson (1982)—the Tristimulus method—which compares key spectral areas of harmonic sound. In Figure 3, the vertical axis represents the value of quality (timbre quality in standard musical notation from C3 to G) and the horizontal axis the time elapsed in seconds. For the duration of each vocalisation, a rectangle is placed around the infant's vocalisations. A particular finding of this timbre analysis shows that the mother changes her voice quality after the infant's vocalisation and the mother's voice drops right before the infant's vocalisation. Malloch (1999) suggests the changes in the mother's timbre may indicate how the mother signals to her infant that she has heard her.

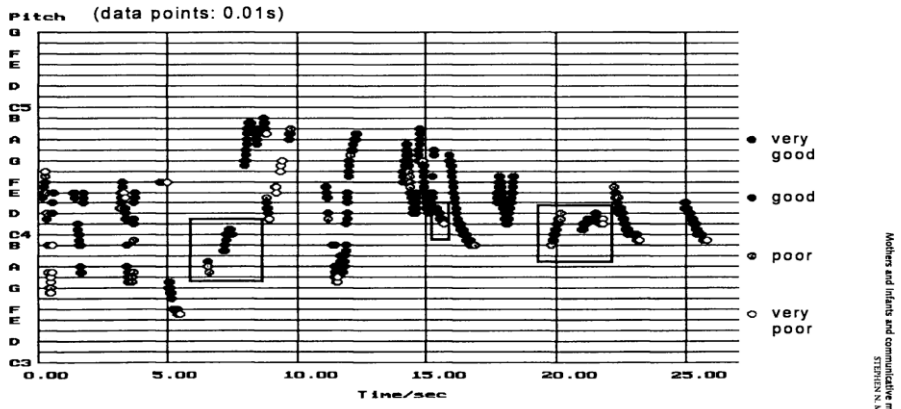

Figure 5. Pitch plot of Laura (6 weeks) — entire extract.

Figure 3 is an extraction of a Tristimulus graph showing the vocalisations represented in *Figure 1* and pitch-plots from *Figure 2* (Malloch, 1999 p.41). The infant's utterances are enclosed in a rectangle and show a different timbre from the mother's vocalisations[47].

The two elements present in quality—melodic or pitch processing and timbre quality— have been explored in further studies of music cognition and within the cognitive neuroscience of music. These studies have focused on musical processing in different populations (e.g. musical savants with congenital blindness) and the results suggest that music is manifested in the brain in terms of circuits and networks that overlap in function with many other cognitive, cultural and communicative domains. Some of these music-specific processing characteristics are found to share characteristics with speech processing (Honing et al. 2018; Peretz & Zatorre, 2003; Aramaki, et.al., 2013). These recent studies are contributing to defining the type and nature of the elements defined by Malloch in quality, namely melody processing, timbre, and pitch contour processing, which builds more substantial evidence to define this characteristic of communicative musicality. For instance, Sandra Trehub (2003) shows that infants could recognise similarities and differences in melodic sequences when altered from the control stimulus. This difference recognition occurs both in infants and adults. Trehub studies show how the capacity to perceive difference in melodies appears very early in life (6 months approximately) and is related to retention and discrimination processing abilities.

3.3.3. Narratives

Narratives is the third component of communicative musicality. The term 'narratives' was originally coined by psychoanalyst and infant researcher Daniel Stern (1985; 1998; 2010) and then

[47] See also Malloch, 1999 pp. 42-44 for further and detailed breakdown of harmonic analysis.

adapted to the theory of communicative musicality by Malloch (1999) and Trevarthen (1999; Malloch & Trevarthen, 2009). Stern's use of the word 'narrative' refers to 'vignette-like' experiences between an infant and their caregiver . In their interactions, claims Stern (2002), caregiver and infant repeat interactive sequences such as how feeding is likely to proceed, how they play games together, the way the baby is put into bed, and other sequences which take place regularly to form 'schemas-of-being-with' that Stern goes on to call a 'pre-narrative envelope'. These schemas of repeated interactive situations form pre-narrative envelopes in the baby's mind by means of internalisation[48] that start to determine progressively the way in which the individual interprets and relates with the world. The pre-narrative envelopes are the fundamental units for making subjective models of interaction, models that should coincide with the objective reality (2002; 2010). This model is different to that of intentionality discussed above, in which subjective experience is independent to objective reality, experience is mediated and biased by perception, and perception is an intentional engagement with the world. However, this thesis suggests that subjective experience and the external world are not only a perceptual intentional situation, but that that the environment (i.e. the external world) affects the infant's development too. In that sense, the dyad has to be in tune to each other at that time, the same radio station has to be turned on to the same channel for a musical phenomenology to occur (see also Chapter 5 in this thesis).

Narratives, in this account, refer to the quality and way in which intersubjective experiences are registered and performed by the dyad. As used in the theory of communicative musicality (Malloch 1999), *narratives* are the essence of human companionship and communication and refer to the musical timings and joint responsiveness between infants and their mothers when communicating together. They are the result of combining pulse and quality, the first two attributes of communicative musicality.

[48] In a broad psychoanalytic vocabulary, internalisations mean the process by which inter-subjective relations are transformed into intra-subjective ones (see Laplanche and Pontalis, 1973).

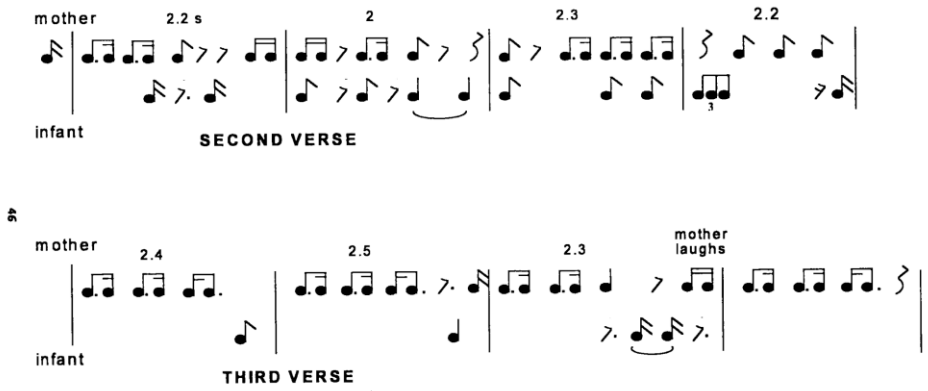

Figure 9. Musical notation representing the participation of mother and baby (4-month old) in a rhythm derived from the nursery rhyme Clap-a-clap-a-handies *(rests are omitted where this does not cause ambiguity).*

Figure 4. Notation of a caregiver singing a nursery rhyme to their 4-month-old infant.

The observations and qualitative behavioural analysis show that the infant smiles soon after the mother starts singing. This is qualitatively described by the researchers as responses of pleasure. For reasons of visual clarity, *Figure 4 (*Malloch, 1999 p.46) represents the interaction in musical notation and the time of each bar represents the time lapse in seconds. In the first verse the baby does not vocalise, but in the second verse, the baby joins in with the mother, showing accurate timing in their vocalisations. The infant's contributions show musical variety and consistency. For example, in the second and third bars, the baby vocalises on the beat. In the third verse, the baby vocalises consistently on the last beat of each bar. On the third bar of the third verse, the baby does something known as a 'musical joke', entering a semiquaver earlier than the regular beat, vigorously vocalising. It is uncertain if the baby has done the entry intentionally, but it is sensed by the mother who reacts immediately with laughter. Malloch (1999) observes that "After this

tour-de-force by both musical partners, the rhyme loses energy, and other play takes over" (p. 47). The narrative aspect present in this example also coincides with the argument that each of these vocalisations has a beginning, middle or climax, and end (see Malloch 1999; Malloch & Trevarthen 2009)—the type of storyline format the authors (Stern and Malloch & Trevarthen) use to conceptualise a 'narrative' characteristic of mother-infant interactions.

The previous example (*Figure 4*) shows how an infant at a very early stage can engage with the structure of a musical game with another:

> We have seen what can be described as a musical narrative created through the companionable interaction of a mother and an infant. We have also seen how timing is a vital element in mother-infant vocalisations, and how this timing can be represented as a series of bars or as a series of time-units. We have seen how mother and infant can use pitch imitation and complementation during their vocal exchanges—how both appear to have a strong sense of the pitch space that their joint vocalisations are covering, and how each relates to the other in a musical manner. We have seen how the mother is intuitively aware of the timbre of her voice, and how her modification of this timbre is an integral part of her vocal communication with her infant. Lastly, we have seen how a mother and her infant can jointly create a musical piece - both are musical partners within their communicative space. (Malloch, 1999, p. 47)

Narratives, in the context of communicative musicality, and making use of Daniel Stern's contributions, are the expression of multiple elements happening simultaneously in the brief moments of communication between caregivers and their infants. Pulse and quality are the musical elements that, when combined, form narratives. However, narratives are more than the combined factors of pulse and quality. That is, a joint correspondence that happens just at the moment of interaction when communicative musicality occurs in its full appearance, which shows that both participants are attentive and receptive to each other's expressions. In the vocalisations, there are

moments of imitation, where the infant imitates what the caregiver is doing, and there are times when it is the caregiver who imitates what the baby is doing. At times, the baby creates a new pattern as seen in the upbeat 'musical joke' in *Figure 4*, to which the caregiver responds, and both engage in a playful way. The behavioural cues inform each other (caregiver and infant) about the state of the mutual interaction and the musical cues may inform about the emotional states, which are communicated and 'socialised' within human communicative musicality. Narratives are the element of communicative musicality that move forward from the discrete musical elements of pulse and quality to inform about the state of the relationship between an infant and a caregiver. Narratives tell more about the way baby-caregiver share information, how the baby grows, and how the caregiver responds to the infant's developmental process. The way the information is exchanged has a musical dimension which is why communicative musicality presents a significative variable in development.

3.4. Conclusions

The concept of communicative musicality claims there are musical features within the intimate interactions between an infant and their caregiver, which are essential for language and social development. This concept is composed of pulse, quality, and narratives—a range of elements that make the sharing of information about physiological and emotional states possible. Communicative musicality implies that shared interactions are patterns of communication in which an infant and its caregiver exchange information about physical and emotional needs, showing how those needs are met. It is a way of identifying how, when, and in what state is the relationship. For example, if the infant communicates x, does the caregiver respond sensitively? A sensitive response is part of the reciprocity present in communicative musicality which this thesis claims as central in the process of self-development, the formation of object relations, and attachment figures. This is a claim grounded in the similarities of the object of study for both communicative

musicality and those theories in psychoanalysis concerned with the relevance of shared encounters between caregivers and infants. However, communicative musicality presents a unique approach by arguing that intersubjective sharing has timed and melodious patterns. This musical dimension of communication could be included as an observation variable in developmental psychoanalysis to see how musical patterns inform the state of the relationship. When considering the inclusion of communicative musicality into this thesis' main claim, in which music plays a fundamental role in development and experience, two points can be identified. First, communicative musicality is part of the necessary elements to facilitate self-development (Chapter 4). Second, there is the growth of emotional awareness of the other; that is, the incipient moment of socialisation is progressively introduced through those initial interactive experiences within communicative musicality (Chapter 6).

These two points argue that communicative musicality is fundamental for understanding non-verbal communications as both full of content and a means for the transmission of emotional material in reciprocal, coordinated ways. The developmental model primarily discussed is that of Donald Winnicott (1945; 1949; 1967; 1971) who suggested that the mother facilitates the start of the trajectory from complete psychic, physical, and emotional dependence towards independence. This trajectory is marked by the way she handles and holds the baby, how she responds or reacts to the baby's demands, and how she allows the baby to start its process towards independence. While those interactions occur, the infant's body and psyche are developing and making more complex relations about her or his experience and psychically growing a sense of the self. If communicative musicality has a place in this process, it would then be accounted for as an additional dimension of communication in the process of individuation and one that could be traced for it is meant to be musically logical. In other words, there should be a correspondence between what is being communicated, the response provided by the caregiver, and the context in

which the dyad is immersed at the moment of the interactions (e.g. if the dyad is playing a game, it is likely that they smile and find a pleasurable moment together). This correspondence enables the infant to make meaning of what is being experienced, and therefore, a sense of self can grow, but also be discovered.

Additionally, in this thesis there is another element identified, a particular aspect of communicative musicality that manifests when infant and caregiver are interacting playfully. Malloch and Trevarthen register it within broad behavioural repertoires, specifically to refer to brief moments of interactions that are not strictly related to physiological needs, but as moments of musical exchange, play, and singing, which are generally pleasurable. The relevance of separating this particular shared moment from others resides both in the implicit association of creativity and play with the narrative and with the intimate poetic of the dyad as well as with the parallels with musical grouping and expressions in the social sphere (see Chapter 1, section 1.1.2 (iii)). This assumption potentially provides links with the location of the cultural experience of Winnicott (1967), who claims that cultural experiences and creativity start in the early interactions and the process of individuation through transitional phenomena and play. As discussed in the following chapters, this supports the thesis' general hypothesis about self-development and the developmental trajectory as related to a specific function of communicative musicality in self-development. This in turn could further clarify the connections assumed by Malloch and Trevarthen and complement them with developmental theories proposed by psychoanalysis. In that sense, shared communicative musicality as a part of self-development gets established in the interplay between external and non-differentiated experiences which involve creation, adjustment, transition, and play, what in adulthood translates as cultural experience (Winnicott, 1945; 1949; 1967; 1971).

The following chapters (Chapters 4 and 5 in Part II) revisit concepts that have been revised in Part I (Chapters 1–3) and discuss new complementary concepts that are relevant to the argument that psycho-somatic development is first and foremost musical.

PART II

MUSICAL DEVELOPMENT AND EXPERIENCE

INTRODUCTION

The previous three chapters in this thesis explored the phenomenon of music from different angles and argued that music is not solely a cultural expression and that its universality belongs more to the underlying psychobiological-bodily aspects (musicality) that make music possible as a cultural practice. These psychobiological elements are carried out by evolution and reinforced by cultural mechanisms that correlate with cognitive and perceptual systems. The previous chapters defined music, musicality, and communicative musicality from three different but related perspectives. The initial study focused on contextualising the major theoretical debates and relevant conceptual tensions that lead to the understanding of music as a phenomenon beyond its cultural expression. By acknowledging the limitations of each conceptual definition, a map of structural components provided the grounds for understanding the essential mechanisms of music, musicality, and communicative musicality from different angles and how these components are interrelated. These structural components (rhythm, melody, and harmony) are common elements and appear consistent within the culture-biology spectrum. Even though the consistency of these components gives substantial evidence for arguing that music is a much more complex phenomenon rooted in different sources, it is not enough to define these concepts structurally.

Although essential in this thesis, the structural components of music, musicality, and communicative musicality do not offer a convincing developmental aspect for understanding the psychic relevance of music in human development (ontogenesis). When considering emotional development, the theories provide explanations primarily informed by cognitive sciences and

neurosciences. This thesis argues that a 'neurocentric' approach to music is fundamental for retrieving the psycho-biologically-informed centrality of the body in musical development processes, but most of the evidence-based research appeals to reductionist approaches to validate the ontogenesis of musical function. As argued in Chapter 2, claiming that musical processes only exist if they can be found concretely in the brain disregards a more hollisticpossibility of considering the whole body as an epistemic reservoir. One of the conclusions from the previous chapters (1–3) suggests that developmental, experiential, and phenomenological aspects of musical situations are fundamental when studying music and its functions. However, the previous chapters did not provide a convincing theoretical framework to study these phenomenological aspects of music. In other words, studying musical situations need a structural frame of reference, but there are additional dynamic features that provide insights into the complex phenomenology of music. Such elements are addressed in the following chapters (4–6) and aim to discuss the dynamic and experiential components of music within different disciplines that provide angles of reference for understanding the complexities of music when harnessing it as a profound, complex, and elusive human experience.

The theoretical approaches used in the second part of the thesis include psychoanalytic (Winnicott, 1949; 1956; 1971, Maiello, 1995), phenomenological, literature, and psychosocial approaches (e.g. Malloch & Trevarthen, 2009, J.J. Gibson, 2015; Merleau-Ponty, 1962; Sara Ahmed, 2006; Lederach & Lederach, 2011). Respecting each approach's methodological query, the chapters aim to explore the place of music in human experience which contributes to a developmental hypothesis, but do not solve the tensions between each theoretical approach. This second part of the thesis differs in form from the previous three chapters and is not divided into theoretical contexts, structural components, and discussions (as in Chapters 1–3). Instead, the musical developmental formulation responds to a design that integrates both structural and phenomenological aspects in a

developmental continuum that prioritises three significant elements of ontogenesis: ego and self-development, phenomenology and temporalities of experience, and socio-emotional expressions.

Consequently, Part II investigates the correlation between emotional development and music, musicality, and communicative musicality. This part has the dual function of taking on the relevant insights that are applicable to a complex observation of music and suggests other forms of looking at this phenomenon from more dynamic, rather than structural perspectives. More specifically, this part is comprised of three distinct chapters:

Chapter 4 examines ego and self-development, exploring the relevance of musicality and its transcendent nature in relation to this developmental trajectory. By examining the role of musicality and communicative musicality in shaping one's sense of identity, this chapter demonstrates that musicality extends beyond the mere development of the ego, enabling individuals to differentiate between external and internal realities. While the establishment of an ego plays a pivotal role in facilitating this process, the chapter argues that the significance of musicality and communicative musicality in human experience and relationships extends far beyond the attainment of a finalised separation or self-recognition distinct from others. Instead, it emphasises the paradoxical realm of experience, intertwined with the tensions and dynamics of life, wherein musicalized possibilities for existence and interaction within the environment (including objects and things, other individuals, and oneself) arise.

Building upon the foundations laid in Chapter 4, **Chapter 5** explores the phenomenology of musical experiences. Departing from ego development, this chapter draws upon a range of disciplines such as psychoanalysis, phenomenology, decolonial and feminist theory, and literature to illustrate the nature of existing musically within the in-betweenness—a fundamental aspect of development where creativity thrives and the distinction between oneself and others remains fluid. Accordingly, Chapter 5 posits that while musicality and communicative musicality undoubtedly play a crucial role in ego development, their significance and purpose surpass the ultimate endpoint

of separation between self and others. Instead, the chapter asserts that the in-between space, which fosters creativity and continuity of experience within the world, holds greater importance.

Lastly, **Chapter 6** examines how emotional recognition in others, socialisation, and cultural experiences contribute to this theory of musical psychic development. This entails exploring how exposure to diverse musical traditions and engagement with music in various social contexts affects an individual's emotional and psychological development.

As demonstrated in Part I (Chapters 1–3), certain theories specifically address the role of music, both in terms of phylogenesis and ontogenesis (as explored in Chapters 2 and 3). Other theories, such as Winnicott's, do not directly address music but are still used to support this thesis' theoretical exploration. Some elements are essential to the model and relate to both musical and developmental aspects, taking into account theories that directly address music with those that do not. These elements include pleasure, for example, as understood by Darwin (1872), Freud, (e.g. 1920) and Pinker (1997), and repetition, as understood by Freud (1900; 1911; 1915; 1920), Winnicott (1949; 1956; 1971), Stern (1985; 2010), and Malloch and Trevarthen (2009). Such nodal points of intersection are prevalent within multidisciplinary research and form the keynotes for the harmony progression that makes this thesis' exploration musically viable. In that sense, this part of the thesis functions as a polyphony in which three melodies co-occur.

The first voice of the polyphony explores the developmental place of music in human experience. The second voice signposts the theoretical intra and interdisciplinary tensions. The third voice outlines the nodal points that interrelate within the different disciplines used in this thesis. The focus on a developmental progression responds to the limitations found within those theoretical models whose principal study object is music. However, these models tend to overlook the developmental aspects of music, which this thesis claims as crucial aspects for understanding music in a complex manner. The developmental process presented in Chapters 4–6 travels within theoretical and historical contexts, weaving together elements from different disciplines, including

tensions and theoretical inconsistencies. The intention of this new formal design is to recognise the complexity of both music and human development, taking advantage of such complexities, not for solving logical, historical, or epistemological contradictions, but for tolerating them and retrieving the place and fundamental value of paradox within a multidisciplinary musically infused exploration.

Due to the circular nature of this conceptual framework, the psyche, and music, concepts, and ideas are inevitably repeated throughout the following chapters. The tensions between repetition and novelty are constantly present, as they are also present in musical development, including caregiver-infant interactions. Thus, the form of this second part is expressive of this: it is jazz[49], it is a Bambuco Viejo[50], it is Vulnicura[51], and caregiver-infant communicative musicality, where all structural elements are used, stretched, repeated, and played with. This second part of the thesis proposes a complex and multi-faceted view of the relationship between music and psychic development, considering both individual and psychosocial factors.

[49] TRACK 14: Jazz. Charlie Parker – All the Things You Are.

[50] TRACK 15: Bambuco viejo. Grupo Bahia Trio – Bambuco Viejo.

[51] TRACK 16: Björk - Vulnicura (Full Album).

CHAPTER FOUR

DEVELOPMENT, MUSIC, MUSCIALITY, AND COMMUNICATIVE MUSICALITY: AN ONTOGENETIC HYPOTHESIS

This chapter introduces one branch of a musical developmental hypothesis encompassing distinct aspects. The first aspect pertains to self and ego development, highlighting the influence of musicality and communicative musicality within this process. This chapter explores how musicality contributes to ego development, asserting the crucial nature of understanding the intricate relationship between musicality, ego, and socioemotional development. Ego and Self are frequently used interchangeably in psychoanalytic literature. Some developmental theories, such as the Kleinian and object relations schools, do not differentiate between them. In this thesis, 'ego' refers to a structural concept, while 'self' encompasses the entirety of the personality. Traditional psychoanalytic literature (Freud, 1915; 1923; Winnicott, 1971/1972) defines the ego as an agency responsible for conscious functioning, while the self represents a sense of wholeness preceding the separation of internal and external realities[52].

In this thesis, the ego emerges through a gradual process of maturation that begins after birth when the body and brain are sufficiently developed to initiate such differentiation. This process is facilitated through shared emotional experiences conveyed through music, as well as the use of transitional objects, as described by Winnicott (1953; 1971). As the infant begins to recognise the outside world, the process of individuation takes place, resulting in the emergence of a psyche. Ego formation and separation are not instantaneous events but instead occur over time, shaped by the individual's lived experiences and their interactions with the world around them. Through

[52] For further definitions of the concept of self, refer to Winnicott (1962) and for expanded perspectives on the concept of self, consult Jung (e.g. 2009) and M-L Von Franz (1987)

these experiences, a sense of self and the world is gradually woven, allowing for healthy emotional, psychological, and psychical growth.

This maturational process is paradoxical in nature, involving a continuous dialectic movement from discontinuity to continuity, rooted in frustration but ultimately tending towards integration. Furthermore, the distinction between psyche and soma is virtual rather than real, representing a proto-representation, a rational elaboration, or a metaphor. The presence of constant and consistent emotional and attuned contents is crucial for healthy growth, allowing for a secure environment for transitional phenomena to occur. If the infant is too distressed or anxious, transitional phenomena may not fully manifest, leading to developmental impingements that may have lasting effects on creativity, cognitive processing, language acquisition, intellectual maturation, emotional recognition, and social behaviour. In this regard, the self requires a relatively safe environment to develop and grow.

Chapter 4 explores various dimensions related to human development and experience, dividing its focus into five sections. The first section (4.1.) delves into the role of sound memory traces before and after birth. The second section (4.2.) takes a psychoanalytic approach to examine the role of the environment in the process of separation, exploring concepts such as oneness, subjectivation, and the dynamics of pleasure-reality principles and creativity. The third section (4.3.) further dissects the paradox of transitional phenomena and in-betweenness through the lens of prominent theorists like Winnicott, Vygotsky, and Anzaldúa. The fourth section (2.4.) focuses on the improvisational dynamics of variation and improvisation in creativity and stillness, exploring aspects like imitation, repetition, and the sense of belonging. Finally, the fifth section (4.5.) examines and illustrates transitionality and manifestations of disruption, exploring themes of horror and creative possibility through concepts such as *lo fantástico*, and *el duende*. Each section contributes to a comprehensive exploration of the multifaceted nature of human development, incorporating insights from psychoanalysis, developmental psychology, and cultural studies.

4.1. Intra and extra uterus: Before and after birth—the retrospective role of sound memory traces

One relevant hypothesis proposed by this thesis is that music, musicality, and communicative musicality contribute to the process of ego development. The musical aspects of human development, particularly those involved in caregiver-infant interactions, play a crucial role in establishing the ego and facilitating the recognition of the distinction between oneself and others[53].

The idea of ego development in relation to musicality can be observed in the mnemic[54] registers of auditory processes, which begin early in life, even in the prenatal stage. These perceptual registers of sound in memory serve as essential raw material for the development of the ego and emotions. This section focuses on the function and trajectory of sonic experiences and utilises insights from psychoanalytic and cognitive neuroscience perspectives to examine the role of sonic memory traces in ego development. Moreover, it explores how these traces are retrospectively used to establish the distinction between oneself and others.

---

[53] This process of ego development is a relevant study subject in ego psychology. Ego psychology is a psychological perspective that emphasises the importance of the ego in understanding human behaviour. It originated from Sigmund Freud's psychoanalytic theory but was further developed by subsequent authors. The main focus of ego psychology is to study the adaptive and executive functions of the ego and its role in mediating between the demands of the id, superego, and external reality. In addition, ego development refers to the progressive growth and maturation of the ego, which is one of the three components of the mind according to psychoanalytic theory, along with the id and superego. The ego is responsible for mediating between the instinctual drives of the id, the moral demands of the superego, and the realities of the external world. Ego development involves the acquisition of various psychological capacities, such as reality testing, impulse control, self-awareness, and the ability to maintain healthy interpersonal relationships. It encompasses the individual's cognitive, emotional, and social development throughout their lifespan. A list of authors who developed or influenced ego psychology include: Erikson, 1950; A. Freud 1936; S. Freud, 1923; H. Hartmann, 1958; Jacobson, 1964; Kernberg, 1975; Kohut, 1971; Kris, 1952; Loewenstein, 1960; Mahler, 1975; Rapaport, 1951; Spitz 1945. Most of these ideas were largely welcomed in the North American School of psychoanalysis.

[54] Accoring to the OED (n.d.) mnemic is defined as: "The capacity which a substance or organism possesses for retaining after-effects of experience or stimulation undergone by itself or its progenitors".

Sound plays a mediating role in ego development and starts its journey within the uterus, where sensorial information is processed and integrated as the infant matures. Memory processes are fundamental for encoding these sensorial auditory inputs. Recent research in cognitive neuroscience offers evidence of sound memory imprints occurring before birth (see DeCasper & Fifer, 1980; DeCasper & Spence, 1986; Frankland, Köhler, & Josselyn, 2013; Lecanuet & Schaal, 1996; Shetler, 1990) as the sense of hearing begins to develop around the fourth month of gestation (Malloch & Trevarthen, 2009; Honing et.al., 2018; Mancia, 1981), and is structurally developed by the third trimester (see Henriques et. al. 2022). During this period, foetuses tend to perceive low frequencies associated with sounds produced by the caregiver's body, such as heartbeat, breath, and digestive noises. However, the hearing sensitivity in neonates is still distorted to that of an average adult. According to Sininger et al. (1997), auditory thresholds in neonates, as measured by auditory brainstem responses (ABR), are generally higher than those in adults. This means that neonates have reduced sensitivity to sound. Specifically, the thresholds for neonates are elevated across various frequencies, with the most significant differences observed at higher frequencies. This indicates that the auditory system of neonates is still maturing, particularly in the high-frequency range.

Even distorted, medium and high frequencies may stimulate motility, while low frequencies have a soothing effect and slow down motor activity due to their rhythmic and constant quality (Malloch & Trevarthen, 2009). These frequencies stimulate the developing memory systems in the brain, which mature approximately from the eighth month after birth onwards. Among these memory processes, declarative (or autobiographical) memory is the earliest and undergoes rapid development within the first three years of life (Panksepp & Bernatzky, 2002; Panksepp & Trevarthen, 2009). Consequently, early sound processing and registering assume a significant role in the formation of self-referencing repertoires.

Psychotherapist Suzanne Maiello (1995) suggests a relevant connection of the experiences of sound in uterus and their influence in ego development. Maiello's (1995) contribution to this thesis is that sound precedes and prepares for separation and therefore precedes representation and symbolic thought. Sounds are not only heard but seem to leave memory traces, which constitute sound-codes from which the child will develop an internal world, a psyche, and later, language and social functions. Foetuses retain and receive inflexions and modulations of the birth giver's voice, a foreign and uncontrollable object that causes discontinuity in an environment otherwise defined by continuity. It is an experience that could be a source of frustration and anxiety[55]. The birth giver's silences, for instance, might give the child a proto experience of absence, loss, and emptiness. In other words, a missing object generates desire, and desire cannot exist without consciousness of an elsewhere and a not-me. If so, argues Maiello (1995), the child's listening ear, as well as their mental structure, would no longer be entirely fused in a primary sonic oneness, that is, Maiello claims the existence of a prenatal ego.

Maiello's contribution coincides with the evidence available in other disciplines like cognitive neuroscience regarding memory imprints before birth (see, e.g. Frankland, Köhler & Josselyn, 2013; DeCasper & Fifer, 1980; De Casper and Spence, 1986; Lecanuet, 1996; Shetler, 1990). Although there is no conclusive evidence of prenatal memory processing, there is evidence that three-day old babies respond to the birth giver's voice, discriminating their voice over other people's voices (See DeCasper & Fifer, 2013). The precise auditory experience is not known, but studies in other species demonstrate perceptual preferences and proximity-seeking responses, i.e. other species are affected by auditory experience before birth (See Dmitrieva & Gottlieb, 1994).

Another relevant study providing evidence of prenatal hearing is that of Henriques et. al. (2022). The authors outline the developmental timeline of the auditory system, noting that the cochlea

[55] The author is referring to the Kleinian view of anxiety and symbolisation, see Klein, M. (1930) The Importance of Symbol Formation in the Development of the Ego. Int. J. Psycho-Anal.,11:24-39.

and auditory pathways are structurally complete by the third trimester. This period is critical as it marks the onset of auditory learning, where the foetus begins to respond to external sounds. The study emphasises that the womb is not a silent environment; rather, it is filled with a variety of sounds, including maternal physiological noises (such as heartbeat and blood flow) and external sounds filtered through the maternal abdomen.

One of the key contributions of Henriques et. al's (2022) book chapter is the detailed analysis of how sound is transmitted to the foetus. The authors describe the attenuation and filtering effects of the maternal tissues, which modify the acoustic properties of external sounds. This filtering results in a unique auditory environment for the foetus, characterised by low-frequency dominance and reduced intensity of high-frequency sounds. The study utilises both empirical data and theoretical models to illustrate these acoustic transformations, providing a comprehensive understanding of the foetal auditory experience. The chapter also explores the implications of prenatal auditory exposure for postnatal auditory development. The authors argue that early exposure to sound is crucial for the maturation of the auditory system. They suggest that the foetus's ability to hear and respond to sounds in utero lays the foundation for later auditory processing skills, including language acquisition and musical perception. This early auditory experience is posited to influence neural plasticity, shaping the auditory pathways in preparation for the complex auditory environment encountered after birth. Furthermore, the authors discuss the potential impacts of excessive noise exposure during pregnancy. They highlight the risks associated with high levels of environmental noise, which can penetrate the womb and potentially disrupt normal auditory development. The chapter calls for further research into the effects of noise pollution on foetal hearing and advocates for measures to protect pregnant women from excessive noise exposure (see Henriques, et.al. 2022).

Although inconclusive, most of these studies on intrauterine sound memory are hopeful because they are based on already documented findings that newborns are sensitive to rhythmicity (see e.g.

Condon & Sander, 1974), intonation (see e.g. DeCasper & Fifer, 1980; Morse, 1972), frequency variation (DeCasper & Fifer, 1980; Morse, 1972), and some phonetic components of speech (see e.g. DeCasper & Spence, 1986). Additionally, their general sensory competency possibly "enables other maternal cues such as her odor, [touch], the manner in which she handles the infant to serve as supporting bases for discrimination and vocal preference" (DeCasper, 2013, p.1176 and see Sander et al., 1972).

Maiello's (1995) understanding of ego development is placed on sensorial experiences in intrauterine life, particularly sonic experiences. During intrauterine life, there is a continuous experience where internal and external worlds are not categorically distinct, with the umbilical cord connecting both bodies. The unborn baby's experience is a conglomerate of tactile and auditory sensations, where the world is perceptual and bodily defined, without clear outlines. Maiello argues that the intrauterine experience of sound gives the child a proto-experience of both presence and absence. These proto-experiences give rise to primitive defensive reactions and the constitution of a sound-object[56], which Maiello connects with the later perception of the actual external object, namely the breast.

However, Maiello's perspective challenges the developmental hypothesis of primary narcissism and ego formation, which posits a progressively integrated psychic structure that goes from non-differentiation to the organisation of an ego capable of differentiation. If there is an ego before birth, experiences cannot follow this progression, and the caregiver would not have an essential role in assisting the integration process through interaction and communicative musicality. This

[56] According to Laplanche and Pontalis (1979), "Psychoanalysis considers the notion of object from three main points of view: I. In correlation with the instinct: the object is the thing in respect of which and through which the instinct seeks to attain its aim (i.e. a certain type of satisfaction). It may be a person or a part-object, a real object or a phantasied one. II. In correlation with love (or hate): the relation in question here is that between the whole person, or the agency of the ego, and an object which is itself focussed upon in its totality (person, entity, ideal, etc.). III. In the sense traditional to the philosophy and psychology of knowledge, in correlation with the perceiving and knowing subject: an object is whatever presents itself with fixed and permanent qualities which are in principle recognisable by all subjects irrespective of individual wishes and opinions (the adjective corresponding to this sense of 'object' is 'objective')" (p. 273)"

contradiction contributes significantly to this thesis' hypothesis that musicality serves the developmental process of ego-formation. The ego is shaped throughout the experiential and shared interactions of the baby with their environment, mediated and facilitated by emotional interactions such as communicative musicality. In sum, Maiello's claim posits the existence of proto-experiences during intrauterine life that influence ego development. This perspective challenges traditional developmental hypotheses but supports the idea, which aligns to this thesis, that the ego is shaped by experiential and shared interactions with the environment, particularly attuned emotional interactions like communicative musicality.

The concept of a prenatal ego is not supported by the evidence of sound memory traces and their role in ego development. Instead, the available evidence (in psychoanalysis and neurodevelopment) about sonic perceptual memory traces is consistent with the idea that the ego develops later, after birth, when the brain and body are mature enough (Winnicott, 1949; Solms and Panksepp, 2012). If there are memory traces, as psychoanalysis and cognitive neuroscience argue, these traces are stored bits of information that are processed retrospectively, *après-coup*[57].

This retrospective temporal notion is non-linear, contrary to most developmental models (see, e.g., Piaget, 1927/1977, Piaget, 1936/1952, 1937/1954, 1945/1951; Freud, 1905). It is studied in

[57] In psychoanalysis, the concepts of conscious and unconscious have been explored since Freud's metapsychology papers (Freud 1915-1917), revealing diverse temporalities that manifest within the psyche. One notable temporal concept is *Nachträglichkeit*, also known as après-coup in post-Freudian and French psychoanalytic literature. Initially emphasised by Freud but later less prevalent in psychoanalytic papers until the 1950s, it contributed to a loss of specificity and was commonly referred to as 'deferred action' or 'afterwardedness' (Libermann 2015). *Nachträglichkeit* challenges the linearity of 'conscious time' and introduces heterogeneity to the overall structure of temporality in mental functioning. It posits that experiences, impressions, and memory traces can be revised at a later date to align with new experiences or developmental stages, thereby acquiring not only new meaning but also psychological value (Laplanche & Pontalis 1996, see p.111). Although Freud did not extensively theorise about *Nachträglichkeit*, he employed the term to elucidate the temporal causality specific to traumatic events, supporting his model of repression and the return of the repressed. This temporal notion holds significance in this thesis as it delineates temporal functions beyond the confines of chronological order, crucial for understanding musicality, memory, and the emotional musicalisation of experiences. The relevance of these concepts in this thesis is therefore about the temporal function, not on metapsychology.

psychoanalysis as an argument for conscious-unconscious functioning and causality[58], and it is also explored in queer musicology, phenomenology, and indigenous-informed temporal notions in Latin America (see e.g. Chapter 1 of this thesis; Ahmed, 2006; Rivera-Cusicanqui, 2010/2020). The initial developmental psychic process involves two aspects that coincide throughout different theoretical frameworks: sensorial-sonic-mnemic prints of continuity and discontinuity and a temporality that is fundamentally non-linear. These characteristics correspond to the musical fundamentals discussed in this thesis: music as *chi'xi* (Rivera Cusicanqui, 2010/2020) and rhythmicalities that are both continuous and discontinuous (see also sections on temporality and repetition below and in Chapter 5). These sonic perceptual memory traces which are used retrospectively constitute one of the most important aspects of ego development, but as the following sections argue, this is not the only developmental function of musicality and communicative musicality. The developmental focus is on the process of separation rather than the endpoint itself.

4.2. The role of the environment in the process of separation: A psychoanalytic perspective

This section presents a primarily psychoanalytic viewpoint on the process of separation in ego development and the significance of environmental interaction within this process. This thesis asserts that such interaction possesses a fundamentally musical nature. The inclusion of the psychoanalytic perspective offers a valuable contribution by elucidating the functioning of this developmental process and demonstrating the presence of musical elements within it. Additionally, Chapter 5 develops an alternative perspective on the environment from a phenomenological

[58] The temporal retrospective notion has been studied in psychoanalysis from various perspectives, since early Freud (see e.g. Breuer & Freud, 1893; Freud, 1905, 1915), to post Freudian authors and schools such as the French and English Schools. The most frequently used terms to refer to this temporal notion are *Naträglichkeit, Après-coup,* and deferred action (see House & Slotnik, 2015 for a detailed historical account).

stance, drawing upon the psychological insights of James Gibson (2015) and Eleanor Gibson (1969; 2002), as well as the perspectives of social anthropologist Tim Ingold (2010). By integrating both perspectives on the environment (as discussed in Chapter 5), a robust framework emerges, illustrating the musical essence of the environment. This framework encompasses a relational model (in line with Winnicott's perspective) and a perceptual-phenomenological model (as proposed by Gibson & Gibson, and Ingold in Chapter 5). The psychoanalytic account serves to illustrate a structural mental trajectory, while the ecological account provides a phenomenological understanding. Both perspectives are vital for supporting the central argument of this thesis.

As seen throughout the chapter, the process of ego development entails a journey of moving from a state of oneness to a recognition of the outside world. This thesis posits that musicality and communicative musicality play a fundamental role in enabling these notions of an inside and an outside. To clarify how this process of separation operates, psychoanalytic thought offers two relevant insights that shed light on the psychological mechanisms involved. According to the psychoanalytic theories of Winnicott (1949; 1956) and Freud (1900; 1911; 1920), the psychological process of moving from oneness to ego development is explained by two important aspects: environmental relevance and the pleasure-reality principle dynamic. These concepts do not explicitly encompass musical aspects in their development, but this sub-section uses these psychoanalytic developments to illustrate the developmental model with musical elements, which are integral to the present thesis. While these insights are valuable, they are not exhaustive in understanding the maturational process (see sections below and Chapter 5).

The relational environment is regarded, from Winnicott's psychoanalytic perspective, as the facilitator for the emergence of human subjectivity from the initial state of non-distinction. The stability of this environment enables the infant to construct the caregiver through illusion and gradually recognise them as having a separate existence. The caregiver provides an environment where omnipotence is a fact of experience for the infant (Caldwell & Joyce, 2011). Similarly, Freud

(1911) proposed that the caregiver's absence initiates a hallucinatory experience of satisfaction, which marks the beginning of moments of presence and absence. These moments are precursors to thought and the reality principle, which are crucial developmental aspects that may prevent the development of severe mental disturbances such as states of non-integration and profound psychic suffering (Winnicott, 1949).

According to Winnicott, the early experiences of the body and psyche in relation to the environment have significant implications for psychic development. Although Winnicott did not directly hypothesise about the developmental place of the first auditory experiences, he developed an important trajectory on emotional development that this thesis draws upon to template the developmental trajectory. Winnicott (1956) argued that a few weeks before birth and some weeks after birth, the birth giver enters a particular state of mind in which they *are* the baby and the baby *is* them. Winnicott called this state 'Primary Maternal Preoccupation,' and it is vital because the baby's psychological and physical health relies on whether the birth giver is able to get into and come out of this state of being.

Following Winnicott's idea, the baby's psyche indwells the soma, founding the psyche-soma unity, on which emotional, physical, and psychic development are dependent (Winnicott, 1949). Thus, it is from an initial non-differentiation that subjectivity emerges, and the caregiver's role is vital in providing a facilitating environment that allows the child to develop psychically and physically, i.e., to establish their own going-on-being (Caldwell & Joyce, 2011). From primary narcissism to an object relation, the development of a psyche that recognises and relates to others constitutes a psyche that makes sense of experiences, creating a world of symbols and representations, leading to understanding the world in a particular way unique to each person. This is a non-linear and dynamic process with spectrums and predominance in different times of life.

The emotional process of subjectivation, facilitated by care, both physical and emotional, which what Winnicott called handling and holding (see e.g. 1952 in 1965 chapter VIII). These aspects of

care are related to the action, i.e., musicking, rather than an abstraction of caregiving or to a specific person:

> It has often been noted that, at five to six months, a change occurs in infants which makes it more easy than before for us to refer to their emotional development in the terms that apply to human beings generally. Anna Freud makes rather a special point of this and implies that in her view the tiny infant is concerned more with certain care-aspects than with specific people. (Winnicott, 1945, p. 147)

In this this passage, both Winnicott and Anna Freud (cf. 1936) assert that an infant's emotional growth and development is dependent on caregivers' attunement to their physical and emotional needs. This thesis examines the role of communicative musicality in this process of attunement, suggesting that the caregiver's response to the infant's needs can be understood as a musical performance that influences the trajectory of emotional development (see also Chapter 3 this thesis).

For Winnicott (e.g., 1955; 1960), "holding" encompasses the mother-figure's role in safeguarding and providing a secure environment for the baby's growth, it denotes the caregiver's physical and emotional care, while "handling" refers to their ability to adaptively respond to the child's emerging needs and behaviours. The caregiver physically handles the child, establishing a holding environment that addresses both the physical and psychological needs of the child. Winnicott emphasises that both holding and handling are essential elements of a healthy caregiver-child relationship, fostering trust and confidence in the child, which in turn support emotional and social well-being. According to Winnicott: "[T]he unit is not the individual; the unit is an environment individual set-up. The centre of gravity of the being does not start off in the individual. It is in the total set-up. By good-enough childcare, technique, holding, and general management the shell

becomes gradually taken over and the kernel (which has looked all the time like a human baby to us) can begin to be an individual" (Winnicott 1958 in 1975, p.99).

The notion of holding extends beyond the realm of infancy and finds application within psychotherapy. Winnicott (1955; 1960) asserts that the therapist must provide a good-enough holding environment, allowing the patient to regress and address any lingering effects from their early experiences. Consequently, Winnicott suggests that the therapist's role is akin to that of a mother, caring for and supporting the vulnerable patient. However, feminist and constructivist theories have criticised this technique and the idea of regressing to dependency as they argue that it idealises motherhood (e.g., Bassin, Honey, & Kaplan 1994; Benjamin, 1988; Chodorow, 1978; Heti, 2019; Mitchell, 2000; Rich, 1986). Moreover, critics challenge the equation of the analyst with a mother-figure in the analytic setting, highlighting the unique characteristics of the analyst-patient relationship, which involve emotional dynamics distinct from past experiences (Bruke 1992). In the midst of these debates, it is crucial to consider the politics of motherhood and reframe Winnicott's theory within a politically informed framework that employs precise language. Nevertheless, it is important to acknowledge the richness of Winnicott's seemingly simple and straightforward writing style. His complex theories can serve as guidance for sharpening intuition in clinical settings, offering more than mere prescriptive instructions on replicating specific forms such as the holding environment. Rather, they invite exploration of the nuanced dynamics within the analyst-patient relationship.

Infants begin to recognise the caregiver's inner world, prompting emotional responses and establishing a two-way communication system. This awareness of both the infant's and caregiver's inner experiences progressively develops when the baby is born and continues for approximately six months after birth. Winnicott suggests that infants, at this stage, start grasping the concept of having an "inside" and understanding that the sources meeting their needs exist in the "outside" world:

> We can say that at this stage a baby becomes able in his play to show that he can understand that he has an inside, and that things come from the outside. He shows that he is enriched by what he incorporates (physically and psychically). Further, he shows that he knows he can get rid of something when he has got from it what he wants from it. All this represents a tremendous advance. It is at first only reached from time to time, and every detail of this advance can be lost as a regression because of anxiety. (Winnicott, 1945, p. 148)

Around the age of six months, there is a noticeable shift towards recognising the external world in the infant's interactions with their environment, which this thesis claims it is a shift facilitated by communicative musicality. This recognition of internal and external dimensions of the self and caregiver aligns with Malloch and Trevarthen's (1999; 2009) argument that communicative musicality plays a crucial role in emotional development before birth and up to six months of age.

The separation process works psychologically in a manner that is closely linked to the process described by Freud in his 1911 paper, "Two Principles of Mental Functioning". According to Freud, the *primary process* is responsible for immediate satisfaction of needs, such as hunger, warmth, cleanliness, as well as sexual and emotional needs, and is driven by the pleasure principle. Pleasurable feelings are derived from the primary process, and memories of satisfaction and pleasure are stored in the mental structure. The primary process seeks satisfaction through the hallucinatory fulfilment of a wish, but when the body's signals of tension are not relieved, the *reality principle* comes into play, exposing the individual to the external world and the frustration of unsuccessful self-satisfaction. Thus, the *secondary process* adapts the satisfaction of the need to the conditions imposed by the outside world. Winnicott drew upon Freud's (1911) paper to develop his theory of separation, emphasising the fundamental role of the environment in the process. Although both Freud and Winnicott failed to recognise the role of musicality in this process, their descriptions of psychic structural and dynamic processes and emotional development contribute immensely to the understanding of musical psychic development.

Steven Pinker's (1997) evolutionary psychology argument links with the Freudian-Winnicottian pleasure principle in terms of pleasure. Pinker argues that music is an evolutionary by-product that is maintained due to its strong connection with the pleasure neural circuit. However, this thesis challenges Pinker's argument about music being an evolutionary by-product in Chapter 2. Although Pinker claims that humans can exist without music because it has no evolutionary significance—an argument this thesis opposes—his claim about the pleasure neural circuit that activates each time humans engage with musical activities seems accurate. This is valuable to the thesis' inter-argumentative threat, as the recognition of an external world is fundamentally mediated by musicality. The initial experiences of communicative musicality are closely tied to the neural and bodily pleasure circuits due to the evolutionary functions of music, which comprise intra- and inter-species communication and emotional communication, including those feelings related to pleasure.

In musically derived interactions, pleasure acts as a glue that allows joy, creativity, and social bonding to occur in human development. The 'pleasure-reality' dynamic of musicality promotes creativity because the initial hallucination coincides with Winnicott's concept of a creative act. The reality principle brings feelings of frustration and the fall of the experience of omnipotence, but the creative act remains as a phenomenological experience that carries forward bits of pleasure. In this thesis, the binary pleasure-reality is not linear and does not happen categorically. The confrontation with reality can be frustrating but is also fundamentally creative, making experiencing reality painful and exciting along with other emotional nuances of experience. Musicality facilitates this psychic dynamic through environmental care rituals and emotional communications that are also musical (see Chapter 3 of this thesis).

Dean Falk's (2004) article, "Prelinguistic Evolution in Early Hominins: Whence Motherese?", supports this thesis's psychoanalytic hypothesis on the relevance of environmental interactions in psychic development through her exploration of the evolutionary origins of language, with

particular attention on motherese or infant-directed speech (IDS). Falk offers an interdisciplinary argument that positions IDS as a pivotal adaptation that addressed the unique challenges posed by evolving hominin anatomy and social dynamics, facilitating the eventual emergence of language. Similar to Dissanayake's approach (in Chapter 2), Falk's (2004) hypothesis centres on the adaptive pressures resulting from the evolution of bipedalism, which necessitated significant changes to pelvic morphology. These changes, coupled with an evolutionary trend toward larger brains, increased the complexity of childbirth and resulted in the birth of neurologically immature offspring. This shift, she argues, required mothers to develop strategies for ensuring the survival and development of highly dependent neonates. IDS, characterised by exaggerated prosodic features such as high pitch, rhythmic repetition, and melodic intonation, likely evolved as a communicative mechanism to manage this dependency. These vocal and gestural interactions captured infants' attention, facilitated emotional regulation, and enhanced learning, thus providing an evolutionary advantage.

Drawing on comparisons with chimpanzee and human interactions, Falk emphasises that while other primates exhibit some precursors to IDS, early hominins underwent a distinct evolutionary trajectory. Unlike other primates, hominin infants could not cling to their caregivers, necessitating new behaviours to maintain the mother-infant bond and manage infant behaviour during maternal foraging. These prosodic and gestural markings served not only to reassure and silence infants but also to foster joint attention, an essential precursor to language that enabled the transmission of social and environmental information. Over time, the repeated use of such markings likely laid the groundwork for the emergence of protolanguage, as specific vocalisations began to acquire conventional meanings.

Falk supports her claims with evidence from fossil records, neurological studies, and developmental psychology. Fossil evidence highlights the anatomical changes associated with early hominin communication, including alterations to brain size, pelvic structure, and vocal tract

morphology. Neurological research suggests that mothers with heightened vigilance and attentiveness, who consciously modified their vocalisations to communicate with their infants, were likely favored in the evolutionary process. Furthermore, insights from developmental psychology indicate that contemporary infants exhibit a robust preference for infant-directed speech, underscoring its deep evolutionary roots and its role in facilitating linguistic and social learning.

The role of the environment, as described by psychoanalytic insights and complemented by other interdisciplinary researchers (e.g. Falk, 2004), is crucial in the process of separating and recognising an external reality in emotional development. This dynamic is relevant to the theories of musicality and communicative musicality because musicality is at the core of this process of separation, which is essential to human development. The following sections further define the developmental process by drawing on other psychoanalytic aspects proposed by Winnicott, in dialogue with other theoretical insights, and weaving these insights with the musical aspects defined in this thesis (see Chapters 1–3).

4.3. Winnicott, Vygotsky, and Anzaldúa: Fundamentals of the paradox of in-betweenness

The process of delineating and acknowledging the distinction between the ego and the external world, facilitated by musicality and communicative musicality and confronted with the interplay between pleasure and reality, underscores the necessity of an initial transitional phase. This transitional space establishes a domain of in-betweenness from which music, together with numerous other fundamental aspects of human existence, emerges. A fundamental early transition is developed by Winnicott (1945; 1951; 1953; 1971) in his work on emotional development and play theories. However, this thesis argues that the transitional space is not confined to early development but persists in various stages of life, constituting a vital element for cultural

experiences. These transitional moments are musical in nature and serve as bridges not only between different perceptions of reality but also as reservoirs for creativity, emotional interconnectedness, and cultural phenomena.

The following section explores Donald Winnicott's (1945; 1951; 1953; 1971) foundational transition between "me" and "not me," which he claimed was key to understanding emotional relationships and creativity. This thesis claims that this transitional moment is heavily mediated by musicality, allowing for emotional relationships and creativity to exist. This moment not only leads to more complex social and creative relationships but also remains a fundamental part of the human experience as transitional aspects migrate into different forms of experience. This section explores some of those migrations through the work of Lev Vygotsky (1978), Gloria Anzaldúa (2015), Gratier and Apter Danon (2009), Julio Cortázar (1980), and Federico Garcia Lorca (1933/2017).

4.3.1. Winnicott: Emotional development—illusion, transitional objects, and phenomena

Winnicott's (1945; 1951; 1953; 1971) theories on illusion and transitional phenomena are relevant to the study of musicality. Transitional phenomena are experiences that allow individuals to move between their subjective inner world and the objective outer world. Similarly, musical experiences involve a sense of intermediate space and creative exploration that connect individuals with their emotions, provide an alternative outlet for expression and self-discovery, and facilitate personal growth. Winnicott's theories offer a useful framework for understanding the psychological complexities of musical experiences and the ways in which music can help individuals develop creativity and imaginative capacity.

From a Winnicottian perspective, the process of development moves from a state of unity with the caregiver to ongoing relative independence. The gradual transition requires the caregiver's support, and it begins with the infant's creation of their sense of existence through illusion (see previous section on environmental relevance). The infant's recognition and acceptance of reality through illusion continue to be a part of adult life in cultural settings such as art and religion (Winnicott, 1953; and see Chapter 6 in this thesis). The caregiver's role in facilitating separation extends to an object that is neither inside nor outside the infant. This object, known as a transitional object, is the first possession that is not the caregiver and is usually a tangible item such as a toy or a blanket. Winnicott (1951; 1953) argued that these objects are crucial to a baby's maturation process and their development into creative and cultural life. The transitional object is both a concrete expression and a material representation of the infant's recognition of the distinction between inside and outside, leading towards independence, which is never fully achieved. Caregiving rituals and techniques, including communicative musicality, are fundamental in this process.

One of Winnicott's definitions of transitional object and phenomena are:

> I have introduced the terms 'transitional object' and 'transitional phenomena' for designation of the intermediate area of experience, between the thumb and the teddy bear, between the oral erotism and true object relationship, between primary creative activity and projection of what has already been introjected, between primary awareness of indebtedness and the acknowledgement of indebtedness ('Say: ta!').
>
> By this definition an infant's babbling or the way an older child goes over a repertoire of songs and tunes while preparing for sleep come within the intermediate area as transitional phenomena, along with the use made of objects that are not part of the infant's body yet are not fully recognised as belonging to external reality. (Winnicott, 1951, p. 230)

The transitional object acquired during their development is their first possession that is not a part of themselves, but it is also part at the same time. This object becomes part of the infant's personal patterns and rhythms of being-in-the-world. Initially, the infant expresses this intimate rhythmicity through thumb or finger sucking, pronation and supination of the forearm (Winnicott, 1953), and sound patterns in caregiver-infant communications, which constitute transitional phenomena as they exist both inside and outside the infant-caregiver dyad.

Although Winnicott does not explicitly discuss the importance of sound in this process, he acknowledges that separation is mediated by sound. However, this thesis argues that the mediation process is more complex than the mere sensory input of sound. The transitional space is made possible by musicality and communicative musicality, not just sound as an attempt of naming the object. According to the theories of Winnicott (1967) and the concepts of musicality and communicative musicality, sound can be considered not only as a constituent part of an object, but also as a thing in itself (see Chapter 5 of this thesis and Ingold, 2010). Winnicott's theory of transitional objects emphasises the significance of objects that facilitate the transition from the infant's self-sufficiency to a shared reality. By extension, sound can be understood as a transitional phenomenon, enabling the individual to engage with and experience the external world. Moreover, the concept of musicality posits that humans possess an innate predisposition to engage with sound, suggesting that sound holds a significant role in human perception and communication (Malloch & Trevarthen, 2009). Furthermore, communicative musicality highlights the expressive and communicative nature of sound, asserting that it serves as a fundamental medium for interpersonal connections and social interaction (Trevarthen, 1999). Thus, sound can be considered a thing in its own right, with the capacity to facilitate the transition from self to others, evoke emotional responses, and foster meaningful connections within the social fabric of human experience.

The transitional object facilitates the infant's recognition of the distinction between inside and outside and marks the opening of a 'psychic topography' where transitional phenomena occur and the transitional object resides. This intermediate area of experience is paradoxical since it is neither entirely inside nor outside. It is a place where things have different realities, and symbols are abundant, making it a fertile ground for creativity, fantasy, and music. The transitional area could also be conceptualised as *ch'ixi* (as discussed in Chapter 1 of this thesis), a talismanic concept that means multiple things and defies static placement and abstract permanence.

> (…) every individual who has reached to the stage of being a unit (with a limiting membrane and an outside and an inside) it can be said that there is an *inner reality* to that individual, an inner world which can be rich or poor and can be at peace or in a state of war" (p230). (…) My claim is that if there is a need for this double statement, there is need for a triple one; there is a third part of the life of a human being, a part that we cannot ignore, an intermediate area of *experiencing*, to which inner reality and external life both contribute. It is an area which is not challenged, because no claim is made on its behalf except that it shall exist as a resting-place for the individual engaged in the perpetual human task of keeping inner and outer reality separate yet inter-related. (Winnicott, 1951, p. 230)

Transitional phenomena continue to be significant in childhood (Winnicott, 1953) and serve as the reservoir of an individual's emotional repertoires and the location of creativity and cultural phenomena, such as musicality and music (see Chapter 6). These phenomena facilitate the process of distinguishing between inside and outside and provide companionship and meaning to infants in a world that can sometimes feel lonely and threatening. The transitional object does not disappear or get repressed; instead, it loses its meaning because it is not confined to either the inside or outside. Its function diffuses and is spread out over the whole intermediate territory between 'inner psychic reality' and 'the external world as perceived by two persons in common', that is to say, over the cultural field. The phenomenology of transitional phenomena and the

trajectory from primary experience to sociocultural expression and sharing are emphasised in this thesis. This thesis also claims that transitional phenomena are not exclusive to early development but are always present, changing in form and responding to developmental demands. Moments of transition require different engagements with the environment, and the first transitions establish the foundation for the reservoir of creative living as Winnicott asserted. As the reservoir of cultural, creative, and emotional life, transitions are essential for musical experience.

Two related concepts, Lev S. Vygotsky's (1978) theory of learning and the Zone of Proximal Development (ZPD) and Gloria Anzaldúa's (2015) theory of migration identity and in-betweenness (n*epantla*), complement Winnicott's theory on transitional phenomena and highlight the importance of these mental states in emotional development. They also support the argument presented in this chapter that the development experiences involve paradoxical mental states influenced by musical interactions that go beyond and precede music's cultural context. Additionally, these concepts support the thesis's argument that development involves processes that are not directly associated with consciousness but are situated within relational environmental matrices of experience.

4.3.2. Vygotsky: Learning development and the Zone of Proximal Development (ZPD)

In his historic-cultural theory of learning development, psychologist Lev S. Vygotsky (1978) proposed that classical theories of learning development could be categorised into three primary perspectives. The first viewpoint, advanced by theorists such as Piaget and Binet, argues that child development is separated from learning, which is viewed as an external process. In this perspective, development is a prerequisite for learning, and instruction is only possible when a child's mental functions have matured to the point where they can learn. As such, maturation is seen as a one-

way arrow, preconditioning learning but not resulting from it. According to Vygotsky, this position suggests that "learning forms a superstructure over development, leaving the latter largely unchanged" (p. 80).

The second major position posits that learning and development are synonymous, with learning integrated into the developmental process. William James is credited as a precursor to this idea, which views learning as the mastery of conditioned reflexes, and both development and learning as involving elaboration and substitution of innate responses. However, the key difference between this position and the first is that for the former, developmental cycles and learning cycles occur simultaneously, not as replacement of reflexes (see Vygotsky, 1978).

The third perspective combines the first two positions and argues that development and learning are distinct yet interconnected processes. Kurt Koffka (1924), a Gestalt psychology pioneer, first proposed this idea. According to this view, maturation depends directly on the development of the nervous system and on learning, which is a developmental system in its own right. This model emphasises the role of learning in a child's general development and suggests that learning's impact is not specific since it involves mental operations that allow for the transfer of general principles across various tasks. The learning process is more than just skill acquisition; it embodies an intellectual order that permits the transfer of general principles identified while resolving one task to several other tasks (Vygotsky, 1978, p. 83).

However, Vygotsky (1978) rejected all three positions and instead introduced the Zone of Proximal Development (ZPD) as a means for psychologists and educators to comprehend the internal course of cognitive development, specifically the learning process. He posited that a theoretical gap exists between not knowing and learning something new, and that two simultaneous developmental levels must be considered in the process of learning: the actual developmental level and the potential level. Vygotsky contended that learning abilities can be boosted through interaction with someone more proficient in the learning task. Therefore, the

ZPD is the difference between the actual developmental level, as determined by independent problem-solving, and the potential developmental level, determined through problem-solving under adult guidance or in collaboration with more capable peers. Vygotsky asserted that "what children can do with the assistance of others might be in some sense more indicative of their mental development than what they can do alone" (1978, p. 85). Hence, the Zone of Proximal Development is "the distance between the actual developmental level as determined by independent problem-solving and the level of potential development determined through problem-solving under adult guidance or in collaboration with more capable peers" (p. 86).

The last remark on Vygotsky's theory is that his claim on collaborative learning is vertical and dependent on someone more capable (Vygotsky, 1978). Thinking of development in that way may slip into power dynamics that reproduce macro-systems where there is no collaboration but abuse of power. This situation occurs systematically as a macro-culture of uses of power which take advantage of the infant's (or young child's) vulnerabilities instead of working with them as a facilitating environment for emotional development. These dynamics can be seen in domestic and sexual abuse, and there is a statistical prevalence that men, particularly those family members that take the father's role, are more likely to be perpetrators (Johnson, 2011; Sanderson, 2004; Stark & Flitcraft 1988). This tendency has been seen as a specific power dynamic consequence of the patriarchal myth, which gives a symbolic entitlement of superiority to cisgender men. However, this is a vital topic to illustrate how environmental circumstances embedded in socio-political contexts can impinge on a person's developmental course and shut the music down. A more extensive discussion on the psychological effects of domestic violence and sexual abuse can be found elsewhere (e.g., Shonkoff et al. 2012; see also Winnicott 1945; 1949). In this thesis, the main point in the developmental trajectory can be thought of as a collaboration in which both parts learn from each other in different ways and facilitate meaningful socio-emotional interactions, which open levels of consciousness that may allow for intimate connections but also finding the

self. Although Vygotsky's theory was primarily focused on later childhood (around 5 years old), his ideas have relevant contributions to the argument presented in this thesis. The Zone of Proximal Development (ZPD) refers to a transitional zone between different mental states, similar to Winnicott's transitional zone. The ZPD defines those functions that have not yet matured but are in the process of maturation or in an embryonic state. These functions are the buds of development rather than the fruits, characterising cognitive development prospectively, not retrospectively as discussed with the mnemic prints in ego development (see previous section this chapter). These two temporal figures (*après-coup* and *avant-coup*) may be at operation in transitional phenomena; consequently, in developmental musical trajectories there are two different temporal figures at operation: retrospective and prospective. The retrospective is part of most ego psychology and psychoanalytic rationale (see previous sections; and e.g. Maiello, 1995) and the prospective idea is further explored in the following chapter with the ecological model (Gibson, 2015; Ingold, 2010).

Early interactions between caregivers and infants, along with infants' engagement with their environment, are crucial learning experiences that allow caregivers to help infants understand their emotional experiences cooperatively. Vygotsky's contributions, particularly the concept of the Zone of Proximal Development, can extend beyond the educational context and apply to emotional and intellectual development in early and later stages of life. These early interactions have a fundamental musical quality, which contributes to the development of complex thought patterns, as Darwin also suggested (see Chapter 2). Infants learn to understand the meaning of interactions and emotional communication with external objects such as individuals and things. Transitional areas, including the ZPD, remain essential throughout life and are significant for the development of psychic and ego maturation.

4.3.3. Anzaldúa: *Nepantla* and the in-betweenness of different cosmovisions

The developmental phenomenology of in-betweenness, as exemplified by Winnicott's transitional phenomena and Vygotsky's ZPD, can also be seen in a different form in the indigenous Nahuatl concept of *nepantla,* defined by Gloria Anzaldúa (2015) as the paradoxical bridge between two worlds. It involves navigating between conventional and non-conventional ways of viewing the world and perceiving something from different perspectives, simultaneously existing and not existing.

> En este lugar entre medio, nepantla, two or more forces clash and are held teetering on the verge of chaos, a state of entreguerras. These tensions between extremes create cracks or tears in the membrane surrounding, protecting, and containing the different cultures and their perspectives. Nepantla is the place where at once we are detached (separated) and attached (connected) to each of our several cultures. Here the watcher on the bridge (nepantla) can "see through" the larger symbolic process that's trying to become conscious through a particular life situation or event. Nepantla is the midway point between the conscious and the unconscious, the place where transformations are enacted. Nepantla is a place where we can accept contradiction and paradox. (Anzaldúa, 2015, p.56)

Anzaldúa uses *nepantla* to situate not only social and cultural identity but also the intimate experience of belonging to multiple places, histories, and symbols. She argues that categories such as sex, gender, and nationality are insufficient to define the paradoxical, spiritual, and political experiences that individuals may have. Anzaldúa employs the concept of border art as a means of exploring identity as a tension between different cultures and experiences. Border art is an art style that confines the collective cultural heritage of Mexican/Chicana identities and their experience of growing up in the United States. The concept shares similarities with Rivera Cusicanqui's *chi'xi*, both of which respect the subaltern notion of mestizaje, a force of resistance against the exploitation of border identities. As a talisman concept, *nepantla* is a mobile and bending situation

between two or more places. For Anzaldúa, mestizaje is also not a blending of colours, but her claim focuses on the question about making mestiza art and writing mestiza papers, prose, and fiction, whilst resisting the exploitation that comes with trends that exoticise border identities and *arte de la frontera* (border art): "The artist on some level still connects to that unconscious reservoir of meaning, connects to that *nepantla* state of transition between time periods, connects to the border between cultures" (Anzaldúa, 2015, p.55). In that sense, Anzaldúa's is also a racial claim of resistance, but from a different angle than Rivera Cusicanqui (2010/2020).

Nepantla, like Winnicott's transitional space, is the topography of creativity and predecessor ego formation. *Nepantla* facilitates transitions, evoking the place/no-place, but also of intuition and symbolic events—including spiritual and collective knowledge carried from '*los muertos*' (generational symbols of our ancestors). As an immigrant Latinx, the author of this thesis brings together contradictory belief systems such as magical realism, Catholicism, and hyperrationality, which collide within the idiosyncrasies of British society. This places the author in a subaltern psychic space where 'mestizaje' becomes a force of resistance and adaptation. Although Winnicott's transitional space does not emphasise spirituality as Latinx identities, it still addresses the tensions of identity and the process of ego formation which can be presented as a form of *nepantla*, in one aspect of development.

> Chicana/o artists currently are engaged in 'reading' that Nepantla , that border, and that cenote-from which direction and renewal spring forth. Imagination, the mundis imaginalis—the source of creativity, dreams, fantasies, intuitions, and symbolic events—resides in el cenote. For those of us who are receptive, el cenote offers the unconscious's resources for self-knowledge and transformation. Nepantla is the threshold of transformation. Art and la frontera intersect in a liminal space where border people, especially artists, live in a state of nepantla. The Nahuatl word for an in-between state, nepantla is that uncertain terrain one crosses when moving from one place to another;

> when changing from one class, race, or sexual position to another; when traveling from the present identity into a new identity. The Mexican immigrant at the moment of crossing the barbed-wired fence into a hostile "paradise" of El Norte (the U.S.) is caught in a state of nepantla. (Anzaldúa, 2015, pp.55-56)

Anzaldúa describes *nepantla's* in-betweenness as similar to anthropologist Victor Turner's concept of 'liminal' space (Turner, 1974; Harris, Turner et al.,2017), which refers to a zone of transition precipitated during a rite of passage, play, or works of art. For Turner, formal logical systems create meaning in society within a structure of oppositional pairs. However, what he refers to as '*les symboles sauvages*'—those not produced by formal logical systems—are not fixed binaries but dynamic and governed by emotional and volitional dimensions. These symbols traverse contextual locations and provide different meanings depending on their time and spatial locations.

> Undoubtedly, in the specialized genres of complex societies such as philosophical, theological, and formal logical systems, symbols, and the signs derived from their decomposition, do acquire this 'algebraic' or logical quality, and can be treated effectively in relations of 'binary opposition', as 'mediators', and the rest, denatured by the primacy of specialist cognitive activity. But 'les symboles suvages', as they appear not only in traditional, 'tribal' cultures, but also in the 'cultural refreshment' genres (poetry, drama, and painting) of post-industrial society, have the character of dynamic semantic systems. They gain and lose meanings—and meaning in a social context always has emotional and volitional dimension—as they 'travel through' a *single* rite or work of art, let alone through centuries of performance, and they are aimed at producing effects on the physiological states and behavior of those exposed to them or obliged to use them for their communication with other human beings. (Turner, 1974, pp. 54-55 original *italics*)

Similar to *ch'ixi*, *nepantla*, transitional phenomena, and the Zone of Proximal Development, Turner's liminality is polysemic because it can be transposed into different contexts. It means the

same but different things depending on each context and challenges the binary logical nature of either/or. Even though these concepts come from different epistemological reasoning and suggest different arguments, they converge in their essential topographic claim regarding a space of transition where logic functions differently from a formal arithmetical linear and abstract trajectory. These concepts also have in common a reference to experience at an individual or collective level; they refer to the experience of being situated in bodies. They also share a relationship with behavioural musical cues, which seem important in making them a collective yet individual phenomenology: imitation, play, creativity, art, emotional communication, and self-other interactions. These aspects, addressed throughout this thesis, are also fundamental parts of musicality and music, which leads to the conclusion that music and musicality may be both axioms and facsimiles of transitionality. Ego development is founded in a transitional space but continues in a trajectory that complies with rational thinking and linearity, while the self is less of a sonata, less rational, and more like a jazz standard.

4.4. Improvisation zone, imitation, repetition, and mirroring: Variation and improvisation in creativity and stillness

The previous section highlighted the initial stage of the developmental process, which starts with a state of complete fusion, lacking a distinction between inside and outside. Crucial in emotional maturation, transitional spaces mark the infant's separation process and early ego development. These transitional phenomena continue to occur throughout life and play a crucial role in emotional and cultural growth, forming part of the same developmental continuum. This chapter focuses on the first years of life, with an emphasis on musical elements. Nonetheless, it is vital to note that developmental milestones, such as transitional phenomena, facilitate emotional and

cultural growth at all stages of life. The concept of transitionality is also related to shared aspects between music and development, including *imitation*, *repetition*, and *mirroring*, and their connection to creativity. In their 2009 book chapter, researchers Maya Gratier and Gisèlle Apter-Danon further developed the idea of communicative musicality (see also Chapter 3 in this thesis), which involves an "improvisation zone", understood in this thesis as another type of transitional phenomenon.

Throughout this thesis, imitation and repetition emerge as recurring themes in various aspects of development, music, musicality, and communicative musicality. *Imitation* allows humans to adapt to their interactive reality, learn how to navigate the world, and facilitate the developmental process while providing a stable rhythmicality for active engagement with others. The process of imitation also stimulates neuron connections that are essential for social interaction, cognition, and emotional processing. In infancy, imitation is particularly important for development and is often demonstrated through the behaviour of the infant and the responses of caregivers and others who interact with them. In addition, *repetition* is fundamental to the rhythmicalities of life, learning, and creativity, but can also be a source of disturbance and stillness in emotional interaction (see e.g. Freud, 1920; Gratier & Apter Danon, 2009).

In adulthood, interactions between individuals involve a validation or reciprocity, referred to as *mirroring* in psychoanalytic literature. This goes beyond mere imitation and creates intimate and interdependent situations of reciprocity. This section explores the themes of imitation, repetition and mirroring in the context of self and ego development and their relevance within the communicative musicality framework.

4.4.1. Imitation, repetition, and belonging—The Improvisation Zone

During the developmental process, communication between infants and caregivers is reciprocally influenced by imitation and repetition. Gratier and Apter-Danon (2009) propose a conceptualisation of the functions of imitation and repetition in relation to the sense of belonging and identity at the heart of communicative musicality. Their theory complements the developmental trajectory proposed in this thesis and offers another transitional, or *nepantla*, situation explicitly linked to music through their idea of an *improvisation zone*. According to the authors, during spontaneous interactions, infants and caregivers create "repertoires of communicative motifs based on repetition and variation of expressive units that carry meaning" (p. 301). These repertoires represent a dynamic balance between uniformity and novelty, and coordinated expression forms the basis of spontaneous communicative musicality during the initial months of life. However, disruptions to this coordination can occur.

Adopting the methodology employed in the initial research of Malloch (1999) (see Chapter 3 of this thesis), Gratier (2001, 2003) conducted a cross-cultural study that examined spectrographs of 60 caregiver-infant dyads from France (N=10), India (N=10), and the USA (N=10). Thirty caregivers were living in their countries of birth, compared with thirty who had recently emigrated mostly from India to the USA. The data was used by Gratier and Apter-Danon later in 2009 to support their hypothesis about temporal coordination, the improvisation zone, and sense of belonging. The results of the study provide conclusive evidence of temporal coordination in terms of Malloch's categories of pulse, phrase, and narrative episodes (see Gratier & Apter-Danon, 2009, pp. 302-304 and Chapter 2). Gratier and Apter-Danon's study concluded that immigrant caregivers responded similarly to those of their native culture or even to the new culture in which they were settling (Indian immigrants in the US). However, when immigrant caregivers self-reported a lack of confidence in their ability to care for their infants and felt distressed in their adaptation (signs of cultural conflict), their temporal organisation was less coherent and lacked an improvisational

quality in their communications. In other words, the vocal expressions of these caregivers who showed cultural conflicts were more rhythmically rigid and monotonous. Gratier and Apter-Danon claim that "mothers who had experienced a loss of self-confidence through a confused sense of belonging were far more predictable in their communicative expressions, and their infants in turn were far less adventurous or creative in theirs" (2009, p. 304).

Based on those findings, the authors suggest that belonging comes to light through communicative musicality in the first months of life. A sense of belonging, according to Gratier & Apter-Danon,

> is both culturally and musically derived. Belonging is based on interactive motifs and styles shared by the community into which the infant's born, and that the infant begins to embody spontaneously through regular and intimate communication with close kin. But belonging goes beyond what is culturally given as a right of birth. It allows the infant to explore *new* inventive ways of expressing and sharing experiences. The infant is motivated right from the start to acquire and incorporate culturally meaningful ways of tuning in to others (Trevarthen 1988, 1993); but soon, his or her own particular style of belonging, with all of its improvisational vitality, becomes an ongoing motivating drive for development and learning. The feeling of belonging is acquired through musical engagement and attunement (Stern et al 1985) and opens up new spaces for an intimate communication supporting culturally based personal styles of 'being together in time'. (2009, p. 304)

According to Gratier and Apter-Danon (2009), during their interactions, infants and their caregivers coordinate their communications and learn to anticipate each other's responses, much like jazz musicians. The sense of belonging and the improvisational quality of vocal interactions suggest a source of personal confidence and a powerful motivating force generated by the caregiver-infant awareness of sharing culturally derived predictable expressive forms that allow for

playful variation. In the authors' model of protohabitus[59], the infant's sense of belonging is primarily based on active bodily sense, rather than directly on elaborate cognitive or linguistic processes. Protohabitus is composed of "all projectable styles and routines that mothers and infants establish over time as they interact. It is a variable repertoire of embodied habits rooted in cultural styles that the mother brings with her from her own community of belonging. We can think of this repertoire as akin to that used by jazz musicians in their improvisation, made of 'licks', riffs and in part tacitly learned 'etiquette'" (Gratier & Apter-Danon, 2009, p.306).

This predictability-novelty tension represents another '*nepantla*' situation in which paradox determines the quality of what is happening within the interactions—communicative musicality—directing the possibility of emotional growth. According to Gratier and Apter-Danon (2009), the sense of belonging is not a matter of recognising juxtaposing territories (*nepantla*) or races (*ch'ixi*), nor is it a transitional space of recognition of inside and outside (Winnicott) or a cognitive achievement made through collaborative effort (Zone of Proximal Development). Instead, it involves entering the 'improvisation zone'.

The authors argue that interactions lacking protohabitus prevent the creation of shared structures and do not foster a sense of belonging: "[b]elonging requires a balance between the known and the new, repetition and creativity, structure and variation" (p. 305). Studies on the temporal aspects of expression in communications between caregivers and their infants show that optimal forms of timing are not so much periodic as improvisational. Flexible but predictable polyrhythmic exchanges support affective involvement and learning in infants, providing structures for shaping units of meaning (narratives) and the infant's perception of time. The improvisation zone is used to conceptualise the special quality of temporal organisation in spontaneous caregiver-infant

[59] A term borrowed from Bourdieu's notion of habitus which refers to a physical embodiment of the cultural capital through ingrained habits and dispositions acquired throughout lived experiences: "The particular set of culturally determined bodily dispositions which have no representative content but through a 'regulated improvisation' unconsciously guide our perceptions, actions and representations is known as habitus" (Bourdieu 1977, p.78 as cited in Gratier & Apter-Danon, 2009).

interactions, which improves the infant's social awareness by stimulating expectations and awareness of a responsive and engaged other.

Daniel Stern (1982; 1999) supports this view, claiming that modulated, variable timing of caregiver-infant interactions maintains and modulates the infant's attention and emotions. The improvisation zone maintains attention and meaningful and playful interrelations because when repetition persists monotonously, the infant disengages and gets bored. Similarly, when the infant is presented with unstructured timing, the infant's response is either not paying attention or becoming upset (see further studies in Gratier & Apter-Danon, 2009, p.207).

> *Repetition* implies appropriation and projection, and contributes building a dynamic and assertive sense of self. *Variation* of repeated forms and processes transforms the known into the new, moves it forward, and draws or invites it into a space for creative dialogue and exploration. Studies in the cognitive psychology of music have shown that variations in timing, intensity and duration in musical performance serve to enhance aspects of musical structure by facilitating listeners' segmentation of musical sequences (Drake & Palmer 1993). In the case of mother-infant interaction, variation of known forms may contribute to strengthening a shared protohabitus. (Gratier & Apter-Danon, 2009, p. 308 original *italics*)

Gratier and Apter-Danon (2009) agree with Daniel Stern (1985), as discussed in Chapter 3 of this thesis, that the imitation quality in early mother-infant interactions is not identical but always corresponds with the infant's immediate behaviour. Rather, there is a theme with a minor variation (e.g., A + a = Aa). Additionally, Gratier and Apter-Danon (2009) note that the temporal organisation of caregiver-infant interaction is not strictly rhythmic but instead presents a timing that creates frames of expectation and generates improvisation zones. This timing is both clearly structured and subtly varied.

For example, Jaffe et al. (2001; also in Gratier & Apter-Danon, 2009) found that the mid-range coordination between caregiver and infant in vocal interaction allows for creative expression and collaborative exploration. This study also highlights the importance of interactive coordination between caregiver-infant dyads in terms of secure or insecure attachment and suggests predictors of language development at twenty-four months. Similarly, Winnicott (1949) suggests in his theory on primitive emotional development that the caregiver's role is time-sensitive in the infant's separation process. Winnicott proposes that if the caregiver is away more than a certain period, the baby's capacity to use the symbol ceases. If the caregiver returns within a specific time frame, the baby is distressed but the distress is soon mended. However, if the caregiver is away for too long, the baby becomes traumatised, and the caregiver's return does not mend the baby's altered state:

> The feeling of the mother's existence lasts x minutes. If the mother is away more than x minutes, then the imago fades, and along with this the baby's capacity to use the symbol of the union ceases. The baby is distressed, but this distress is soon mended because the mother returns in x+y minutes. In x+y minutes the baby has not become altered. But in x+y+z minutes the baby has become traumatized. In x+y+z minutes the mother's return does not mend the baby's altered state. Trauma implies that the baby has experienced a break in life's continuity, so that primitive defences now become organized to defend against a repetition of 'unthinkable anxiety' or a return of the acute confusional state that belongs to disintegration of nascent ego structure. (Winnicott, 1967. p. 131)

When comparing the two models, Winnicott's model does not include improvisation zones, while Gratier and Apter-Danon's model does not include time-sensitive reactions to the presence or

absence of the caregiver. Both theories provide bridges between frustration and the establishment of the reality principle. These bridges are improvisation zones or "jazz" bridges.

Gratier and Apter-Danon's (2009) research demonstrates the importance of the improvisation zone in human exchange for the development and understanding the roots of belonging in non-discursive, polysemic configurations of human exchange. Their contribution combines various elements found separately in the literature, such as rhythm, interaction, communicative musicality, creativity, and a zone of in-betweenness or improvisation. Although the authors explore the importance of juxtaposing known and not-known spectra in their cross-cultural study, they do not provide a detailed analysis of the socio-political consequences of immigration in distressing and repetitive communications. A more thorough discussion of this issue could lead to less generalised assumptions about the varied experiences of immigration, which require socio-political and intersectional contextualisation. Moreover, the authors overlook the significance of including a gender perspective in their analysis, as assigned female babies may lack a place culturally and therefore find it more challenging to develop a sense of belonging. However, such discussions are beyond the scope of this thesis, but it is essential to consider these factors in future research.

The authors also examine the relevance of the improvisation zone in situations where it fails, such as with distressed immigrant caregivers and caregivers diagnosed with borderline personality disorder (BPD), who exhibit monotonous, repetitive, and disengaged interactions with their babies. In these cases, the type of narrative is usually stereotypical in sequence, as shown in studies with caregivers diagnosed with BPD (see Gratier & Apter-Danon, 2009; Malloch & Trevarthen, 2018). One of these cases presents a BPD caregiver who repeats "the same up-and-down vocal gesture again and again, with almost no participation on the part of the infant...the mother momentarily takes notice (…) [and] responds to her infant's conversational offering by ceasing her unresponsive repetition (…). But the dialogue almost immediately breaks down, and the mother returns to her stereotypical, repetitive vocal gesturing" (Malloch & Trevarthen, 2018, p. 12).

While the authors' illustration is useful in showing the complexities of the sense of belonging, the in-between states could be an identity on their own, as Anzaldúa points out (also explored in Hernandez, 2015). Learning to navigate that tension could be a way out from the need to resolve belonging into one static, concrete place, i.e., a non-pathological side of confusion and in-betweenness. The path that can be taken may depend on age, mental state, and biographical circumstances in which one enters those '*nepantla*s'. There are moments in life that are more sensitive than others and require stable and safe environments for transitioning, as pointed out in the previous section. Failing to provide such environments can lead to trauma and profound disorganisation in psychosomatic structuring. These spaces of transition require playfulness and enhance emotional connection, meaning, and learning, but they need to be transited in the company of others and in a state of mind where the interacting individuals feel relatively safe, which is not always the case, especially with immigrant caregivers or people with divergent mental functioning.

Robb (1999) offers important insights regarding emotional musicality and postnatal depression, highlighting how socio-political contexts and broader environmental factors profoundly influence human musicality and, consequently, emotional development. Robb's (1999) research examines how these interactions function as a form of emotional communication and highlights the impact of maternal mental health, particularly postnatal depression, on the acoustic features of these exchanges. Central to Robb's argument is the concept of emotional musicality, which refers to the inherently musical qualities—such as rhythm, pitch, and prosody—present in the vocal exchanges between mothers and their infants. These interactions, characterised by melodic intonations and rhythmic patterns, are posited to serve as a primary medium for emotional bonding and communication in early infancy (see also Chapter 3). Robb emphasises that this form of communication is universal, transcending cultural and linguistic boundaries, and serves an adaptive

function by facilitating the emotional and social development of the infant. The study suggests that the musicality embedded in these interactions supports the infant's ability to manage emotions, establish a sense of security, and develop attentional capacities.

In addition to exploring the normative aspects of caregiver-infant vocal affect, Robb (1999) investigates the impact of postnatal depression on these interactions. Through an acoustic analysis of caregiver-infant exchanges, the study reveals that postnatal depression is associated with significant alterations in the prosodic features of caregiver vocalisations. Depressed caregivers are found to produce vocalisations that are less melodically varied, slower in tempo, and characterised by reduced dynamic range. These acoustic changes, Robb argues, may impair the emotional attunement between caregiver and infant, potentially hindering the infant's social and emotional development. The findings underscore the importance of maternal emotional health in shaping the quality of early vocal interactions and highlight the potential for emotional musicality to serve as a diagnostic tool for identifying and addressing postnatal depression.

Robb (1999) situates these findings within the broader context of developmental and evolutionary theories, suggesting that the musical qualities of mother-infant vocalisations may have evolved as an adaptive mechanism to promote infant survival and maternal-infant bonding. The study draws parallels between these interactions and the broader human propensity for music, positing that the origins of musicality may be rooted in its capacity to facilitate social cohesion and emotional communication.

Although existing research lacks adequacy in examining communicative musicality within regions affected by persistent war, civil conflict, or among minorities confronting systematic threats to their social cohesion, these psychosocial contexts are pertinent to the central argument in this section[60]. This argument posits a correlation between imitation, repetition, and the sense of

[60] Although there is a lot to be done, there is work beginning to be done on music's potential roles in conflict contexts. See for example the 2020 compendium in Hesser and Bartleet's (2020) edited volume, *Music as a Global Resource:*

belonging. In environments marked by hostility, the likelihood of establishing an improvisation zone is diminished, thereby compromising the potential for imitative communication and shared narratives of emotional meaning, which are considered inherent in the ordinary and natural repertoire of the human species (see Honing, 2018; Malloch & Trevarthen, 2009a).

Variations and pathological expressions may emerge in the absence or inconsistency of spontaneity, correspondence, and attunement. For instance, a caregiver experiencing significant disturbances in their sense of belonging may exhibit a lack of authenticity and monotonous responses in their interactions. Referring to mirroring (further developed in the next section), Winnicott (1971, see Chapter 9) discusses the consequences of cases where infants do not receive reciprocal responses, leading to the atrophy of creative capacity. This aligns with the self-development hypothesis of this thesis, primarily facilitated by communicative musicality—shared emotional reciprocity. Concerning repetition, pathological expressions of non-reciprocal interactions may be related to Freud's compulsion to repeat (1914; 1920) or to Andre Green's (1983, also Kohon, 1999) "dead mother's theory" and his work on the negative10. These examples illuminate the challenging consequences of disturbances in communicative musicality when considered on a broader scale in hostile psychosocial settings. Chapter 6 further elaborates on the psychosocial aspects of music, musicality, and communicative musicality. However, it is essential to emphasise the continuity between dyadic interactions and wider psychosocial contexts, as they are inherently interconnected.

Solutions for Cultural, Social, Health, Educational, Environmental, and Economic Issues (5th ed.), which explores music's role in addressing global challenges. The volume features 109 projects from 54 countries, demonstrating music's potential to contribute to the United Nations Sustainable Development Goals. The interdisciplinary approach integrates perspectives from music therapy, education, community music, and environmental studies, highlighting music's impact on social cohesion, health, education, environmental sustainability, and economic development. The editors underscore the importance of cultural sensitivity and community engagement in implementing music-based interventions, making this compendium a valuable resource for researchers, practitioners, and policymakers (Hesser & Bartleet, 2020).

In conclusion, in spontaneous interactions, caregivers and infants build repertoires of communicative motifs through repetition and variation of expressive units that carry meaning. These shared repertoires bring a sense of mutual understanding and belonging. The feeling of belonging in caregiver-infant interaction requires a dynamic balance between sameness and novelty, well-known trajectories and adventurous detours, and timed presence and absence within the infant's capacity to tolerate the rhythmicity of the reality principle. The spontaneous imitative quality of caregiver-infant interaction is a central factor in the rhizomatic emergence of the complexities of self-development explored in this thesis, highlighting the importance of emotional interactions in the establishment of social and relational dimensions of the subject. (Gratier & Apter-Danon, 2009).

4.4.2. Mirroring, echoing, and attunement

This thesis puts forward the hypothesis that mirroring plays a key role in facilitating the developmental importance of imitation and the improvisation zone. Focus is primarily put on Winnicott's (1971) concept of mirroring, but also incorporates the contributions of Lacan (1949/2006), Anzieu (1995) and Stern (1998) to enhance the understanding of the musical aspects of this phenomenon. In the context of caregiver-infant communicative musicality, the processes of handling and holding are essential in the separation of the me and not-me.

According to Winnicott (1971), the environment plays a critical role in the emotional development of human infants in the early stages of life. At this stage, the infant has not yet separated from the environment. Gradually, the not-me separates from the me, with the pace determined by both the infant and the environment. Holding, handling, and object-presenting are emphasised by Winnicott as important environmental functions across the developmental trajectory of the infant's ego and self-development. Effective handling and holding involve attuned responses to the baby's

physical and emotional needs, enabling the baby to perceive the object as an external object that is subjectively perceived and created. In this context, the term "object" refers to both the caregiver and other emotionally cathected objects, including animate (e.g., the caregiver) and inanimate (e.g., the transitional object) objects.

> The bare statement is this: in the early stages of the emotional development of the human infant a vital part is played by the environment which is in fact not yet separated off from the infant by the infant. Gradually the separating-off of the not-me from the me takes place, and the pace varies according to the infant and according to the environment. (Winnicott, 1971, p. 150)

The concept of mirroring has been explored by both Lacan (1949/2006) and Winnicott (1971) in relation to early emotional development. In Lacan's (1949/2006) view, the mirror stage represents a crucial turning point in the mental development of a child, where the recognition of oneself in the mirror requires turning to an external object viewed as 'outside oneself' as the subject is the foundation of the 'I'. According to Lacan (1949/2006; Bailly, 2009), this recognition involves a libidinal relationship with the body image that departs from the tension between self-recognition and non-recognition (meconnaissance) of the subject as perceived in the reflected body, which is both real (me) and external (not-me) and interpreted as an ideal image rather than a real one.

In contrast, but also influenced by Lacan's (1949/2006) paper on the mirror stage, 'Le Estade Du Miroir', Winnicott's concept of mirroring emphasises the caregiver's role in mirroring the baby's mental states, rather than the baby's own reflection in a physical mirror. This multisensorial phenomenon involves emotional and gestural expressions, as well as verbal responses during handling, holding, and object presentation: "In other words, the mother is looking at the baby, and what *she looks like is related to what she sees there*" (Winnicott, 1971, p. 151 original *italics*) [61]. The

[61] There is a similar concept developed by psychoanalyst Wilfred Bion, where he defines the alpha function of the caregiver as an unconscious contemplation and processing of the baby's emotional projections (alfa elements), which

reciprocity between caregiver and infant is crucial for self-recognition and ego formation, emotional sharing, and the infant's overall emotional state. Furthermore, the function of communicative musicality suggests that mirroring through sound and touch would precede visual mirroring and that shared interactions would evolve over time.

Mirroring is therefore not limited to visual reflection, as sensorial experiences are not reducible to sight. Blind infants, for example, rely on senses other than sight to reflect and mirror themselves. Mirroring, therefore, creates a communicative musicality that involves an emotional *nepantla* experience for both caregiver and infant. Although the concept of mirroring is applicable in various contexts, the idea that it is more an emotional disposition of reciprocal interaction remains a crucial factor in an individual's emotional state and ego development.

Mirroring, viewed as an emotional disposition goes beyond the literal imagery of a mirror. It involves focusing on the reciprocity and the meaning that emerges through the shared connection between the infant and the caregiver. According to Winnicott (1975), the caregiver's face does not serve merely as a mirror. Without appropriate responses from the external world, infants' creative capacity may diminish, and their significant exchange with the world becomes replaced by mere perception:

> The mother's face is not then a mirror. So perception takes the place of apperception, perception takes the place of that which might have been the beginning of a significant

are then returned into a digestible form for the baby (beta elements). The process by which the alpha function takes place is mediated by reverie—the capacity to engage with another's mental and emotional contents in a dream-like way (see Sandler, 2018, for detailed definitions and references to Bion's work). The reason why this thesis does not include Bion's theory, even though it can be closely related to this thesis' musical hypothesis is because his premises on psychic development are founded Melanie Klein's theoretical assumptions such as a pre-conception of ego and unconscious phantasies. As seen with the case of Suzanne Maiello, these assumptions do not logically cohere with the main argument of this thesis and would imply making an in-depth theoretical discussion, which is outside the scope of this thesis. This theory is mentioned, however, because there are many points of convergence with the theories on mirroring and it could present valuable contributions to the theory of communicative musicality presented in this thesis, which has a strong psychoanalytic approach.

> exchange with the world, a two-way process in which self-enrichment alternates with the discovery of meaning in the world of seen things. (Winnicott, 1975, p. 151)

At this point, the infant's development of an objective understanding of their inner states and the external world is reinforced through mirroring. Together with transitional phenomena, mirroring indicates the presence of the separation-integration process. The relationship between infants and caregivers can be likened to a live jam session[62], where both parties recognise each other, joining to create improvised tunes of mutuality in physical and emotional exchanges.

Psychoanalyst Didier Anzieu (1995) synthesises sound and gaze in his concept of the 'mirror of sound,' drawing on the ideas of Winnicott and Lacan. Anzieu's sound-wrap hypothesis highlights that infants' exposure to the sounds of others or their own body's creates an illusory space. They are bathed in a rich array of sound qualities and volumes, which prepare and stimulate their development and ultimately facilitate the emergence of the ego:

> The bath of melody (the mother's voice, the songs she sings, the music she lets it hear) offers it a first mirror of sound, which it exploits first by cries—which the mother's voice reacts to with soothing noises—then by gurgles, and finally by playing with phonemic articulation. (Anzieu, 1995, p.187)

The caregiver's gaze and smile also play a crucial role in this process as they reflect an image of the child back to themselves, perceived visually and internalised, thus reinforcing their sense of self and developing their ego. As Anzieu (1995) points out, the bath of melody offers infants their first mirror of sound. This mirror points at a trajectory of verbal language formation.

[62] A social encounter where people improvise music without extensive preparation or previous arrangements. Most times, these sessions go over jazz standards, but the quality, tempo and improvisation sections are completely fresh, made by the group there and then.

Communicative musicality is present from the outset, and mirroring represents a specific form of it that constantly reinforces the paradoxical moments of separation and non-separation. Ultimately, this facilitates separation. The confrontational nature of mirroring arises from the presentation of reality to the infant in the form of the caregiver's emotional states and reactions to the infant's interactions. Imitation, repetition, and improvisation are used to reflect back what the infant is communicating. This presents the infant with the individuality of the other person while simultaneously reflecting themselves. Thus, Winnicott's assertion that the baby only sees themselves in the caregiver's face is not entirely accurate, as they see both themselves *and* the other person, a situation determined by paradox and transitionality. This conceptualisation of communicative musicality is intersubjective, polysemic, paradoxical, and *nepantla* and *ch'ixi*.

The notion of primary narcissism was used at the beginning of this chapter to contextualise the initial lack of differentiation between self and other. It is relevant to revisit this concept in relation to mirroring. The myth of Narcissus, which is frequently referenced in psychoanalytic literature, offers an illustration of a mirror that highlights the fundamental interconnectedness of emotional development within the relational environment. Young Narcissus falls in love with his own reflection in the river. In the beginning, this mirroring aligns with the Lacanian perspective, where self-recognition signifies an identity crisis and the formal establishment of the ego and ego ideal. The story also provides an explanation for Narcissus as a symbol and myth used in psychoanalysis and clinical psychology to address a type of mental functioning that is distinct from the argument presented in this section, known as secondary narcissism (see Freud, 1914). This type of functioning makes it difficult for individuals to give a place to the emotional needs of others. In terms of socialisation, narcissism emphasises the establishment of vertical relationships, a desire to be superior to others, a need for approval, and a belief that no one is good enough except for oneself (see DSM-V, American Psychiatric Association, 2013). This differs from the horizontal emotional exchange that this thesis conceptualises.

However, it is essential to note that the environment plays a crucial role in the story of Narcissus, which is frequently overlooked. Before Narcissus even beholds his own beauty, his environment has failed him, and he cries as a compensatory reaction to his grief and anger, placing all of his expectations in a false image of himself. Oscar Wilde's prose poem, "The Disciple" (1894/2022), contains a version of Narcissus that exemplifies the dual nature of reflection in terms of the environment-ego formation dynamic:

> When Narcissus died, the pool of his pleasure changed from a cup of sweet waters into a cup of salt tears, and the Oreads came weeping through the woodland that they might sing to the pool and give it comfort.
>
> And when they saw that the pool had changed from a cup of sweet waters into a cup of salt tears, they loosened the green tresses of their hair and cried to the pool and said, 'We do not wonder that you should mourn in this manner for Narcissus, so beautiful was he.'
>
> 'But was Narcissus beautiful?' said the pool.
>
> 'Who should know that better than you?' answered the Oreads. 'Us did he ever pass by, but you he sought for, and would lie on your banks and look down at you, and in the mirror of your waters he would mirror his own beauty.'
>
> And the pool answered, 'But I loved Narcissus because, as he lay on my banks and looked down at me, in the mirror of his eyes I saw ever my own beauty mirrored.' (Wilde 1894/2022, pp. 190–191)

The poem underscores the importance of environmental response in determining how individuals perceive themselves and the narratives they construct about their identities. This extends beyond a mere lack of relational engagement and encompasses the presentation and perception of reality by the self. Moreover, the dual nature of reflection in Narcissus elucidates the thesis claim

regarding the paradoxical experience of simultaneously seeing oneself and the other. This perspective challenges the notion that secondary narcissism is inherently pathological, instead emphasising the significance of primary narcissism as a foundational requirement for attaining a sense of self through the attuned reflections provided by others. This process facilitates the bond with existence and enables the individual to both perceive oneself and be perceived by others. This thesis contends that these narcissistic interactions play a pivotal role in the developmental milestones of self-discovery and ego development. While the subject assumes a central position in these experiences, it does not imply a denial of the existence of others. While such denial may occur, it does not adhere to a strictly unidirectional equation.

In his 1998 work, Stern distinguishes between the concepts of echoing and mirroring to explain his notion of attunement. While mirroring is more commonly discussed, echoing has been used by Stern to describe a situation in which one person reflects another's subjective states, rather than their observable behaviours or strict imitation. Stern (1998) proposed the concept of echoing as part of his theory of infant development. According to Stern, echoing refers to a fundamental process through which infants establish a sense of self and develop their understanding of others. In Stern's conceptualisation, echoing occurs during face-to-face interactions between infants and their caregivers. It involves the caregiver mirroring the infant's emotional expressions, actions, and vocalisations in a synchronous and attuned manner. Stern's contribution differentiates from Winnicott's mirroring in the sense that the caregiver's responses provide a reflection of the infant's experiences, emphasising on the creation of a sense of resonance and validation.

Through echoing, infants begin to recognise their own subjective experiences as being understood and shared by others. They develop a sense of coherence between their internal states and the external world. This process is crucial for the formation of a secure attachment between infants and caregivers, as well as for the development of self-awareness, empathy, and social understanding. Stern's echoing concept differs from traditional definitions of echoing in the sense

of an exact repetition of the original sound. Instead, he emphasised that echoing is not merely an imitation of the infant's behaviour but involves an empathetic attunement to their emotional states. It goes beyond surface-level mimicry and aims to capture the deeper meaning and intention behind the infant's actions and expressions. Stern's conceptualisation of echoing highlights the importance of responsive and attuned interactions between caregivers and infants in shaping the infant's sense of self and understanding of others.

This thesis prioritises Stern's notion of attunement over echoing. Although echoing in Stern's sense involves a more complex understanding of the infant's communications and is not a mere repetition of emotional states, linguistically, echoing still adheres to a fidelity constraint akin to mirroring. Mirroring implies complete temporal synchrony, while echoing, not bound by this temporal constraint, replicates the precise content without emotional elaboration (Stern, 1998, p. 144). Stern's concept of attunement, extensively employed in this thesis, draws on the musical term to denote the infant's and caregiver's capacity to recognise emotional states through non-verbal and verbal interactions, encompassing the notion of communicative musicality.

While echoing, mirroring, and the mirror of sound share common themes related to the caregiver's role in reflecting and validating the infant's experiences, they differ in their emphasis and theoretical frameworks. Echoing and mirroring (Winnicott, 1971) focus on the interpersonal attunement and validation, while the mirror stage (Lacan, 1949) highlights the visual self-recognition, and the mirror of sound (Anzieu, 1995) emphasises auditory feedback. These concepts offer distinct perspectives on how infants develop a sense of self and establish a coherent identity through interactions with caregivers and their perception of themselves.

Although diverse perspectives on shared narratives and caregiver-infant interactions exist, with arguments prioritising certain dynamics over others, consensus can be found regarding several key elements across these viewpoints. Firstly, most authors assert that these interactions hold fundamental importance for the psychosomatic development of infants and their individual and

intersubjective existence as they confer significance to emotional, affective, or psychic states. Secondly, the quality and 'attunement' of these interactions are crucial for emotional development, attachment patterns (secure or insecure), social and emotional recognition, and engagement with others. Thirdly, the intersubjectivity fostered by these interactions facilitates involvement in social realms, encompassing language acquisition, cultural musicality, socialisation (including conflict resolution—further explored in Chapter 5), creativity, engagement in creative endeavours, learning, and education. Lastly, the narratives constructed through these interactions establish a psychic space where the self resides, expanding the concept of "I" as distinct from others.

Imitation, therefore, represents a specific response of infants to their environment and serves as an indication of their adjustment to it with stable rhythmicity. Repetition enables sustained interaction and suggests the need for progressive changes, but it can also signal disconnection and challenges in communicative musicality. Mirroring involves the reciprocal reflection of emotional states and offers environmental feedback within the dyadic interaction. Mirroring also signifies a response to the interactions, indicating that the infant is being heard and understood. Although attunement bears similarities to mirroring, it is linguistically more precise as it emphasises the dynamics of music and emotion. Hence, attunement describes a complex situation where, following the argumentative thread of this thesis, caregivers enter a *nepantla* space with infants, attuning themselves to the infants' needs and communications. Both mirroring and attunement facilitate the process of separation, stimulate play and creativity, and create a zone of improvisation where the dyad can engage safely. In conclusion, the four characteristics of communicative musicality—imitation, repetition, mirroring and attunement—offer a framework for comprehending the interactions and relational space established between infants and caregivers, which remain significant throughout life. Together, these characteristics underscore the environmental relevance in emotional maturation, emphasising the pivotal role of communicative musicality in establishing and maintaining relationships.

4.5. Illustrations of in-betweenness: *Lo fantástico* and *el duende*—manifestations of disruption, horror, and creative possibility

The transitional areas of experience, as presented in this chapter, are essential for ego development and self-discovery. The mediating role of musicality and communicative musicality in these transitional areas is a fundamental aspect of this thesis. This chapter finishes discussing two phenomenological aspects of transitional areas (*lo fantástico* and *el duende*), and the ways in which they can manifest in creative life are explored through queering the directions of consciousness. This approach offers a means of expression for a queer phenomenology of musicality.

To conclude this chapter, there are two accounts of 'in-betweenness' that incorporate the elements discussed in this chapter, including transition, development, learning, creativity, play, transgression, irrationality, horror, and surprise. One is '*El Sentimeinto de lo Fantástico*' (the feeling or sense of the fantastic) and the second, Garcia Lorca's account of *El Duende* in flamenco culture.

4.5.2. Lo Fantástico

In 1982, Julio Cortazar delivered a lecture at the Universidad Católica Andrés Bello in Caracas, Venezuela where he discussed this experience/feeling of *lo fantástico* ('the fantastic'). He argues that defining 'the fantastic' presents the same problem as defining certain words—it is a futile attempt to consult the dictionary, where one may find an impeccable description of the elements composing 'the fantastic' (both and ordinary life and in literature), but all the imponderable elements will escape such a definition. Similar to what this thesis argues regarding the definition of music (see Chapter 1), the biological correlates of musicality, and the aspects of musicality in

human interactions (Chapter 3), the elements of the fantastic are volatile, ambivalent, and full of paradox. In order to find an accurate account of what the fantastic is, it is better for each of us to consult our inner world, as William James suggests, our own experiences, and then formulate what those 'irruptions' mean to each of us. These irruptions, which some people call coincidences, occur when intelligence and sensitivity suddenly get the impression that the ordinary natural laws are not working properly, or are broken.

The fantastic is primarily a visceral feeling where an element slips through the interstices between two delineated things. It is an element that cannot be explained by means of rational logic and rules. The fantastic is sensed as estrangement—a 'parenthesis in reality'. Cortázar associates this fantastic element with jazz and how life disrupts its linearity, shaking and displacing individuals. These moments, which he calls improvisation moments, are for Cortázar the source of creativity. He uses these 'absurd' experiences as opportunities that enrich his life and literary style. His love and sensibility for music have profoundly influenced Cortázar's life, particularly jazz, which was essential to most of his masterpieces, including short stories and novels such as *El Perseguidor* [The Pursuer] (1959/1967) and *Rayuela* [Hopscotch] (1963/1970). The fantastic is something about time and space causality that tends to be accepted as immobile and safe but is suddenly disrupted and moved by an internal wind that displaces this causality. These causal exceptions are often classified as magical or esoteric, argues Cortazar, but for some people, this is an ordinary feeling, and as he suggests, magical or not, it is the source of creativity and ludic engagement.

The interrelationships between the concepts of *lo fantástico* in Cortázar's work, transitional phenomena in Winnicott's theory, and music, musicality, and communicative musicality reveal the significance of the liminal state in human experience. These concepts highlight the in-between spaces of ambiguity, disorientation, and vulnerability that arise during times of transition and emphasise the necessity of navigating these spaces for emotional growth and creativity. Music and musicality serve as powerful tools for bridging the gap between internal and external worlds, and

for communicating complex emotions and experiences. The associations between these concepts suggest that the liminal state is an inevitable part of the human experience, and that navigating this state with the help of music and other creative tools can lead to transformation and personal growth.

4.5.3. El Duende

The second account of 'in betweenness' was presented by Federico García Lorca (1933/2017) at a conference on Flamenco and Andalusian folk culture in Buenos Aires, Argentina. In this lecture, he discussed the concept of '*el duende*'[63], which refers to a moment of not-thinking (*un no pensar*). *El duende* is not a skill but a living style of active creation. García Lorca believed that the moment one looks for words to describe it and does not allow the '*coup de foudre'*, *the strike of fire, el fogonazo,* one loses all possibilities of experiencing it. As Niño de Elche (2017) points out in his introduction to Garcia Lorca's conference, "because what the judgemental beings of fear haven't understood yet is that el duende is experienced in a lullaby, in a flamenco, as religious faith, drugs, sex, or love" (Niño de Elche, 2017 in Garcia Lorca, 1933/2017, p. 12). In his discourse, Garcia Lorca argued that *el duende* is located in the present and not the future. He also stressed that the concept of *el duende* is necessary for the collective creation it invokes.

García Lorca invites his audience to play, recognising playing as a political act that questions and shakes established structures and definitions. Flamenco, in this ludic '*duende'* way, sings the human condition of joy and sorrow, a state of tragic ecstasy. *El duende* is a flamenco-style Lacanian Real that is visceral, bodily, fleshy, and above all, creative. Flamenco lyrics, such as "*que si el corazón por la boca se me sale de fatigas* [if my heart falls out of my mouth from fatigue]" (p.112) convey this idea.

[63] In English, el duende is often referred to in folk traditions as a goblin, an elf or a leprechaun.

To search for *el duende*, there is no map or exercise; it is only known that *el duende* burns the blood "*como trópico de vidrios, que agota, que rechaza toda la dulce geometría aprendida, que rompe los estilos, que se apoya en el dolor humano que no tiene consuelo (…)* [like a tropic of glasses, that exhausts, and rejects all learnt sweet geometry, breaks the styles, and finds support in hopeless human pain (…)]" (Garcia Lorca 1933 p119. My translation and italics). The arrival of *el duende* supposes a radical change in all established forms, a queer disruption.

García Lorca believes that *el duende* never manifests itself if there is no possibility of death or pain, he claimed that "(…) *[E]l duende ama el borde de la herida y se acerca a los sitios donde las formas se funden en un anhelo superior a sus expresiones visible* [el duende loves the wound's borders and approaches the places where forms melt in longing superior to all visible expression]" (Garcia Lorca, 1933 p.135. *My italics and translation*). *El duende* inflicts pain, but through the healing of that wound, the extraordinary and creative act emerges. Therefore, *el duende* is drawn to the edges of the creator's pond, be it in gestures, sounds, or ideas. Due to the closeness of *el duende* with pain, death, and sorrow, it can often be mistaken as the theological devil because of its pagan spirit presence, but Garcia-Lorca asks his readers not to confuse the devil with *el duende:* "*Así pues, no quiero que nadie confunda el duende con el demonio teológico de la duda, al que Lutero, con un sentimiento báquico, le arrojó un frasco de tinta en Nuremberg, ni con el diablo católico, destructor y poco inteligente, que se disfraza de perra para entrar en los conventos.* [Therefore, I don't want anyone to confuse the 'duende' with the theological demon of doubt, to whom Luther, with a Bacchic sentiment, threw a bottle of ink in Nuremberg, nor with the Catholic devil, destructive and unintelligent, who disguises himself as a bitch to enter convents ...] (p.113).

García Lorca believed that the power of *el duende* comes from the spirit of the Earth, it is not in the throat, but climbs from within the soles of the feet. *El duende* is the blood of ancient culture and creative act. *El duende's* playful way has elements that resemble this thesis' musical developmental and phenomenological aspects. These aspects can be identified in Garcia Lorca's

highly symbolic and metaphoric language. One of these elements is that *el duende* and musical development and experience are embodied phenomena and at the same time, inherently collective: *El duende es una sorpresa común* [el duende is a collective surprise] "*no pertenece exclusivamente a una sensación individual sino que necesita de esa reunión, de ese común creer en que ha sucedido, de ese sentimiento comunitario, de esa aprobación pública.*" [It does not exclusively belong to an individual sensation but requires that gathering, that shared belief that it has happened, that communal feeling, that public approval] (pp.12-13. My *italics* and translation). Another shared aspect is a temporal one, *el duende* has a temporality characterised by the present, and the ephemeral present: "*El duende que invoca Federico en su conferencia es el duende del ahora que te invita a viajar en el presente, un duende que no cree en el futuro porque sabe que el futuro no existe*. [The duende that Federico invokes in his lecture is the duende of the present that invites you to travel in the now, a duende that doesn't believe in the future because it knows that the future does not exist]"(p.13).

Musical experience can be linked to *el duende* in these embodied and ephemeral presentations. According to García Lorca, the artist believes that every art form requires a living body to interpret them because they are ephemeral forms that are born and die every time, raising their contours in the present. García Lorca also states that *el duende* acts upon the body in dancing and music like air does with sand. *El duende* never repeats itself, much like sea waves do not repeat themselves—close to Heraclitus' river (see Chapter 1 this thesis), it is the same river/*duende*, yet it is never the same river/*duende*. The transitional essence of *el duende* can also be linked to the ephemeral quality of music, not only in terms of the transitory nature of experience but also in the remaining feelings lingering post-experience. The impermanence inherent in encounters with *el duende*, music, or Heraclitus' river may enhance the intrinsic value of the experience, providing evidence for meaning, transformations, and theoretical inquiry (see Muñoz, 1996). The ephemeral evidence from these illustrations of transitionality unveils concealed possibilities for challenging normative structures such as rational logic or the wider sociopolitical *status quo* (Muñoz, 1996). Within the

macro-concept of *el duende* there exists a universe of novelty, play, and surprise. It is like Cortazar's 'sentimiento fantástico', a moment of enchantment. In Spanish, enchantment [encantamiento; encantar] has the meaning of a magical spell, but it also means something that fascinates, something exciting and different.

Similarly, Gratier and Apter-Danon's concept of the improvisation zone aligns with the transitional, ephemeral, and playful qualities of *el duende*. The interplay between sameness and novelty within the improvisation zone disrupts normative structures in early development, fostering creative modes of interaction with others and the broader environment. The fleeting nature of these experiences seeks a distinctive embodied encounter that resists exact replication. While musical experiences can be captured through notation or recording, the actual lived experience remains unique to a specific moment, location, and emotional state. Repetition may reveal certain patterns or orientations, yet, for instance, a gesture in caregiver-infant interaction is inherently never identical. This prompts the paradoxical aspect of time and experience characteristic of music in which repetition allows constancy, but it is simultaneously never the same. According to Garcia Lorca,

> *Cada arte tiene, como es natural, un duende de modo y forma distinta, pero todos unen sus raíces en un punto, de donde manan los sonidos negros de Manuel Torres*[64]*, materia última y fondo común incontrolable y estremecido, de leño, son, tela; y vocablo.*
>
> *Sonidos negros detrás de los cuales están ya en tierna intimidad los volcanes, las hormigas, los céfiros, y la gran noche, apretándose la cintura con la Via Lactea /*

[64] TRACK 17: Manuel Torres – Tarantas: Que Me Den Las Espuelas.

> [Each art has, as it is natural, a duende of different form, but all unite their roots in one point, where all the black sounds of Manuel Torres emerge, ultimate matter and common ground, uncontrollable and trembling, of wood, son, fabric; and vocable.
>
> Black sounds behind which there are already the kind intimacy of volcanoes, the ants, the zephyrs, and the great night, tightening their waits with the Milky Way]" (Garcia Lorca, 1933 p.140 / *my italics* and translation).

The concepts of '*Lo fantástico*' and '*El duende*' are experiences that exist in liminal spaces and therefore, are not far from the definitions previously established, such as *ch'ixi* (Chapter 1), *nepantla*, transitional phenomena, liminal phase, ZPD, Improvisation Zone and musicality (this chapter). All these notions converge on the idea that such experiences are crucial not only for facilitating transitions but also, as Ahmed contends, for reorienting ways of engaging with reality, and thus perceiving and comprehending the world—a fundamentally creative act. Furthermore, Cortazar's and Garcia Lorca's ideas align with Winnicott's developmental theory regarding transitional phenomena and play, which is a psychological and behavioural extension of the transitional object, as discussed in earlier sections of this chapter.

These literary and musical concepts align with what other authors have explored in more experimental contexts, referring to the phenomenon as "flow." Chirico et al. (2015), for example conduct a systematic review on the concept of "flow" in musical contexts, examining it as both a state and a trait (see also Csikszentmihalyi and LeFevre, 1989). Chirico et al.'s (2015) review focuses on three specific domains: musical performance, composition, and listening. The authors highlight the unique relationship between music and flow, characterised by total absorption, concentration, action-awareness, time distortion, and intrinsic enjoyment. The study discusses how flow can be experienced differently depending on whether it is a state (temporary and situation-specific) or a trait (a more stable characteristic of an individual). The review analyses various studies to provide

guidelines for distinguishing between these two aspects of flow. It also explores the methods used to assess flow, the experimental designs, and the results obtained in different musical settings.

The findings indicate that the dispositional approach to flow is predominant, especially in music performance. However, the authors note that many aspects of flow in musical contexts still require further investigation. They suggest future research should consider group-level analyses, move beyond frequency-based approaches to dispositional flow, and integrate both state and trait perspectives to deepen the understanding of how flow occurs in musical activities.

Although these approaches lack Cortazar and García-Lorca's poetics and mysticism, which seem important to connect with the profoundness of life and transcendental experiences, they are relevant to have different angles of a phenomenon that is intimately connected to musical experience and states of being and socialising.

In conclusion, the associations between the various concepts explored above demonstrate the deep and complex interrelationships between music, human experience, and cultural identity. From Winnicott's transitional phenomena to Garcia Lorca's *el duende*, each concept offers a unique lens through which to explore the emotional and symbolic resonance of music, as well as its role in fostering social and emotional connections. Similarly, the various concepts of ego development, *nepantla*, queer phenomenology, and *lo fantástico* highlight the diverse ways in which music and musicality express the liminal spaces between self and other, reality and imagination, and cultural and personal identity. The examination of the interplay between these concepts and music provides a deeper understanding of the ways in which music can be used as a tool for personal growth, cultural expression, and social connection. Ultimately, the associations between these concepts suggest that music has a powerful and transformative potential to bridge boundaries, evoke powerful emotions, and create new forms of cultural and personal meaning.

CHAPTER FIVE

TOWARD A MUSICAL PHENOMENOLOGY

When proposing that the ego emerges from a state of oneness through transitional phenomena and delineating the trajectory of musical development, the multidisciplinary discussions involved unavoidably give rise to tensions and contradictions. As described in Chapter 3, for instance, there arises a challenge concerning intentionality stemming from the phenomenological tradition (e.g., Husserl [e.g. 1913] and post-Husserl accounts [e.g. Merleau-Ponty, 1962]), juxtaposed with the psychoanalytic literature, which assumes the existence of the unconscious, potentially conflicting with the concept of intentionality. While these tensions exist and call for acknowledgement within the multidisciplinary argument for scholarly rigour, they introduce noise amidst the salient ideas put forth in this thesis.

This chapter focuses on the aspects of experience that are fundamentally musical and those which are threaded in continuity by musical elements. The contribution from the Freudian psychoanalytic unconscious through its descriptive angle supports the body-perception approach this thesis proposes by signposting that awareness of our physiological functions is not determinant to provide experiential elements that contribute to growth. The contribution of a phenomenological account is also significant to this thesis as it centres experience as the pivot for being in the world. Henri Bergson's philosophical contribution aligns closely with the thesis's approach, positing time as fluid and multifaceted, contrasting with the conventional notion of time as linear and metrical, which is viewed as a social construct. These perspectives encompass musical aspects, incorporating the temporal dimensions inherent to each theoretical framework, thus underlining the phenomenological significance of music, musicality, and communicative musicality. This chapter argues that musical phenomenological experience is both perceptual engagement and psychological development, which are reciprocally facilitated by these temporal dimensions.

Musical phenomenology involves surpassing the binary dichotomy of conscious and unconscious, as well as questioning the notion that sensory perception is confined to a specific sense organ. An illustration of this is found in the perceptual aspects of listening, which cannot be solely attributed to the ear. Human development entails acknowledging the intricate and non-categorical boundaries between the senses, as well as the diverse temporalities that orchestrate sensorial and emotional experiences.

This chapter is divided into three main sections, each contributing to a nuanced exploration of temporalities in human experience. The first section (5.1.) navigates the psychoanalytic phenomenological and Bergson's philosophical domains, exploring the descriptive unconscious and embodied experience. The second section (5.2.) aims to establish a foundation for a musical phenomenology. The third section (5.3.) engages in a discussion, probing the essence of musical phenomenology and its connections to music, musicality, communicative musicality, and human development. This discourse includes considerations of time, spatial temporality, orchestration of phenomenology, and the integration of perception, embodied, and queer experiences within the framework of musical phenomenology. Each section contributes distinctive perspectives, enriching the overall understanding of the temporal dimensions inherent in human musical experiences.

5.1. Temporalities of experience: The psychoanalytic descriptive unconscious, the phenomenological embodied experience, and Bergson's time, intuition, and creativity

As a developmental process mediated by communicative musicality, the recognition of self and others entails multifaceted psychological functions such as memory, learning, and perception. This thesis demonstrates how the developmental trajectory of self-recognition and ego formation affects the mental topography, economy, and dynamics, commencing with psychosomatic fusion

(primary narcissism) and advancing towards a virtual differentiation between inner and outer realities. Proposing a musical developmental process that facilitates ego, emotional, and socio-cultural development indicates that a notion of consciousness is implied in the framework. However, the theoretical contributions this section draws on to illustrate the musical factors present in emotional development, particularly that of time and rhythm, evidence tensions in the ideas of consciousness and the unconscious. However, the relevance of these contributions is focused on the body-perception and the phenomenology of musical bodily perception. This particular focus on body-perception is because music, musicality, and communicative musicality maintain a continuity of aspects of life that become separated in time. For example, consciousness and ego development establish a notion of an outside and an inside, but even though music, musicality, and communicative musicality facilitate this developmental process, they maintain the in-between spaces where there are no such categorical distinctions of inside and outside. Both psychoanalysis and phenomenology provide useful tools for understanding the primary experiential, or phenomenological, side of musicality.

5.1.1. The contribution from psychoanalysis—the descriptive unconscious

The psychoanalytic framework assumes the inextricable dynamic of consciousness and the unconscious in its rationale. However, in Freud's (see e.g. Freud, 1915) conceptualisation of the unconscious, there are nuances about the dynamics, topography, and economy of the unconscious. In that sense, this thesis understands the Freudian unconscious in three different ways.

The first and most important unconscious for the development of psychoanalysis as a model of the mind and a theoretical framework for clinical practice refers to the unconscious that contains the repressed material. This unconscious has particular operations and temporalities which respond to the pleasure-reality dynamics (primary and secondary processes). This unconscious is commonly referred to as the 'dynamic' unconscious (see Freud, 1915; Laplanche & Pontalis, 1974).

The second unconscious determines the rhythmicalities of psychobiological life. This unconscious, generally referred to as the 'descriptive' unconscious, is generally disregarded in classic psychoanalytic thought for it is not a cornerstone of psychic processes that provide the material of psychic life and organisation, i.e., repressed contents. The descriptive unconscious pertains to all contents that are not within the field of consciousness and thus are not consciously known. However, these contents do not comprise the repressed material found in the preconscious or unconscious systems defined by Freud in 1915 (Freud, 1915e; Laplanche & Pontalis, 1974). The non-repressed unconscious (i.e., the descriptive unconscious) mostly contains material from the senses, which help to define the map of the body at an early stage and may later combine with other unconscious contents to form a topography that makes more sense of the world[65]. The border between the somatic and the mental is established first as instinct and later, following Freud's ideas, as a topography containing the dynamic unconscious with its operational laws. These operational laws are, for example, operating under the primary process and governed by the pleasure principle, where symbols and associative thought chains are connected through contiguity and similarity rather than logical reasoning. Access to the dynamic unconscious is indirect, and its contents are revealed through expressions such as jokes, slips, and dreams (for detailed definitions, see Freud, 1915e). This thesis claims, however, that this 'descriptive unconscious' provides a strong contribution for understanding a musical theory of the mind but also provides a connecting point to thinking of a phenomenology of musical experience. In other words, the descriptive unconscious helps to understand the rhythmicalities of embodied experiences, just as phenomenology does in its own way.

The third unconscious type, less relevant to this thesis, is that which falls outside the realm of the pleasure-reality dynamic, that is, the unconscious that is not exclusively determined by repressed

[65] Most recent studies in Neuropsychoanalysis are reconsidering the value of the descriptive unconscious and the keys that Freud gave to the functions of the perceptual systems in psychic functioning (see e.g. Solms, & Leuzinger-Bohleber, 2016)

material, nor by the rhythmicalities of psychobiological processes, but an unconscious that engages into the existential implications of death. This is known as death-drive unconscious or *id*[66]. This third unconscious is related to the other two as it was a later elaboration in Freud's (e.g. Freud, 1920; 1923) works, so it transforms previous knowledge and context experiences into a conversation with new ideas about death.

In terms of the temporalities of these three unconscious types, Freud distinguishes between the timeless nature of the unconscious and the stable, linear trajectory of consciousness. As Freud writes, "The processes of the system *Ucs*. are timeless; i.e., they are not ordered temporally, are not altered by the passage of time; they have no reference to time at all. Reference to time is bound up, once again, with the work of the system *Cs*" (Freud, 1915, p. 187 original *Italics*). While this distinction makes sense given that repressed material is organised according to association laws and the pleasure-unpleasure principle, it contradicts the notion that repressed material is tied to a temporal reference. Freud's discrete division between consciousness and unconsciousness can be thought of as a rational misconception, a mythology of the conscious system[67]. Freud contributed to this idea by claiming that repressed material sometimes bypasses censorship and reaches consciousness without detection (e.g., jokes, slips, or symptoms). The body's rhythmical qualities imply a temporal notion, which contradicts Freud's idea of timelessness in the unconscious. Therefore, the Freudian unconscious cannot be atemporal, but rather it could function with non-linear temporal organisations. Considering an unconscious dimension in a musical theory of the

[66] The mythology of imperative finitude of life, as discussed in this thesis, interprets Freud's notion of death as inexistence (e.g. Freud, 1920). This perspective is rooted in a belief system that presupposes that the absence of consciousness equates to death. However, alternative mythologies propose a more dynamic view, particularly from an atomic standpoint, positing that life and death are continuous processes. For instance, Buddhist philosophy introduces the concept of pratityasamutpada (dependent origination or causal process), suggesting that existence involves a perpetual cycle of dying and living. This perspective aligns with the constant regeneration of cells in our bodies. Such notions emphasise impermanence, prevalent in various cultures and belief systems (see, Chinn, 2001; Kardas, 2015 for etymological analysis). Tim Ingold (2010) also explores the ideas of constant creation and making of experience; refer to the upcoming pages in this section for more details on this author.

[67] Mythology in this context means a set of symbols and psychosocial structures that organise psychic and behavioural tendencies.

mind necessarily infers considerations of time, although not essentially linear in its rationale. For that reason, the descriptive unconscious provides a more significant contribution in terms of experiential and embodied musicality. The descriptive unconscious is fundamentally marked by the temporalities of nature and biology, and the temporal experiences related to *après-coup* situations are also *nepantlas* of time, space, and mental topographies. Analogously, music also exhibits tensions between linear and non-linear temporalities. For example, linear, mapped-out rhythmical structures are essential for navigating a piece of music, for example jazz standards, which use a stable time as a reference point from which to improvise and play, creating new temporal forms and speed figures each time a standard is played[68].

Freud's contributions of the descriptive unconscious help to illustrate those dimensions of multiple temporalities and the primarily musical organisations of embodied experiences that organise ways of being in and understanding the world. Additionally, the idea of the descriptive unconscious provides keys for understanding the continuity between perception and memory—two elements necessary for ego development. The descriptive unconscious thus contributes to the notion that the body is fundamental in the establishment of an ego, but it is also an interesting concept that represents the musical mind-body continuum.

5.1.2. The contribution from phenomenology—embodied experience

A contribution from phenomenology to this thesis also addresses the idea of embodied and subjective experiences as fundamental aspects of the musical model. Phenomenology, contrary to psychoanalysis, regards experiences as tied up to consciousness. For Husserl (1913/1982), for example, consciousness is intentional, i.e. consciousness is consciousness of something, and it has

[68] An example of these temporal figures in jazz can be found beautifully written in Julio Cortazar's El Perseguidor (The Pursuer) (1967). A story inspired by the Bebop movement and Charlie Parker.

inherent directedness towards objects (intentional objects). This intentional notion of consciousness known as intentionality means that consciousness is not a detached spectator but is necessarily intertwined with the world they experience. Husserl's ideas have been influential to the theoretical development of communicative musicality (see e.g., Malloch & Trevarthen, 2018 and Chapter 3 of this thesis). Heidegger's (1927/1962) notion of consciousness is another example of a non-detached observer, but consciousness is necessarily immersed in the world (Heidegger's concept of Dasein, for example, appeals to the retroreflective state of engagement to the world: being-in-the-world). The third example of a phenomenological idea of consciousness is Merleau-Ponty's (1945/2012), who focuses on the embodied nature of consciousness. He emphasises that consciousness is not a disembodied entity but is inseparable from the body and its perceptual experiences. Merleau-Ponty suggests that the body and its sensorimotor interactions with the world play a crucial role in shaping our conscious experiences. Merleau-Ponty's (1945/2013) phenomenological approach posits that the world is a field of perception, and consciousness confers meaning upon that perceptual world. Like Husserl's approach, Merleau-Ponty's methodology is sourced from associative forces that direct attention to specific aspects of the perceptual field. Therefore, consciousness provides meaning to perceptual engagement, which comprises both sensing and reasoning.

These three general examples of how phenomenology conceptualises consciousness focus on the study of subjective experiences and the structures of consciousness. They emphasise first-person perspectives and aim to describe and understand phenomena as they appear in conscious experience. Its reference of these sensorial, perceptual, and embodied experiences, is that such experiences shape the ways in which individuals engage in and with the world and how life acquires meaning through subjective encounters from and towards perceptual systems. The relevance of this, and similar to the previous account about the descriptive unconscious, is that embodied experiences are orchestrated with the rhythmicalities and harmonies of life and of nature, but at

the same time orchestrate and are orchestrated by both experience and cultural reference. Musicality is not divided by conscious or unconscious situations because in musicality's essence, there is still a virgin continuity that determines passages from nature to psyche, emotions, and culture in a threaded fabric that this thesis associates with experience.

In terms of the temporalities addressed in phenomenology, whose broad aim is to describe and analyse the structures of human experience, time and temporality suppose fundamental aspects of lived experience. The main idea from phenomenology that this thesis draws on is that time is not seen as an objective and measurable entity, but rather as a subjective and lived experience (Merleau-Ponty, 1945/2013). Time is not simply a sequence of events that happen one after the other, but rather a structure that permeates human experience and shapes the perception of the world. Phenomenologists distinguish between different modes of time, such as clock time, lived time (Husserl, 1893-1917/1991), and the temporality of being (Heidegger, 1927/1962). Clock time refers to the objective measurement of time, while lived time refers to the way in which we experience time subjectively—a continuous flow of moments that cannot be divided into sections or measured (Husserl, 1893-1917/1991). The temporality of being, on the other hand, refers to the way in which time structures our existence, shaping our past, present, and future (Heidegger, 1927/1962). Husserl's notion of time, as discussed in "On the Phenomenology of the Consciousness of Internal Time" (1893-1917/1991), is more finely tuned to the phenomenological experience. For Husserl, the three levels of time operate in phenomenology: worldly objective time, personalistic or subjective time, and the consciousness of internal time. Consciousness of internal time is necessary to detect objective time, which involves a succession of organised events outside of oneself. Awareness of subjective time depends on successive events of mental states because consciousness enables the apprehension and unity of such states. This thesis claims that internal time is guided by musicality which manifests the multiple rhythmicalities of experience. From that, objective time is set as a continuous line with segmented sections which organise entire

societies in the West or Western-informed societies. In that sense, this thesis claims that those experiences of time operate simultaneously in human experience, but those temporalities become a fact of experience through musicality and communicative musicality.

One of the key insights of phenomenology to this thesis is that perception of time is shaped by bodily experiences, cultural contexts, and social interactions, and is not something observable from a distance—just as music following this thesis' approach. Time is an integral part of the lived experience. Furthermore, the experience of the *future (*in terms of a prospective creative force) plays a crucial role in shaping our present experiences. By analysing the structures of time in experience, phenomenology offers insights into the nature of human consciousness and the way we make sense of the world around us (Husserl, 1913/1982; Merleau-Ponty, 1945/2013). In that sense, the experiences of time in the body do not only constitute a retrospective elaboration of sensory-perceptual material, as psychoanalysis claims, but also a prospective forward-improvisational driven force which constitutes life and the things in it (See e.g. Ingold, 2010 and following section 5.2. this thesis).

From a cognitive science perspective, the work of Koelsch et al. (2019) offers an interesting perspective on temporal predictability and present-time musical experiences. Their account on music perception explores how music serves as an epistemic offering, continuously engaging listeners in a dynamic process of hypothesis generation and uncertainty resolution. The authors use the predictive coding framework to elucidate how the brain processes music. Predictive coding posits that the brain is constantly generating predictions about incoming sensory information and updating these predictions based on the actual sensory input.

Even though Koelsch et al.'s (2019) approach is nowhere near as complex as the temporal notions described in this section, their study sheds light for understanding perception and attention processes in relation to temporality and predictability. A central theme of their paper is the concept of active listening. The authors argue that music perception is not a passive process but an active

engagement where listeners generate and test hypotheses about future musical events. This active listening is driven by the brain's need to resolve uncertainty, which is inherently rewarding. The authors provide evidence that this process is reflected in neural responses, such as the early right anterior negativity (ERAN), which is more pronounced when listeners are informed about impending music-syntactic violations.

Koelsch et al. (2019) introduce the notion of precision filtering and attentional selection within the predictive coding framework. They suggest that certain lower-level auditory processes and higher-level music-syntactic processes are relatively immune to top-down predictive influences. This selective attention to salient auditory features allows for a more nuanced understanding of how listeners focus on specific aspects of music while filtering out irrelevant information. This perspective supports the idea that experiences of time and the notions of past, present, and future involve brain specialisation and filtering of information that could relate to the previously explored notions of intentionality (in terms of attention processes) and prospective notions of time. The authors, however, limit the idea of time experiences as a more mechanic and procedural process, not including subjective elements in a phenomenological way, which is the focus in this chapter.

5.1.3. Henri Bergson: Non-linear time, intuition, and creativity

Philosopher Henri Bergson (1889/2013) presents a radical departure from the traditional conceptions of time and contributes to this thesis' exploration of embodied perception, consciousness, and creativity. Bergson rejects the traditional view of time as a linear sequence of measurable moments. Instead, he introduces the concept of duration (*la durée*), which he describes as a fluid and indivisible experience. For Bergson, time is not a succession of isolated instants but a continuous flow where past, present, and future coexist dynamically within subjective experience. He asserts that the past is constantly reinterpreted by the present, while the future is rich with

possibilities: "The idea of the future, pregnant with an infinity of possibilities, is thus more fruitful than the future itself, and this is why we find more charm in hope than in possession, in dreams than in reality" (Bergson, 1889/2013, p. 10).

Bergson critiques the reduction of time to spatial metaphors or mathematical measurements, which he argues distort its true nature. He argues that time, or *durée*, is a subjective and indivisible flow that cannot be captured through intellectual or analytical methods, such as those employed by phenomenology. In contrast, phenomenology, particularly in Husserl's work, tends to focus on time as a structure of consciousness, with a more explicit emphasis on the ways in which time is experienced in relation to intentional acts and objects. He writes,

> But time is not a line along which one can pass again. Certainly, once it has elapsed, we are justified in picturing the successive moments as external to one another and in thus thinking of a line traversing space; but it must then be understood that this line does not symbolize the time which is passing but the time which has passed. (Bergson, 1889/2013 pp.182–183)

Bergson's exploration of time also extends to its relationship with consciousness and emotion, particularly in aesthetic experiences, pain, and horror. Bergson suggests that aesthetic experiences involve a suspension of ordinary temporal constraints, allowing individuals to fully immerse themselves in the present moment. Conversely, experiences of pain and horror disrupt our sense of temporal continuity, overwhelming our awareness with intense immediacy. This idea of disruption of the time flow relates to the examples provided in Chapter 4 regarding transitional moments and experiences of in betweenness ('*lo fantástico'* and '*el duende*').

For Bergson, there is a constant dynamic interaction between time, the body, consciousness, and embodied perception. He views the body not merely as a physical entity but as a vital component in the process of perception. Perception is for Bergson an active engagement with the world, facilitated by the body's sensory organs. Moreover, for Bergson, the body's movements and

sensations play a crucial role in shaping the experience of reality. In that sense, embodied perception is an active engagement of the individual with their environment. Similar to this thesis' approach (see sections below), perception involves a direct and non-discursive grasp of the world which transcends the phenomenological notion of consciousness and the psychoanalytic notions of unconscious. For Bergson, the unconscious is related more to the intensity and duration of feelings and perceptions than a mental organisation ruling perception. Consciousness occurs when the intensity and duration of feelings and perceptions reach a tipping point, making them noticeable and bringing them into the individual's awareness. This concept is closely related to the idea of the descriptive unconscious, which suggests that individuals remain unaware of bodily processes until these processes attain a level of intensity that demands attention.. Bergson's conceptualisation of embodied experience could be related to the performative aspect of the physicality and kinaesthetic aspects of musical performance. Musicians engage with their instruments through bodily movements, expressing themselves through gestures, posture, and touch. Bergson's philosophy invites to consider the intuitive dimension of musicality, highlighting the ways in which music engages individuals in temporal fluxes of experience, presenting intricate notions of reality.

> For him [Bergson] reality is not to be reached by any elaborate construction of thought: it is given in immediate experience as a flux, a continuous process of becoming, to be grasped by intuition, by sympathetic insight. Concepts break up the continuous flow of reality into parts external to one another, they further the interests of language and social life and are useful primarily for practical purposes. (Pogson, 1910 in Bergson Bergson, 1889/2013 p.x)

For Bergson, intuition operates beyond the realm of conceptual thought and intellectual analysis. It allows individuals to apprehend reality in an immediate, holistic manner, bypassing the limitations of language and logical reasoning. Intellect, with its finite categories, can only separate,

whereas intuition is that which does not separate, it sees the whole in the parts, the unity in the diversity of things. As Bergson (1889/2013) claims,

> What we must say is that we have to do with two different kinds of reality, the one heterogeneous, that of sensible qualities, the other homogeneous, namely space. This latter, clearly conceived by the human intellect, enables us to use clean-cut distinctions. To count, to abstract, and perhaps also to speak. (p.97)

Central to Bergson's framework is the interplay of time, intuition, and creativity. For Bergson, intuition represents a direct, non-discursive mode of knowing that allows individuals to grasp the fluid, ever-changing nature of reality. In contrast to the intellect, which categorizes and fragments experience, intuition uncovers the interconnectedness and continuity of existence. As Bergson (1889/2013) explains, "Intuition operates beyond conceptual thought, providing immediate access to deeper truths that elude discursive reasoning" (p. 97). This emphasis on intuition aligns with the holistic perception of phenomena, such as music, which Bergson associates with the dynamic, creative flow of life. The constantly flowing and indivisible flux of time is a creative aspect of the self. The self and thus time or as he calls it, 'duration', are a qualitative multiplicity of continuities that individuals experience. This is closely related to psychosocial healing and reparation processes. As Chapter 6 develops, it explores how engaging in creative activities at the collective level implies a non-linear experience of time, as suggested by Bergson. These temporal fluxes facilitate the emergence of both individual and collective voices, fostering a sense of self and a shared sense of collective identity. The self for Bergson is therefore not a fixed, immutable entity but a dynamic process of becoming. The true self is revealed through our experience and our creative engagement with the world. This idea of the self as a creative process of becoming is also related to Winnicott's conceptualisation of creativity and the true self which also refers to a genuine creative process of situating oneself in the world and within ourselves too (see Chapter 4). In *Creative Evolution* (1907/1998), Bergson extends his philosophy to argue that life itself is characterised by creativity

and an intrinsic tendency toward novelty and complexity. He introduces the concept of *élan vital*, a vital force driving the evolutionary process. This creative impulse, he posits, mirrors the continuous and dynamic flow of duration. Similarly, in aesthetic experiences, Bergson suggests that individuals transcend ordinary temporal constraints, immersing themselves in the immediacy of the present.

Bergson's emphasis on intuition and creativity relate to the temporal dimension of music. Musical experiences unfold over time, and intuition allows individuals to perceive the temporal flow of music as a unified whole, rather than as a series of discrete events. This holistic perception of musical time contributes to the immersive and transformative power of music.

Bergson's ideas also find resonance in various aspects of music, musicality and communicative musicality. With respect to the temporal dimension of musical experiences, music unfolds as a temporal flow that allows individuals and groups to engage in a multiplicity of present embodied experiences, shaping our perceptions of existence through melodies, rhythms, and harmonies. Musicians, for example, exercise their free will in interpreting, performing and improvising music, engaging creatively with the dynamic process of musical expression.

Musicality, understood as the underlying psychobiological mechanisms of music (see Chapter 2), could be related to Bergson's theory as these mechanisms have their own multiplicity of temporal fluxes. As Bergson claims, living organisms evolve and creatively adapt to the environment; bodies and cognitive processes too have their rhythmicalities that shape perception and notions of the world. The ability to perceive the underlying unity and continuity of musical phenomena is more intuitive and creative rather than through analytical dissection of individual elements.

In the context of communicative musicality, which explores how music facilitates social interaction and emotional communication (see Chapter 3), Bergson's idea of intuition highlights the immediate and unmediated nature of musical expression. Music serves as a direct channel for conveying emotions, thoughts, and experiences, bypassing the need for verbal language and engaging listeners

on intuitive and creative levels. Bergson's notion of intuition finds resonance in musical expression, particularly in moments of inspiration and improvisation where musicians feel deeply connected to the essence of the music. Musicality, characterised by intuitive perception of musical structures and emotions, arises from a holistic understanding of musical phenomena.

Bergson's philosophy invites to reconsider our understanding of time, consciousness, and creativity, offering insights into the nature of human existence and agency. Through the lens of intuition and creativity, Bergson illuminates the interconnectedness of time, perception, and the self, which invites to embrace the continuous flow of experience.

5.2. Temporalities of experience—toward a musical phenomenology

Understanding time is crucial in conceptualising musicality in mental phenomena. This thesis emphasises the paradox of the need for stability, such as linear time, to perform creatively across non-metrical or non-linear rhythms. If a musical theory of the mind acknowledges this paradox, multiple temporalities can organise the experience of time itself as well as other experiences of being, including emotional or interpersonal ones (i.e. first and second-person perspectives). Therefore, time is not a single forward arrow but comprises multiple convolutions or circles that touch upon experience while determining the course of perceptual orientations to oneself and things.

Throughout this thesis, sensory, embodied, and emotional ways of experiencing the world are presented. These ways of experiencing the world are not necessarily conscious, unconscious, rationalised, or repressed but still provide meaning to life and to an individual's experience of the world. Rationality is therefore not compulsory to understand phenomenal experiences, and the

world can be known through sensations and experiences that do not require consciousness a priori nor a posteriori, but awareness in the sense of intuition, in the sense of being in tune with oneself and others. This thesis' theory on communicative musicality informs a phenomenological world that is both intentional and unconscious, but ultimately, the claim is that a musical developmental model is key for facilitating emotional growth. This emotional growth will amalgamate into a rational consciousness that completes Merleau-Ponty's (1945/2013) theory which equates subject-time, but underneath, like a fairy world, there exists an unconscious (in a descriptive sense primarily), intuitive, natural sensory-emotional world of meaning, sharing, and experiencing.

This thesis' phenomenological exploration of musical experience and the conceptualisation of distributed agency (Enfield and Kockelman, 2017) share a fundamental critique of rigid boundaries between self and world, proposing instead a fluid and relational perspective. In the musical phenomenology framework, the body's sensorial and cognitive systems extend into the external world, akin to a spider's web that integrates external vibrations into the spider's embodied experience. The web is not only a trap and home for the spider, but also an extension of its body and sensorial system. When a string vibrates, it is almost as if the spider's body was that big and extended to the length of the web. Musical unconscious phenomenology extends beyond the boundaries of the skin and involves an embodied experience where, as William James claims, the distinction between outside and inside is non-existent or at least unnecessary, as we experience things (material or imaginary) in a similar fashion. Similarly, Enfield and Kockelman (2017) argue for a distributed understanding of agency, wherein agency emerges not as an individualised property but through dynamic interactions within social and material networks. Both perspectives challenge anthropocentric and individualistic assumptions by emphasising the inseparability of internal and external dimensions of experience.

The analogy of the spider's web resonates with the distributed agency model in highlighting how entities (human and non-human) are interconnected within broader systems. Just as the spider's

web becomes an extension of its sensory and perceptual capabilities, linguistic structures and cultural norms in Enfield and Kockelman's (2017) framework act as affordances that shape and mediate agency. Furthermore, the musical unconscious phenomenology's assertion that distinctions between "me" and "not me" are constructs of conscious ego parallels the distributed agency perspective's rejection of a static, autonomous self. Instead, both approaches foreground the emergent, processual nature of experience and agency, underscoring their inherently relational character.

The temporal dynamics discussed in Enfield and Kockelman (2017) also complement the phenomenological account of musicality. Both frameworks emphasise iterative feedback loops and interactions over time, whether through the temporal unfolding of musical engagement or the evolving interplay of actors within distributed networks. In both cases, the processual nature of these interactions points to the continuous negotiation of meaning, agency, and identity, dissolving static distinctions between inside and outside, self and other. This alignment highlights the potential for cross-disciplinary dialogue between phenomenology and the relational ontologies articulated in distributed agency scholarship.

Following William James' (1904) criticism of the existence consciousness, he distinguishes between two types of consciousness: awareness of an object and awareness of self. The former can be studied scientifically and explained in terms of neural activity in the brain, while the latter cannot be reduced to physical processes and must be studied through introspection and philosophical inquiry. James (1904) suggests that our subjective experience of the world is an essential aspect of existence that must be taken seriously in any attempt to understand ourselves and the world around us. Moreover, James's (1904) main point is that the distinction between consciousness and the material or external world is a fallacy because both the experience of the world and the ideas of objects out of perceptual reach are experienced as the same thing. James' equation of consciousness to the external world questions the understanding of consciousness as a situation

abstracted from experience. Instead, human experience could be understood as the result of psychological tensions between experience and social narratives. Regarding consciousness and the unconscious, tensions remain. Nevertheless, this thesis concurs with James (1904) in that phenomenal encounters and engaged subjective inquiry provide more answers compared to scientific investigations. This positions the realm of experience beyond the realm of consciousness as the central topography of human encounters. This thesis emphasises that certain experiential phenomena have an inherently musical nature. In other words, the distinctions between consciousness, the unconscious, and experience are not essential categories of existence. Instead, they represent different conceptualisations of experience, whether it be conscious or unconscious. The notion of consciousness, according to James (1904), becomes disconnected from the world of experience, which is essentially an awareness of experience in itself. James (1904) argues that the experience of a 'real' object is no different from the experience of an 'imagined' or 'represented' object in terms of its reality and the experience it elicits. Therefore, James (1904) claims that the concept of consciousness is unnecessary, as experience does not rely on objectual divisions.

Psychoanalytic descriptive unconscious and the general understanding of phenomenology as subjective experiences of the world agree on the point that embodied subjective experiences shape how the world is us and we are the world, while also shaping identities of perception. This thesis expands upon the perspectives of perception brought forth by the descriptive unconscious and phenomenology and draws upon the contributions of Winnicott and communicative musicality. It asserts that not only do these identities of perception play a role, but the environment and the relational world also significantly influence how humans comprehend, interact, and connect with the world. The environment, in this context, has a relational meaning. That is, being in the world is not only regarded to first person perspectives but also second-person perspectives. This thesis argues that understanding the world requires second-person perspectives, such as emotional interactions and environmental characteristics (i.e., communicative musicality), in addition to

individual acts or first-person situations. Representing the external world carries the impression of a divide between internal and external realities. It is relevant to note that much of what is theoretically written on music and psychic development tends to dissociate from the body and embodied experiences in general (see Chapter 2 of this thesis). Therefore, incorporating phenomenological and the descriptive unconscious, in conjunction with the environment into a developmental model of music, musicality, and communicative musicality, can provide a more holistic understanding of the role of music as a non-representational developmental quality.

This non-representational developmental quality is also inspired by the idea of non-pulsed time. Time is a fundamental characteristic of experience and of music, musicality, and communicative musicality. The idea of non-pulsed time is proposed by philosopher Gilles Deleuze in his work *Difference and Repetition* (1968). He challenges the conventional understanding of time in music and introduces the concept of 'non-pulsed time', which suggests moving beyond the familiar rhythms and beats that structure our temporal experience. Deleuze's (1968) notion of non-pulsed time suggests that time is not a uniform, measured progression but rather a complex and fluid dimension. He argues against reducing time to regular intervals or pulses, encouraging us to consider a more intricate understanding of temporal flow. This perspective aligns with his broader philosophical endeavour to question established ideas of identity, causality, and representation. In parallel, this section suggests the idea of non-mediated music. Non-mediated music invites us to engage with music on a sensory and perceptual level, as free as possible from preconceived notions and cultural influences. It emphasises the immediate sensory experience of sound, encouraging listeners to immerse themselves in the raw elements of music—timbre, pitch, rhythm, and texture—without the need for intellectual interpretation.

Non-mediated music liberates us from the constraints of cultural context and interpretation, urging us to be fully present in the moment as we perceive the music unfolding in real-time. It is an aesthetic exploration of sound for its own sake, allowing for a personal and open-ended response,

unburdened by conventional musical norms. This concept recognises the subjectivity of musical experience, acknowledging that each listener's engagement with the music is unique and deeply personal. It does not prescribe meaning or interpretation but encourages a profound and individual connection with the auditory world. However, it is unrealistic to think of engagement with music as pure and judgement-free. This thesis suggests a connection to the aspects of music that evoke embodied and perceptual experiences, as well as cultural dimensions of experience, rather than emphasising an intellectual engagement with music. Similarly, the linkage to musicality lies in the biological, physical, and emotional interactions that occur both before and beyond ideas or representations conveyed by verbal language.

Additionally, this thesis challenges the idea that being in the world is mediated by either unconscious or conscious aspects. Claiming that ego development occurs as a developmental trajectory fundamentally facilitated by musicality and communicative musicality does not necessarily imply a particular reference to consciousness or the unconscious. These models, both psychoanalysis and phenomenology, contribute to this thesis' argument but it is not determinant to agree with any posture or defend the existence of certain mental categories. These aspects are helpful ways to illustrate the tensions and also draw on the interdisciplinary possibilities to imagine new forms of the musical mind.

5.3. Discussion: What is musical phenomenology and how does it relate to communicative musicality and development?

The most salient elements detected in this multidisciplinary study (Chapters 4 and 5 this thesis) are the temporalities of the interactions between self and others, the notions of perception and experience, and the environment which relate to the musical claim this thesis makes, and the debates and contributions form unconscious and consciousness within the disciplines discussed.

These elements are further discussed in this final section through the lens of authors which suggest novel ways of understanding these phenomena.

5.3.1. Time and spatial temporality in relation to musicality and communicative musicality—the orchestration of phenomenology

When considering musicality and communicative musicality within a conceptualisation of emotional development, there are several key elements that emerge from the cross-disciplinary discussions mentioned in this and the previous chapter. Some of such elements are those of time, temporality, and rhythm. Other aspects pertain to the discussion between consciousness and the unconscious, and how in this thesis' model, both concepts can coexist within the discussions provided by musicality and communicative musicality. The other set of elements relate to transitional areas of experience that are transversal to emotional development, the phenomenology of experience, and how queer phenomenology may also provide insights in the discussions around perception and experience as fundamental parts of thinking considering a musical phenomenology of development.

When comparing the developmental trajectory proposed in this thesis with the structural and dynamic aspects of music, musicality, and communicative musicality, time and temporalities of experience emerge as fundamental aspects that intersect across disciplines. These temporalities, which the thesis argues are musical, provide continuity to the paradoxical nature of life. Such continuity originates in the body and, through perception, traverses the consciousness-unconscious paradox, manifested mainly in emotional extra-verbal communications.

In considering human musicality, contemporary neuroscience looks at the spatial and temporal patterns of brain activity that may be specific to humans' experience of music. Common patterns indicate "biologically rather than culturally defined competences of mind and brain" (Turner &

Ioannides, 2010, p. 147). Turner and Ioannides used brain-mapping techniques to study music and found that cerebral blood-oxygen flow and electrical signals are involved in the activation of areas innately involved in syntactic structures of both linguistic and musical expression, i.e., lateral prefrontal areas. They found consistency with evidence that a newborn human is already music-competent, "with specific areas in both hemispheres capable of interpreting structured sequences of sounds—especially those with distinct rhythms linked with the body rhythms with cardiac pulsation, respiration, gestural movement, and walking" (Turner & Ioannides, 2010, p. 161). This shared rhythmic sense, or communicative musicality, facilitates later acquisition of language and thought through communication between babies and their intimate companions.

Trevarthen (2008) proposes a chrono-biological spectrum that outlines the development of emotional expression. Like adults and many other animals, infants make rhythmic gestures that communicate motive states and emotional changes. The integrated rhythms of brain function guide body movements and the assimilation of perceptions. The intrinsic timing of animal vitality is divided into three main zones, each with its own functions in regulating a moving consciousness of vitality affects:

(i) The core narrative times in body and mind work together during periods when we maintain routines of basic-life functions (e.g., nourishment or mood and hormone regulation). Trevarthen (2008) emphasises that natural mother-infant proto-conversations and baby songs have a typical duration of 20–40 seconds with a pulse that coincides with the heartbeat, linked to breathing while sleeping. These intervals are coupled with alpha brain-activity, generating integrative mechanisms of the central nervous system, namely dreaming. Caregiver-infant story-sharing is a dyadic emotional adjustment of psychobiological states, opening the way for inventive and cooperative actions, but also for trauma and the retention of weakness and suffering.

(ii) The psychological present-time of the body is characterised by immediate awareness and behaviours lasting between 300 milliseconds and 6 seconds. This is also the rhythmic time of action in dance patterns, concise deliberate actions that mark the present (e.g., step, bar, short-term memory). The foundation of this time is both ergotropic (embodied) and experienced.

This relates to Paul Fraisse's (1984) work, *Perception and Estimation of Time,* which explores the multifaceted nature of temporal perception and its underlying cognitive and psychological mechanisms. Fraisse investigates the processes by which humans perceive, measure, and estimate time, drawing on empirical findings, theoretical frameworks, and interdisciplinary insights from psychology, neuroscience, and philosophy. His analysis provides a relevant understanding of temporal experience, bridging micro-level perceptual phenomena with broader cognitive and behavioural implications.

Fraisse addresses the distinction between perceived time (the immediate sensory experience of temporal intervals) and estimated time (higher-order cognitive processing, including memory and attention), elucidating how these constructs are shaped by different psychological processes. Fraisse argues that temporal perception operates within a continuum, where short intervals are processed primarily through sensory mechanisms and longer durations engage cognitive and contextual influences. This distinction forms the basis for understanding the variability in temporal judgements across different contexts and tasks.

Central to Fraisse's analysis is the role of attention in shaping temporal perception. He highlights how the allocation of attentional resources affects the accuracy of time estimation, with focused attention on temporal intervals yielding more precise judgements. Conversely, divided attention or distraction often leads to distortions in perceived duration, typically resulting in the overestimation or underestimation of time. This interplay between attention and temporal perception is further contextualised within experimental paradigms, such as interval timing tasks, which reveal the sensitivity of temporal judgements to task demands and cognitive load.

Fraisse also examines the impact of memory on temporal estimation, particularly in retrospective time judgements. He argues that the amount of information processed and the complexity of events experienced during a given interval significantly influence perceived duration. This phenomenon, known as the "filled-duration illusion," demonstrates how richer and more varied experiences tend to elongate subjective time estimates compared to monotonous or uneventful intervals. Fraisse situates this finding within broader theoretical discussions on the interplay between episodic memory and temporal cognition, suggesting that memory encoding and retrieval processes are integral to the construction of temporal experience. Fraisse explores how humans perceive time, focusing on the non-linear relationship between physical and perceived time. He explains that short intervals are overestimated, and long intervals are underestimated. This bias is linked to an internal clock mechanism, as described by scalar expectancy theory. Fraisse also considers cultural and developmental factors, noting that cultural attitudes towards time and age-related cognitive development shape how humans experience time.

(iii) Nursery songs and fairy stories determine how infants come to live in time. An infant's time-fragmented experience of 'here and now' becomes connected in a line-mode experience, allowing them to solve problems of memory, think about specific things at certain times and places: 'there and then'. This is a process that musically develops in time and is simultaneously assisted by language. Each verse "has an episode in the whole drama of mood change" (Trevarthen, 2008. p. 36). In this way, particular dramas or rituals gain importance, and narration avidly takes meaning from words as well as music. These narrative rituals are indeed very powerful, not only for the complex time-assisted messages they convey, but because the memory of music is the earliest and the strongest (see also Tsang, Falk, & Hessel, 2016). Threvarten's temporal idea coincides with Husserl's temporal categories (see previous section).

Trevarthen (2008, see e.g. pp. 27–28) demonstrates the significance of communication, rhythm, and time in early development. He illustrates this by using the example of a blind 5-month-old girl

who listens to her mother sing two songs. The baby, like a conductor leading an orchestra, waves her hand in a melodic space imagined by her body, pointing up towards her caregiver's head as the voice rises in pitch and dropping at the waist accordingly with the voice's pitch. The infant is leading her caregiver in time; each of her hand movements occurs a third of a second before the mother's voice moves up or down, they couple in harmony like two dancers or musicians improvising. This shows the importance of the hearing sense over visual primacy and highlights the innate intuition for music and emotional communication in infants without the use of words. The example also reveals a shared feeling about moving and rhythmic conversation and an innate sympathy between bodies as well as mirroring, imitation, repetition, and improvisation zones (see previous sections in this chapter).

The importance of rhythm and time in emotional expression and communication from infancy is emphasised in Trevarthen's chrono-biological spectrum, and some of those elements portrayed by Trevarthen can also be related to both the descriptive unconscious and phenomenological aspects of rhythm and time (see Section 5.1.). He highlights the integral role of caregiver-infant interactions, nursery songs, and fairy stories in shaping an infant's sense of time and the development of their cognitive and emotional faculties. The transitional space, or the *nepantlas* of experience, is a crucial concept that illustrates the complex process of symbolisation and the creation of a mental space between internal and external realities. This becomes the condition for creative living, highlighting the intricate interplay between body, mind, and environment that shapes psychological and emotional experiences.

Trevarthen's (2008) observations regarding the natural rhythms of proto-conversations and baby songs resonates with Falk and Tsang's (2020) book chapter, "The Role and Functions of Infant-Directed Singing in Early Development," which provides a detailed examination of the developmental, social, and cognitive significance of infant-directed singing (IDS). Drawing on interdisciplinary perspectives from psychology, musicology, and developmental science, the

authors argue that IDS is a multifunctional behaviour that supports emotional bonding, language acquisition, and cognitive and sensory-motor development. They propose that IDS is an evolutionarily adaptive practice, central to the caregiver-infant relationship and vital for achieving developmental milestones.

The authors highlight the crucial role of IDS in fostering secure emotional attachment between caregiver and infant. Through its modulated use of pitch, tempo, and timbre, IDS engages infants on an emotional level, resonating with their perceptual sensitivities and promoting trust and emotional regulation. This attunement underscores the importance of IDS as a caregiving tool that facilitates relational stability and resilience. In addition to its emotional impact, IDS plays a key role in language acquisition. Falk and Tsang (2020) emphasise its melodic and rhythmic qualities, which enhance phonemic awareness and aid in the segmentation of linguistic units. These features align with the prosodic bootstrapping hypothesis, which suggests that infants use the melodic contours of speech to infer linguistic structure. The authors present empirical evidence indicating that infants exposed to IDS demonstrate superior language comprehension and production compared to those primarily exposed to adult-directed speech, illustrating the critical role IDS plays in early linguistic development.

The acquisition of symbolic functioning from a purely subjective state to the creation of mental space occurs within temporal tensions. This creates a notion of separateness between one thing and another, producing a mental space characterised by being in-between internal and external realities, which becomes the condition for creative living. The symbolisation process is a complex ego function that is inextricably interrelated to the development of memory, representation, boundary formation, reality testing, apperception, and synthetic function. Winnicott's (1971) concept of the transitional space is where the infant is free to play, explore, and experiment, fostering creativity and the growth of the self, and as seen in the previous chapter, this transitional space is not something only occurring in the first moments of life but thought life.

Regarding the discussion of self and ego development, the manifestation of body, mind, external object interactions, and cognitive extensions is evident through music, musicality, and communicative musicality. This highlights the significance of musical organisations in existential possibilities. The role of rhythm in sensorial experiences is emphasised, as the unborn baby listens to the caregiver's heartbeat and breathing, developing rudimentary notions of time and stability. In addition, the regular succession of behavioural events, whether vocal or gestural, influences how individuals coordinate their communications. Spending time together teaches humans how to anticipate life events and modulate emotional and body expressions (Trevarthen, 2010; and Chapter 3 of this thesis).

Temporalities, including the process of distinction between me and not-me and socialisation, are also facilitated through communicative musicality. Innate components allow for interpersonal exchange with caregivers and intimate companions, enabling embodied and present experiences of emotional sharing. Communicative musicality acts as a catalyst in the separation and self-formation process in the newborn infant. The separation between the birth giver and baby begins with a concrete somatic oneness, where both exist within the same body. Bodily sensations transmitted to the brain are processed in a bottom-up fashion, leaving memory traces known as mnemic prints, which serve as the starting points of associative constellations (metonymies) of existence.

This and the previous chapters claim that during early development, interactions with a responsive and 'attuned' caregiver establish a sense of self and psychosomatic coherence. This is closely related to the assumptions put forth by the theories of musicality and communicative musicality, which hypothesise that human musicality facilitates the infant's developmental process in terms of attachment and ego formation. This results in a psychological statement that raises questions about the role of musicality in human development. Therefore, sound, rather than visual perception, determines the evolution of representations, thought, and language through sonic and kinaesthetic

experiences. Powers and Trevarthen (2009) support these characteristics through their studies and observations of caregiver-infant interactions, demonstrating that infants

> start the journey as an innately musical and poetical being, moving and hearing with pulse and rhythm, immediately sensitive to the harmonies and discords of human expression, in the self and in companionship with close others. (Powers & Trevarthen, 2009, p. 209)

Individuals who are affectionate and driven by love and care communicate poetically through vocalisations and gestures when interacting with infants. Infants possess an intuitive ability to share implicit emotional meaning, and mothers are equipped to respond to the creative vitality of their children through affective and vocal intimacy.

5.3.2. Perception, embodied, and queer experiences as part of musical phenomenology

This chapter integrates theoretical contributions from psychoanalysis and phenomenology, emphasising the role of perception and sensory embodied experiences as primary means of engaging with the world, oneself, and others. It aligns with the perceptual embodied experience approach as fundamental to life and supports the thesis's musical hypothesis. However, it challenges the discrete division of the senses and the perceptual system posited by both phenomenology and psychoanalysis. While discrete divisions aid in understanding the functioning of each sense organ, this thesis argues that perception and meaning are inherently multidimensional and not confined to single sense organs. The body and its environment, extending beyond the skin's boundaries, interact in musical ways, co-creating meaning and existence.

This section discusses the works of Siri Hustvedt (2016), Humberto Maturana and Francisco Varela (1980), James J. and Eleanor Gibson (Gibson E., 1969, 1991, 2002; Gibson J.J., 1966, 1979/2015), Tim Ingold (2010), and Sara Ahmed (2006) to expand on the ideas of musical

phenomenology. These authors contribute to understanding human development through a musical diapason, situating the interaction of self, body, others, and environment as a continuum of experience. This continuum views paradox as a fundamental trait of musicality, with its phenomenological implications being disruption and creativity. The chapter concludes by illustrating how perception, phenomenology, and the paradox of in-betweenness occupy a fundamental musical place in human existence.

Siri Hustvedt's (2016) essay on the 'thinking body' explores perception and consciousness from two perspectives, emphasising the role of movement and the idea that perception and consciousness are relational rather than particular. Hustvedt interprets Merleau-Ponty's work, arguing that before distinguishing between the psychological and physiological, "the body is not stripped of human predicates and the soul is not defined as existence for itself. Naive consciousness does not view the soul in the body as the pilot in his ship; this way of thinking belongs to philosophy" (1963, p.188, as cited in Hustvedt 2016, p.262).

Another idea of embodied experience outside of awareness is that of Humberto Maturana and Francisco Varela (1980) who posited the notion of unconscious psychobiology, which is the self-organising system that constantly adapts to sustain physiological equilibrium or homeostasis. Autopoiesis, as they called it, ensures the generation of components that sustain an analogous organisation to the one that produces them:

> Also, it is apparent that the components referred to above cannot be specified as parts of the living system by the observer who can only subdivide a system in parts that he defines through his interactions, and which necessarily, lie exclusively in his cognitive domain and are operationally determined by his mode of analysis. (Maturana & Varela, 1980 p.48)

Similar to Malloch and Trevarthen's theory of communicative musicality, Trevarthen's (1999) Intrinsic Motive Pulse (IMP) theory (see Chapter 3), and Daniel Stern's concept of vitality affects, the orchestration of volitional processes and the motor of vital energy is essentially a musical performance. This is not merely a metaphorical description but a literal musical orchestration of coordinated movements and impulses that propel the body into movement and communication. This autopoietic process involves cells, hormones, and structures that function within a 'big band' of proprioceptive sensations, which need and exist in intercommunication with themselves, other systems, and beyond their own ecosystem, i.e. beyond the skin.

As highlighted in the preceding chapters, particularly in Chapter 2, the body is fundamental to the theoretical model proposed in this thesis. It is through the materiality of our bodies that communicative musicality becomes possible, allowing us to experience ourselves and others. Embodied experiences are the building blocks of situated continuity of development, which make it essentially musical. Communication, both before and beyond formal language, and sensorial-perceptual epistemic acquisition before and beyond consciousness, play a critical role in cognitive, ego, and emotional development:

> Las grandes pulsaciones de la sangre, de la carne y de la naturaleza pasan por encima y por debajo de la inteligencia y no hay ningún control lógico que pueda detenerlas. *The large pulsations of the blood, flesh, and nature pass beyond and below intelligence, and there is no logical control to stop them.* (Cortazar 1980/2013, pp. 256-257. My translation)

Hustvedt (2016) also references the work of Simone Weil (1956) and J.J. Gibson (1979/2015). The author's understanding of Weil posits that movement helps create fantasies and "the body grasps relationships and not particulars" (1978, pp. 31-32, as cited in Hustvedt 2016, p. 233). Weil further argues that "the body classifies things before there is any thought" (as cited in Hustvedt, 2016, p. 263). For example, if someone raps on a table, another person can immediately imitate the rapping

without counting. Although most people can imitate a short, irregular rhythm, counting while rapping may interfere with recalling the beats. Such rhythmic imitations are part of preconceptual know-how, where the body perceives things as a whole and in relation.

Hustvedt also references the work of J.J. Gibson (1979/2015), which is an important theoretical input to this thesis' approaches to embodied perception and phenomenological instances of experience. J.J. Gibson's work, while focusing on visual perception, extends beyond the visual realm. This thesis challenges the discrete division of the senses, proposing that the complex embodied interaction composing life experience is central. In his seminal book, *The Ecological Approach to Visual Perception* (1979/2015), J.J. Gibson claims that humans perceive their environment directly, without the mediation of cognitive processes. For example, perceiving a tree involves directly perceiving its visual properties, rejecting the classical stimuli approach that situates the perceiver as a passive subject to external stimuli. The ecological theory posits a continuity between perception and action, similar to this thesis's hypothesis about music as constant embodied contextual action and interaction.

In this view, the organism-environment is a continuum, with both interacting actively and finding contextual significance for each other. This aligns with William James' (1904) claim regarding consciousness and the redundancy of a concept that may mean the same thing when it comes to experiencing life. James' radical empiricism influenced J.J. Gibson's ideas, suggesting that individuals cannot know the world separately from their own experience. The ecological model offers innovative perspectives for understanding perception and perceptual learning, where classical dichotomies such as perception/action and organism/environment are not categorical assumptions.

J.J. Gibson's concept of affordances, derived partly from Jamesian premises, suggests that individuals perceive the possibilities for action within the environment. Affordances are action-

potentials perceived as meaningful environmental information. For example, steps are perceived not in centimetres but in terms of whether they can be stepped on. The ecological character of the environment is given by the action of the organism, with perceptual learning involving the attunement and calibration of affordances created through organism-environment interaction. Eleanor Gibson's work on perceptual calibration and attunement, such as her cliff experiments with infants, demonstrates that affordances change depending on environmental conditions and developmental needs.[69]

The Gibsons' contribution demonstrates a continuity between organism and environment, with J.J. Gibson stating that "the words animal and environment make an inseparable pair. Each term implies the other. No animal could exist without an environment surrounding it. Equally, although not so obvious, an environment implies an animal (or at least an organism) to be surrounded" (1979/2015, p. 4). This environmental notion expands Winnicott's concept, focusing on the wider functionalities of the surroundings rather than relational qualities of care. Both notions claim a continuity between the organism and their surroundings, with the organism adapting to the environment by tuning into meaningful action potentials within present interactions. This thesis explores the shared emphasis on the situated and embodied nature of perception, action, and meaning-making, whether in the visual domain as proposed by the Gibsons or in the music domain. The idea that environmental interactions shape development, perception, and understanding is common to both J.J. Gibson and Winnicott's environmental notions, despite their different disciplinary backgrounds[70].

[69] An example of how things have mutual effect on each other is the perception of sound patterns. See for example the episode (S1:E20) on music on the series 'Explained' (available on Netflix) - Klein, 2018.

[70] In the context of music, the ecological approach has been influential in understanding musical perception and behaviour. For example, the work of Edwin E Gordon is prominent and claims that music development is rooted in the ecological affordances of sound and movement. The main suggestion is that humans have an innate disposition to perceive and respond to musical elements, such as rhythm, melody, and harmony (see e.g. Gordon 1976; Hargreaves & Lamont 2017).

Social anthropologist Tim Ingold (2010) builds on J.J. Gibson's theories of visual perception and affordances, agreeing that human experience is inseparable from the world we inhabit. While Ingold accepts the contextual nature of environmental perception, he critiques Gibson's lingering division between object and subject. Drawing on Heideggerian philosophy and phenomenology, Ingold presents a more radical view of organism-environment continuity. In 'Bringing Things Back to Life', Ingold (2010) argues that both natural and human-made objects are active participants in the flow of life, not passive entities. He contends that human interactions with the material world are deeply embedded in experience and context, suggesting that humans and things[71] are enmeshed in a complex web of relationships where actions and meanings emerge dynamically. Ingold emphasises that things possess agency and vitality, challenging the notion of objects as static entities. He uses phenomenology, Deleuze and Guattari's philosophy, and ecological perspectives to argue that interactions with the material world are embodied, skilful, creative, and improvisational. For example, he explores how craft skills, such as woodworking, involves a continuous dialogue between the crafts-persona and the material, as they both react and respond to each other's actions.

[71] Ingold distinguishes between things and objects to designate the participatory character of things in experience. Ingold draws on Heidegger's premises of Das Ding (The Thing), stressing on the character of a thing as a gathering together of the threats of life instead of a limited object determined by its shape and distinction from other objects. Ingold's example comes alive taking a walk in the park: "our path takes us through a woodland thicket (…). Suppose that we focus our attention on a particular tree. There it is, rooted in the earth, trunk rising up, branches splayed out, swaying in the wind, with or without buds or leaves, depending on the season. Is the tree, then, an object? If so, how should we define it? What is tree and what is not tree? Where does the tree end and the rest of the world begin? (…) Is the bark for example part of the tree? If I break off a piece in my hand and observe it closely, I will doubtless find that it is inhabited by a great many tiny creatures that have borrowed beneath it made their homes there. Are they part of the tree? (…)." All these observations lead Ingold to conclude that the tree (or anything) is not an object but a thing without clear borders and threads that gather together to form experiences of life (Ingold, 2010, p.4).

Ingold introduces the term 'meshwork' from Henri Lefebvre (1991) to describe the movements and rhythms of human and non-human activity, contrasting it with the concept of a network. Unlike networks, which connect points, meshworks consist of lines spun from materials that extend from the being of the organism. Meshwork refers to flows and counterflows, forces, echoes of reverberations, and patterns of light and shade. Returning to the example of the spider, Ingold offers an illustration in which the spider's web, unlike a communication network, does not simply connect points. Instead, the web consists of lines spun from materials produced by the spider's body and laid down as the spider moves. These are extensions of the spider's being, as it trails into the environment (Ingold 2008; 2010). This idea is akin to Deleuze and Guattari's (2004) concept of the rhizome, which represents a root system without a beginning or end. Ingold prefers 'meshwork' for its association with the fungal mycelium, highlighting the fluid and interconnected nature of life processes. He argues that boundaries are sustained by the flow of material across them, rendering any inner-outer dichotomy, such as the human skin as a boundary, psychologically irrelevant (Ingold 2010).

Ingold also underscores the significance of place and environment in shaping human engagements. He posits that the improvisational nature of interrelational processes positions the environment as an active participant in life, not merely a backdrop. Human movements, such as walking, involve sensory-perceptual attunement to the environment, making places and things dynamic and relational. He discusses how human movements through space, such as walking, are not purely cognitive but involve a sensory-perceptual attunement to the environment. Places and things, following Ingold's ideas, are not fixed entities but are constantly shaped and transformed by our engagements, making them inherently dynamic and relational. In that sense, for Ingold, the role of creativity and imagination is crucial for human engagement in and with the world. Ingold highlights the crucial role of creativity and imagination in human engagement, emphasising exploration, experimentation, and play as essential aspects of human experience. Through creative practices,

individuals actively participate in the ongoing process of becoming, where ideas and materials interact and transform each other.

Ingold's arguments on creativity and the improvisational nature of living, the continuity between individual-environment, and the forces at play within these dynamics can be related to Winnicott's developmental claims regarding creativity, play, and living. Winnicott's emphasis on play aligns with Ingold's ideas as both recognise the significance of embodied actions and engagement with the environment. Play, as described by Winnicott, involves active exploration, experimentation, and improvisation, which are also inherent in Ingold's understanding of creativity. Both theorists highlight the idea that creativity is not confined to isolated mental processes but emerges through active involvement in the world.

This thesis' hypothesis on music, musicality, and communicative musicality also aligns with Ingold's and Winnicott's approaches because it emphasises the inherent musical nature of human beings. On the one hand, Winnicott believed that play and creativity involve a spontaneous and authentic expression of the self (see Chapter 6). Ingold's dynamic relational mesh also claims for a co-creative aspect of living. Similarly, this thesis' musical developmental hypothesis suggests that music is related to the innate human capacity for self-expression, creativity, and communication. The three perspectives emphasise the importance of tapping into our inherent creative capacities to exist interacting attuned with the environment.

Another approach to environmental interaction that illustrates the co-creative engagement of an individual with their environment is Sara Ahmed's (2006) queer phenomenology. The centrality of the body in musical experiences is emphasised in this chapter understood as a pivotal reservoir for musical experiences. When considering developmental temporalities and the body, transitional phenomena and the in-betweenness of being become important establishments of temporal engagements with reality. Such engagements inform the ways bodies are oriented and perceive things, which can be considered phenomenologically queer in the sense that transitional

experiences disrupt the continuity of being (see Chapter 4 of this thesis), providing creative opportunities for reorganisation into new and different ways of existence.

In her work, Sara Ahmed (2006) argues that phenomenology focuses on the orientation and directedness of consciousness towards objects. Ahmed suggests that queer studies[72] can benefit from her claim about phenomenology and vice versa. Queer phenomenology offers a creative opportunity to reorient oneself in other, often unaccepted, directions, bringing new objects into reach and changing one's perception of the world. However, Ahmed's claim is rooted in classical phenomenology, which posits that object-related experiences occur through consciousness. The argument of consciousness regards consciousness as the centre of perception, a fundamental part of Husserl's (1893-1917/1991) and post-Husserl's phenomenology (e.g. Merleau-Ponty, 1945/2013). The tension between consciousness and unconsciousness remains pertinent, but in this thesis' phenomenology, perception is not solely focused on conscious intentional aspects of embodied experiences but also on aspects of existence that are not conscious and not necessarily repressed in a Freudian sense. The focus is on movement, not on consciousness. Queerness disrupts, disorients, and reorders these relationships by rejecting conventional and expected paths, norms, and heteronormativity. Through this reorientation, other objects that may have previously seemed misaligned become attainable, thereby reconfiguring one's perception and relationships with the world, environment, and oneself.

Phenomenology, claims Ahmed,

> is full of queer moments; as moments of disorientation that Maurice Merleau-Ponty suggests involve not only 'the intellectual experience of disorder, but the vital experience

[72] Queer studies refer to the study and education of topics related to sexual orientation and gender identity with a general focus on non-heteronormative identities such as lesbian, gay, bisexual, transgender, asexual, queer, questioning, intersex, interracial people, culture, subcultures, and the understanding of these identities in different spheres of society (e.g. medicine, biology, politics, law, among others).

> of giddiness and nausea, which is the awareness of our contingency, and the horror with which it fills us' (2002:296). *Phenomenology of perception* gives an account of how these moments are overcome, as bodies become reoriented. But if we stay with such moments then we might achieve a different orientation toward them; such moments maybe the source of vitality as well as giddiness. We might even find joy and excitement in the horror (Ahmed 2006, p.4 original *italics*).

Ahmed presents a model for understanding how bodies become oriented by how they occupy space and time. The author refers to the paradoxical moment of dislocation where things—objects and the experience of oneself in relation to them—are decentred. Similar to Anzaldúa's *nepantla*, Ahmed suggests that the place of disorientation may lead to a possibility of dwelling in spaces in a different way, not necessarily returning to the previous state but a new one. For Anzaldúa (2015), *nepantla* states entail tolerating the tension of oppositional places/nationalities. Queer phenomenology offers a creative opportunity to reorient oneself in other, often unaccepted directions, bringing other objects into reach and changing one's perception of the world. To queer something up means, therefore, to appropriate something that might insult difference, creatively subverting its meaning into a configuration that reinforces non-normative identities. In that sense, Ahmed (2006) argues that deviation may bring other objects into reach, and therefore the perception of the world will also change and go in other directions. For instance, the concrete objects of philosophy are often related to what is at reach to the writer, such as a table (Ahmed, 2006). Heraclitus (see Chapter 1 this thesis) looked at a river and offered exceptional conceptions of impermanence and paradox. Wittgenstein (also referred to in Chapter 1) examined bricks and linguistic commands, offering an understanding of the meaning of words as situated in actions. Ahmed's queer phenomenology suggests looking and engaging with other objects such as one's own body, as well as relating to others (objects and subjects) in different ways.

Ahmed's queer ideas resonate to those of Ingold and Winnicott in pivotal points that allow conceptualising a musical being. Firstly, Winnicott's emphasis on play, creativity, and the transitional space aligns with Ingold's ideas regarding the importance of embodied actions and engagement with the environment. The significance of active exploration, experimentation, and improvisation put the person's agency as central for self-expression and development, and creative engagement align to Ahmed's exploration of space as embodied affective experiences. Both Winnicott and Ahmed highlight the significance of lived experiences and how they shape the sense of self and relationships with others. Ingold's emphasis on human engagement with the environment, also relevant to Winnicott, and the critique of the mind-body dualism, relevant to James (1904) and Gibson (1979/2015), can intersect with Ahmed's (2006) exploration of embodied experiences. Both Ingold and Ahmed challenge the notion of disembodied self and stress the inseparability of mind and body in human perception, action, and social interactions.

By way of conclusion, this thesis considers these theoretical possibilities to formulate the musical model. In terms of the shaping of the ego mediated by musicality, there are two temporal figures put forward that involve the processes of perception and memory. The retrospective (*après-coup*) function of mnemic perceptual registers, and the forward-looking improvisational function of perception in which the person-environment co-creates the context and meaning of experience. This temporal tension allows for conceptualising human development as a living fabric of forces that intercommunicate (very much like the *fungi mycelium*[73]), creating their own ways of existing.

Whilst one of the fundamental consequences of thinking of music as polysemic is ego development, the nature of musical processes precedes the distinction between me and not-me and lies in transitional paradoxical and non-representational moments. These transitional spaces are musical and comprise the continuity of environment-body-mind-experience. The transitional nature of

[73] Mycelium is a root-like structure of a fungus consisting of a mass of thread-like hyphae which are the filamentous or branches of a fungus. Mycelium: Exploring the hidden dimension of fungi | Kew. (n.d.). Kew. https://www.kew.org/read-and-watch/fungi-hidden-dimension

musical phenomena is determined by different tensions which are characterised primarily by the temporal paradox of linearity and nonlinearity, the embodied experience of which we are both aware and unaware but function in dynamic harmonies of life which in each encounter provide meaning for living. The existential particularity of the continuum of environment-perception-psychosomatic-relational experience is key when considering music as fundamental to development and experience.

CHAPTER SIX

DEVELOPMENT, MUSCIALITY, AND COMMUNICATIVE MUSICALITY: CULTURAL EXPERIENCES AND THE PSYCHOSOCIAL ASPECTS OF MUSICAL DEVELOPMENT

The preceding chapters (4–5) explore how musicality and communicative musicality facilitate development and explained that one of the major developmental consequences it brings is ego development—the separation between internal and external realities in the infant's experience. However, Chapters 4 and 5 also posited the very nature of music, musicality, and communicative musicality to be transitional, queer, *nepantla*, and of in-betweenness. This paradoxical nature of music, musicality, and communicative musicality continues in a developmental process which not only manifests in ego development but also reaches a trajectory into sociocultural, psychosocial, and socio-emotional dimensions.

This chapter continues such developmental trajectory as a part of the arborescent nature of musical affordances in relation to human experience. This thesis focuses on two branches of the multiple possibilities for considering these correlations between music and human development, but in reality, there may be multiple approaches. This chapter continues using Winnicott's developmental trajectory as a template to articulate the continuity between illusion and transitional phenomena (Chapters 4 and 5), into play and cultural experience (this chapter). Additionally, the following sections focus on the manifestations of this trajectory correlating play and cultural experiences to the manifestations and possibilities in psychosocial contexts. To finish, a brief recount of the arborescence highlighted in this thesis will be presented and some conclusions, ideas, and further thoughts will be shared at the end of chapter 7.

Chapter 6 is divided into four sections, each contributing to a comprehensive understanding of the intersections between playing, creativity, and socio-cultural landscapes. The first section (6.1.), illusion, playing and creativity, serves as a continuation of the developmental trajectory proposed in Chapters 4 and 5, extending into diverse socio-cultural topographies. Building upon this foundation, the second section (6.2.), explores the transformative journey from individual play to collective cultural encounters. The third section (6.3) probes the place of cultural experience and its complex links to socio-political dimensions of creativity. The fourth section (6.4.) illustrates real-world instances, featuring insights from Bessel Van der Kolk and the impactful social aural healing work of Angela Jill and Jean Paul Lederach in conflict-ridden areas. Each section contributes a unique layer, offering a nuanced perspective on the symbiotic relationship between music, cultural experience, and the socio-political angles of sonic approaches to creative expression.

6.1. Illusion, play, and creativity: A continuation of the developmental trajectory into socio-cultural topographies

The developmental trajectory, outlined in the previous chapters, asserts the influence of music, musicality, and communicative musicality on ego and self-development, as well as on embodied experience and perception. This chapter also centres primarily on Winnicott's developmental theory, serving as a framework to delineate the ongoing developmental trajectory spanning from early development (0–6 months) through socio-emotional development, where cultural experiences are integrated. According to Winnicott's theory, these components play a crucial role in the separation process between "me" and "not me" (see Chapter 4) and persist in influencing individuals and their collective environments.

Winnicott's developmental trajectory introduces the concept of illusion as its initial element. Immediately after birth, the caregiver imparts an illusion to the infant that the breast (or bottle) is an extension of their body, representing an initial psychic sense of oneness. This illusion, a caregiver's attuned response to the infant's basic needs such as hunger, aligns with the infant's experience of what Winnicott (1960; 1965; 1969) called 'primary narcissism', where everything seems no different from oneself. Through this illusion, the infant perceives themselves as the creator of the source satisfying their needs, experiencing omnipotence without conscious reflection on the magical act of control and creation. Winnicott (1953) terms this omnipotent experience 'primary creativity'.

However, as the caregiver gradually defers meeting the baby's needs, instances of disillusionment and frustration arise, introducing the infant to reality and awakening a crucial aspect of their mental potential that eventually leads to ego development. The initial omnipotent creations stand in contrast to moments of reality's disillusionment, where the infant learns that their needs are not instantly satisfied but deferred. This deferral prompts the baby to recognise the existence of an outside world, challenging their omnipotent feelings with the reality that others control the satisfaction of their needs. In other words, the infant embarks on the journey of ego development as they grasp that aspects of their world lie beyond their control, and there is something external to them that differs and fulfils their needs. This process of realisation lays the groundwork for the notion of an external world (as discussed in Chapters 4 and 5).

As seen in the previous chapters, the notion of an external world and the process of the infant's separation from their caregiver, marked by the development of the notions of "me" and "not-me" and, consequently, the external world, is initiated through communicative musicality. Gradually, as the transitional space unfolds, a transitional object (e.g., a blanket or toy) typically enters the scene, aiding in the transition process and the establishment of external reality. The transitional object serves as both a symbol and a concrete manifestation of a lived situation that fulfils the infant's

emotional needs. Its most noteworthy characteristic is its dual paradoxical nature, being neither solely inside nor outside the infant's being; it is fundamentally a lived experience.

Transitional objects and phenomena in general, including those discussed in previous chapters, particularly related to the beginning of life, are essentially phenomenological. In other words, transitional phenomena primarily represent lived experiences. Winnicott (1971) argues that a child's use of a transitional object constitutes the infant's initial encounter with symbolism, the onset of play, and the preliminary interaction with the external world—a rudimentary experience of an ego. Thus, the use of transitional objects marks a foundational step in the development of symbolic thinking and the formation of an ego.

The caregiver's function is to tune in and sense the infant's needs and deal with present reality in a way that is manageable for the baby, according to their maturational rhythms. Transitional moments start before or as soon as the baby is born. Through musicality and communicative musicality, which facilitate emotional and physical growth, the baby experiences learning, coping with disorientation and anxiety, as well as the development of socio-political identities. The concrete relationship to that object that is neither inside nor outside is established through sensorial activity that provides phenomenological evidence of the previous developmental trajectory (see Chapters 3–6). As Winnicott says: "a beginning is a summation of beginnings" (Winnicott, 1962, p. 56). In that sense, the first object use is temporally retrospective of numerous musicality-infused phenomenal experiences. However, as seen in the previous chapter, there is not only the retrospective function of transitionality but a prospective one. The beginning of a new way demarks prospective possibilities or phenomenal affordances.

These transitional phenomena inherently embody creativity, maintaining the continuity of primary creativity as it evolves into more sophisticated interactions with external reality. With the infant's growth, a more complex creative repertoire emerges, where emotional and material affordances develop into branching trajectories of being. The process of ego development through transitional

phenomena creates a psychic topography of in-betweenness, as seen in Chapters 4 and 5. Winnicott (1971) suggests that this space is the residence of the self and creativity. He further links transitional spaces with the concept of play, with his theory on play stemming from clinical observations and complementing his ideas on transitional phenomena. According to Winnicott, "psychotherapy takes place in the overlap of two areas of playing, that of the patient and that of the therapist. Psychotherapy has to do with two people playing together" (Winnicott, 1967, p. 299). In this context, playing is essentially a *nepantla* that serves as a communication system, and this thesis establishes a connection between Winnicott's theory on playing and music, musicality and communicative musicality.

In psychoanalysis and psychoanalytically-informed psychotherapy, the significance of play has gained prominence in child analysis through the contributions of Anna Freud (1936) and Melanie Klein (1932; 1955). Play serves as the medium through which the psychoanalyst and the child engage in therapeutic communication, i.e., the use of play in therapy. However, Winnicott (1971) expanded the conceptualisation of play, viewing it not merely as a therapeutic method but as a mental function in its own right—an aspect of play that this thesis explores. Winnicott's distinction between play (noun) and playing (verbal noun) emphasises the fundamental role of playing in the whole of the organisation of personality. This thesis argues that within transitional spaces, various facets of human development interconnect. Playing, particularly within the framework of transitional phenomena, is a psychic function that is not limited by age and manifests in diverse forms throughout the lifespan.

Music, musicality, communicative musicality are precise forms of non-verbal communication that involve the same trajectories of play: illusion, transitional object, play, and cultural experience. Thus, it could be claimed that the trajectories of music, musicality, and communicative musicality are fundamental aspects of the trajectory of play and cultural experiences as psychosomatic and psychosocial function. Playing as music can also be attributed the talisman function of *ch'ixi;* it is

paradoxical as it has been stated multiple times, and it manifests differently according to the individual's needs. Sometimes the function is of communication (see e.g. Edmund's example in Winnicott, 1971, pp. 56–59), or of self-healing (see Diana's example in Winnicott, 1971 pp. 59–63), or as sharing, social, or ritual events. For Winnicott, playing is a given universal and belongs to health; it facilitates growth and therefore attuned interactions. Playing is fundamental in psychosomatic development and leads into group relationships.

Playing, as an active continuation of illusion, communicative musicality, and transitional object use occupies a temporal and spatial dimension neither inside nor outside an individual's experience. It facilitates the developmental process of recognising distinctions between 'in' and 'out.' For Winnicott, the time and space of playing occurs in a potential space between the baby and their caregiver. This potential space is created by communicative musicality, a *nepantla* of foundational creativity. The nature of this potential space varies depending on the baby's life experiences in relation to their caregiver or mother-figure. The potential space is fed but contrasted with the inner world (related to psychosomatic partnership) and the actual, external reality "which has its own dimensions and can be studied objectively, and which, however much it may seem to vary according to the state of the individual who is observing it, does in fact remain constant" (Winnicott, 1971, pp. 55–56). According to Winnicott (1971), the potential space:

> is not *inside* by any use of the word (…). Nor is it *outside*, that is to say, it is not a part of the repudiated world, the not-me, that which the individual has decided to recognise (with whatever difficulty and even pain) as truly external, which is outside magical control. To control what is outside one has to *do* things, not simply to think or to wish, and *doing things takes time*. Playing is doing. (p.55)

The passage articulates the paradoxical nature of transitional phenomena, particularly play, while asserting that playing is a dynamic action. This aligns with the thesis's idea that music is not passive or abstract but an action, echoing Christopher Small's (1998) notion of musicking and Turino's

(2008) notion of music as participatory. Consequently, playing can be interpreted as a form of musicking, as discussed in Chapter 1.

Winnicott's distinction between me and not me, i.e., the establishment of the ego, is a key idea that supports this thesis claim in music's role in human development. The ego, beyond being a psychic structure, can be understood also as a guide of the innermost conflicts of humans and deals with the weight of unconscious mythologies and cultural expectations. There are many ways to live, perceive, know, and understand the world that is not necessarily conscious or is not strictly related to the filter of the ego, nor to the structure of the more traditional understandings of the unconscious. Thus, decentralising experience from the ego might reorient (in Ahmed's [2006] sense) the ways we consciously perceive the world. Following this idea that the division between me and not me may be unclear, the fluidity of developmental processes guides us through transitional experiences and therefore we are able to enter *nepantla*, *el duende* appears, and *lo fantástico* occurs. Although entering *nepantlas* of experience happens over time, there is a more conscious decision to disorientate, generating transitional spaces of creativity and play. In this context, understanding the developmental function of play, as posited by Winnicott, entails recognising play as a form of communication, humour, playing music, playing games, and playing with *el duende* flamenco. These playful expressions represent creative ways of engaging with the world. These forms of play disrupt the conventional distinctions between me and not-me, momentarily bridging the internal and external realities. They introduce an element of confusion to the ego, establishing connections with those moments rather than dismissing or succumbing to paralysis in the face of such experiences[74].

[74] There are times where disruptions are destructive and confuse the system, but that is not playing in this thesis' sense. This happens when things are not working well and there are environmental failures; in adulthood, this could be situations of forced displacement, war, domestic and sexual abuse, etcetera. The nature of the confusion in both cases operates exactly in the same way, but the main differential ingredient is that playing is changed by trauma and in trauma creative processes take different directions towards destruction and operating out of tune. Healing is aural for it reinstates the capacity for playing (see following sections on sociocultural musical healing).

Consequently, playing is way of engaging in and with the world. According to Winnicott (1971), in children's play what matters is not the content but the near-withdrawal state, similar to concentration in adults[75]. The area of playing is located in the transitional space because it is not entirely psychic reality since the action of playing involves engagement with the outside world; however, it is not entirely the external reality because playing has a strong psychic component. The child uses objects from the external reality and puts them at the service of the inner reality. The development goes from transitional phenomena into playing, and then from shared playing to cultural experiences. This trajectory implies trust and feeling safe in a responsive, tuned-in environment. These notions of trust and a responsive, tuned-in environment are quintessentially musical because they reflect the fundamental aspects of musical engagement and experience, including the concept of communicative musicality. Playing, like music-making and listening, involves a dynamic interplay between inner and outer realities, engaging individuals with their environment. The near-withdrawal state in play, akin to adult concentration, parallels the immersive focus often experienced in musical activities, where individuals enter a state of flow. The concept of a transitional space, where inner and outer realities blend, is similar to the musical experience, which serves as a bridge between internal emotions and external sounds. In both play and music, external objects are used to express internal states, with musicians manipulating instruments to convey their emotions. The developmental trajectory from transitional phenomena to play, and then to cultural experiences, mirrors the journey in music, from personal engagement with sound to participation in cultural practices. Trust and safety in a responsive, tuned-in environment are crucial in both contexts, fostering effective collaboration and improvisation in music. This responsive, attuned environment is inherently musical, as music relies on listening, responding, and synchronising with others, creating a sense of trust and connection.

[75] This could also be described in terms of the acquisition of inhibitory control: see Hennessy, S. L., Sachs, M. E., Ilari, B., & Habibi, A. (2019). Effects of Music Training on Inhibitory Control andAssociated Neural Networks in School-Aged Children: A Longitudinal Study. *Frontiers in Neuroscience*, 13.

Communicative musicality, the innate human capacity for musical interaction and expression, further underscores this connection, highlighting how musicality facilitates emotional and social bonding. Thus, the characteristics of play described by Winnicott align closely with the nature of musical experiences, emphasising the deep interconnection between play, music, communicative musicality, and human development.

Playing (at first) belongs to the potential space between baby and mother-figure, with the infant in the state of absolute dependence and the mother-figure's capacity to respond and adapt to the baby's needs, i.e. being attuned to the infant's communicative musicality:

> The important part of this concept is that whereas inner psychic reality has a kind of location in the mind or in the belly or in the head or somewhere within the bounds of the individual's personality, and whereas what is called external reality is located outside those bounds, playing and cultural experience can be given a location if one uses the concept of the potential space between the mother and the baby. (Winnicott, 1967, p.169)

Following the developmental trajectory of this thesis, as the infant matures, illusion is succeeded by play. Play becomes a more elaborate continuation of illusion where the infant already has a notion of an outside but still operates in that transitional space where things are neither in nor out. The use of a transitional object (e.g. a toy or a blanket) helps the separation of the infant and their caregiver and it is a physical object that both *represents* and *is* the internal and external world of the infant. The infant plays in order to create the world that is just starting to make sense in their mind. The origin of this intermediate area dates to the time where birth giver and baby were merged physically and psychically, co-existing in oneness. When the baby starts growing, there is a need for separation, and that movement requires a space of transition; this space is paradoxical because it is not in or out of the baby, it is both inside and outside (Winnicott, 1951). This paradox is ought to be tolerated, accepted, and not resolved.

Playing also involves the body, the concrete volitional reaching out and manipulating objects, and the excitement of engaging in play. The instincts are a threat to play and to the ego and when exploited (e.g., abuse), play is made impossible. Playing is essentially satisfying, which needs excitement but not excessively or it will become unbearable. Similarly, anxiety is an element of play, but when excessive, it destroys playing. Playing is exciting and precarious because it belongs to the interplay in the mind of the subjective and that which is objectively perceived (actual or shared reality). The degree of objectivity that people count on when talking about external reality is variable from individual to individual. According to Winnicott (1971), "to some extent, objectivity is a relative term because what is objectively perceived is by definition to some extent subjectively conceived of (…). [For] many individuals external reality remains to some extent a subjective phenomenon (…)" (pp. 299–300).

An important feature of playing is that the child or adult is free to be creative. Winnicott argued that when children are able to create illusions in play, they are able to develop their sense of self and gain a better understanding of their own emotions. Through his work, Winnicott showed how important it is for children to be able to explore their environment through play and creativity for them to develop healthy socioemotional skills. Creativity originates in a prelogical fusion of subject and object:

> Moments when the original poet in each of us created the outside world for us, by finding the familiar in the unfamiliar, are perhaps forgotten by most people; or else they are guarded in some secret place of memory because they were too much like visitations of the gods to be mixed with everyday thinking. (Milner, 1957 in Winnicott, 1967, p. 300) (See also the work of Marion Milner, 1952, 1957/2010, 1969/2010b)

Human development is facilitated by an environment that allows the transitional space to come about, and within this transitional area is that the individual plays and creates. It is in playing where

the individual can be creative, and in doing so the individual discovers their self (Winnicott, 1971). Creativity for Winnicott (1971) is not only an important intellectual stimulant, because playing posits logical tasks and problem solution situations (see e.g., Vygotsky [1930]1978), but also the way in which someone comes to know who they are in relation to both the internal and the external worlds. Hence, creativity is a developmental situation, not a by-product of human intellectual faculties.

The search for the self occurs within the areas of playing. In play, the child or adult is able to be creative and use their whole personality, as "it is only in being creative that the individual discovers the self…(Bound up with this is the fact that only in playing is communication possible…)" (Winnicott, 1967, p.170). For Winnicott, creativity refers to a colouring of the whole attitude to external reality. Creative apperception[76] is essentially what makes the individual feel that life is worth living. The relationship to external reality, by contrast, is one that requires adaptation and compliance—leading to depressive trains of thought (sense of futility and recurrent idea that life is not worth living, or the frustration of not being creative themselves but living up in the creativity of someone else or of a machine (Winnicott 1971, see e.g. p. 299).

A final remark is the importance of separating creation from works of art. Lydia Goehr's analysis in "Being True to the Work" (1989) provides a crucial perspective on the idea of the work of art, particularly the work of music, as a sociohistorical-cultural construct. Goehr argues that the concept of a musical work, as we understand it today, emerged at the end of the eighteenth century, influenced by the articulation of Fine Art, the autonomy of the work of art, and the interplay of Enlightenment, Romantic, and Idealist thought. This historical development positioned musical works as autonomous entities deserving of fidelity, a notion encapsulated in the concept of

[76] Apperception refers to the psychological process of integrating new experiences or information into an individual's existing cognitive framework or understanding. It involves the active assimilation and interpretation of new stimuli based on one's pre-existing knowledge, beliefs, and experiences. Apperception allows individuals to make sense of the world by relating new information to their existing mental structures, facilitating the process of understanding and learning.

Werktreue, or fidelity to the work. Goehr's analysis underscores that musical works are not merely abstract entities but are deeply embedded in their sociohistorical and cultural contexts, shaped by the norms, values, and practices of their time.

In this context, Thomas Turino's (2008) distinction between presentational and participatory music further enriches our understanding of musical works. Turino differentiates between presentational music, where there is a clear divide between performers and audience, and participatory music, where everyone present is actively involved in the music-making process. Presentational music aligns with the concept of Werktreue, emphasising control, virtuosity, and fidelity to the composer's intentions. In contrast, participatory music highlights the communal and inclusive aspects of music-making, where the focus is on collective engagement rather than strict adherence to a predefined work.

Integrating Goehr's and Turino's perspectives into the discussion of creativity, it becomes evident that separating creation from works of art is essential. A picture, a house, a garden, a hairstyle, or a symphony are all creations, but creativity, as Winnicott suggests, is a universal aspect of being alive, encompassing both human and non-human entities. Creativity pertains to the individual's approach to external reality, where the creation stands between the observer (or listener) and the artist's creativity. Studying works of art in psychoanalysis often bypasses the core idea of creativity, which is intrinsically linked to the process of creative living itself.

Thus, Goehr's (1989) analysis of musical works as sociohistorical-cultural constructs and Turino's presentational-participatory distinction highlight the multifaceted nature of creativity. They underscore the importance of understanding musical works within their broader cultural contexts and recognising the diverse ways in which individuals engage with and create music. This approach aligns with the thesis's emphasis on the inherent musicality of human beings and the significance of creative living as a fundamental aspect of existence.

In relation to works of art including music, creativity, as an essential developmental feature, can be used to both find one's own self and to make things with objects like art (i.e. technical endeavours). This ultimately means that creativity is available to all, and everyone has potential to develop artistic skills, but not all artistically skilled people have found their self, they have only mastered the artistic production. Winnicott (1971) refers to the second situation as a non-purposive state, which refers to a level of un-integration and formlessness of the personality. However, creativity in Winnicott's sense can also be thought of outside technical artistic skill, creative living can also be understood as a way of living, and as the individual matures, creativity may become a conscious way of engaging with the world.

Winnicott's developmental continuity is helpful for understanding how musicality and communicative musicality are involved in a trajectory where meaning and emotional connection are created inter-subjectively within a relatively safe and stable environment that allows the opening of a psychic space where transitions occur and reconfigure the ways of engaging in and with the world. The following section continues the developmental trajectory that goes from play to cultural experience. It is important to recall that even though Winnicott and this thesis conceptualise such a trajectory in a linear fashion, that linearity is only marked by developmental possibility and maturation (e.g. as the brain and rest of the body grow, the infant is capable of doing more complex things both cognitively and physically). However, this thesis does not consider that linearity in a staged from. A staged form would recognise that one level has to be achieved to continue with the next level and then the previous level is part of a crystallised past. Instead, whereas it is true that some developments are necessary to achieve more complex tasks, those that have been acquired in the past remain active in the present and shape the future too. One of the main inputs of conceptualising human development in musical terms is that temporalities of life become much more fluid and therefore experience can be understood in simultaneous levels that are transient and mobile.

6.2. From playing to cultural experience

Winnicott's developmental trajectory unfolds from the early stages of playing to encompass cultural experiences. The previous section delineated the developmental journey undertaken by most infants, starting with a state of complete oneness and starting separation through a series of caregiving rituals, attuned responses, and communicative musicality. This process of separation and acknowledgment of an external reality lays the foundation for ego and self-development. Rather than adhering to temporal linearity, the continuity of this process lies in certain characteristics—illusion, playing, and creativity—that initiate as rudimentary expressions and evolve in complexity as the infant matures. These developmental elements persist not only in early infancy but throughout an individual's life, finding their origin and residence in the transitional space.

As the infant matures and encounters a broader social environment, these elements become entwined with wider collective socio-cultural values, creating a seamless connection between playing and cultural experiences. Winnicott (1967) expands on this notion by emphasising the extension of transitional phenomena:

> I have used the term cultural experience as an extension of the idea of transitional phenomena and of play without being certain I can define the word culture. The accent indeed is on experience. In using the word culture I am thinking of the inherited tradition. I am thinking of something that is the common pool of humanity and into which individuals and groups of people may contribute, and a source from which we may all draw *if we have somewhere to put what we find.* (p.3 original *italics*).

Cultural experiences, situated in the potential space between the individual and environmental interactions, initially manifest in creativity and play. This expression, far from

following a staged progression, continues as an arborescent phenomenon, gaining complexity with each interaction an individual has with their environment and others.

The term cultural experience is employed in this thesis, in alignment with the extension of transitional phenomena and play, emphasising the focus on experience rather than attempting a rigid definition of culture. Winnicott conceives culture as an inherited tradition, a common pool of humanity, and a source from which individuals and groups contribute and draw. In this thesis, cultural experiences are regarded as *nepantlas*—various forms of transitional places and other in-between spaces explored in Chapter 4. These *nepantla* spaces function as reservoirs of creative engagement with the world, echoing Winnicott's view that transitional phenomena in early infancy serve as the reservoir of creativity and the fate of cultural experiences.

Winnicott's contribution to cultural experience in this thesis is that it plays a pivotal role in the development of an individual's sense of self and their ability to relate to others. He believed that the cultural environment provides a collection of symbols and values that are internalised by the individual and become part of their psychological makeup. According to Winnicott, cultural experience starts in early childhood, as the child begins to interact with their immediate environment and caregivers. The child learns to adapt to the cultural norms and expectations of their family and community, and this process of adaptation is vital for the development of a stable sense of self. Winnicott also believed that cultural experience provides a space for creativity and play, which are essential for psychological growth and development. He saw play as a way for the child to explore their environment and test their boundaries, and cultural symbols as a way for the child to express and communicate their inner experiences. All these characteristics are also fundamental to musicality and especially communicative musicality, which is why Winnicott's ideas have a key influence in this thesis

because he relates the ontogenetic trajectory to cultural experiences via his developmental claim on transitional phenomena and play.

In conclusion, cultural experiences play a critical role in helping individuals to navigate the complexities of the external world while maintaining a connection to internal, subjective experiences. In the context of music, certain sounds, rhythms, or musical experiences can serve as transitional phenomena, providing a space for individuals to navigate the boundaries between inner emotional experiences and external realities. The moments of integration-disintegration explored in Chapter 5 are not only crucial for the fate of psychic structuring and ego development but also for reframing individual engagement with the world and sociocultural expressions. Engagement with various musical styles and genres, for instance, involves an interaction between the familiar (me) and the unfamiliar (not-me), contributing to a dynamic and integrated sense of self. This aligns with the thesis's claim about how views of the world primarily integrate through communicative musicality. Chapter 4 further develops the developmental trajectory of me and not-me in relation to music, musicality, and communicative musicality, and this chapter connects it to cultural experiences and identity.

Furthermore, the relationship between play and creativity in concrete cultural expressions yields outcomes similar to those discussed in the previous chapters, which focus more on human development and experience. These similarities indicate and reinforce the developmental continuity between human development and experience and cultural experiences. Musical activities, such as playing instruments, improvisation, or participating in musical performances, can be considered forms of playing, offering avenues for creativity, self-expression, and the negotiation of internal and external realities. Another parallel is that of ego and self-development. Cultural experiences contribute to the development of one's sense of self and reality. Shared cultural practices, along with exposure to and participation in musical traditions, contribute to the formation of cultural identity, linking individuals with

their cultural heritage. This aligns with one of the strong evolutionary consequences of music described in Chapter 2—social bonding.

The complexities of the relationship between music and cultural identity are further exemplified by Curran and Sims (2021) in their study "Performing Purlapa: Projecting Warlpiri Identity in a Globalised World." They explore how the Warlpiri people use traditional performances to assert their cultural identity in a globalised context, highlighting the intricate interplay between music, cultural expression, and identity. These accounts of developmental continuity between playing and cultural experiences share the commonality of a stable developmental structure. However, the expression, complexity, and level of engagement between an individual and their environment depend on their developmental possibilities and the context in which they find themselves.

6.3. The place of cultural experience and its relationship to the socio-political aspects of creativity

Winnicott's developmental trajectory recognises the nuances of cultural influences as part of the environment, but his focus is on early psychic development and how that looks in therapeutic settings. However, it is relevant to think of the relationship of creativity as a primary developmental source and its trajectory into cultural experience and forms, which in the case of musicality would translate in non-verbal communications. A specific form of a cultural translation of musicality would be the cultural expression of music (see Chapter 1). This developmental trajectory is necessarily mediated by socio-political contexts. Feminist and queer theorists such as bell hooks (1994), Gloria Anzaldua (1987/2012), and Audre Lorde (1985 *In* Lorde 2017) have insightful contributions to these aspects which are also fundamental when considering creativity from a musical perspective.

Intersectional[77] feminist theory can be used to understand the socio-political aspects of creativity. Using an intersectional feminist perspective helps to understand that creativity is not a neutral or objective process, but is influenced by social and cultural factors, including gender, race, class, and sexuality. Feminist theories of creativity challenge traditional ideas of creativity as a solitary and individualistic pursuit and instead emphasise the social and cultural context in which creativity occurs. For example, bell hooks in her book *Teaching to Transgress: Education as the Practice of Freedom* (1994) explores the connection between creativity and social justice, arguing that creativity is a powerful tool for challenging dominant cultural narratives and creating more inclusive and equitable communities. Also, hooks argues that as a performative act, teaching works as a catalyst for drawing the unique aspects in each classroom. Teaching, for her, "offers the space for change, invention spontaneous shifts" (hooks, 1994/2014, p.11). She refers to performative not in a traditional sense, as teaching for her is not a spectacle, but as a place for people to engage together, to become active participants in learning. In that sense, hooks' idea could be related to providing environmental conditions to tune-in and foster creative practices for learning, and learning thus should be a liberatory practice, not a coercive one, where power dynamics are used against the learners but constantly revised and challenged whilst offering co-creative spaces for learning.

In *Borderlands/La Frontera: The New Mestiza*, Gloria Anzaldúa (1987/2012) writes about the role of creativity in expressing and embracing multiple identities and cultural influences, particularly for people who exist at the intersection of different cultural and social identities. Anzaldua's concept of borderland, which is related to multiple identities, is used to think about creativity. Anzaldua thinks of borderland as a cultural collision and transformation. Borderlands, similar to her concept of *nepantla*, is a place of creative potential, where different cultures, languages, and experiences come together to create something new. The coexistence of multiple identities is for Anzaldua a

[77] The idea of intersectionality was originally coined by Kimberlé Crenshaw in the late 1980s. Intersectionality recognises that people's identities and experiences are shaped by the intersection of multiple social categories, such as race, gender, class, sexuality, ability, and more.

fundamental source of strength and creativity. The complexities of one's own identity, including marginalised and hidden aspects, are part of an internal process of confrontation. Anzaldua calls the parts of the self that are often rejected by society the inner shadows, and when embracing those parts, the person can tap into a deeper well of creativity and self-expression. This is a similar approach to Winnicott's transitional space as the well or *reservoir* of creativity and the residence of the true self. However, Anzaldua deliberately includes the socio-political aspects of such phenomena, which this thesis considers essential when thinking of the developmental endeavours of creativity, cultural phenomena, especially those processes directly or indirectly related to musicality, communicative musicality, and music. These are factors that neither Winnicott nor Anzaldua factor into their theories, but this thesis does take them into account.

Another example of the sociopolitical aspects of creativity in the light of this thesis' feminist approach to development is writer and poet Audre Lorde. In her essay 'Poetry is Not a Luxury', (1985 *In* Lorde, 2017), Lorde argues that poetry and other forms of creative expression are essential tools for self-empowerment and resistance against oppressive systems. In this essay, Lorde explores the significance and transformative power of poetry, particularly for marginalised communities, and argues that poetry is an essential and empowering means of self-expression and resistance. Just as this thesis' claim on music, poetry, for Lorde, is not a frivolous or decorative art form but a powerful tool that connects individuals to their innermost emotions, desires, and truths. It serves as a source for empowerment and liberation. In that sense, poetry, or music, is not only a true form of self-expression (in Winnicott's sense), but it is also traversed by other intersections such as class, gender, sexual orientation, etc. Poetry thus offers a place for marginalised communities to find and express their true selves—a right that many times has been taken away by others (oppressors) (see Lorde, 2017; hooks, 2014). This thesis claims that not only poetry, but all creative endeavours, with a strong focus on music, offer a way for marginalised people to articulate experiences, challenges, and joys. It facilitates ways of breaking free from societal

constraints and reclaiming a voice. Creativity is therefore also a way of resistance against oppression and dehumanisation[78]. Lorde invites her readers to think of the importance of community and connection in the creative process. Poetry, like music, has the ability to bring people together, fostering empathy, understanding, and shared experiences. Ultimately, Lorde's essay encourages the recognition of the intrinsic value of poetry and creative expression. It encourages people, particularly those that have been marginalised and silenced, to embrace their creativity, engage with their emotions, and use poetry as a powerful tool for self-discovery and healing[79] (see also section 6.4 below).

Winnicott's theory on play and creativity can be related in different ways to these feminist and social theory approaches to creative engagement and thinking, including through their emphasis on imagination, spontaneity, and the importance of the environment in fostering these qualities. Winnicott's theory emphasises the importance of play as a way for individuals to express themselves, experiment with new ideas, and form meaningful connections with others. He also emphasises the role of the environment in creating a safe and supportive space for play to occur. Winnicott believed that play was essential for healthy development and that it could help individuals work through psychological challenges and develop their sense of self. However, Winnicott did not factor in that for some people, access to such safe environments is not a given due to socio-political aspects that affect the whole of the environment, both through and beyond the infant's direct environment, i.e. the primary caregiver, which is why intersectional feminism comes in to play a fundamental role to think about the nuances affecting the environmental circumstances of development. Feminist theories that explore creativity emphasise the importance of creating safe and supportive environments for creativity to flourish, just as Winnicott's claims.

[78] This has been very common in Latin America, where most ancestral knowledge is transmitted orally from generation to generation. These communication systems have survived through music, clothing, and hairstyles that suffer violent exclusion from the Western-informed cultures which coexist in these territories. (see e.g., Civallero, 2007)

[79] Similarly, Sandra Harding in her book, *The Science Question of Feminism* (1986), offers a feminist approach to scientific inquiry, which explores the connections between creativity and scientific inquiry, arguing that feminist and other marginalised perspectives can contribute to more creative and inclusive scientific practices.

These theories, however, often challenge traditional ideas of creativity as a solitary and individualistic pursuit, instead emphasising the social and cultural context in which creativity occurs. Many feminist theorists argue that creativity is a collaborative and socially responsible endeavour that values relationships and empathic connections. In this way, Winnicott's theory of play and feminist theories of creativity share a similar focus on the importance of the environment in fostering creative expression and the development of the self[80]. Both approaches to creativity also emphasise the importance of imagination, spontaneity, and playfulness as essential qualities for healthy development and creative expression. Theories of creativity, play, musicality, and communicative musicality are all interconnected in various ways, particularly in their focus on the ways in which individuals engage with and express themselves through music and musical behaviours. Musicality, as seen in Chapter 2, refers to an individual's innate ability to perceive and produce music, while communicative musicality refers to the ways in which individuals use music to communicate and connect with others (see Chapter 3). Both of these concepts are closely related to theories of creativity, which emphasise the importance of imaginative expression and experimentation in creative processes.

When thinking of musicality, communicative musicality, and music there is a need to think of the ways in which musical interactions are shaped by biological, physical, psycho-emotional, cultural and social factors, including gender, race, class, and sexuality (see Malloch & Trevarthen, 2009; McClary, 1991/2002; Chapters 1–3 of this thesis and Section 6.4. below for further analysis and examples). Many musical theorists and practitioners, including those who focus on communicative musicality (e.g. Malloch & Trevarthen, 2009), emphasise the importance of play and spontaneity in musical expression, giving strength to this thesis' interdisciplinary argument regarding the connections between creativity, emotional development, and socio-cultural expression. This thesis

[80] see Manasseh (1991) for reference to work on lullabies conceived of as existing in safe spaces for female expression within otherwise intensely patriarchal and misogynistic cultural contexts

argues that music is not only a means of communication, but also a form of play that allows individuals to experiment with different sounds and rhythms, express their emotions, and connect with oneself and others intimately.

6.4. Examples of sociocultural manifestations of music, musicality, and communicative musicality

This section provides concrete examples of how it looks like to think of musicality, communicative musicality, and music in socio-cultural contexts that are not necessarily involved in concrete musical expression. Instead, this section suggests biopsychosocial examples when music, in this thesis' broader sense, is considered as a fundamental human aspect. The examples provided in this section are closely related to trauma, mostly because the authors specialise in traumatic experiences, and are useful to grasp the relevance of thinking of human beings in a musical way.

6.4.1. Bessel Van der Kolk's insights

Psychiatrist Bessel Van der Kolk (2014) has significantly contributed to the understanding of trauma's impact on mental and physical health, offering innovative therapeutic approaches for trauma recovery. His work emphasises the critical role of trauma in various psychological and physical conditions, particularly its enduring effects on emotional regulation, memory, and stress responses that lead to symptoms like dissociation, hypervigilance, and emotional dysregulation.

One of Van der Kolk's unique contributions lies in his body-oriented clinical approach, which extends beyond a 'neurocentric' perspective to embrace the psychosomatic nature of traumatic experiences. By recognising trauma's impact on the entire body, not just the brain, his therapeutic methods incorporate psychosomatic elements through practices such as yoga, mindfulness, and other body-based interventions. While Van der Kolk's approach is rooted in a classical Western

medical framework, acknowledging its limitations within a White Eurocentric context, he appreciates the potential offered by non-Western traditions. This includes techniques involving physical movement, breathing, and meditation found in practices like yoga, tai chi, qigong, and rhythmical drumming across different cultures.

Despite nuanced criticisms, it is essential to recognise the value of Van der Kolk's (2014) decentralisation of trauma from a solely brain-focused perspective. This decentralisation aligns with the thesis's stance on musicality, emphasising the importance of considering the entire body in understanding musical behaviour (see Chapter 2). In contrast to biomusicology approaches that often isolate specific brain structures, Van der Kolk urges a broader, more complex understanding, challenging the notion that trauma is exclusively linked to brain structures and biomarkers.

Furthermore, Van der Kolk's approach incorporates explicit considerations regarding music, which are relevant in understanding and addressing complex trauma therapeutically. His body-centered methodology, along with the acknowledgment of musical elements in the treatment of complex trauma, aligns with several key aspects of this thesis. These include a holistic understanding of the body and phenomena related to the psyche, the notion of social and collective healing, and, notably, musical instances that underscore the potential of creative and artistic activities in fostering healing for both individual and psychosocial trauma. Van der Kolk's (2014) contributions extend into the areas of music and communal body experiences. This thesis identifies three primary areas of relevance: i) the establishment of a secure base and the restoration of synchrony; ii) the exploration of communal rhythms and synchrony; and iii) the intersection of art, music, and dance within the context of trauma recovery.

Secure base and restoring synchrony

As this thesis has claimed, when infants enter the world, they scream to announce their presence, and someone immediately engages in their care. Similarly, Van der Kolk (2014) claims that "we are

profoundly social creatures; our lives consist of finding our place within the community of human beings" (Van der Kolk, 2014, p.151). As infants grow (see Van der Kolk 2014, and Chapters 4 and 5 of this thesis), they gradually learn to take care of themselves physically and emotionally. But as asserted in the previous chapters, this is greatly influenced by the environment. According to Van der Kolk, "[W]e get our first lessons in self-care from the way that we are cared for. Mastering the skill of self-regulation depends to a large degree on how harmonious our early interactions with our caregivers are" (p.151).

This view is largely influenced by Bowlby's attachment theory. One of the key insights for Van der Kolk about Bowlby's attachment theory is that Bowlby (see e.g. 1969b) saw attachment as the secure base from which a child moves out into the world. This secure base

> promotes self-reliance and instils a sense of sympathy and helpfulness for others in distress. From the intimate give-and-take of the attachment bond children learn that other people have feelings and thoughts that are both similar to and different from theirs. In other words, they get 'in sync' with their environment and with the people around them and develop the self-awareness, empathy, impulse control, and self-motivation that make it possible to become contributing members of a larger social culture. (p.152)

These qualities were missing from the children in Van der Kolk's mental health clinic. These characteristics of secure attachment are intimately related to communicative musicality and attunement (see Chapter 3 of this thesis). According to Van der Kolk, secure attachment is connected to mirror neurons—the brain-to-brain links that give the capacity for empathy. These neurons start operating as soon as the baby is born and are responsible for imitation—a fundamental social skill and accordingly a key feature of musicality and communicative musicality as well as mirroring in psychological development (see Chapters 3–5 of this thesis).

In the previous three chapters, this thesis has argued that the early infant environment, particularly the caregiver, plays a crucial role in fostering development. Through communicative musicality,

the caregiver responds in an attuned manner to the infant's physical and emotional needs, providing a platform for the infant to learn how to navigate and understand their own and others' emotions through their interactions. Similarly, as highlighted by Van der Kolk (2014, see p.154), caregivers contribute to teaching children to tolerate heightened emotional arousal, setting the path towards independence, in the sense described by Winnicott and the development of an internal locus of control—a pivotal element in coping with and managing emotional responses across one's lifespan (Van der Kolk, 2014). This internal locus of control enables individuals to discern what brings about positive and negative emotional states, facilitating the development of a sense of agency. Consequently, individuals discover their own voice and inner musicality through this process.

Drawing from Van der Kolk's ideas, the concept of harmony could be integrated into the emotional exchange between an infant and their caregiver, as well as extended to the coherence between the body's musicality, emotional responses, and behaviour. In terms of attachment types, for instance, this coherence is absent in the avoidant types, where children may appear unaffected externally while exhibiting constant hyperarousal indicated by chronically elevated heart rates. Additionally, avoidant behaviours manifest in caregivers' reluctance to engage in physical closeness and pleasurable rhythmic interactions with their infants (Van der Kolk, 2014).

According to Van der Kolk (2014), these early attachment types create inner relationship maps that guide interactions throughout life, shaping expectations and influencing the capacity for comfort and pleasure in others' presence. These maps, residing in the emotional brain, are not reversible solely by understanding how they were created. While understanding connections to early experiences may not guarantee immediate trust in engagements, it can inspire exploration of alternative ways to connect and build trustworthy relationships. Ruth Feldman (2017) relates to Van Der Kolk's ideas, offering a framework for understanding human attachment bonds through the integration of insights from animal research and neuroimaging studies. Feldman identifies four

primary types of mammalian bonds: parent-infant, pair-bonds, peer relationships, and conspecifics. These bonds are underpinned by the interplay of oxytocin and dopamine in the brain's striatum, which combines motivation and social focus. Feldman emphasises the concept of biobehavioural synchrony, where attachment bonds are characterised by the synchronisation of physiological and behavioural processes between individuals. This synchrony integrates subcortical and cortical networks involved in reward, motivation, embodied simulation, and mentalisation, highlighting the neurobiological basis of love and attachment.

Van der Kolk (2014) proposes diverse approaches to heal damaged attunement systems through training rhythmicity and reciprocity, a concept he refers to as 'restoring synchrony', which can be closely associated with musicality and communicative musicality due to the psychobiological relevance of rhythm and the IPM (see Chapter 3). Achieving synchrony involves integrating body senses—vision, hearing, touch, and balance:

> Being in synch means resonating through sounds and movements that connect, which are embedded in the daily sensory rhythms of cooking and cleaning, going to bed and waking up. Being in synch may mean sharing funny faces and hugs, expressing delight or disapproval at the right moments, tossing balls back and forth, or singing together. At the Trauma Center, we have developed programs to coach parent in connection and attunement, and my patients have told me about many other ways to get themselves in synch, ranging from choral singing and ballroom dancing to joining basketball teams, jazz bands and chamber music groups. All of these foster a sense of attunement and communal pleasure. (Van der Kolk, 2014, p.289)

The trauma recovery process, according to Van der Kolk (2014), involves regaining a sense of self-leadership and agency. Recovery, therefore, consists in revisiting trauma to confront and regain ownership of oneself (mind and body). However, this process must occur within the context of

safety to prevent revictimisation and re-traumatisation. In alignment with the thesis' developmental rationale, recovery from trauma involves "restoration of executive functioning and, with it, self-confidence and the capacity for playfulness and creativity" (Van der Kolk, 2014, pp. 474–475). In other words, Van der Kolk's perspective suggests that recovery from trauma implies the restoration of the naturally developmental music.

Integrating Feldman's insights, the concept of biobehavioural synchrony aligns with Van der Kolk's idea of restoring synchrony through rhythmic and reciprocal activities. Both perspectives underscore the importance of synchronised interactions in fostering attachment, healing, and overall well-being. Feldman's emphasis on the neurobiological underpinnings of attachment bonds complements Van der Kolk's therapeutic approaches, highlighting the role of rhythmicity and attunement in both the formation of healthy attachments and the recovery from trauma.

Communal rhythms and synchrony

Van der Kolk's exploration of communal rhythms and synchrony resonates profoundly with the theories of musicality and communicative musicality presented in this thesis. Highlighting the connection between the brain and the body, particularly through the vagus nerve, Van der Kolk emphasises the direct influence of breathing, chanting, and movement on the arousal system—an approach embedded in cultural practices worldwide but often marginalised in mainstream culture:

> Some 80 percent of the fibres of the vagus nerve (which connects the brain with many internal organs) are afferent; that is, they run from the body into the brain. This means that we can directly train our arousal system by the way we breathe, chant, and move, a principle that has been utilized since time immemorial in places like China and India, and in every religious practice I know of, but that is suspiciously eyed as "alternative" in mainstream culture. (Van der Kolk, 2014, p. 477)

This aligns with the thesis' assertion regarding the embodied nature of relationships and the foundational role of communicative musicality in psychosocial bonds, as detailed in Chapters 2 and 3. Van der Kolk's trauma approach is distinctive because it is not limited to the consulting room. He claims that trauma healing necessarily involves collective encounters which are characterised by synchronised rhythmical experiences. In the aftermath of trauma, the breakdown of attuned physical synchrony highlights the significance of shared rhythmic experiences in healing, and the healing power of community encounters. This significance of shared rhythmicalities is a principle evident in Van der Kolk's involvement with the Truth and Reconciliation Commission in South Africa. In his own words:

> The healing power of community as expressed in music and rhythms was brought home for me in the spring of 1997, when I was following the work of the Truth and Reconciliation Commission in South Africa. In some places we visited, terrible violence continued. One day I attended a group for rape survivors in the courtyard of a clinic in a township outside Johannesburg. We could hear the sound of bullets being fired at a distance while smoke billowed over the walls of the compound and the smell of teargas hung in the air. Later, we heard that forty people had been killed.
>
> Yet, while the surroundings were foreign and terrifying, I recognized this group all too well: The women sat slumped over-sad and frozen-like so many rape therapy groups I had seen in Boston. I felt a similar sense of helplessness, and surrounded by collapsed people, I felt myself mentally collapse as well. Then one of the women started to hum, while gently swaying back and forth. Slowly a rhythm emerged; bit by bit other women joined in. Soon the whole group was singing, moving, and getting up to dance. It was an astounding transformation: people coming back to life, faces becoming attuned, vitality returning to bodies. I made a vow to apply what I was seeing there and to study how rhythm, chanting, and movement can help to heal trauma. (Van der Kolk, 2014 p.493-495, and see also Chapter 20 for the case of theatre)

The transformative power of music and shared rhythms becomes vividly apparent in the narrative of a group for rape survivors, where communal singing, movement, and dance facilitate an astounding transformation, bringing vitality back to bodies and attuning faces.

Van der Kolk's testimonials and therapeutic methodology in addressing trauma are closely linked to the musical developmental concepts explored in this thesis. They not only illustrate the progression from early musicality to more sophisticated psychosocial and cultural manifestations of music but also underscore the perpetual and dynamic interplay, marked by paradoxes, between individual and collective dimensions of human existence.

Art, Music, and Dance

The third aspect in Van der Kolk's work that aligns with this thesis involves art, music, and dance. While this thesis predominantly centres on music, it acknowledges the interconnectedness of various cultural expressions, including art in general as well as dance, which is closely related to music. The connection between musicality and communicative musicality, expressed through shared cultural forms like art, music, and dance, serves as a potent method for healing trauma. However, attunement also provides a visceral experience of reciprocity[81], particularly in contexts where shared experiences are integral to the healing process. These shared experiences not only foster healing but also, in the act of making art, music, singing, or dancing with others engender a playful interaction that aids in reconnecting with a sense of agency, joy, and pleasure. The developmental significance of play, as discussed in earlier sections of this chapter, is pivotal and manifests in how creativity and playfulness are essential in social interactions, particularly in the process of restoring the social and individual fabric. As Van der Kolk puts it, "[w]hen we play

[81] For a general account of reciprocity in musical interaction see p.813 of Cross, I. (2014). Music and communication in music psychology. Psychology of Music, 42(6), 809-819

together, we feel physically attuned and experience a sense of connection and joy. Improvisation exercises (such as those found at http://learnimprov.com/) also are a marvellous way to help people connect in joy and exploration" (p.497).[82]

As discussed in Chapters 4 and 5, as well as in earlier sections of this chapter, the ability to play and creatively explore human musicality is linked to a sense of self and belonging. Van der Kolk draws a parallel between play, internal rhythms, and the sense of agency. Similarly, this thesis posits that transitional spaces where play, creativity, and the self intersect also play a crucial role. Building on Van der Kolk's premise, if trauma fractures the sense of self, it inevitably closes the door on agency and self-expression. Engaging in play and sharing experiences with others becomes a means of reconnecting with our individual rhythms, aligning with our body's pace and needs. This process increases awareness and attuned responsiveness to our own selves:

> Our sense of agency, how much we feel in control, is defined by our relationship with our bodies and its rhythms: Our waking and sleeping and how we eat, sit, and walk define the contours of our days. In order to find our voice, we have to be in our bodies—able to breathe fully and able to access our inner sensations. This is the opposite of dissociation, of being "out of body" and making yourself disappear. It's also the opposite of depression, lying slumped in front of a screen that provides passive entertainment. Acting is an experience of using your body to take your place in life. (p.769)[83]

Van der Kolk discusses the significance of finding one's own voice, implying a connection with both subjective and collective musicality and the reclaiming of one's own place in the world. The following section will explore more in depth the relationship of voice to healing, but particularly to reconnecting with musicality.

---

[82] For empirical evidence see Robledo, J. P., Hawkins, S., Cornejo, C., Cross, I., Party, D., & Hurtado, E. (2021). Musical improvisation enhances interpersonal coordination in subsequent conversation: Motor and speech evidence. PLOS ONE, 16(4), e0250166.

[83] Examples of healing through theatre can be found on pages 772-773 (Van der Kolk, 2014).

What follows in Van der Kolk's ideas is that cultural artistic expression, especially music and dance, provide a space for people to work through their inner and collective trauma. Van der Kolk reflects on the power of these collective spaces and their capacity to communicate when words are not available: "The capacity of art, music, and dance to circumvent the speechlessness that comes with terror may be one reason they are used as trauma treatments in cultures around the world" (p. 562 and and see also "Expressive Dance, Writing, Trauma, and Health: When Words Have A Body." Pennebaker and Krantz [2007, pp. 201-29"]).[84] Another example is the relevance of thinking of communicative musicality in a larger, collective sense is that collective music creates a larger context for life, a meaning beyond individual fait (Van der Kolk, 2014). Van der Kolk connects the collective meaning of music to religious ritual. As seen in Chapter 1, rituals involve rhythmic movements,

> from davening at the Wailing Wall in Jerusalem to the song liturgy and gestures of the Catholic Mass to moving meditation in Buddhist ceremonies and the rhythmic prayer rituals performed five times and day by devout Muslims. Music as the backbone of the civil rights movement in the United States. Anyone alive at that time will not forget the lines of marchers, arms linked, singing 'We shall overcome' as they walked steadily toward the police who were massed to stop them. Music binds together people who might individually be terrified but who collectively become powerful advocates for themselves and others. Along with language, dancing, marching, and singing are uniquely human ways to install a sense of hope and courage. (Van der Kolk, 2014 p.774-775)

[84] "There are thousands of art, music, and dance therapists who do beautiful work with abused children, soldiers suffering from PTSD, incest victims, refugees, and torture survivors, and numerous accounts attest to the effectiveness of expressive therapies. However, at this point, we know very little how they work or about the specific aspects of traumatic stress they address, and it would present an enormous logistical and financial challenge to do the research necessary to establish their value scientifically" (Van der Kolk, 2014, pp.561-562). For Music Therapy approaches to trauma and clinical presentations see e.g., Bradt et.al. (2016); Bruscia (2014); Eurich (1977); Gaston (1968); Magee (2019); Tahut & Hoenberg (2015).

The relationship between Van Der Kolk's research on trauma and the concepts of musicality and communicative musicality underscores the potential of music to facilitate emotional healing, self-expression, and interpersonal connection. While Van der Kolk's work centres on trauma's impact on the mind and body, the essence of musicality and communicative musicality resides in the unique ways humans engage with and communicate through music and music-like behaviours. This interplay between Van der Kolk's ideas and those suggested in this thesis can be articulated in the way music emerges as a powerful ally in navigating complex trauma and emotions. Music, musicality, and communicative musicality possess an innate ability to evoke feelings and shape emotional landscapes. Amid the difficult journey of trauma recovery, where emotions are often shut, disjointed, or feel overwhelming, music provides a safe place to work through those processes, giving a sense of being held, where creativity can be explored in diverse ways. Whether it is through melodies, instruments, or one's voice, music gives a channel in which intricate emotions can be explored, processed, or untangled.

As Van der Kolk emphasises the significance of somatic experiences in both trauma and healing, music, with its rhythmic cadence, emerges as a harmonious companion for expression. The rhythmic heartbeat of music and human inner-rooted rhythmicality forges a deep connection with the body, eliciting a sense of rootedness and expression like no other expressive means. For instance, a drumbeat, or a caregiver's heartbeat in early stages may mirror our own heartbeat, grounding the experience to a present moment where different temporalities coexist (see Chapter 5 of this thesis). Through this synchrony, Van der Kolk suggests music nurtures the bridge between oneself and internal soundscapes, inviting a recalibration of the body's natural rhythmicalities which are often disrupted by trauma.

Communicative musicality's assertion that music transcends verbal language resonates with Van der Kolk's trauma healing claim. For many survivors, trauma's aftermath involves experiences that defy verbal communication. Music emerges as a communication facilitator, capable of conveying

the inexpressible and touching upon the unspeakable. In the fabric of notes, rhythms, and melodies, emotions find a canvas on which to unravel, unburdened by the constraints of words. This expressive outlet offers not just release but also a means of asserting agency over one's own narrative—especially pertinent when trauma can strip individuals of their sense of control, belonging, and identity.

Beyond personal healing, the therapeutic applications of music extend to fostering connections within groups. Van der Kolk's insights into the importance of social support find resonance in the world of music therapy. Group music-making, whether in drumming circles or choir rehearsals, creates a shared space where individuals can harmonise not just musically but emotionally. The collective rhythms and harmonies mirror the rhythms of human connection, serving as a bridge that traverses isolation. The bonds forged through music echo Van der Kolk's recognition of the role relationships play in healing, emphasising the idea that shared musical experiences can cultivate a sense of belonging that is integral to recovery.

However, following this thesis' phenomenological claims, it is essential to acknowledge that music is as individual as the journey of healing. The paradox between the individual and collective manifests clearly in this context because collectivity and sharing are crucial for musicality and music to take place, but to the same extent, they are intimately subjective experiences. The case of trauma is no different to the music paradox. Trauma manifests uniquely in each person, and while music can be a transformative tool, it is not a universal on-fits-all practice. As seen throughout this thesis, universal, crystalised definitions only constrain the natural flows of life experiences, excluding creative possibilities of perceiving the world, with its internal and external soundscapes.

In sum, the relationship of Van der Kolk's trauma-focused research to musicality and communicative musicality accentuates the potent role of music in the mosaic of trauma recovery. Music becomes an avenue through which emotions find expression, and bodily sensations and

human connections find resonance. In this delicate interplay, music offers a jazz jam of healing, with each note a reminder that even amidst trauma's dissonances, there exists the potential for harmony and renewal.

Van der Kolk's contribution to this thesis provides clarity to the continuity between musicality and cultural experiences which involve the developmental trajectory that spans from early human interactions, through play and cultural experiences. His contribution helps to understand this trajectory in the context of trauma and the possibilities to heal. When working with trauma through artistic practices, a similar situation to the one described in the previous chapters is necessary. A secure environment where people can work through their feelings and feel free to explore their movements and voice is paramount to allow healing. Providing a safe place where people can explore what it is to experience trustworthy relationships is also essential in a healing process. Without that, people cannot give a voice to their feelings and therefore healing cannot happen. In the following section, these elements of individual-collective music are further explored from a psychosocial perspective, specifically in contexts of protracted violence.

6.4.2. Angela Jill Lederach and Jean Paul Lederach's social aural healing in places in conflict

Angela Jill Lederach and Jean Paul Lederach (2011) offer a transformative approach to understanding conflict dynamics, focusing on fundamental causes rather than superficial manifestations. They propose an innovative auditory perspective on the origins of conflict, challenging conventional linear or circular notions of healing and reconciliation. While recent peacebuilding research suggests that societal healing follows a non-linear trajectory, the Lederachs argue that most theories still outline healing in stages, creating a fundamental contradiction in understanding these processes.

The Lederachs' central contribution is the substitution of visual metaphors of linearity and circularity with an auditory, multi-layered metaphor. They argue that metaphors are not just poetic devices but are deeply intertwined with our modes of perceiving and interpreting the world. Metaphors shape our understanding through comparison, framing reality and altering meaning. Metaphors "transcend mere poetic devices; they are deeply intertwined with our modes of perceiving, comprehending, and interpreting the world. By their very structure, metaphors shape our understanding of our experiences and the creation of meaning. This occurs through a process of comparison, where 'one kind of thing' is apprehended 'in terms of another'" (Lakoff & Johnson 1980 p. 5, as cited in Lederach and Lederach, 2011, p. 43).

This perspective aligns with Sara Ahmed's concept of orientations (see Chapters 4 and 5 of this thesis), where realities and meanings shift with our perceptions. The Lederachs' use of metaphor as a narrative tool offers valuable insights into psychosocial healing, revealing often overlooked dimensions. They describe 'orientational metaphors' that structure entire systems of concepts, linking this idea to Ingold's phenomenological meshwork. These metaphors, which often employ spatial figures, orient the meaning and order of related concepts.

The work of Lakoff (1987) relates to these ideas of metaphors and orientations. He challenges the classical view that categories are defined by shared properties among their members, positing instead that categories are shaped by human perception and experience. Central to Lakoff's thesis is the role of metaphor in cognitive processes. He argues that metaphors are not merely linguistic expressions but are fundamental to how we understand and interact with the world. This perspective underscores the significance of metaphors in shaping our cognitive structures.

Lakoff (1987) introduces the concept of the "embodied mind", suggesting that our bodily experiences significantly influence our cognitive processes. This idea stands in stark contrast to the traditional view that the mind operates independently of the body. By emphasising the embodied nature of cognition, Lakoff provides a more holistic understanding of how humans categorise and

comprehend experiences and illustrates the unique and seemingly arbitrary ways in which different cultures categorise the world. It serves as a poignant reminder of the cultural specificity of categorisation systems. Lakoff's critique of classical categorisation theory is another cornerstone of his work. He challenges the notion that categories have clear boundaries and are defined by common properties. Instead, he advocates for a prototype theory, where categories are organised around typical examples rather than fixed criteria. This approach offers a more flexible and realistic understanding of how we group and classify our experiences.

The Lederachs propose a shift to an aural metaphor for healing and reconciliation, moving away from linearity, or staged characterisations of peacebuilding and reconciliation. They argue that reconciliation involves developmental progression, often explained through movement metaphors like cyclical or spiral processes. However, they acknowledge the tension between these movement-based images and the concepts of circularity and linearity, which are often overlooked in the quest for useful categories. The Lederachs advocate for social healing as an intermediary phenomenon, focusing on local communities and empowering their voices. They emphasise the importance of acknowledging the complexity of temporal simultaneity in processes and experiences.

In contexts of violence, healing represents an intricate reality, characterised by simultaneous dynamics rather than linear sequences. The Lederachs' notion of social healing materialises as a dynamic structure, requiring nuanced understanding. Their framework mirrors the thesis' premise of *nepantla* and *chi'xi,* sigposting paradox and simultaneity. The aural quality of healing underscores the intrinsic role of music and musicality in human experience and restoration. The Lederachs' approach advocates for a non-linear understanding of psychosocial processes, shifting away from binary views towards a complex phenomenology of existence. They employ this phenomenological approach across various conflict settings.

The Lederachs claim that "voice suggests a notion of movement that is both internal, within an individual, and external, taking the form of social echo and resonance that emerges from collective

spaces that build meaningful conversation, resiliency in the face of violence and purposeful action" (p.7).

As seen in the Tibetan bowl metaphor in the previous paragraphs, another aspect that relates to this thesis' arguments delves into the idea of music as a container. Whether through a lullaby or other musical forms, sound creates a sensation of being held and surrounded, tapping into deeper levels of experience beyond verbal expression. This echoes Boyce-Tillman's observation that music has the capacity to hold and transmit emotions:

> In essence, music permits feeling things not always easily conveyed through the spoken word, the touching of a level of experience not conveyed through the spoken word, the touching of a level of experience not conveyed by explanation or conversation. Sound penetrates to a deeper level and can create the sensation of feeling held and surrounded. (Boyce-Tillman, 2000, as cited in Lederach & Lederach 2011, p. 120)

A final aspect draws parallels between music and therapeutic processes, emphasising the multiple functions of repetition and rhythm. The Lederachs' exploration of therapeutic repetition challenges linear explanations by highlighting the transformative potential inherent in repetition. This aligns with the thesis' perspective on repetition in development and socio-emotional communication, where it is seen as a natural aspect of music, fostering integration and reintegration. The exploration of these parallels in the thesis has been both organic, rooted in the clinical background of the theories investigated, and intentional, recognising that these connections are integral to the arborescent nature of music.

In this thesis, these parallels have been explored both organically, within the clinical context of the theories examined, and intentionally, as they are not mere coincidences; these connections are integral to the arborescent nature of music. Furthermore, these connections extend beyond music and therapeutic processes to encompass human development and socio-emotional

communication, which are the primary emphasis in this thesis. The Lederachs' unique focus on song and therapeutic processes aligns closely with this thesis' approach. The predominant view of therapeutic repetition often centres on revisiting unconscious events, particularly those related to trauma, which play a pivotal role in shaping individuals' or groups' narratives, forming identity and meaning. In the therapeutic context, repetition involves revisiting emotional narratives that sustain the identity of individuals or groups, providing them with a voice.

For many people, however, significant events of the past submerge into unconscious memory. The memories then play out symptomatically through indirect and at times dysfunctional and self-destructive expressions. A large part of the therapeutic process orients itself towards the process of identifying these key landmarks and events. The retrospective telling and retelling of the events, a creative act that simultaneously links perception, memory, and inventiveness—for none of us can re-create past events without some dose of storytelling creativity—provides opportunity to reframe, that is, to rename the experience. From this perspective, therapeutic repetition suggests that in the retelling, the experienced traumatic event becomes a more commonplace part of a person's life story. Repetition, if you will, flattens the significance of a particular event, removing the sharpness of the trauma as the defining event and lens that gives meaning to—or, as may be the case, takes constructive, life-giving meaning away from—one's life story, past, present, and future. In so doing, repetition creates the platform from which a new kind of power emerges to help a person rediscover, redefine, and rename their life story (Lederach & Lederach, 2011, p. 124).

This aspect of repetition, both in development and therapeutic settings, is a natural element of music, where newly accessed areas of the personality are reintegrated into people's narratives of meaning, allowing new and more reflective patterns to emerge. Individuals become more playful, actively participating in their process of integration and reintegration. Lederach and Lederach (2011) argue that therapeutic settings often offer a linear explanation for repetition: letting go of the past to move toward a healthier future. This may miss the deeper understanding of what

happens underneath the surfaces of verbal narratives and linear ideas of the cure. Repetition as a multidirectional musical feature allows:

> the entry into a space pregnant with the potential to rename more closely approximates the possibility that the key transformation underway is one that permits people who carry trauma to transcend the weight of being an object at the mercy of events and permits them to enter the essential space of becoming artists. (Lederach & Lederach, 2011, p. 125)

This 'essential space' is what this thesis calls transitional, *nepantla, chi'xi*, or of in-betweenness.

Circling and repetition connect with a child-like nature of exploration and finding meaning, providing a way into healing "because they touch and rise from a deeper place within the soul, a comfort and acceptance of oneself, a feeling rooted, of being located and feeling close to home" (p. 127). Different from other understandings of repetition and healing, the Lederachs suggest that circling and repetition do not diminish trauma to exert control. Instead, they assert that these processes serve as a gateway to connect with a deeper sense of self and discover one's own voice, fostering the recovery of the sacred nature of life damaged by violations and violence.

In conclusion, the exploration of temporal simultaneity in this chapter embraces music as a rich metaphorical space that holds the complexities of human experiences, providing a nuanced understanding of healing, development, and socio-emotional communication. Music, with its ability to navigate nonlinearities, serves as a mirror reflecting both order and chaos in the mature human experience.

6.4.3. Nigel Osborne's music therapy approach

Nigel Osborne (2020) explores the relationship between imagination, intersubjectivity, and music therapy. Osborne positions imagination as a fundamental aspect of human cognition and experience, essential for creativity, empathy, and meaning-making. He argues that imagination is

inherently intersubjective, involving shared experiences and mutual understanding between individuals. In music therapy, imagination enables a unique form of communication that transcends verbal language, allowing for deep emotional expression and connection: “Imagination in music therapy allows for the creation of a shared space where both therapist and client can explore and express emotions that might be difficult to articulate through words alone" (Osborne, 2020, p. 640).

Osborne's (2020) personal narrative gives an intimate glimpse into his experiences as both a music therapist and a participant in therapeutic processes. This narrative approach highlights the subjective and relational nature of therapy, where the imaginations of both therapist and client interlace to create a shared therapeutic space. Osborne illustrates how musical improvisation and composition serve as powerful tools for exploring and expressing complex emotions, fostering a sense of agency and self-discoveryOsborne, 2020).

Drawing on theories from psychology, phenomenology, and musicology, Osborne (2020) integrates diverse perspectives to build a comprehensive framework for understanding the role of imagination in music therapy. He references Winnicott’s notions of play and creativity in psychological development, and Merleau-Ponty's phenomenological approach that underscores the embodied and relational aspects of human experience. Osborne emphasises the transformative power of music in therapeutic settings, noting its ability to evoke memories, emotions, and imaginative scenarios. Music, with its non-verbal and evocative qualities, becomes a conduit for accessing and articulating experiences that might be difficult to express through words alone. Osborne’s work includes various case studies demonstrating how music therapy has facilitated significant breakthroughs in clients' emotional and psychological healing.

One of the cases Osborne discusses involves his work with a young boy diagnosed with autism. Through musical improvisation, the child was able to express emotions and experiences that he struggled to communicate verbally. The therapeutic process involved creating a safe and

supportive environment where the child could explore different sounds and rhythms, leading to significant improvements in his social interactions and emotional regulation.

Another case study focuses on an adult client suffering from severe depression. Music therapy sessions provided a non-verbal outlet for the client to express feelings of sadness and hopelessness. Over time, the client began to engage more actively in the sessions, using music to explore and process difficult emotions. This engagement facilitated a gradual improvement in mood and a greater sense of agency in the client's life.

Osborne also discusses a group therapy session involving several clients with diverse backgrounds and therapeutic needs. The group used musical activities to foster a sense of community and mutual support. Through collaborative music-making, the clients were able to build trust, share their experiences, and develop new coping strategies. The group dynamic enhanced the therapeutic process, demonstrating the power of collective creativity and intersubjectivity in healing.

These examples and Osborne's (2020) work in general are tightly related to this thesis' ideas and theoretical frameworks. Osborne advocates for a more nuanced appreciation of the role of imagination in therapeutic settings, suggesting that music therapy offers a unique and powerful means of fostering intersubjective connections and personal growth and healing.

6.5. Conclusions

This chapter extends the exploration of the developmental trajectory of musical development, positing that during the initial stages of life, infants exist in a state of complete oneness. The initiation of separation and subsequent ego development results when the infant encounters reality, signifying that the gratification of needs, both physiological and emotional, is no longer immediate and even though it demands external caregiving, the infant's capacity to wait provides the

rudimentary notions of a distinction between inside and outside (Winnicott, 1965 and Chapter 4 of this thesis). The caregiver's role assumes the responsibility of facilitating a conducive space, an illusion, within which the infant can create their perceptual world and, consequently, fulfil their needs. Winnicott (1965) argues that this process constitutes a creative act, referred to as "primary creativity," wherein the infant invents a satisfying reality.

The gradual realisation that this gratifying illusion is actually provided by another individual marks a pivotal, paradoxical juncture in development, blurring the boundaries between self-creation and external influence. This paradoxical realm, situated between realisation and creative omnipotence, initiates the process of separation, known as ego development, where internal and external realities diverge (Winnicott, 1965 and Chapter 4 of this thesis).

Caregivers facilitate this developmental progression through attuned responses to the infant's rhythmic cues, thereby introducing temporal and inherently musical dimensions into the caregiving relationship. Facilitating attuned responses requires a safe place, and feeling safe is paramount for creativity, development, and psychosocial healing to take place. The establishment of this paradoxical transitional space produces a state of in-betweenness characterised by inherent paradoxes. This transitional space serves as the backdrop for shifts in perceptual experiences and diverse manifestations of reality (Winnicott, 1965, and Chapters 4 and 5 of this thesis).

With the foundational transitional space in place, infants embark on the journey of play, thereby diversifying their interactions with the world, encompassing objects, people, and self. As infants grow under ordinary conditions, their modes of interaction with these entities evolve into more sophisticated forms. This developmental journey eventually develops into cultural experiences, and it is there where music, as a cultural phenomenon, takes place. However, this thesis highlights that music, as a cultural product, is not detached from the foundational musical experiences that underpin and nourish cultural lore. These musical experiences are musicality and communicative

musicality, which underlie musical culture and encompass psychobiological components and emotional interplay with oneself and others. These 'hidden' elements of cultural expressions shape the phenomenology of human experience, significantly influencing individuals' perceptions of the world and themselves.

This thesis highlights that musical cultural experiences extend beyond cultural music itself and permeate all human interactions. The works of Van der Kolk (2008), Lederach and Lederach (2011), and Osborne (2020) on trauma and healing processes underscore the profound role of music in psychosocial contexts. Van der Kolk emphasises communal rhythms and attunement as fundamental musical elements in healing, while the Lederachs explore a dynamic aural dimension of healing, focusing on the non-linear interplay of sound at individual and collective levels. Osborne adds another layer by highlighting the intersubjective and imaginative dimensions of music therapy, where imagination creates a shared space for emotional exploration and expression, fostering deep connections and transformative healing.

Integrating these perspectives, this thesis underscores the multifaceted role of music in human development, healing, and peacebuilding. The continuity between internal and collective cultural experiences and their intimate relationship to musicality and communicative musicality provides meaning to non-linear but contextual emotional experiences. By examining the insights of Van der Kolk, the Lederachs, and Osborne, this thesis offers a comprehensive understanding of the profound impact of musical experiences on individual and collective well-being, demonstrating how music facilitates emotional expression, connection, and personal growth in complex socio-cultural contexts.

CHAPTER 7

ECHOES AND CONCLUSIONS

This concluding chapter is divided into four main sections. The first section (7.1.) offers the discussion and conclusions drawn from each chapter and the whole thesis. The second section (7.2.) revises the methodological and formal considerations set out in the introduction and the main challenges encountered in the writing of the thesis. The third section (7.3.) offers some possibilities for future research and how this thesis' approach can offer possibilities for continuing to think about the role of music in human development and experience. The fourth section (7.4.) states final remarks.

7.1. Discussion and conclusions

A critical re-examination of the core debates surrounding the definitions of music was necessary to support this thesis' claim that music constitutes a fundamental component of human development. Traditionally, these definitions present universal and static conceptions of music, often inclusive or exclusive of different elements in their delineations (see Chapter 1 and see e.g. Blacking, 1977; Currie & Killin, 2016; Davies, 2012a, 2012b; Godt, 2005; Gracyk & Kania, 2011; Hamilton, 2007; Levinson, 1990; Merriam, 1964; Nettl, 2001; Scruton, 1997). Difficulties arose from the diverse disciplinary perspectives and attempts to define music as a singular entity. However, viewed as polysemic, music retains relatively stable structural components while remaining fluid, contingent upon individual and collective experiences within the musical encounter. This inherent polysemy, coupled with stable structural elements, creates a paradoxical tension that demands acknowledgment rather than resolution. The primary conclusion drawn from this task is that understanding music as polysemic enables a broader perspective, transcending its cultural expression and recognising its presence in various aspects of life. This

thesis particularly focused on development and experience, but multiple avenues are possible due to the arborescent nature of music that this thesis claims.

Contrary to predominant discussions that chiefly view music as a cultural artefact, this thesis argued that music surpasses its status as a mere cultural product. While acknowledging its cultural manifestations, the thesis strived for the recognition of music as a fundamental aspect of human development, needing acceptance of its paradoxical and fluid nature. This recognition involves understanding the connections between music and development, requiring a broader perspective beyond cultural expressions. This entailed examining structural components consistent across individual experiences as well as cultural variances and psychobiological underpinnings involving humans and other animals, emphasising the claimed universal essence of music as Chapter 2 explored. This universality stems not from an abstract definition, as discussed in Chapter 1, but from foundational structural elements that are harnessed in psychobiological traits that sustain the structural elements revised in this thesis (rhythm, melody, and harmony). These foundational components enable music to serve as a cultural receptacle of human experience. These psychobiological components, sustaining the stability of music's structural aspects, form the basis of "Musicality," encompassing the psychobiological underpinnings of musical behaviour.

In conclusion, Chapter 1 advocates for a holistic understanding of music, encompassing its multiplicity of meanings, performative nature, and inherent complexities across both concept and action. The emphasis on context, human relationships, and emotional responses underscores the shaping of music interpretation. This sets the foundation for the exploration of psychobiological elements and emotional impact explored in Chapter 2.

Chapter 2 explored the concept of musicality, taking into account its multidisciplinary nature by integrating biological, neurological, and psychological aspects of music. Grounded in the historical influences of Carl Stumpf's (1911) psychology of music and Charles Darwin's (1871) evolutionary theory, the chapter elucidated central aspects of musicality through its structural components—

rhythm, melody, and harmony—and suggested more dynamic components extending beyond psychobiological correlates (further developed in Chapters 4–6).

Chapter 2 also discusses that a significant portion of the elements of music discussed in this thesis, namely rhythm, melody, and harmony, share mechanisms with psychological processes related to musical behaviour, including language development, memory processing, and emotional expression. One of the central conclusions of Chapter 2 is the way in which the phylogenesis of musicality directs its central inquiry towards the body, elucidating the neurobiological functions of music. This shift is pivotal to the thesis' assertion that music is essential for development and, simultaneously, embodied and primarily experiential. The embodiment of these processes is crucial, as music would be rendered inviable as a developmental process without it. However, the psychobiological study of music—musicality—tends to align with the scientific agenda, sometimes limiting exploration of less apparent processes within the musical experience, such as phenomenological or political aspects (further developed in Chapters 5 and 6). These limitations were further explored within this thesis and complemented with other models incorporating philosophical perspectives on musical experience (e.g. Marleau-Ponty, 1945/2012, Ahmed, 2006), psychoanalytic (e.g. Winnicott, 1971) and psycho-developmental models (e.g. Malloch, and Trevarthen, 2009), and psychosocial and critical approaches (e.g. Lederach & Lederach, 2011), as discussed in Chapters 4–6.

Identifying the historical trajectories and the recurring elements in musicality definitions, this chapter highlighted important correlates such as the relationship between music and language, musical communication as a conveyer of emotions and basic needs, the role of musical behaviour in complex cognitive processes, the activation of pleasure circuits during musical experiences, and the significance of musical behaviours in socialization and group cohesion. These correlates lead to the conclusion that music, when thought of beyond its cultural expressions, may be the

forerunner of fundamental psychological processes. This conclusion allows the understanding that music is not only ancient as a behavioural trait but also as a necessary aspect of human evolution.

Musicality emerges as a form of non-verbal communication deeply embedded in the body's intercommunication, connecting body and psyche and facilitating interactions between individuals. This non-verbal communication extends to the transmission of emotions, reflecting a concept emphasised since Darwin's time and corroborated by more contemporary studies. The communicative nature of musicality plays a role in socialisation and social bonding, reflecting humanity's evolutionary history of interdependence and shared experiences. Chapter 2 also concludes that the underlying relationship between musicality and social cohesion through the importance of social synchronization and shared musical encounters.

Furthermore, the chapter also examines the fundamental interrelation between music and pleasure. A physiological phenomenon that is used as an argument to claim that music does not have evolutionary significance (Pinker, 1997). This thesis agrees with other authors that challenge this view and make strong cases to demonstrate music's evolutionary significance (e.g. Honing et al., 2018). While emphasising the activation of pleasure circuits during musical engagement, the chapter acknowledges that pleasure involves physiological reactions and phenomenological experiences, adding depth to the understanding of musical experiences.

Crucially, the chapter underscored the centrality of the body in musical experiences, advocating for musicology to consider the body as a fundamental aspect of musical engagement. This involves not only physical responses but also psychophysiological reactions and the intricate interplay between physical and psychological aspects of musical engagement.

Chapter 2 positioned musicality as a comprehensive concept bridging biology, culture, and human experiences. Through the limitations identified in the discourses on musicality, Chapter 2 lays the foundation for exploring the phenomenological and embodied dimensions of musical engagement

in subsequent chapters, highlighting the profound impact of music on individuals and society as a whole.

As a way to further examine the limitations of musicality scholarship, the thesis continued exploring related avenues in the subsequent chapters. Chapter 3 focused on a distinctive approach to musicality, illuminating the connections between music and human development by involving the exploration of early human pre-verbal communication. The term, communicative musicality, coined by Stephen Malloch and Colwyn Trevarthen (Malloch, 1999; Trevarthen, 1999; Malloch & Trevarthen, 2009), specifically focuses on the musical nature of pre-verbal communication. This concept amalgamates three fundamental components—pulse, quality, and narratives which correspond to rhythm, melody, and harmony as explored throughout the thesis—with human interaction and emotional expression. As discussed in Chapter 3, these elements provide a comprehensive framework for understanding the musical dimensions of human communication, deepening the appreciation of how music and communication intertwine in human development.

One of the most relevant conclusions of this chapter is that beyond these structural components, essential emotional interactions that respect stable musical qualities form the core of communicative musicality. The roots of communicative musicality, as developed in Chapter 3, trace back to a historical revision of the collaborative efforts in the 1960s (e.g. Bullowa, 1979). These studies challenged conventional developmental models, recognising that preverbal communication, marked by rhythmic and melodic patterns, plays a vital role in language, psychological, and emotional development. These early development researchers laid the foundation for ideas surrounding the value of shared moments conveying meaning (Malloch and Trevarthen, 2009; Stern, 1985). The infusion of musical elements into caregiver-infant interactions deepened the understanding of emotional communication and the biological basis of music. This made the bridge between psychobiology, human development, and music more evident.

Building on these historical foundations, Trevarthen and Malloch's early works significantly contributed to the hypothesis of the presence of musicality in infant-directed speech (IDS) and the concept of communicative musicality (Beeb et al., 1985; Papoušek, 1999; Gratier & Apter-Danon, 2009). Their interdisciplinary approach brought together insights from philosophy, cognitive science, psychology, and neuroscience, shedding light on thinking about the origins of intentionality and consciousness in the context of communicative musicality (further discussed in Chapters 4 and 5). Their research had broad implications across clinical studies, education, and social engagement, emphasising the significance of early intersubjectivity in shaping human development and well-being.

The concept of communicative musicality asserts that musical elements exist within intimate interactions between infants and caregivers, playing a crucial role in language and social development. This perspective emphasises the reciprocity in caregiver-infant interactions, highlighting its centrality in self-development, object relations, and attachment. At its essence lies the intuition of a baby and their caregiver to communicate in ways that make both feel heard and recognised. This function, aligned with Daniel Stern's (2002; 2010) concept of 'attunement', encapsulates a fundamental aspect of the parent-infant relationship, involving the caregiver's capacity for emotional responsiveness, tuning in to the infant's emotional and communicative signals. Recognising this musical function as integral to human development prompts a re-evaluation of Winnicott's developmental theory (e.g. 1949; 1971), incorporating an exploration of the musical elements involved in human development. Winnicott's (e.g. 1949; 1971) model is particularly relevant to this thesis due to its accounts of dimensions of psychosomatic and emotional development resonating with the musical claims presented further in Chapters 4 and 5. His model inspired reflection on two specific consequences of the musical shift proposed in this thesis. The first consequence is that communicative musicality is integral to fostering ego self-development (Chapter 4). The second consequence is that communicative musicality fosters the

growth of emotional awareness and socialisation in infants, but more importantly is that the continuity of early musical experiences develops into tangible cultural experiences where music, as a cultural artefact, and psychosocial musical aspects take centre stage (Chapters 5 and 6).

Chapter 3 conclusively asserts that communicative musicality offers a valuable perspective on the role of music-like patterns in early caregiver-infant interactions. This thesis claims that it represents an additional layer of communication before and during individuation, contributing to the infant's self-discovery and growth. The notion of playful interactions within communicative musicality connects it with Winnicott's ideas about play and cultural experiences and creativity, further supporting its role in self-development (Winnicott 1971; Chapters 4–6). Thus, shared communicative musicality becomes an integral part of self-development, entwined with the interplay between early emotional experiences and cultural growth.

In the developmental process of individuation, what Chapter 4 calls ego formation, characterised by the recognition of oneself and the external world, a crucial transitional state marked by paradox emerges. According to Winnicott (1971), this transitional state, fostered by an attuned and secure environment promoting creativity and play, is foundational to creative development. Contrary to conventional views, this thesis argues that transitional states persist beyond early life, continuing through the entire lifespan. For example, Lev S. Vygotsky's Zone of Proximal Development (ZPD) and Gloria Anzaldúa's (2015) concept of *nepantla* contribute to exploring transitional mental states, emphasising the interconnectedness of development and experiences influenced by musical interactions in later moments of life (Anzaldúa, 2015; Vygotsky, 1978). These concepts highlight the dynamic process of development intertwined with relational environmental experiences beyond consciousness and beyond the first years of life and reaching towards socio-cultural and socio-political spheres.

The societal significance of transitions, as expressed by Munroe Bergdorf (2023), challenges stigmatisation, aligning with the argument that transitions are crucial for emotional development

and the internalisation of social norms (Bergdorf, 2023). Donald Winnicott's (1971) insights into transitional objects and phenomena provide a valuable framework for understanding emotional relationships and creativity, particularly when influenced by musicality, as Chapter 4 claims. Sound, in the form of musicality and communicative musicality, emerges as a vital element facilitating transitions between inner and outer realities (Malloch & Trevarthen, 1999). When all of these transitions unfold harmoniously, they become integral to human experience, enabling diverse self-orientations and fostering stronger connections to oneself and others. Music assumes a pivotal role in facilitating these transitional phases, offering cues for connecting with oneself and others beyond the confines of verbal language.

One of the most relevant conclusions of Chapter 4 is that viewing music as a complex phenomenon fundamental to human development needs to consider notions of time and experience. Time, integral to all conceptions of music and development, extends beyond its structural component (rhythm) to a phenomenological aspect crucial to the existential dimension of being alive, closer to the notion of pulse developed in Chapter 3. Another relevant insight developed in Chapter 4 is that it examines time through a jazz key, focusing on the creative tensions between stable repetition and improvisation. Life within this perspective demands the natural stability of a changing rhythm capable of modifying tempo, allowing freedom to improvise and create new rhythms in a co-creative relationship between self and environment. This improvisational nature and fluidity of time manifest predominantly within transitional spaces, the *nepantlas* of time (borrowing the Nahuatl word from Anzaldúa, 2015), where boundaries between binaries blur, and individuals connect experientially and creatively with the rhythmicalities of themselves and their surroundings, primarily driven by emotionality and interconnectedness.

Positioning development and experience into the sonic sphere thus shifts the focus from reason to emotional engagement. Another conclusion from Chapter 4 is that this shift highlights multiple dimensions, both physical and experiential, introducing a third dimension of experience

encompassing philosophical, emotional, physical, psychic, individual, collective, and political aspects. The emphasis on the location of such experiences may shift, placing greater importance on certain aspects depending on the context. For example, the experience of chills (frissons) while listening to specific tunes may shift the focus towards a physiological response, but this does not negate the presence of memories, socio-cultural influences, and emotional engagement. Engaging in collective music-making as a means to process ineffable and often traumatic experiences places greater emphasis on the collective and socio-political dimensions of the experience without negating the presence of psychobiological repertoires. Recognising music's role in providing continuity to the human experience highlights its unique function in facilitating the arborescent nature of experience, characterised by its impermanence, and shaped like a mycelium.

This chapter therefore explores the interplay between illusion, transitional phenomena, and in-betweenness within the context of human development, highlighting their profound connection to musicality and communicative musicality (Honing, 2018; Malloch & Trevarthen, 1999; Winnicott, 1971). The differentiation of self from the external world, rooted in the interplay of pleasure and reality dynamics, needs a transitional phase foundational to various aspects of human existence. Music is key for opening transitional moments because it is the sensory, embodied, and shared emotional experience that allow creative moments in life (Winnicott, 1971). Figures like Phillip Glass (in Martens, 1983) and Steve Reich (1974) advocate for this shift in focus, emphasising that "centrarse en el proceso musical posibilita este desvío de la atención de él o ella y el tú y el yo hacia afuera, hacia el ello / *centering in the musical process facilitates the shift in attention of him or her, and the me and the I towards the external source, towards the id.*" (Paci Dalò & Quinz, 2022, p. 32, my translation). The shift to the external source is a creative engagement that needs transitioning which is why transitional moments are key. Furthermore, it is creativity, which this thesis claims as musical, that allows individuals and societies to change the world's views, making

new avenues for constructing futures and understanding pasts in different and hopefully more ethical ways.

Chapter 4 further investigated the complex dynamics of mirroring, imitation, repetition, echoing, and attunement in early human development, particularly in caregiver-infant communicative musicality (Gratier & Apter-Danon, 2009; Stern, 1985; Winnicott, 1971). Mirroring, from both Lacan's and Winnicott's perspectives, proved crucial in distinguishing self from external reality (Lacan, 1949/2006; Winnicott, 1971). The multi-sensorial nature of mirroring, especially for blind infants, creates profound communicative musicality akin to an emotional *nepantla* experience (Anzieu, 1995/2016; Lacan, 1949/2006; Winnicott, 1971).

Another conclusion derived from Chapter 4 is that the exploration of 'in-betweenness' leads to disruptions of reality, allowing creativity to emerge and make sense again of the experience. Such dislocation provokes emotional reactions of terror and surprise, but if all goes well, it facilitates new re-engagements with reality, that is, new forms of recognising me and not-me dichotomy. The concepts of *lo fantástico*, and *el duende*, shed light on the phenomenology of the transformative nature of transitionality (Ahmed, 2006; Cortázar, 1980/2013; García Lorca, 1933/2017). These concepts challenge binary systems, emphasising dynamic and polysemic experiences at both individual and collective levels (Freud, 1919; Kohon, 2012; Turner, 1974).

In sum, the main conclusion drawn from Chapter 4 is that musicality acts as a catalyst for ego development and creativity within transitional phenomena, emphasising the need of safe environments for healthy development. Furthermore, that in-betweenness presents challenges but also opportunities for growth, transformation, and profound aesthetic engagement with the unknown and helps understand the known in novel ways (Ahmed, 2006; Cortázar, 1980/2013; García Lorca, 1933/2017). The musicality of existence unleashes and harmonises the complexities of life's transitional moments, guiding individuals through the jazz standard of existence (Honing et al., 2018; Malloch & Trevarthen, 1999). Music emerges as a transformative force that transcends

boundaries, fostering profound transformations, personal growth, and richer understandings of the interplay between self and other, reality and imagination, and cultural and personal identity.

Chapter 5 offered a comprehensive discussion that considers the concept of musical phenomenology and its intricate relationship with communicative musicality and development. The key takeaway is the profound influence of time and temporality across various dimensions of human experience and development. The discussion emphasised that temporal elements, including rhythm and other experience of time, hold a central place when considering musicality and communicative musicality within the context of emotional development and the emergence of the ego. These temporal aspects provide continuity to life's inherent paradox, originating in the body and transcending the dichotomy of consciousness and the unconscious, primarily through emotional non-verbal communications, as argued in Chapters 3 and 4.

The transformative and disruptive nature of music presented in this thesis leads to the understanding of the developmental continuum of existence, shaped by creativity, play, and cultural encounters within transitional spaces, which establishes what this thesis called 'musical phenomenology' in Chapter 5. One of the main conclusions of Chapter 5 is that musical phenomenology interweaves consciousness, time, and embodied experiences, emphasising the fundamental role of temporal considerations in understanding human musical experiences and their impact on how individuals perceive and engage with the world. This examination contributes to an even more nuanced understanding of the human experience. This is a contribution that this thesis brings to the understanding of music in relation to experience and how music, in all its polysemy, ignites shifts in perception and reality engagement.

Another important aspect derived from Chapter 5 is, once more, the revision of temporality. This chapter, however, differently from Chapter 4, addresses time from a phenomenological perspective, not from a developmental one. Thus, Chapter 5's approach to time leads to the conclusion that at the core of the musical phenomenological argument lies the pivotal role of

musicality and communicative musicality in orchestrating temporal experiences. This perspective accentuates the significance of bridging the theoretical divide between conscious and unconscious aspects of human existence. The result encourages a holistic, though not necessarily uniform, approach to human existence and the implications of our presence in the world. By acknowledging the profound impact of embodied experiences, cultural contexts, and social interactions in shaping human perception of time and shared experiences, this discussion affirms this thesis' understanding of music as a polysemic, talismanic (*chi'xi*) concept at the heart of the human experience.

The insights from Chapters 2, 3, and 4 laid the foundation for the transitional role of Chapter 5, acting as a bridge between the preceding chapters and paving the way for the exploration of socio-cultural dimensions in Chapter 6. Chapter 5's transitional function establishes a connection between musical experience, the embodied temporal dimension, and diverse perceptions of time, shedding light on the paradoxical and phenomenological nature of musical encounters. The innate sense of rhythm, as discussed in Chapters 2 and 3, is deeply rooted in bodily rhythms, forming the basis for early interactions between infants and caregivers where music and emotional communication surpass verbal expressions.

Temporalities, encompassing the distinction between self and others and the process of socialisation, are revealed as crucial aspects of communicative musicality. These innate components facilitate interpersonal exchanges, contributing to embodied emotional sharing. The discussion further illuminates the role of music, musicality, and communicative musicality in ego development and body-mind interactions. These elements highlight the importance of rhythm in sensorial experiences, particularly in unborn infants who listen to rhythmic cues as a precursor to cognitive and emotional development. This multidisciplinary exploration underscores the importance of temporal elements, particularly rhythm and time, in the complex interplay between musical phenomenology, communicative musicality, and human development. Chapter 5 helps to

support the assertion that sound, before and equally important than visual perception, assumes a pivotal role in shaping thought, language, and representation, reinforcing the profound influence of music on human experience.

Chapter 5 synthesises a nuanced exploration of perception and embodied experiences within musical phenomenology. The foundational role of sensory experiences in shaping our engagement with the world and co-creating meaning in musical encounters has been a fundamental insight from this chapter. By challenging conventional divisions of the senses, musical phenomenology has proposed a paradigm where life engagement occurs through sensorial musicality, framing human development as an ongoing, paradoxical, and creative journey.

Using theoretical perspectives, including Siri Hustvedt's (2016) 'thinking body,' Simone Weil's insights into movement and perception, J.J. Gibson's ecological model (1979/2015), and Maturana and Varela's (1980) unconscious psychobiology and their concept of physiological equilibrium or autopoiesis (i.e. the poetics of self-production), has revealed the profound impact of perception, phenomenology, and in-betweenness on the human experience. Chapter 5's theoretical discussions provided an exploration of embodied experiences, as a continuity of ideas from Chapter 2 (Musicality), where the body was put at the centre of music's study. However, the approach to musical embodiment in Chapter 5 transcends the limitations posed in Chapter 2, mostly because of the scientific agendas that such studies demand. Thus, embodiment in Chapter 5 continues the previous chapters' idea that the body is not only essential for thinking about music in this thesis' sense, but the way the body is thought is also polysemic and subject to re-orientations (to use Ahmed's language). Therefore, Chapter 5's approach to the body is a re-orientation of the insights retrieved from Chapter 2.

Emphasising the centrality of the body in Chapter 5 has illuminated how embodied experiences form the foundation for cognitive, ego, and emotional development, drawing parallels between the orchestration of volitional processes and a musical performance involving intricate bodily

interactions. The alignment with J.J. Gibson's ecological model of perception has further reinforced the exploration of musicality as constant embodied contextual action, emphasising direct perception without cognitive mediation (Gibson, 1979/2015).

By discussing the Gibsons' affordances and the continuum between the organism and the environment, Chapter 5 sheds light on the active interaction and mutual influence shaping human engagement (Gibson, 1979/2015). This narrative has emphasised the continuity between the organism and the environment, drawing on William James' (1904) insights into consciousness and the redundancy of concepts concerning lived experience and consciousness.

The introduction of Sara Ahmed's (2006) queer phenomenology has enriched this understanding, highlighting the pivotal role of the body in musical experiences. Ahmed's contributions resonate with the musical model proposed in this thesis, providing a nuanced perspective on the intricate interplay between the body, perception, identity, and musical engagement. Her insights offer a valuable lens through which to explore into the polysemic nature of music and its profound implications for how we perceive and experience the world. Furthermore, these implications have an impact on the formation of selfhood and identity.

In conclusion, Chapter 5 contributes to the understanding of the experiential dimension of music's developmental role, integrating diverse theoretical perspectives and emphasising two transversal aspects present in the revised theories—time and the body. The embodied nature of perception and human experience facilitates the continuity between self, body, environment, and musicality, stressing the importance of creativity and play in understanding human existence (Winnicott, 1971). This conclusion provides a robust foundation for further exploration and discovery within the complexities of perception of time and reality, embodiment, and musical phenomenology.

The developmental continuity of being, traced through the journey of creativity, play, and cultural encounters from infancy to adulthood, illuminates the foundational role of music, musicality, and

communicative musicality in human life. Chapter 6 explored the psychosocial expressions of this musical nature, extending beyond conventional cultural manifestations like songs or concerts. Chapter 6 illustrates and concludes that a sonic perspective on life prompts an examination of the complex and diverse experiences of humanity. Musical development emerges as a central aspect of human existence, particularly crucial in navigating life's challenges and maintaining creative continuity. Drawing insights from Van Der Kolk (2008) and Lederach and Lederach (2011), Chapter 6 illustrates how traumatic experiences, which disrupt musical trajectories, underscore the need for musical approaches to restore the lost integrity and the fragmentations on the social and individual fabrics. These findings form a robust foundation for future research in psychosocial studies.

Chapter 6 also leads to the conclusion that sound possesses an evocative capacity that penetrates the human experience holistically, offering a unique means to express aspects not easily articulated in words. Lederach and Lederach (2011) describe sound's ability to evoke painful experiences and, conversely, to open avenues for constructive dynamics that allow individuals to 'feel' the spiritual and healing elements of human existence. Sonic experiences become a mechanism for triangulation, locating individuals in their social landscape, providing a sense of orientation and belonging. Sound creates a sensation of being held, fostering spaces for insight, creativity, and the potential for feeling accepted and at home. Music becomes a vessel transporting individuals to different dimensions of space and time, where temporalities bend, and past and future narratives collide in the present moment. In that sense, music, musicality and communicative musicality do not only take people out of their known reality, as explored in Chapters 4 and 5, but allows them to come back into life, reconfiguring personal and collective narratives of life and existence.

Another insight derived from Chapter 6 and the psychosocial dimension of music is that repetition, often found in music, as well as development and experience unfold as a gateway to a sacred connection, offering meditative spaces that bring individuals closer to their inner voice and the

divine. Sonic experiences, including song and music, create beauty, invoking a sense of connection with nature and a capacity to notice and feel beauty, even in the aftermath of protracted violent contexts.

In conclusion, this thesis asserts that music, with its inherent polysemy, fluidity, and dynamic nature, constitutes a fundamental component of human development. Bridging biological, psychological, philosophical, and socio-cultural and socio-political aspects, music influences human existence from infancy through adulthood. The multidisciplinary exploration of music enriches the understanding of human development and emphasises music's significance as a dynamic force in the human experience. Future research is encouraged to continue exploring the possibilities of understanding music as this thesis does, and to delve deeper into the complex interplay between music, time, and human development, opening avenues for exploration in music psychology and beyond.

7.2. Methodologies, form, challenges, and the echoing of the paradoxical nature of music

7.2.1. Form, style, and methodology

In order to understand the nuanced and paradoxical nature of music in human development, it was imperative to transcend conventional definitions, adopting a methodology inspired by multi- and transdisciplinary approaches (Choi et al., 2006) and drawing from Silvia Rivera Cusicanqui's (2010/2020) "Sociology of The Image" research method. This approach allowed for seamless navigation between disciplines, avoiding commitment to a specific ontology while maintaining disciplinary rigor. The recognition of music as a complex, fluid phenomenon emerged from this free transiting, extending into the borderlands (Anzaldúa, 2015) and acknowledging its relevance as both an epistemological entity and a phenomenological subject of inquiry. This epistemological and phenomenological complexity of music necessitates a polysemic understanding that embraces

its paradoxical and fluid nature. To address these tensions, discomforts, and paradoxes inherent in the study of music, a nuanced approach is required. For example, the tension between cultural and biological aspects, universal and individual dimensions, and conscious and unconscious facets of music highlights instances of these epistemological paradoxes that this thesis has dealt with throughout each chapter.

Regarding human development and music, the thesis emphasised the profound impact of sonic stimuli on perception and worldly experience starting from birth. Transitional phenomena, particularly in early developmental milestones, play a crucial role in establishing a phenomenological configuration of sonic experiences, contributing to the continuity between the individual and the collective throughout life, shaping reconfigurations of transitionalities and experiences of in-betweenness (Anzaldúa, 2015). These transitional moments mark the continuity between the individual and the collective, ultimately contributing to the establishment of cultural experiences through creativity.

The thesis embraces multidisciplinary discussions, avoiding dwelling excessively on theoretical discrepancies. Despite challenges, a conscious effort was made to extract valuable insights from each approach, uncovering commonalities and equilibrium within certain tensions. Embracing such a multidisciplinary approach permitted the retrieval of valuable insights from each discipline while also allowing theoretical tensions to arise without the need to find a resolution. For instance, phenomenology and psychoanalysis are revised through a nuanced exploration of the conceptual dichotomy of the consciousness and the unconscious. This dichotomy is challenged (e.g. William James, 1904), and the suggestion is to find logical coherence and acceptance of experience mediated by elements beyond conscious awareness. In that sense, the static nature of conceptual references is questioned, suggesting the coexistence of tensions without rigid adherence.

The inherently arborescent nature of the thesis, reflected in its structure, form, and underlying thought, invites open-ended future explorations. Preliminary suggestions are offered as a

navigational chart for new musical journeys, imagining a musical soundscape and acknowledging the foundational ideas' role in future developments. Readers are encouraged to immerse themselves in the thesis's sonic frameworks and acknowledge that any subsequent development is an outgrowth of these foundational ideas, just as this thesis itself, which emerges from various authors, influences, and experiences, mostly with an attitude positioned on the borderlands (Anzaldúa, 1987; 2015) of magical realism[85]. Moreover, it is expected that this mycelium of ideas will be employed ethically, aligning with the author's political stance and aspirations for emancipation and love. The aspiration for this work is to illuminate aspects of music that may be familiar to many, but have not been explored with the depth and interconnectedness offered by this thesis.

While the methodological approaches of this thesis directed a substantial portion of the research —drawing on multidisciplinary and transdisciplinary frameworks (Choi et al., 2006) and employing the "Sociology of the Image" method (Rivera-Cusicanqui, 2010/2020)—the limitations encountered signalled the need to transcend prescriptive approaches and led to a reliance on the thesis author's intuition and creativity. A substantial aspect of the thesis' methodology originated from an intuitive compass, guided by the author's clinical and musical experience, delineating the original songlines of this theoretical exploration which continues to evolve. This compass involved extensive reading across various disciplines, such as music, musicality, communicative musicality, emotional development, phenomenology, queer and feminist studies, literature, and sociology. From the readings, common elements were retrieved as nodal points which became the primary codes of analysis and flagged the sonographies and theoretical kaleidoscopes that guided an important part of the research and allowed the treatment of music as an epistemological thing

[85] Magical realism generally refers to literary fiction and artistic style and aesthetic. In this context, it also refers to a social identity where the border between reality and fantasy is blurred. Specific to this thesis' methodology, it refers to the process where rationality and intuition became blurred and creativity and imitation limits were too dislocated.

(following Rheinberger, 1997) and as a phenomenological subject. Similar to Deleuze's assertion, this thesis' concepts and nodal points were handled as chords, and therefore: "Los conceptos son centros de vibraciones, cada uno en sí mismo, y los unos en relación con los otros." / "*concepts are centres of vibration, each one on its own, and each one in relation to others*" (1991/1993, p. 28, my translation). These encompassed structural elements like rhythm, melody, harmony, and the body, alongside developmental and emotional aspects such as Winnicott's (1956, 1965, 1960) primary maternal preoccupation, handling, holding, Lederach and Lederach's (2011) Tibetan Bowl metaphor (see Chapter 6), and psychological and neuropsychological elements including memory, pleasure perception, and cognition (see Chapter 2). These nodal points were conducive to thinking about the musical continuity of being which traces the developmental trajectory proposed in this thesis: the notion of being oneself (ego development), existential implications of reality, paradoxes in developmental trajectories, transitional phenomena, play, creativity, cultural experience, as well as philosophical aspects derived from experiences of time, auditory stimuli, embodied experiences, individual-collective dynamics, and aesthetic experiences. Furthermore, socio-political considerations, including social healing, peacebuilding, gender, body politics, and contextualised experiences contributed to the comprehensive exploration of the thesis's subject matter.

An inherently pluralistic and polyphonic aesthetic underpins this thesis, an aesthetic that thrives on experimentation, embracing multiplicity, and paradox. Similar to Rheinberger (1997) claim of the epistemological thing, experimentation with subjects of inquiry brings new meanings to things within a context that is affected by questions and variables of analysis, but it is in the experimentation, in the 'musicking', that things acquire new meanings and developments. Thus, this thesis marks a fluid, ever-evolving aesthetic. Rather than keeping the theoretical discussions adrift, this thesis selectively amalgamated insights from diverse sources to create a polyphonic collage.

Intuitively tracing the theoretical trajectories and identifying the junctures where this thesis began to take form was influenced by insights from authors who embrace paradox as a fundamental strength of their ideas. The author of this thesis has also engaged in exploring paradoxical and border identities, shaping it into both a theoretical approach and a methodology for articulating tensions and reshaping the role of contradiction present in conceptualisations of human development and experience. This allowed the mycelium-like behaviour to unfold, where the roots of a formless yet organic structure extend into both forward-looking and reflective territories, without rigid adherence to specific structural elements that traditionally define their nature. For instance, while music typically encompasses structural components such as rhythm, melody, and harmony, certain musical genres, particularly those challenging conventional structures, blur the boundaries of these components, pushing the boundaries of reality and aesthetic perception into uncharted territories. Jazz, free jazz, *musique concrète*, minimalist music, electronic music, noise, and avant-garde music serve as notable examples of this branching nature of sounds and in this thesis not only sounds but ideas, concepts, and emotional development. The concept of sonic rhizomes or mycelium has steered this thesis towards embracing movement, impermanence, and change, while also acknowledging the inherent potential of natural trajectories. In its non-linear trajectory, the thesis mirrors the non-linear development of music. It starts exploring music as a cultural artefact and returns to socio-cultural manifestations of music but in a different way from the one at the beginning, resembling a Ritornello—a recurring yet always different return. This non-linearity, the revisiting of different forms of understanding music, and the challenges encountered throughout the research process, reflected the paradoxical nature of its theoretical foundation and the choral of diverse 'voices' within its pages.

7.2.2. Challenges

During the thesis writing process, significant challenges emerged, each contributing to the complexity of the task. The first challenge was attempting to encapsulate the concept of non-linear musical development within the confines of a linear written structure, i.e. a thesis structure with chapters and sections. The very nature of non-linearity, with its intricate web of interconnected ideas, clashed with the inherent linearity of written discourse. However, a way of overcoming this challenge was accepting the paradox and trying to explicitly write of the complexity faced within the required structure. The need to structure the thesis into distinct sections addressing interconnected aspects of experience introduced yet another layer of complexity. Striking a delicate balance between avoiding repetitive points and maintaining the coherence of the central argument was an ongoing challenge that required meticulous planning and execution yet openness to change and rethinking numerous times the paths each discipline took the author's thought process.

Exploring the spectral and fluid nature of time within the confines of linear time (Chronos) and associated deadlines added another layer of complexity. This challenge required a delicate dance between the conceptualisation of time as a dynamic, ever-evolving entity and the practical constraints of meeting academic deadlines.

One of the most ambitious challenges was navigating the terrains of multidisciplinary approaches, respecting their own agendas and methodologies, being critical of their limitations, and resisting taking on a single approach. This task demanded a nuanced exploration of various, sometimes contradictory, theoretical frameworks. However, from that journey, the question of music's developmental and experiential relevance emerged as a possibility that gave theoretical freedom to navigate the claim that music does have developmental relevance which can be looked at from different perspectives which gives a richer and more fluid understanding of this phenomenon.

Another challenge arose in the endeavour to convey ideas about pre- and non-verbal communication through the written word. This challenge stemmed from the limitations of text-

based communication in capturing the subtleties and nuances inherent in these non-linguistic aspects of music, musicality, and communicative musicality in relation to development. The way to overcome this challenge was to use different ways of stating the non-verbal aspects this thesis dealt with and capturing the limiting nature of words to convey subjective-collective experiences.

Lastly, external factors such as financial difficulties, academic obstacles, the upheaval caused by the pandemic, immigration-related issues, and health concerns further complicated the writing process. These external elements occasionally disrupted focus and inhibited the flow of the work, highlighting the need for adaptability and resilience in the face of adversity.

In summary, the thesis writing journey was marked by a series of important challenges, from the conceptualisation of non-linearity of a large subject of inquiry to the practical constraints of time and external disruptions. Addressing these challenges required a delicate balance between creative exploration and pragmatic navigation, ultimately contributing to the depth and complexity of the thesis' subject.

7.3. Music futures and research soundscapes

Within the polysemic account of music this thesis argues for, musicality and communicative musicality emerge as powerful lenses through which to explore and understand human development. This section suggests a range of ideas of how this thesis' developmental argument, drawn on the interplay between music, musicality, and communicative musicality, informs various domains other than the ones explored in this thesis. This research can be thus taken as a starting point to keep thinking about music's multidisciplinarity. The following subsections offer some possibilities for future avenues of analysis, some of which were more developed in this thesis (e.g., parent-infant research and peacebuilding) than others (music education and public policy). These

possibilities include, but are not limited to, clinical practice, parent-infant research, music therapy, psycho-social healing as well as peacebuilding, education, and public policy.

7.3.1. Clinical practice and music therapy

This thesis' argument can hold place within clinical practice, offering a unique way for therapeutic intervention and emotional expression.

Clinical Practice

One avenue, which can be closely related to this thesis' main argument, is that of considering non-verbal and physical musical aspects of emotional expression within the clinical setting. An example of this is the tone of voice used by people when narrating certain topics related to their biography. The rhythmicalities of their emotional expressions in their narratives provide an additional lens for the therapeutic process and psychological functioning. Another key factor for healing is providing a safe environment for people to reclaim their voice and be able to give voice to their lives, knowing that being listened to in a safe place is essential. These elements are common in psychotherapy practices, but integrating the musical aspects and developmental ideas that this thesis suggests will enrich the understanding of the person or people the clinician is working with and will bring about forms of listening and thinking about the therapeutic relationship that open dimensions not often considered within traditional training models. For example, considering the paradoxical nature of development helps when listening to the patient, who may not be in need of a cure or conflict resolution, but instead need to understand contradictions, to find a voice, or to experience or re-frame a place. Even though psychotherapy sessions generally occur at a set time (e.g. fifty minutes), the perceptions of time become an aspect of interest to feel the rhythm of the session. The interactions that occur in a session and throughout the psychotherapy process mark improvisation zones that are referents for identifying the activity that is occurring in the session. Psychoanalyst

Roger Kennedy (2020), for example, explores some of these clinical applications of musical understanding within the consulting room.[86]

Music Therapy

Another avenue related to clinical applications is music therapy, which directly harnesses the intrinsic power of music to a therapeutic setting in order to address a wide range of psychological, emotional, and physical challenges. Through improvisation, composition, and receptive listening, individuals can explore their feelings, develop coping mechanisms, and enhance their overall well-being.

Music therapy stands as an established health profession that employs music as a therapeutic tool to address a diverse array of physical, emotional, cognitive, and social needs across the lifespan. Music therapy's psychotherapeutic potential facilitates emotional healing and personal growth (see e.g. Eurich, 1977; Gaston, 1968). Over the past few decades, the field of music therapy research has grown, encompassing various populations, settings, and formats. Music therapy stands as a fertile therapeutic area due to its non-invasive and non-pharmacological means of addressing a broad spectrum of issues (see e.g. Bruscia, 2014).

Some of the principal strands of music therapy practice and research stem into different subjects. One of these subjects is studying the effectiveness of music therapy (see e.g. Bradt et al., 2016; Magee, 2019; Thaut et al., 2015) in treating a wide range of conditions, including anxiety, depression, pain management, and dementia. In clinical settings, music therapy is employed to alleviate symptoms of anxiety, depression, and trauma. It can facilitate communication among people who struggle with verbal expression, such as those on the autism spectrum or individuals

[86] This podcast also gives account of Kennedy's work on music and his psychoanalytic practice: https://ipaoffthecouch.org/2020/11/22/episode-72-the-musicality-of-psychoanalysis-and-the-psychoanalysis-of-music-with-roger-kennedy-md/

with dementia (i.e. neurodevelopmental aspects). Moreover, the rhythmic and melodic qualities of music can synchronise physiological functions, promoting relaxation and pain management. Music therapy's versatility is evident in its applications, ranging from pain management and emotional expression to communication development and rehabilitation. As a result, it has gained recognition and integration within clinical and healthcare settings. Music therapists collaborate with interdisciplinary teams to provide holistic care, recognising the interconnectedness of music, emotions, and well-being.

As research advances, the integration of musicality and communicative musicality into clinical practice becomes increasingly evident. Understanding how individuals perceive and respond to music on an innate level informs therapeutic strategies tailored to their unique musical profiles. By acknowledging the role of musicality in patients' lives, clinicians can enhance the efficacy of music-based interventions and promote holistic and more creatively oriented healing.

Another subject in the growing research body on music therapy is the neuroscience of music which studies the profound impact of music on the brain and nervous system (see e.g. Thaut & Hoemberg, 2014; Tomaino, 2017). Understanding the neurological underpinnings of music facilitates further therapeutic developments, taking into account the data of the brain areas involved, including the reward system, language areas, and motor areas (see e.g. the work of Koelsch, 2014; Schlaug et.al., 2008; Tramo, 2001; also see Chapter 2 this thesis).

Addressing social and communication difficulties, music therapy has emerged as an effective approach for ameliorating the social and communication deficits associated with autism spectrum disorder (ASD). Pioneering work in this area is exemplified by Petra Kern, David Aldridge, and Grace Thompson (Aldridge, 1996; Kern, 2010; Thompson et al., 2014).

Music therapy and palliative care is another prominent aspect of research in music therapy. Alleviating pain and anxiety through the integration of music therapy in palliative care has been

important in addressing the physical and emotional needs of patients. Research has demonstrated its efficacy in reducing pain, anxiety, and depression. Notable contributors to this field include Joanne Loewy, Cheryl Dileo, and William Mitchell (Dileo et al., 2012; Loewy et al., 2013; Mitchell, 2018).

In conclusion, music therapy research encompasses a diverse landscape, with scholars drawing from a variety of perspectives and approaches. These strands of inquiry contribute to the rich tapestry of music therapy's role in clinical practice.

7.3.2. Parent-infant research

The parent-infant relationship is a foundational component of human development, and music plays an integral role in shaping this bond (see Chapters 3 and 4 of this thesis). Infants are born with an innate sense of musicality, which enables them to engage in musical exchanges with their caregivers from the earliest moments of life. These musical interactions form the basis of communicative musicality—a shared, non-verbal language between parent and child (see Malloch & Trevarthen, 2009 and Chapter 3 of this thesis).

Research in this area highlights the significance of musical interactions for infants' cognitive, emotional, and social development. The rhythmic patterns of lullabies, the sing-song quality of parent-infant communication, and the mirroring of facial expressions and vocalisations all contribute to the development of trust, emotional management, and attachment (see Chapters 3 and 4).

Understanding the role of musicality and communicative musicality in parent-infant interactions has practical implications for supporting healthy child development. Parenting programmes that incorporate musical elements can foster stronger socio-emotional bonds, enhance communication skills, and promote early language development. This highlights the importance of nurturing

musical exchanges within families as a means of enhancing infant well-being. By implementing a musicality approach, music therapy has proven influential in promoting human development and research on this topic indicates improvements in language development, social skills, and academic performance (see e.g. Malloch & Trevarthen, 2009; Cevasco et al., 2016; Kern, 2010; Loewy et al., 2013).

7.3.3. Psychosocial practice, social healing, and peace building

Music, musicality, and communicative musicality possess a unique potential to inform and enrich psychosocial practices, contribute to social healing, and play a pivotal role in peacebuilding initiatives (see e.g. Lederach & Lederach, 2011 and Chapter 6 of this thesis). These elements suppose a multidisciplinary approach that understand how these elements intersect with the domains of psychology, sociology, and conflict resolution, offering profound insights and tools for fostering change in individuals and communities. Some of the most relevant aspects of using this thesis' developmental model have been illustrated in previous chapters and can be outlined in the way music provides a safe and expressive outlet for individuals and communities to process and release complex emotions and ineffable traumatic experiences, facilitating healing. For example, through participatory music-making, individuals can address trauma, grief, and emotional wounds. The shared experience of making and listening to music fosters empathy and connection among diverse individuals, transcending cultural and social barriers and leading to psychosocial well-being. Group music activities also promote a sense of belonging and social cohesion, contributing to the healing of fractured communities (see Lederach & Lederach, 2011; Ruud, 2012; Malloch & Trevarthen, 2009; see Chapter 6 of this thesis).

7.3.4. Public Policy and education

The recognition of music's role in human development may also have implications for public policy, particularly in areas related to healthcare, social services, and education. Public policies that support access to music education, music therapy, and the arts can have far-reaching benefits for communities and society as a whole.

Regarding healthcare policy, policymakers can advocate for the inclusion of music therapy as a service within healthcare systems. This ensures that individuals of all backgrounds and ages have access to music-based interventions that can improve mental and physical health outcomes.

In terms of social services policy, by recognising the role of musicality and communicative musicality in early childhood development, policymakers can support initiatives that provide resources and training to parents, caregivers, and early childhood educators to promote musical interactions with infants and young children.

Finally, in the arena of education, music and musicality play pivotal roles in enhancing cognitive development, creativity, and social skills. Music education programs are grounded in the belief that all individuals possess musical potential. Through exposure to various musical genres, instruments, and ensemble experiences, students can develop their musicality and gain valuable life skills. Musicality fosters the ability to perceive, appreciate, and create music. It enhances listening skills, pattern recognition, and the capacity to express emotions through sound. In an educational context, this translates to improved language development, mathematical reasoning, and enhanced problem-solving abilities. Moreover, music education promotes communicative musicality by encouraging collaboration, active listening, and ensemble playing. Students learn to communicate non-verbally through music, forging connections with peers and developing empathy and emotional intelligence.

Public policy can prioritise music education as an essential component of a well-rounded curriculum. This involves funding for music programs in schools and promoting equitable access to music education for students from diverse socio-economic backgrounds. Also, the research advances in music education and music psychology have shed light on the paths to follow in this field and have shown how giving priority to music in research is essential in order to start thinking about shifts in education methodologies and psychological approaches to learning, memory, and cognition (for further information on music and the public sphere see e.g. Hallam, Cross & Thaut, 2008; Nooshin, 2009; King & Himonides, 2016; Wissner, 2012; Everett & Laird, 2016; Roman-Velazquez, 2017; Himonides ,2019; Welch et.al, 2023).

The previous examples are domain specific suggestions about how this thesis' ideas can inform diverse professions. However, the outlook does not stop within these arenas of practice and research. This thesis also suggests reflections and echoes across and beyond disciplinary and academic applications.

7.4. Final remarks

In the end, this thesis' arborescent nature and style allow us to continue to think about music in multiple ways. Music's polysemy is irreverent and thus permits transgressing disciplinary and academic boundaries to create new avenues for musicking through life. The concluding reflections are presented in the author's original language, capturing the essence of in-betweenness—an experiential *nepantla* that emerged throughout the process of writing this thesis.

Both this chapter's conclusions and this thesis in general open the possibilities to:

pensar musicalmente al ser humano, entender su complejidad y poder nombrar las estanciasefímeras del desarrollo emocional. *contemplate humanity through a musical lens and thus be able to grasp its intricacies and articulate the ephemeral instances of emotional development*.

reconocer la continuidad del desarrollo emocional hacia lo cultural como aspecto fundamental de la vida, y con ello, reclamar la importancia emocional, cognitiva, social y política de los espacios culturales. *recognise the continuity of emotional development towards cultural development as a fundamental aspect of life which entails reclaiming the emotional, cognitive, social, and political significance of cultural spaces.*

entender que toda comunicacion que va más allá del lenguaje verbal, tiene correlatos musicales y por ende psicobiológicos y psicosociales que afectan profundamente las maneras como los seres humanos se relacionan consigo mismos y con el mundo. *understanding that all communication, beyond verbal language, has musical and, consequently, psychobiological and psychosocial correlates profoundly impacting how humans relate to themselves and the world.*

ver el profundo impacto de asumir que la sintonización emocional permite la interpretación empática y encuentros recíprocos con otres, presumiblemente promoviendo interacciones psicosociales más sanas. *see the profound impact of claiming that emotional attunement enables empathic interpretation and responsive engagement with others, fostering presumably healthier psychosocial interactions.*

conectar de manera más genuina con nuestros cuerpos y nuestras formas de habitar el mundo. *genuinly connect with our bodies and our ways of inhabiting the world.*

entender que la creatividad, cuyos orígenes ontogenéticos provienen de experiencias musicales, es fundamental para expandir los horizontes de nuestras propias limitaciones, ya que nos permite crear el mundo, una y otra vez, y dejarnos impactar por las dislocaciones del tiempo y el espacio. Al ver la realidad diferente, cambia nuestra percepción del mundo, y ojalá de nosotras mismas, y así, nuevas formas de realidad pueden emerger. *acknowledge that creativity, rooted in ontogenetic experiences*

of music, is crucial for expanding beyond our limitations. It allows us to continuously shape the world, inviting the impacts of temporal and spatial dislocations to alter perception, introducing new forms of reality.

entender entonces que sin actos creativos, y sin las musicalidades psicosociales, o sea sin sonoridades que pulsan los caminos del ser y los encuentros humanos, las experiencias adversas que fragmentan los tejidos individuales y colectivos, son difíciles de reparar. *recognise that without creative acts and psychosocial musicalities—sonorities that pulse through the paths of being and human encounters—repairing the adverse experiences that fragment individual and collective fabrics becomes challenging.*

En últimas, cada ser, cada pueblo, cada grupo, cada diada de cuidadora-bebé, necesita su voz. Un voz que muchas veces no tiene palabras para nombrarse (como es el caso de bebés, personas en relaciones abusivas, o grupos en situación de conflicto). Los espectros sonoros, las musicalidades de cada dimensión tanto humana como de otros animales y la naturaleza en general, demuestran la trascendencia y profundidad de órdenes que sobrepasan nuestro entendimiento, pero atraviesan nuestra experiencia cada vez. Al conectar con este misterio existencial que a la ve nos atraviesa bajo la piel, conectarnos con ese motor creativo que afirma nuestro lugar en el mundo, nuestro sentido colectivo y nos da voz. La musica nos da voz y sin ella, la vida no sería posible. *Ultimately, every being, community, and caregiver-infant dyad needs its voice. A voice that often lacks words for self-naming, as seen in babies, individuals in abusive relationships, or groups in conflict. Sonic spectres, the musicalities of human and non-human dimensions, reveal the transcendence of orders beyond our comprehension but coursing through our experiences. Connecting with this existential mystery that runs beneath our skins aligns us with a creative force that confirms our place in the world and our collective sense. Music gives us a voice, and without it, life would not be possible.*

BIBLIOGRAPHY

Ahmed, S. (2006). *Queer phenomenology: Orientations, objects, others.* Duke University Press.

Agawu, K. (1995). *African rhythm: A Northern Ewe perspective.* Cambridge: Cambridge University Press.

Aldridge, D. (1996). An exploration of interactive music therapy in the treatment of children with developmental delay. *The Arts in Psychotherapy, 23*(5), 433-446.

Alperson, P. (Ed.). (1994). *What is Music? An Introduction to the Philosophy of Music.* Pennsylvania State University Press.

Alperson, P. (2010). A Topography of Improvisation. *The Journal of Aesthetics and Art Criticism, 68*(3), 273-280. http://www.jstor.org/stable/40793268

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.).* Arlington, VA: Author.

Anderson, M. L. (2010). Neural reuse: A fundamental organizational principle of the brain. *Behavioral and Brain Sciences, 33*(4), 245-266. https://doi.org/10.1017/S0140525X10000853

Anglada-Tort, M., Harrison, P. M. C., Lee, H., & Jacoby, N. (2023). Large-scale iterated singing experiments reveal oral transmission mechanisms underlying music evolution. *Current Biology.* [https://doi.org/10.1016/j.cub.2023.02.070]

Anzaldúa, G. (1987). *Borderlands/La Frontera: The New Mestiza.* Aunt Lute Books.

Anzaldúa, G., & Keating, A. (2015). *Light in the dark: Luz en lo oscuro : rewriting identity, spirituality, reality (1st ed.).* Duke University Press. https://doi.org/10.1515/9780822375036

Anzieu, D., & Segal, N. (Tr) (1995). *The Skin-Ego: A New Translation by Naomi Segal (The History of Psychoanalysis Series) (1st ed.). (2016).* Routledge.

Aramaki, M., Derrien, O., Kronland-Martinet, R., & Ystad, S. (2013). *Sound, music, and motion: 10th International Symposium, CMMR 2013, Marseille, France, October 15-18, 2013. Revised Selected Papers.* Springer.

Ariès, P. (1996). *Centuries of childhood / Philippe Ariès ; translated from the French by Robert Baldick ; with a new introduction by Adam Phillips.* Pimlico.

Arom, S. (1991). *African polyphony and polyrhythm: Musical structure and methodology*. Cambridge University Press.

Ashton, A. (2003). *Harmonograph: A visual guide to the mathematics of music.* Wooden Books.

Atkinson, P. (1988). Ethnomethodology: A critical review. *Annual Review of Sociology, 14*, 441-465.

Baruch, C., & Drake, C. (1997). Tempo discrimination in infants. *Infant Behavior & Development, 20*(4), 573–577. https://doi.org/10.1016/S0163-6383(97)90049-7

Barwick, L., & Turpin, M. (2016). Central Australian Women's Traditional Songs: Keeping Yawulyu/Awelye Strong. In H. Schippers & C. Grant (Eds.), Sustainable Futures for Music Cultures:An Ecological Perspective (pp. 111-144): Oxford University Press

Bassin, D., Honey, M., & Kaplan, M. M. (Eds.). (Year). *Representations of motherhood.* Yale University Press.

Bateman, A., & Fonagy, P. (2010). Mentalization based treatment for borderline personality disorder. *World Psychiatry: Official Journal of the World Psychiatric Association (WPA), 9*(1), 11-15. https://doi.org/10.1002/j.2051-5545.2010.tb00255.x

Bateson, G. (2002). *Mind and nature : a necessary unity / Gregory Bateson.* Hampton Press.

Bateson, M. C. (1979). The epigenesis of conversational interaction: a personal account of research development. In M. Bullowa (Ed.), *Before Speech: The Beginning of Human Communication* (pp. 63-78). Cambridge University Press.

Beebe, B., Jaffe, J., Feldstein, S., Mays, K., & Alson, D. (1985). Inter-personal timing: The application of an adult dialogue model to mother-infant vocal and kinesic interactions. In F. M. Field and N. Fox (Eds.), *Social perception in infants*, pp. 249-268. Ablex, Northwood, NJ.

Benjamin, J. (1990). An outline of intersubjectivity: The development of recognition. *Psychoanalytic Psychology, 7*(Suppl), 33–46. https://doi.org/10.1037/h0085258

Benson, B. E. (2011). Phenomenology of Music. In T. Gracyk & A. Kania (Eds.), *The Routledge Companion to Philosophy and Music* (pp. 581-591). Routledge.

Bergdorf, M. (2023). *Transitional: In One Way or Another, We All Transition.* Bloomsbury Publishing.

Bergson, H. (2013). *Time and free will: an essay on the immediate data of consciousness*. Routledge. (Original work published 1889)

Bergson, H. (1998). *Creative evolution / Henri Bergson ; authorized translation by Arthur Mitchell.* Dover. (Original work published 1907)

Besson, M., & Schön, D. (2003). Comparison Between language and music. In I. Peretz & R. J. Zatorre (Eds.), *The Cognitive Neuroscience of Music* (pp. 269-293). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Blacking, J. (1969). *Process and Product in Human Society: Inaugural lecture.* Witwatersrand University Press.

Blacking, J. (1973). *How musical is man?* University of Washington Press.

Blacking, J. (1977). Can Musical Universals be heard? *The World of Music, 19*(1/2), 14-22. http://www.jstor.org/stable/43560438

Blacking, B., & Byron, R. (Eds.). (1995). *Music, culture, & experience: Selected papers of John Blacking.* University of Chicago Press.

Blood, A. J., & Zatorre, R. J. (2001). Intensely pleasurable responses to music correlate with activity in brain regions implicated in reward and emotion. *Proceedings of the National Academy of Sciences of the United States of America, 98*(20), 11818-11823. https://doi.org/10.1073/pnas.191355898

Boring, E. G. (1929). *A history of experimental psychology*. New York: Appleton-Century-Crofts. Boring, E. G. (1942). Sensation and perception in the history of experimental psychology. New York: Appleton Century-Crofts. Brown, S., Merker, B.

Boring, E. G. (1942). *Sensation and perception in the history of experimental psychology*. New York: AppletonCentury-Crofts.

Bowlby, J. (1969b). *Attachment and loss (vol. 1), Attachment.* New York: Basic Books. Penguin Books, 1971; 2nd edn, 1982.

Bradt, J., Dileo, C., & Potvin, N. (2016). *Music for stress and anxiety reduction in coronary heart disease patients. Cochrane Database of Systematic Reviews, 2013*(12).

Brentano, F. (1874). *Psychology From an Empirical Standpoint.* Routledge.

Brett, P., Wood, E., & Thomas, G. C. (Eds.). (2006). *Queering the pitch : The New Gay and Lesbian Musicology*. Routledge.

Breuer, J. & Freud, S. (1893). On The Psychical Mechanism of Hysterical Phenomena: Preliminary Communication from Studies on Hysteria. *The Standard Edition of the Complete Psychological Works of Sigmund Freud 2:1-17*

British Broadcasting Corporation. (n.d.). *Tempo, metre and rhythm*. BBC Bitesize. Retrieved July 24, 2021, from https://www.bbc.co.uk/bitesize/guides/z4yh8xs/revision/6

Brown, Steven. (2000). Evolutionary Models of Music: From Sexual Selection to Group Selection. *Perspectives in Ethology. 13*, 231-281. 10.1007/978-1-4615-1221-9_9.

Brown, S. S., & Jordania, J. (2013). Universals in the world's musics. *Psychology of Music, 41*(2), 229-248. https://doi.org/10.1177/0305735611425896

Bruscia, K. E. (2014). *Defining music therapy* (3rd ed.). Barcelona Publishers.

Budd, M. (2011). Music's Arousal of Emotions. In T. Gracyk & A. Kania (Eds.), *The Routledge Companion to Philosophy and Music* (pp. 232-242). Routledge.

Bullowa, M. (Ed.). (1979). *Before Speech: The Beginning of Human Communication*. Cambridge University Press.

Burns, D. D. (2001). Feeling Good: The New Therapy.

Byers P. (1976). Biological rhythms as information channels in interpersonal communication behavior. In *Perspectives in Ethology II*, ed. Bateson P.P.G., Klopfer P.H. New York: Plenum Press, pp. 135–164.

Caldwell, L., & Joyce, A. (Eds.). (2011). *Reading Winnicott* (0 ed.). Routledge. https://doi.org/10.4324/9780203813591

Cameron, S. (2003). The Practice of Attention: Simone Weil's Performance of Impersonality. *Critical Inquiry, 29*(2), 216–252. https://doi.org/10.1086/374026

Caplin, W. E. (1988). Review: *The Rhythms of Tonal Music, by Joel Lester. Journal of the American Musicological Society, 41*(2), 382-392. https://doi.org/10.2307/831441

Cevasco, A. M., Grant, R. E., & Lundy, M. (2016). The effects of music therapy on engagement in family-centered pediatric palliative care. *Journal of Music Therapy, 53*(1), 27-57.

Chatwin, B. (1988). *The songlines.* Penguin Mass Market.

Chanda, M. L., & Levitin, D. J. (2013). The neurochemistry of music. *Trends in Cognitive Sciences, 17*(4), 179-193. https://doi.org/10.1016/j.tics.2013.02.007

Chinn, E. (2001). Nāgārjuna's Fundamental Doctrine of Pratītyasamutpāda. *Philosophy East & West*, *51*(1), 54–72. https://doi.org/10.1353/pew.2001.0005

Chirico, A., Serino, S., Cipresso, P., Gaggioli, A., & Riva, G. (2015). When music "flows". State and trait in musical performance, composition and listening: A systematic review. *Frontiers in Psychology,* 6(906).

Chodorow, N. (1978). Mothering, object-relations, and the female oedipal configuration. *Feminist Studies, 4*(1), 137–158. https://doi.org/10.2307/3177630

Choi, & Pak, A. W. P. (2006). Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: 1. Definitions, objectives, and evidence of effectiveness. *Clinical and Investigative Medicine, 29*(6), 351–364.

Christensen, T. W. (Ed.). (2002). *The Cambridge History of Western Music Theory.* Cambridge University Press.

Ciompi, L. (1991). Affects as central organizing and integrating factors: A new psychosocial/biological model of the psyche. *British Journal of Psychiatry*, 159(1), 97-105.

Civallero, E. (2007). Indigenous oral tradition in southern Latin America: A library's effort to save sounds and stories from silence.

Classics Explained. (2018, April 12) *Melisma* [Video]. YouTube https://www.youtube.com/watch?v=knNgw6vKi3Q&ab_channel=ClassicsExplained

Clayton, M. (2008). The social and personal functions of music in cross-cultural perspective. In S. Hallam, I. Cross, & M. H. Thaut (Eds.), *Oxford Handbook of Music Psychology, Oxford Library of Psychology.* Oxford Academic. https://doi.org/10.1093/oxfordhb/9780199298457.013.0004

Cohn, R. (1998). Introduction to Neo-Riemannian Theory: A Survey and a Historical Perspective. *Journal of Music Theory, 42*(2), 167–180.

Cohn, R., Hyer, B., Dahlhaus, C., Anderson, J., & Wilson, C. (2001). Harmony. *Grove Music Online.* Retrieved 16 Dec. 2024, from

https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000050818.

Condon, W. S., & Sander, L. W. (1974). Neonate Movement Is Synchronized with Adult Speech: Interactional Participation and Language Acquisition. *Science (American Association for the Advancement of Science), 183*(4120), 99–101. https://doi.org/10.1126/science.183.4120.99

Cooper, G., & Meyer, L. B. (1960). *The Rhythmic Structure of Music.* The University of Chicago Press.

Crane, T. (2013). *The objects of thought.* Oxford: Oxford University Press.

Critchley H. D., Garfinkel S. N. (2017). Interoception and emotion. *Current Opinion in Psychology, 17*, 7-14. https://doi.org/10.1016/j.copsyc.2017.04.020

Cross, I. (1999). Is music the most important thing we ever did? *Music, development and evolution.* In S. W. Yi (Ed.), *Music, mind and science* (pp. 10-39). Seoul National University Press.

Cross, I. (2001). Music, Mind and Evolution. *Psychology of Music, 29*(1), 95-102. https://doi.org/10.1177/0305735601291007

Cross, I. (2003). Music and biocultural evolution. In M. Clayton, R. Middleton, & T. Herbert (Eds.), *The cultural study of music: A critical introduction* (pp. 19-30). London: Routledge.

Cross, I. (2005). Music and meaning, ambiguity and evolution. In D Miell, R MacDonald and D Hargreaves, eds, *Musical communication*, 27–43. Oxford University Press, Oxford.

Cross, I. (2014). Music and communication in music psychology. *Psychology of Music, 42*(6), 809-819. https://doi.org/10.1177/0305735614543968

Cross, I. (2024). Sharing uncertainty: Music in humanistic and scientific understandings. *Musicae Scientiae, 28*(2), 222-236. https://doi.org/10.1177/10298649231197388.

Cross, I., & Tolbert, E. (2021). Epistemologies. In T. McAuley, J. Levinson, & N. Nielsen (Eds.), *Oxford handbook of Western music and philosophy* (pp. 265-282). Oxford: Oxford University Press.

Crossley-Holland, P. (2020, November 12). *Rhythm.* In *Encyclopedia Britannica.* Retrieved from https://www.britannica.com/art/rhythm-music

Cortázar, J. (1967). *El perseguidor y otros cuentos.* Originally published in 1959.

Cortázar, J. (1970). *Rayuela ([12. ed.]).* Editorial Sudamericana. Originally published in 1963.

Cortázar, J. (1980/2013). *Clases de literatura: Berkeley.* Alfaguara.

Costall, A., & Morris, P. (2015). The "textbook Gibson": The assimilation of dissidence. *History of Psychology, 18*(1), 1–14. https://doi.org/10.1037/a0038398

Critchley, H. D., & Garfinkel, S. N. (2017). Interoception and emotion. *Current Opinion in Psychology, 17*, 7–14. https://doi.org/10.1016/j.copsyc.2017.04.020

Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56(5), 815-822.

Cuddy, L. L., & Lunney, C. A. (1995). Expectancies generated by melodic intervals: Perceptual judgments of melodic continuity. *Perception and Psychophysics, 57*(4), 451-462.

Cummins. F. (2009). Rhythm as entrainment: The case of synchronous speech. *Journal of Phonetics, 37*(1), 16-28. https://doi.org/10.1016/j.wocn.2008.08.003

Currie, A., & Killin, A. (2016). Musical pluralism and the science of music. *European Journal for Philosophy of Science, 6*(1), 9-30. https://doi.org/10.1007/s13194-015-0123-z

Dalessio, G. (2020, August 23). *Classical vs. Jazz Harmony* [Video]. YouTube. https://www.youtube.com/watch?v=_a0DsvLkOAg&ab_channel=gregdalessio

Dalton, A., Wolff, K., & Bekker, B. (2021). Multidisciplinary Research as a Complex System. *International Journal of Qualitative Methods, 20*. https://doi.org/10.1177/16094069211038400

Damasio, A. (1999). *The Feeling of What Happens: Body and Emotion in the Making of Consciousness.* Mariner Books.

Damasio, A. (2010). *Self comes to mind: Constructing the conscious brain.* Pantheon.

Darabi, N., Svensson, U. P., & Mertens, P. E. C. (2024). Neurologically motivated simulation of ensemble performance. *Music & Science, 7*, 20592043241267890.

Darwin, C. (2013). *The Descent of Man.* Wordsworth Classics of World Literature. (Original work published in 1871)

Darwin, C. (1872). *The expression of the emotions in man and animals.* London: John Murray. 1st edition.

Darwin, C., Bettany, G. T. (George T., Galton, F., & Pearson, K. (1889). *Journal of researches into the natural history and geology of the countries visited during the voyage of H.M.S. Beagle around the world under the command of Capt. Fitz Roy, R.N.* / by Charles Darwin; with a biographical introduction. (From the corrected and enlarged edition of 1845). Ward, Lock and Co.

Davies, S. (2001). *Musical Works & Performances: A Philosophical Exploration.* Oxford University Press. https://doi.org/10.1093/0199241589.001.0001

Davies, S. (2012a). On defining music. *The Monist, 95*(4), 535-555. http://www.jstor.org/stable/42751232

Davies, S. (2012b). *The artful species: Aesthetics, art, and evolution.* Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199658541.001.0001

Davis, C. A. (2011). *Theories of Rhythm and Meter and Their Pedagogical Implications for Non-pitched Percussion Music with an Analysis of William Kraft's "French Suite"* [Master's thesis, University of South Carolina]. Scholar Commons. https://scholarcommons.sc.edu/etd/1639/

de Boer, B. & Kuhl, P. (2003). Investigating the role of infant-directed speech with a computer model. *Acoustic Research Letters Online*, 70. 10.1121/1.1613311.

DeCasper, A. J., & Fifer, W. P. (1980). Of human bonding: Newborns prefer their mothers' voices. *Science, 208*(4448), 1174–1176. https://doi.org/10.1126/science.7375928

DeCasper, A. J., & Spence, M. J. (1986). Prenatal maternal speech influences newborns' perception of speech sounds. *Infant Behavior & Development, 9*(2), 133–150. https://doi.org/10.1016/0163-6383(86)90025-1

Deleuze, G. (1968). *Difference and Repetition* (P. Patton, Trans.). Columbia University Press.

Deleuze, G & Guattari, F. (1991). *Qu'est-ce que la philosophie?*, Minuit, Paris; translated by Thomas Kauf *¿Qué es la filosofía?*, Anagrama. Barcelona, 1993.

Denzin, N. K. (2017). Symbolic interactionism and ethnomethodology. In J. D. Douglas (Ed.), *Everyday life: Reconstruction of social knowledge* (pp. 258-284). New York: Routledge.

Deutsch, D. (Ed.). (1982). *The Psychology of Music.* Academic Press.

Di Pellegrino, G., Fadiga, L., Fogassi, L., Gallese, V., & Rizzolatti, G. (1992). Understanding motor events: a neurophysiological study. *Experimental brain research, 91*(1), 176–180. https://doi.org/10.1007/BF00230027

Dileo, C., Loewy, J., & Sorrells, M. L. (2012). Use of pacifiers and audio lullaby to improve oral feeding in preterm infants: A pilot study. *American Journal of Maternal/Child Nursing, 37*(4), 256-262.

Dingemanse, M., et al. (2023). Beyond single-mindedness: A figure-ground reversal for the cognitive sciences. *Cognitive Science, 47*(1), e13230.

Dissanayake, E. (1995). *Homo aestheticus: Where Art Comes from and why.* University of Washington Press. Seattle and London.

Dissanayake, E. (2004). Motherese is but one part of a ritualized, multimodal, temporally organized, affiliative interaction. *The Behavioral and Brain Sciences*, *27*(4), 512–513. https://doi.org/10.1017/S0140525X0432011X

Dissanayake, E. (2008). If music is the food of love, what about survival and reproductive success? *Musicae Scientiae, 12*(1), 169-195. https://doi.org/10.1177/1029864908012001081

Dissanayake, E. (2009). Root, leaf, blossom, or bole: Concerning the origin and adaptive function of music. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: Exploring the basis of human companionship* (pp. 17-30). Oxford University Press.

Dissanayake, E. (2011). Prelinguistic and Preliterate Substrates of Poetic Narrative. *Poetics Today*, *32*(1), 55–79. https://doi.org/10.1215/03335372-1188185

Dissanayake, E. (2012). The earliest narratives were musical. *Research Studies in Music Education*, *34*(1), 3–14. https://doi.org/10.1177/1321103X12448148

Dissanayake, E (2015). "Aesthetic Primitives": Fundamental Biological Elements of a Naturalistic Aesthetics. *Aisthesis (Florence, Italy)*, *8*(1).

Dissanayake, E. (2015). *Art and Intimacy: How the Arts Began.* University of Washington Press. Work Originally published in 2000.

Dissanayake, E. (2017). Roots and Route of the Artification Hypothesis. *Avant (Toruń)*, *8*(1), 15–32. https://doi.org/10.26913/80102017.0101.0001

Dissanayake, E. (2021). Ancestral human mother–infant interaction was an adaptation that gave rise to music and dance. *The Behavioral and Brain Sciences, 44*, e68–e68. https://doi.org/10.1017/S0140525X20001144.

Dmitrieva, L. P., & Gottlieb, G. (1994). Influence of auditory experience on the development of brain stem auditory-evoked potentials in mallard duck embryos and hatchlings. *Behavioral and Neural Biology, 61*(1), 19–28. https://doi.org/10.1016/S0163-1047(05)80040-8

Drake, C & Bertrand, D. (2003) The quest for universals in temporal processing in music. In *Peretz, I., & Zatorre, R. J. (Eds.). (2003). The Cognitive Neuroscience of Music.* (pp. 21-31) Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Dunbar, R. I. M. (2004). "Language, music, and laughter in evolutionary perspective," in *Evolution of Communication Systems: A Comparative Approach,* eds D. K. Oller and U. Griebel (Cambridge, MA: MIT Press), 257–274.

Dunbar, R. I. M. (2012b). "On the evolutionary function of song and dance," in *Music, Language and Human Evolution,* eds N. Bannan and S. Mithen (Oxford: Oxford University Press), 201–214.

Durkheim, É. (2008). *The elementary forms of religious life.* Oxford Paperbacks. (Original work published in 1912)

Encyclopedia Britannica. (2021a, April 21). *Melody.* In *Encyclopedia Britannica.* Retrieved from https://www.britannica.com/art/melody

Encyclopedia Britannica. (2021b, July 7). *Pitch.* In *Encyclopedia Britannica.* Retrieved from https://www.britannica.com/art/pitch-music

Enfield, N. J., & Kockelman, P. (Eds.). (2017). *Distributed Agency.* New York: Oxford University Press.

Erikson, E. H. (1950). *Childhood and society.* W W Norton & Co.

Esau, K. (1977). *Anatomy of seed plants.* John Wiley & Sons.

Eurich, A. C. (1977). *The science and art of music therapy: A selective bibliography. American Journal of Music Therapy, 1*(1), 4-44.

Everett, W. A., & Laird, P. R. (2008). *The Cambridge companion to the musical.* Cambridge University Press.

Fahn, A. (1990). *Plant anatomy.* Pergamon Press.

Falk, D. (2004). Prelinguistic evolution in early hominins: Whence motherese? *Behavioral and Brain Sciences, 27(4)*, 491-541.

Falk, S. (2011). Melodic versus intonational coding of communicative functions: A comparison of tonal contours in infant-directed song and speech. *Psychomusicology: Music, Mind and Brain, 21*(1-2), 54–68. https://doi.org/10.1037/h0094004

Falk, S., & Kello, C. T. (2017). Hierarchical organization in the temporal structure of infant-direct speech and song. *Cognition, 163*, 80–86. https://doi.org/10.1016/j.cognition.2017.02.017

Falk, S., & Tsang, C. D. (2020). The role and functions of infant-directed singing in early development. In F. A. Russo, B. Ilari & A. J. Cohen (Eds.), *The Routledge Companion to Interdisciplinary Studies in Singing* (Vol. I: Development, pp. 179-188). London: Routledge.

Fechner, G. Th. (1860). *Elemente der Psychophysik*. Leipzig: Breitkopf und Härtel.

Feld, S. (1982). *Sound and sentiment: Birds, weeping, poetics and song in Kaluli expression*. Philadelphia: Publications of the American Folklore Society. New series; 5. BZVDW.

Feldman, R. (2017). The Neurobiology of Human Attachments. *Trends in Cognitive Sciences,* 21(2), 80-99.

Fischer, K. W., & Hencke, R. W. (1996). Infants' Construction of Actions in Context: Piaget's Contribution to Research on Early Development. *Psychological Science, 7*(4), 204-210. http://www.jstor.org/stable/40062946

Fitch, W.T. (2006). The biology and evolution of music: A comparative perspective. *Cognition, 100*(1), 173-215. https://doi.org/10.1016/j.cognition.2005.11.009

Fitch, W.T. (2013). Rhythmic cognition in humans and animals: Distinguishing meter and pulse perception. *Frontiers in Systems Neuroscience, 7*, 68. doi:10.3389/fnsys.2013.00068

Fitch, W.T. (2018). Four Principles of Biomusicology. In H. Honing (Ed.), *The Origins of Musicality* (pp. 23-48). The MIT Press.

Fraisse, P. (1984). Perception and estimation of time. *Annual Review of Psychology*, 36, 1-36.

Frankland, P. W., Köhler, S., & Josselyn, S. A. (2013). Hippocampal neurogenesis and forgetting. *Trends in neurosciences, 36*(9), 497–503. https://doi.org/10.1016/j.tins.2013.05.002

Freud, A. (1936). *The Ego and the Mechanisms of Defense.* In *The Writings of Anna Freud (Vol. 2, pp. 3-191).* New York, NY: International Universities Press.

Freud, S. (1900). *The Interpretation of Dreams.* Strachey, J., Freud, A., Strachey, A. & Tyson, A. (1953) *The Standard Edition of the Complete Psychological Works of Sigmund Freud, Volume IV (1900): The Interpretation of Dreams (First Part). The Standard Edition of the Complete Psychological Works of Sigmund Freud 4:i-xiii*

Freud, S. (1905). *Three Essays on the Theory of Sexuality (1905). The Standard Edition of the Complete Psychological Works of Sigmund Freud 7:123-246*

Freud, S. (1911). *Formulations on the Two Principles of Mental Functioning. The Standard Edition of the Complete Psychological Works of Sigmund Freud 12:213-226*

Freud, S. (1914). *On Narcissism: An Introduction. The Standard Edition of the Complete Psychological Works of Sigmund Freud 14:67-102*

Freud, S. (1915). *The Unconscious. The Standard Edition of the Complete Psychological Works of Sigmund Freud 14:159-215*

Freud, S. (1914-1916). *On the history of the psycho-analytic movement; Papers on metapsychology.* The Hogarth Press.

Freud, S. (1919). *The 'Uncanny'. The Standard Edition of the Complete Psychological Works of Sigmund Freud 17:217-256*

Freud, S. (1920). *Beyond the Pleasure Principle. The Standard Edition of the Complete Psychological Works of Sigmund Freud 18:1-64*

Freud, S. (1923). *The Ego and the Id. The Standard Edition of the Complete Psychological Works of Sigmund Freud 19:1-66*

Galilei, G. (1914). *Dialogues Concerning Two New Sciences* (H. Crew, Trans.). The Macmillan Company. (Original work published 1638).

García-Lorca, F. (2017). *Donde no se hiela el tiempo: Escritos sobre música.* (Original work published 1933).

Garnica, O.K. (1977). Some prosodic and paralinguistic features of speech to young children. In C. E. Snow & C. A. Ferguson (Eds.), *Talking to Children* (pp. 63—88). Cambridge University Press.

Gaston, E. T. (1968). Music in therapy. *The Journal of Music Therapy, 5*(4), 126-137.

Gibson, E.J. (1969). *Principles of perceptual learning and development.* New York: Appleton-Century-Crofts.

Gibson, E.J. (1991). *An odyssey in learning and perception.* Cambridge, MA: MIT Press.

Gibson, E.J. (2002). *Perceiving the affordances: A portrait of two psychologists.* Mahwah, NJ: Erlbaum.

Gibson, E. J., & Pick, A. D. (2000). *An ecological approach to perceptual learning and development.* Oxford University Press.

Gibson, J.J. (1966). *The senses considered as perceptual systems.* Houghton Mifflin.

Gibson, J.J. (2015). *The ecological approach to visual perception.* Psychology Press. (Original work published in 1979).

Godt, I. (2005). Music: A practical definition. *The Musical Times, 146*(1890), 83-88. https://doi.org/10.2307/30044071

Goehr, L. (1989). Being True to the Work. *The Journal of Aesthetics and Art Criticism, 47*(1), 55-67. https://doi.org/10.2307/431993

Gordon, T. (1978). Parent Effectiveness Training.

Goudsblom, J. (1995). *Fire and civilization.* London: Penguin Books.

Gracyk, T., & Kania, A. (Eds.). (2011). *R.* Routledge.

Gratier, M., & Apter-Danon, G. (2009). Musical intermodal patterns involving movement and dance. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: Exploring the basis of human companionship* (pp. 259-282). Oxford University Press.

Graziano, A. B., & Johnson, J. K. (2015). *Music, neurology, and psychology in the nineteenth century.*

Green, A. (1972). The Dead Mother. In *On Private Madness* (1st ed., pp. 142–173). Routledge. https://doi.org/10.4324/9780429478024-8

Gurney, E. (1880). *The Power of Sound.* Smith, Elder & Co.

Gussenhoven, C. (2016). Commentary: Tonal complexity in non-tonal languages. *Journal of Language Evolution, 1*(1), 62–64. https://doi.org/10.1093/jole/lzv016

Hagen, E. H., & Bryant, G. A. (2003). Music and dance as a coalition signaling system. *Human Nature, 14*(1), 21–51. https://doi.org/10.1007/s12110-003-1015-z

Hallam, S., Cross, I., & Thaut, M. (Eds.). (2016). *The Oxford Handbook of Music Psychology.* Oxford University Press.

Hamilton, A. (2007). *Aesthetics and Music.* Continuum.

Hamilton, A., & Scruton, R. (1999). The Aesthetics of Western Art Music. *Philosophical Books, 40*(3), 145-159. https://doi.org/10.1111/1468-0149.00149

Hansen, N. C. (2021). The legacy of Lerdahl and Jackendoff's *A generative theory of tonal music*: Bridging a significant event in the history of music theory and recent developments in cognitive music research. *Music Theory Online, 26*(1). Retrieved from https://mtosmt.org/issues/mto.20.26.1/mto.20.26.1.tymoczko.html.

Harding, S. G. (1986). *The science question in feminism.* Cornell University Press.

Hartmann, H. (1958). *Ego psychology and the problem of adaptation.* (D. Rapaport, Trans.). International Universities Press, Inc. https://doi.org/10.1037/13180-000

Hauptmann, M. (1888). *Die Natur der Harmonik und der Metrik* (Eng. trans.). (Original work published 1853, 2nd ed. 1873).

Heidegger, M. (1962). *Being and time* (J. Macquarrie & E. Robinson, Trans.). Harper & Row. (Original work published 1927)

Hennessy, S. L., Sachs, M. E., Ilari, B., & Habibi, A. (2019). Effects of Music Training on Inhibitory Control andAssociated Neural Networks in School-Aged Children: A Longitudinal Study. *Frontiers in Neuroscience*, 13.

Henriques, J., Jauniaux, E., Maisières, A. T. d., & Gélat, P. (2022). Sound before birth: Foetal hearing and the auditory environment of the womb. In J. L. Drever & A. Hugill (Eds.), *Aural Diversity* (pp. 27-41). London: Routledge.

Heraclitus, & Kirk, G. S. (Ed.). (1954). *Heraclitus: The Cosmic Fragments.* Cambridge University Press.

Hernandez, D. (2015). *A cup of water under my bed: A Memoir.* Beacon Press.

Hesser, B., & Bartleet, B.-L. (Eds.). (2020). Music as a Global Resource: *Solutions for Cultural, Social, Health, Educational, Environmental, and Economic Issues* (5th ed.). New York. [https://www.musicasaglobalresource.org/]

Heti, S. (2019). *Motherhood.* Thorndike Press Large Print.

Heywood, C. (2014). *A cultural history of childhood and family in the age of Empire.* Bloomsbury Academic.

Heywood, C. (2018). *Childhood in modern Europe / Colin Heywood.* Cambridge University Press.

Himonides, E. (2019). Perceived quality of a singing performance: The importance of context. In G. Welch, D. Howard, & J. Nix (Eds.), *Oxford Handbook of Singing.* Oxford University Press: New York, NY, USA.

Huron D. (2001). Is music an evolutionary adaptation? *Annals of the New York Academy of Sciences, 930*, 43–61. https://doi.org/10.1111/j.1749-6632.2001.tb05724.x

Hodges, D. A. (2016). Bodily responses to music. In S. Hallam, I. Cross, & M. Thaut (Eds.), *The Oxford handbook of music psychology* (pp. 183–196). Oxford University Press.

Hoffmann, C. (2001). Haut und Zirkel. Ein Entstehungsherd: Ernst Heinrich Webers Untersuchungen "Ueber den Tastsinn" [Skin and compass—a focus: Ernst Heinrich Weber's study "On the sense of touch"]. In M. Hagner (Ed.), *Ansichten der Wissenschaftsgeschichte* [Vistas on the history of science] (pp. 191–223). Frankfurt: Fischer. Hoffmann, C. (2006). U

Hoffmann, C. (2006). *Unter Beobachtung. Naturforschung in der Zeit der Sinnesapparat* [On a watch: The study of nature in the times of sensory apparatus]. Göttingen: Wallstein.

Honing, H. (2012). Without it no music: Beat induction as a fundamental musical trait. *Annals of the New York Academy of Sciences, 1252*, 85-91. https://doi.org/10.1111/j.1749-6632.2011.06402.x

Honing, H. (Ed.). (2013). *Musical Cognition: A Science of Listening.* Routledge.

Honing, H. (2018a). Musicality as an Upbeat to Music: Introduction and Research Agenda. In H. Honing (Ed.), *The Origins of Musicality* (pp. 3-20). The MIT Press.

Honing, H. (Ed.). (2018b). *The Origins of Musicality.* The MIT Press.

hooks, b. (1994). *Teaching to Transgress: Education as the Practice of Freedom.* New York, NY: Routledge.

House, J., & Slotnick, J. (2015). Après-Coup in French Psychoanalysis: The Long Afterlife of Nachträglichkeit : The First Hundred Years, 1893 to 1993. *The Psychoanalytic Review, 102*(5), 683–708. https://doi.org/10.1521/prev.2015.102.5.683

Husserl, E. (1913). *Ideas Pertaining to a Pure Phenomenology and to a Phenomenological Philosophy—First Book: General Introduction to a Pure Phenomenology*, trans. F. Kersten. The Hague: Nijhoff 1982 (= Ideas).

Husserl, E. (1991). *On the phenomenology of the consciousness of internal time (1893-1917)* (J. Brough, Trans.). Kluwer Academic Publishers.

Hustvedt, S. (2016). *A woman looking at men looking at women: Essays on Art, Sex, and the Mind.* Simon and Schuster.

Hyde, K. L., Zatorre, R. J., Griffiths, T. D., Lerch, J. P., & Peretz, I. (2006). Morphometry of the amusic brain: a two-site study. *Brain. A Journal of Neurology, 129*(10), 2562-2570. https://doi.org/10.1093/brain/awl204

Ingold, T. (2010). *Bringing Things Back to Life: Creative Entanglements in a World of Materials - Realities / Morgan Centre, University of Manchester.* NCRM EPrints Repository. https://eprints.ncrm.ac.uk/id/eprint/1306

IPA off the Couch. (2020, November 22). *Episode 72: The Musicality of Psychoanalysis and the Psychoanalysis of Music with Roger Kennedy, MD.* https://ipaoffthecouch.org/2020/11/22/episode-72-the-musicality-of-psychoanalysis-and-the-psychoanalysis-of-music-with-roger-kennedy-md/

Jackendoff, R. (2009). Parallels and Nonparallels between Language and Music. *Music Perception: An Interdisciplinary Journal, 26*(3), 195-204. https://doi.org/10.1525/mp.2009.26.3.195

Jacobson, E. (1964). *The self and the object world.* International Universities Press.

Jaffe, J., Beebe, B., Feldstein, S., Crown, C. L., & Jasnow, M. D. (2001). Rhythms of dialogue in infancy: coordinated timing in development. *Monographs of the Society for Research in Child Development, 66*(2), i–132.

James, W. (1904). Does consciousness exist? *Journal of Philosophy, Psychology and Scientific Methods, 1*(18), 477-491.

Jenkins, R. (2008). *Social identity* (3rd ed.). Routledge/Taylor & Francis Group.

Jay Gould, S. (1991). Exaptation: A Crucial Tool for Evolutionary Psychology. *Journal Of Social Issues, 47*, 43-65.

Jay Gould, S. (1997a). Evolution: The Pleasures of Pluralism. *New York Review of Books, 44*(11), 47-52.

Jay Gould, S. & Lewontin, R. (1979). The Spandrels of San Marco and the Panglosian Paradigm: A Critique of The Adaptationist Programme. *Proceedings of the Royal Society of London, Series B: Biological Sciences, 205*(1161), 581-598.

Jay Gould, S. & Vrba, E. (1982) Exaptation – A Missing Term in the Science of Form. *Paleobiology, 8*, 4-15.

Jeannerod, M., & Frak, V. (1999). Mental imaging of motor activity in humans. *Current opinion in neurobiology, 9*(6), 735–739. https://doi.org/10.1016/s0959-4388(99)00038-0

Johnson, M. P. (2011). Gender and types of intimate partner violence: A response to an anti-feminist literature review. *Aggression and Violent Behavior, 16*(4), 289–296. https://doi.org/10.1016/j.avb.2011.04.006

Jung, C. G. (Carl G., & Shamdasani, S. (2009). *The red book = Liber novus / C.G. Jung ; edited by Sonu Shamdasani ; preface by Ulrich Hoerni ; translated by Mark Kyburz, John Peck, and Sonu Shamdasani.* W. W. Norton.

Juslin, P. N., & Laukka, P. (2003). Communication of emotions in vocal expression and music performance: Different channels, same code? *Psychological Bulletin, 129*(5), 770-814. https://doi.org/10.1037/0033-2909.129.5.770

Juslin, P. N., & Västfjäll, D. (2008). Emotional responses to music: The need to consider underlying mechanisms. *Behavioral and Brain Sciences, 31*(6), 575-621. https://doi.org/10.1017/s0140525x08006079

Justus, T. & Hustler, J.J. (2005). Fundamental issues in the evolutionary psychology of music: Assessing innateness and domain specificity. *Music Perception, 23*(1), 1-27. doi:10.1121/1.2973189

Kania, A. (2011). Definition. In T. Gracyk & A. Kania (Eds.), *The Routledge Companion to Philosophy and Music* (pp. 3-13). Routledge.

Kania, A. (2017, July 11). The Philosophy of Music. *The Stanford Encyclopedia of Philosophy*. https://plato.stanford.edu/archives/fall2017/entries/music/

Kardas, G. (2015). From Etymology to Ontology: Vasubandhu and Candrakīrti on Various Interpretations of Pratītyasamutpāda. *Asian Philosophy*, *25*(3), 293–317. https://doi.org/10.1080/09552367.2015.1082685

Kennedy, R. (2020). *The Power of Music: Psychoanalytic Explorations*. Phoenix Publishing House, Bicester, 2020.

Kern, P. (2010). *Early childhood music therapy and autism spectrum disorders: Developing potential in young children and their families*. Jessica Kingsley Publishers.

Kernberg, O. (1975). *Borderline Conditions and Pathological Narcissism*. New York: Jason Aronson.

Kew. (n.d.). *Mycelium: Exploring the hidden dimension of fungi*. Retrieved from https://www.kew.org/read-and-watch/fungi-hidden-dimension

Killin, A. (2018). The origins of music: Evidence, theory, and prospects. *Music & Science, 1*. https://doi.org/10.1177/2059204317751971.

King, A., & Himonides, E. (Eds.). (2017). *Music, Technology and Education: Critical Perspectives*. Routledge.

Klein, E. (Program creator). (2018, September 2019). Music (Series 1, Episode 20) [TV series episode]. In C. Gordon (Executive Producer, 31 episodes, 2018-2021), Explained. vox. Netflix.

Klein, M. (1930). The Importance of Symbol-Formation in the Development of the Ego. *International Journal of Psychoanalysis, 11*, 24–39.

Klein, M. (1932). *The Psycho-Analysis of Children*. Delacorte Press.

Klein, M. (1955). *Play in Early Childhood: Its Role in Development*. Routledge.

Koelsch, S. (2014). Brain correlates of music-evoked emotions. *Nature Reviews Neuroscience, 15*, 170-180. https://doi.org/10.1038/nrn3666

Koelsch, S. (2014). Brain correlates of music-evoked emotions. *Nature Reviews Neuroscience, 15*(3), 170-180.

Koelsch, S., Vuust, P., & Friston, K. (2019). Predictive processes and the peculiar case of music. *Trends in Cognitive Sciences*, 23(1), 63-77.

Koffka, K. (1924). *The growth of the mind; an introduction to child psychology*. (R.M. Ogden, Trans.). Harcourt, Brace.

Kogan N (1997). Reflections on aesthetics and evolution. *Critical Review, 11*(2), 193–210.

Kohon, G. (2016). "The Aesthetic Value of the Uncanny." *International Journal of Psychoanalysis, 97*(3), 631-647.

Kohut, H. (1971). *The analysis of the self: A systematic approach to the psychoanalytic treatment of narcissistic personality disorders*. University of Chicago Press.

Kontos, P., & Grigorovich, A. (2018). Rethinking musicality in dementia as embodied and relational. *Journal of aging studies, 45*, 39–48. https://doi.org/10.1016/j.jaging.2018.01.006

Kris, E. (1952). *Psychoanalytic explorations in art*. International Universities Press.

Kristeva, J. (1982). *Powers of Horror: An Essay on Abjection*. Columbia University Press.

Krumhansl, C. & Toivianen, P. (2003). Tonal Cognition. In Peretz, I., & Zatorre, R. J. (Eds.). (2003). *The Cognitive Neuroscience of Music* (pp. 95-108). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Krumhansl, C., L. (1990). *Cognitive foundations of musical pitch*. New York ; Oxford: Oxford University Press.

Krumhansl, C. L., & Tobias, J. V. (1992). Cognitive Foundations of Musical Pitch. *The Journal of the Acoustical Society of America,* 92(2), 1193–1193. https://doi.org/10.1121/1.404005

Kurkela, V., & Mantere, M. (Eds.). (2015). *Critical Music Historiography: Probing Canons, Ideologies and Institutions*. Routledge.

Kursell, J. (2018). Karl Stumpf and the Beginnings of Research in Musicality. In H. Honing (Ed.), *The Origins of Musicality* (pp. 323-346). The MIT Press.

Kurth, E. (1913). *Die Voraussetzungen der theoretischen Harmonik und der tonalen Darstellungssysteme*. Berne.

Lacan, J. (2004). *Anxiety: The Seminar of Jacques Lacan, Book X* (A. R. Price, Trans.). Polity Press. (Original work published in 1962-1963)

Lacan, J. (2006). *The Mirror Stage as Formative of the Fonction of the I as Revealed at Psychoanalytic Experience (1949)*. In B. Fink (Trans.), *écrits: The First Complete Edition in English*. New York/London: W.W. Norton and Company.

Lacan, J. (2006). *Écrits: Response au commentaire de Jean Hyppolite sur la 'Verneinung' de Freud*. (Original work published in 1954). The First Complete Edition in English. New York/London: W.W. Norton and Company.

Lakoff, G. (1987). *Women, fire and dangerous things: what categories reveal about the mind*. Chicago: University of Chicago Press.

Lamont, A., & Greasley, A. E. (2009). Musical preferences. In S. Hallam, I. Cross, & M. Thaut (Eds.), *Oxford Handbook of Music Psychology* (pp. 160–168). Oxford University Press. ISBN 9780199298457

Laplanche, J., & Pontalis, J. B. (1974). *The Language of Psycho-Analysis* (D. Nicholson-Smith, Trans.). W. W. Norton Company. (Original work published 1967).

Lawly, J., & Tompkins, G. (2000). Metaphors in Mind: Transformation through Symbolic Modelling.

Le Guess Who? (2021, March 3). *Afro-Colombian Culture & Community in Buenaventura, by Marimbea - Reports from Other Continents* [Video]. YouTube. https://www.youtube.com/watch?v=Lhi2NRYJyP4&ab_channel=LeGuessWho%3F

Lebedeva, G. C., & Kuhl, P. K. (2010). Sing that tune: Infants' perception of melody and lyrics and the facilitation of phonetic recognition in songs. *Infant Behavior & Development, 33*(4), 419–430. https://doi.org/10.1016/j.infbeh.2010.04.006

Lecanuet, J.-P., & Schaal, B. (1996). Fetal sensory competencies. *European Journal of Obstetrics & Gynecology and Reproductive Biology, 68*(1–2), 1–23. https://doi.org/10.1016/0301-2115(96)02509-2

Lederach, J. P., & Lederach, A. J. (2011). *When Blood and Bones Cry Out: Journeys through the Soundscape of Healing and Reconciliation*. Oxford University Press.

Lerdahl, F., & Jackendoff, R. (1983). *A generative theory of tonal music*. Cambridge, MA: MIT Press.

Lester, J. (1986). *The Rhythyms of Tonal Music*. Southern Illinois University Press.

Levine, M. (1995). *The Jazz Theory Book*. Sher Music Company.

Levinson, J. (1990). *Music, Art, and Metaphysics: Essays in Philosophical Aesthetics*. Cornell University Press.

Lewis, R. (2009). What's Queer about Musicology Now? *Women & Music: A Journal of Gender and Culture, 13*, 43–53. https://doi.org/10.1353/wam.0.0019

Lippman, E. A. (1963). Hellenic Conceptions of Harmony. *Journal of the American Musicological Society, 16*(1), 3–35. https://doi.org/10.2307/829917

Lipps, T. (1926). *Psychological Studies* (H. C. Sanborn, Trans.; 2nd rev. and enl. ed. / translated by Herbert C. Sanborn.). Williams & Wilkins.

Lobo L, Heras-Escribano M, and Travieso D (2018). The History and Philosophy of Ecological Psychology. *Front. Psychol., 9*:2228. doi: 10.3389/fpsyg.2018.02228

Locke, J. (1794). *The Works of John Locke, in Nine Volumes*. (The ninth edition...). Printed for T. Longman, B. Law and Son, J. Johnson, C. Dilly, G. G. and J. Robinson, [and 14 others in London].

Loewy, J., Stewart, K., Dassler, A. M., Telsey, A., & Homel, P. (2013). The effects of music therapy on vital signs, feeding, and sleep in premature infants. *Pediatrics, 131*(5), 902-918.

Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin, 116*(1), 75–98. https://doi.org/10.1037/0033-2909.116.1.75

Lomax, A., & Berkowitz, N. (1972). The Evolutionary Taxonomy of Culture. *Science, 177*(4045), 228-239. https://doi.org/10.1126/science.177.4045.228

London, J. (2001). Rhythm. *Grove Music Online*. Retrieved 16 Dec. 2024, from https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000045963.

London, J. (2012). *Hearing in time: Psychological aspects of musical metre* (2nd ed.). Oxford: Oxford University Press.

London, J. (2024). Rhythm. In *Grove Music Online*. Retrieved from Oxford Music Online.

Magee, W. L. (2019). Music therapy with people who have dementia: A systematic review of the literature. *Journal of Music Therapy, 56*(2), 192-227.

Marett, A. (2005). *Songs, dreamings, and ghosts: The Wangga of North Australia*. Hanover, CT: Wesleyan University Press

Martin, H. (1977). Beyond Schenkerism by Eugene Narmour. *The University of Chicago Press*.

Maynard, D. W., & Clayman, S. E. (1991). The diversity of ethnomethodology. *Annual Review of Sociology, 17*, 385-418.

McClary, S. (2002). *Feminine Endings: Music, Gender, and Sexuality*. U of Minnesota Press. (original work published in 1991)

Mahler, M. (1975). *The Psychological Birth of the Human Infant: Symbiosis and Individuation*. New York: Basic Books.

Maiello, S. (1995). *The Sound-Object: A Hypothesis about Prenatal Auditory Experience and Memory*. *J. Child Psychother., 21*, 23-41.

Malloch, S. N. (1999). Mothers and infants and communicative musicality. *Musicae Scientiae, 3*(1), 29-57. https://doi.org/10.1177/10298649000030S104

Malloch, S., & Trevarthen, C. (Eds.). (2009). *Communicative Musicality: Exploring the Basis of Human Companionship*. Oxford University Press.

Malloch, S., & Trevarthen, C. (2018). The human nature of music. *Frontiers in psychology, 9*, 1680.

Mancia, M. (1981). On the Beginning of Mental Life in the Foetus. *International Journal of Psychoanalysis, 62*(3), 351–357.

Manuel Torres - Topic. (2014, September 20). *Tarantas: Que Me Den las Espuelas* [Video]. YouTube. https://www.youtube.com/watch?v=NV6qq4Eb7cE

Margulis, E. H. (2014). *On Repeat: How Music Plays the Mind*. Oxford University Press.

Martens, W. (1983). *American Minimal Music*. Kahn and Averill, London.

Martineau, J. (2008). *The Elements of Music: Melody, Rhythm & Harmony*. Wooden Books.

MasterClass. (2021, August 10). *Music 101: What Is Harmony and How is it used in Music?* [Video]. https://www.masterclass.com/articles/music-101-what-is-harmony-and-how-is-it-used-in-music#what-is-harmony

Maturana, & Varela, F. J. (1980). *Autopoiesis and Cognition: The Realization of the Living*. Humberto R. Maturana and Francisco J. Varela / with a preface to "Autopoiesis" by Sir Stafford Beer. Reidel.

Maus, F. E., & Whiteley, S. (Ed.). (2018). *The Oxford Handbook of Music and Queerness*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199793525.001.0001

Maynard, T., & Thomas, N. (2004). *An Introduction to Early Childhood Studies*. SAGE.

McClary, S. (1991). *Feminine Endings: Music, Gender, and Sexuality*. University of Minnesota Press. http://www.jstor.org/stable/10.5749/j.ctttt886

Merchant H, Honing H. (2014). Are non-human primates capable of rhythmic entrainment? Evidence for the gradual audiomotor evolution hypothesis. *Frontiers in Neuroscience, 7*, 274. doi:10.3389/fnins.2013.00274.

Merchant, H., Grahn, J., Trainor, L., Rohrmeier, M., & Fitch, W. T. (2015). Finding the beat: A neural perspective across humans and non-human primates. *Philosophical Transactions of the Royal Society B: Biological Sciences, 370*(1664), 20140093. https://doi.org/10.1098/rstb.2014.0093.

Merleau-Ponty, M., & Landes, D. A. (2013). *Phenomenology of Perception* (1st ed.). Taylor and Francis. https://doi.org/10.4324/9780203720714 (original work published in 1945)

Merriam, A. P. (1964). *The Anthropology of Music*. Northwestern University Press.

Merriam-Webster. (n.d.). *Musicality*. In Merriam-Webster dictionary. Retrieved September 20, 2021, from https://www.merriam-webster.com/dictionary/musicality

Merker, P. (2001). Origins of Music and Speech: Insights from Animals. In Wallin, N. L., Merker, B., Brown, S. (Eds.). *The Origins of Music* (pp. 31-48). Amsterdam University Press.

Merker, B., Morley, I., & Zuidema, W. (2018). Five fundamental constraints on theories of the origins of music. *The Origins of Music* (pp. 49-81). Amsterdam University Press.

Meyer, L. B. (1956). *Emotion and meaning in music*. London: University of Chicago Press.

Miall, D. S., & Dissanayake, E. (2003). The poetics of babytalk. *Human Nature (Hawthorne, N.Y.)*, *14*(4), 337–364. https://doi.org/10.1007/s12110-003-1010-4

Michaelis, C. F. (1805). Über die Prüfung musikalischer Fähigkeiten. In. J. F. Reichhard (Ed.), *Berlinische Musikalische Zeitung* (pp. 55-58). Frölich.

Milner, M. (1952). Aspects of symbolism and comprehension of the not-self. *International Journal of Psychoanalysis, 33*(2), 181-195.

Milner, M. (2010). *On Not Being Able to Paint*. (Original work published in 1957)

Milner, M. (2010b). *The Hands of the Living God: An Account of a Psycho-analytic Treatment*. (Original work published in 1969)

Mion, M., & Martini, A. (2021). Hermann von Helmholtz and the Aesthetics of the Acoustics. *Hearing, Balance and Communication, 19*, 65-69. https://doi.org/10.1080/21695717.2021.1876495

Mitchell, J. (2000). *Psychoanalysis and Feminism: A Radical Reassessment Of Freudian Psychoanalysis.*

Mitchell, W. (1965). *Elementary Harmony (3rd ed.). New York. (Original work published 1939).*

Mitchell, W. A. (2018). The effects of group music therapy on quality of life for palliative care patients. *Journal of Music Therapy, 55*(3), 237-261.

Mithen, S. (2005). *The Singing Neanderthals: The Origins of Music, Language, Mind and Body*. Weidenfeld and Nicholson, London.

Monk, G., Winslade, J., & Monk, B. (1997). Narrative Mediation: A New Approach to Conflict Resolution.

Morley, I. (2013). *The Prehistory of Music: Human Evolution, Archaeology, and the Origins of Musicality*. Oxford University Press.

Morse P. A. (1972). The discrimination of speech and nonspeech stimuli in early infancy. *Journal of Experimental Child Psychology, 14*(3), 477–492. https://doi.org/10.1016/0022-0965(72)90066-5

Muñoz, J. E. (1996). Ephemera as Evidence: Introductory Notes to Queer Acts. *Women & Performance, 8*(2), 5–16. https://doi.org/10.1080/07407709608571228

Mulholland, J., & Hojnacki, T. (2013). *The Berklee Book of Jazz Harmony*. Berklee Press.

Music and the Brain. (2015). *Culture, Biology, or Both?* [Video]. The Great Courses. https://www.kanopy.com/en/product/168177?vp=burlington

Münnich, R. (1909). Von der Entwicklung der Riemannschen Harmonielehre und ihren Verhältnis zu Oettingen und Stumpf. In *Riemann-Festschrift* (pp. 60–76). Leipzig.

Narmour, E. (1989). *The analysis and cognition of basic melodic structures*. London: University of Chicago Press.

Narmour, E. (1992). *The analysis and cognition of melodic complexity*. London: University of Chicago Press.

Nettl, B. (1983). *The Study of Ethnomusicology: Twenty-nine Issues and Concepts*. University of Illinois Press.

Nettl, B. (2001). An Ethnomusicologist Contemplates Universals in Musical Sound and Musical Culture. In N. L. Wallin, B. Merker & S. Brown (Eds.), *The Origins of Music* (pp. 463-472). Amsterdam University Press.

Nettl, B. (2001). Music. *Grove Music Online*. Retrieved 12 Nov. 2024, from https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000040476.

Nettl, B. (2005). *The Study of Ethnomusicology: Thirty-one Issues and Concepts*. University of Illinois Press.

Nettl, B. (2010). *Nettl's Elephant: On the History of Ethnomusicology*. University of Illinois Press. http://www.jstor.org/stable/10.5406/j.ctt1xcm42

Nooshin, L. (2016). *Music and the Play of Power in the Middle East, North Africa and Central Asia*. https://doi.org/10.4324/9781315596686

O'Rahilly, R., & Müller, F. (1994). Neurulation in the normal human embryo. *Ciba Foundation Symposium, 181*, 70–89. https://doi.org/10.1002/9780470514559.ch5

Osborne, N. (2009). Music for children in zones of conflict: A psychological approach. In S. Malloch & C. Trevarthen (Eds.), *Communicative Musicality: Exploring the Basis of Human Companionship* (pp. 331-356). Oxford University Press.

Osborne, N. (2020). Imagination, Intersubjectivity, and a Musical Therapeutic Process:A Personal Narrative. InA. Abraham (Ed.), *The Cambridge Handbook of the Imagination* (pp. 635-656). Cambridge: Cambridge University Press.

Oxford English Dictionary. (n.d.). Mnemic. In Oxford English Dictionary. Retrieved December 11, 2024, from https://www.oed.com/definition/mnemic

Paci Dalò, R., & Quinz, E. (2022). *Mil sonidos*. Tercero Incluido.

Panksepp, J. (1998). *Affective neuroscience: The foundations of human and animal emotions*. Oxford University Press.

Panksepp, J., & Bernatzky, G. (2002). Emotional sounds and the brain: The neuro-affective foundations of musical appreciation. *Behavioural Processes, 60*(2), 133–155. https://doi.org/10.1016/s0376-6357(02)00080-3

Panksepp, J., & Trevarthen, C. (2009). The Neuroscience of emotion in music. In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: Exploring the basis of human companionship* (pp. 105-146). Oxford University Press.

Papoušek, H. (1967). Experimental studies of appetitional behavior in human newborns and infants. In H. W. Stevenson, E. H. Hess & H. L. Rheingold (Eds.), *Early behavior: Comparative and developmental approaches* (pp. 249- 277). New York: Wiley.

Papoušek, H. (1977). *Entwicklung der Lernfähigkeit im Säuglings alter* /Development of learning ability during infancy/. In G. Nissen (Ed.), *Intelligenz, Lernen und Lernstörungen* /Intelligence, learning, and learning disorders/, (pp. 89-107). Berlin/Heidelberg/New York: Springer-Verlag.

Papoušek, H. (1993). Transmission of the communicative competence: Genetic, cultural, when, and how? *International Journal of Psychology, 28*(5), 709–717. https://doi.org/10.1080/00207599308246955

Papousek, M. (1996). Intuitive Parenting: A Hidden Source of Musical Stimulation in Infancy. In I. Deliage, & J. Sloboda (Eds.), *Musical Beginnings: Origins and Development of Musical Competence* (pp. 88-112). New York: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780198523321.003.0004

Papoušek, H., & Papoušek, M. (1987). Intuitive parenting: A dialectic counterpart to the infant's integrative competence. In J. Osofsky (Ed.), *Handbook of infant development* (2nd edit., pp. 669-720). New York: Wiley.

Papoušek, H., & Papoušek, M. (1989). Intuitive Parenting: Aspects Related to Educational Psychology. *European Journal of Psychology of Education, 4*(2), 201–210. http://www.jstor.org/stable/23422072

Papoušek, M., Papoušek, H., & Haekel, M. (1987). Didactic adjustments in fathers' and mothers' speech to their 3-month-old infants. *Journal of Psycholinguistic Research, 16*(5), 491–516. https://doi.org/10.1007/BF01073274

Papoušek, H., Jürgens, U., & Papoušek, M. (1992). *Nonverbal vocal communication: Comparative and Developmental Approaches*. Cambridge University Press.

Paus, M. (2017, November 6). Why Melody Matters. *The Gramophone Newsletter*. https://www.gramophone.co.uk/blogs/article/why-melody-matters

Patel, A. D. (2005). A new approach to the cognitive neuroscience of melody. In Peretz, I., & Zatorre, R. J. (Eds.), *The Cognitive Neuroscience of Music* (pp. 325-345). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Patel, A. D. (2008). Music, language, and the brain. Oxford University Press.

Patel, A. D. (2010). Music, biological evolution, and the brain. Art, Psychology, Biology. In M. Bailar (Ed.), *Emerging Disciplines: Shaping New Fields of Scholarly Inquiry in and beyond the Humanities* (pp. 41-64). Rice University.

Patel, A. D. (2012). The OPERA hypothesis: Assumptions and clarifications. *Annals of the New York Academy of Sciences, 1252*, 124-128. https://doi.org/10.1111/j.1749-6632.2011.06426.x

Peretz, I. (2001). Listen to the brain: A biological perspective on musical emotions. In P. N. Juslin & J. A. Sloboda (Eds.), *Music and emotion: Theory and research* (pp. 105–134). Oxford University Press.

Peretz, I. (2006). The nature of music from a biological perspective. *Cognition, 100*(1), 1-32. https://doi.org/10.1016/j.cognition.2005.11.004

Peretz, I., Champod, S., & Hyde, K. (2003). Varieties of Musical Disorders: The Montreal Battery of Evaluation of Amusia. *Annals of the New York Academy of Sciences, 999*, 58-75. https://doi.org/10.1196/annals.1284.006

Peretz, I., & Coltheart, M. (2003). Modularity of music processing. *Nature Neuroscience, 6*(7), 688-691. https://doi.org/10.1038/nn1083

Peretz, I., & Zatorre, R. J. (Eds.). (2003). *The Cognitive Neuroscience of Music*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Peretz, I., & Zatorre, R. J. (2005). Brain Organization for Music Processing. *Annual Review of Psychology, 56*(1), 89-114. https://doi.org/10.1146/annurev.psych.56.091103.070225

Peretz, I., Vuvan, D.T., Lagrois, M-É., & Armony, J.L. (2018). Neural Overlap in Processing Music and Speech. In H. Honing (Ed.), *The Origins of Musicality* (pp. 205-220). The MIT Press.

Perret, D. (2005). *Roots of Musicality: Music Therapy and Personal Development*. Jessica Kingsley Publishers.

Phillips-Silver, J., & Trainor, L. J. (2005). Feeling the beat: Movement influences infant rhythm perception. *Science (American Association for the Advancement of Science), 308*(5727), 1430. https://www.science.org/doi/10.1126/science.1110922

Phillips-Silver, J., & Trainor, L. J. (2007). Hearing what the body feels: Auditory encoding of rhythmic movement. *Cognition, 105*(3), 533-546. https://doi.org/10.1016/j.cognition.2006.11.006

Piaget, J. (1950). *The psychology of intelligence* (M. Piercy & D.E. Berlyne, Trans.). London: Routledge & Kegan Paul. (Original work published 1947)

Piaget, J. (1951). *Play, dreams, and imitation in childhood* (C. Gattegno & F.M. Hodgson, Trans.). New York: Norton. (Original work published 1945)

Piaget, J. (1952). *The origins of intelligence in children* (M. Cook, Trans.). New York: International Universities Press. (Original work published 1936)

Piaget, J. (1954). *The construction of reality in the child* (M. Cook, Trans.). New York: Basic Books. (Original work published 1937)

Piaget, J. (1977). The first year of life of the child. In H.E. Gruber & J.J. Vonèche (Eds. and Trans.), *The essential Piaget: An interpretative reference and guide* (pp. 198-214). New York: Basic Books. (Original work published 1927)

Pinker, S. (1997). *How the mind works*. W. W. Norton & Company.

Piston, W. (1933). Principles of Harmonic Analysis. Boston.

Piston, W. (1987). Harmony (5th ed., M. DeVoto, Rev.). New York. (Original work published 1941, 2nd ed. 1948).

Plantinga, J., & Trainor, L. (2005). Memory for melody: Infants use a relative pitch code. *Cognition, 98*, 1-11. https://doi.org/10.1016/j.cognition.2004.09.008

Polchinski, J. (1998). *String Theory. Vol. 1, An Introduction to the Bosonic String; Vol. 2, Superstring Theory and Beyond*. Cambridge University Press, Cambridge.

Powers & Trevarthen (2009). Voices of shared emotion and meaning: Young infants and their mother in Scotland and Japan In S. Malloch & C. Trevarthen (Eds.), *Communicative musicality: Exploring the basis of human companionship* (pp. 209-240). Oxford University Press.

Racy, A. J. (2003). *Making music in the Arab world: The culture and artistry of Tarab*. Cambridge University Press, Cambridge.

Rameau, J.-P. (1722). Traité de l'harmonie réduite à ses principes naturels. Paris. (Eng. trans., 1971).

Rameau, J.-P. (1726). Nouveau système de musique théorique. Paris. (Reprint).

Rameau, J.-P. (1737). Génération harmonique, ou Traité de musique théorique et pratique. Paris. (Reprint).

Raven, P. H., Evert, R. F., & Eichhorn, S. E. (2005). *Biology of plants* (7th ed.). W. H. Freeman and Company.

Rapaport, D. (1951). *Organization and pathology of thought: Selected sources*. Columbia University Press. https://doi.org/10.1037/10584-000

Ravignani, A., Honing, H., & Kotz, S. A. (2017). Editorial: The Evolution of Rhythm Cognition: Timing in Music and Speech. *Frontiers in Human Neuroscience, 11*, 1-8. https://doi.org/10.3389/fnhum.2017.00303

Rebuschat, P., Rohrmeier, M., Hawkins, J. A., & Cross, I. (Eds.). (2012). *Language and music as cognitive systems.* Oxford: Oxford University Press.

Rehding, A. (2000). The Quest for the Origins of Music in Germany Circa 1900. *Journal of the American Musicological Society, 53*(2), 345-385. https://doi.org/10.2307/832011

Reich, S. (1974). *Music as a Gradual Process*. In *Writings About Music*. New York University Press, New York.

Réti, R. (1951). The thematic process in music. New York: Macmillan.

Reybrouck, M. (2001). Biological roots of musical epistemology: Functional cycles, Umwelt, and enactive listening. *Semiotica, 134*(134), 599–633. https://doi.org/10.1515/semi.2001.045

Repp, B. H. (1991). Some cognitive and perceptual aspects of speech and music. In J. Sundberg, L. Nord, & R. Carlson (Eds.), *Music, Language, Speech and Brain: Proceedings of an International Symposium at the Wenner-Gren Center, Stockholm, 5–8 September 1990* (pp. 257-268). Red Globe Press London. https://doi.org/10.1007/978-1-349-12670-5_24

Repp, B. H., & Su, Y. H. (2013). Sensorimotor synchronization: a review of recent research (2006–2012). *Psychon. Bull. Rev. 20*, 403–452. https://doi.org/10.3758/s13423-012-0371-2

Rheinberger, H.-J. (1997). *Toward a history of epistemic things: Synthesizing proteins in the test tube*. Stanford University Press.

Rich, A. (1986). *Of woman born: Motherhood as Experience and Institution*. New York : Norton.

Ricoeur, P. (1987). Time and Narrative.

Rieber, R. W. (Ed.). (2012). *Encyclopedia of the history of psychological theories*. Springer.

Ringer, A. (2001). Melody. Grove Music Online. Retrieved 16 Dec. 2024, from https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000018357.

Rivera Cusicanqui, S. (2020). *Ch'ixinakax utxiwa: A Reflection on the Practices and Discourses of Decolonization* (M. Geidel, Trans.). Polity Press. (Original work published 2010).

Rizzolatti, G., & Arbib, M. A. (1998). Language within our grasp. *Trends in Neurosciences, 21*(5), 188–194. https://doi.org/10.1016/S0166-2236(98)01260-0

Robledo, J. P., Hawkins, S., Cornejo, C., Cross, I., Party, D., & Hurtado, E. (2021). Musical improvisation enhances interpersonal coordination in subsequent conversation: Motor and speech evidence. *PLOS ONE*, 16(4), e0250166.

Robb, L. (1999). Emotional musicality in mother-infant vocal affect and an acoustic study of postnatal depression. *Musicae Scientiae,* 3(1_suppl), 123-154.

Román-Velázquez, P. (2017). *The making of Latin London*. https://doi.org/10.4324/9781315238487

Rory, W. (2012). *Song of Songs (Hebrew Sephardic or Mizrachi Cantillation manner)* Rory White [Video]. YouTube. https://www.youtube.com/watch?v=TsCkANslvDU&ab_channel=RoryWhite

Roseman, M. (1991). *Healing sounds from the Malaysian rainforest: Temiar music and medicine*. University of California Press, Berkeley and Los Angeles, CA.

Rosenfield, P. L. (1992). The potential of transdisciplinary research for sustaining and extending linkages between the health and social sciences. *Social Science & Medicine, 35*, 1343-1357.

Rouget, G. (1985). *Music and trance: A theory of the relations between music and possession*. University of Chicago Press, Chicago, IL.

Rovner, L. (Director). (2020). *Sisters with Transistors* [Documentary Film]. Anna Lena Films.

Royal, M. S. (1995). Review of The analysis and cognition of basic melodic structures and The analysis and cognition of melodic complexity by Eugene Narmour. Music Theory Online, 1(6).

Russell, G. (2001). *The Lydian chromatic concept of tonal organization: The art and Science of Tonal Gravity* (Vol. 1). Concept Publishing Company.

Ruud, E. (2012). *Music in the community: A social and cultural contribution*. *Nordisk Tidsskrift for Musikkterapi, 21*(1), 38-53.

Sacks, O. (2007). *Musicophilia: Tales of Music and the Brain*. Vintage.

Sadie, S., & Grove, G. (1980). The New Grove dictionary of music and musicians / edited by Stanley Sadie. Macmillan Publishers.

Salimpoor, V. N., van den Bosch, I., Kovacevic, N., McIntosh, A. R., Dagher, A., & Zatorre, R. J. (2013). Interactions Between the Nucleus Accumbens and Auditory Cortices Predict Music Reward Value. *Science, 340*(6129), 216-219. https://doi.org/10.1126/science.1231059

Salley, K. (2015). Review of Joe Mulholland and Tom Hojnacki, *The Berklee Book of Jazz Harmony* (Berklee Press, 2013) and Dariusz Terefenko, *Jazz Theory: From Basic to Advanced Study* (Routledge, 2014). *Music Theory Online, 21*(1), 1-6. https://www.mtosmt.org/issues/mto.15.21.1/mto.15.21.1.salley.html

Samson, S., & Ehrlé, N. (2005). Cerebral substrates for musical temporal processes. In Peretz, I., & Zatorre, R. J. (Eds.), *The Cognitive Neuroscience of Music* (pp. 204-216) Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Sander, L. W., Julia, H. L., Stechler, G., & Burns, P. (1972). Continuous 24-hour interactional monitoring in infants reared in two caretaking environments. *Psychosomatic Medicine, 34*(3), 270–282. https://doi.org/10.1097/00006842-197205000-00009

Sanderson, C. (2008). *Counselling survivors of domestic abuse*. Jessica Kingsley Pub.

Sandler, P. (2018). *The language of Bion: A Dictionary of Concepts*. Karnac.

Sarrazin, N. (2016). *Music and the child: The importance of early musical development*. Open SUNY Textbooks.

Savage, P. D., Brown, S. S., Sakai, E., & Currie, T. E. (2015). Statistical universals reveal the structures and functions of human music. *Proceedings of the National Academy of Sciences of the United States of America, 112*(29), 8987-8992. https://doi.org/10.1073/pnas.1414495112

Schlaug, G., Marchina, S., & Norton, A. (2008). Evidence for plasticity in white-matter tracts of patients with chronic Broca's aphasia undergoing intense intonation-based speech therapy. *Annals of the New York Academy of Sciences, 1169*(1), 385-394.

Schlipphacke, H. (2015). The Place and Time of the Uncanny. *Pacific Coast Philology, 50*(2), 163–172. https://doi.org/10.5325/pacicoasphil.50.2.0163

Schuller, G. (1968). *Early Jazz: Its Roots And Musical Development*. Oxford University Press.

Schuller, B., & Batliner, A. (2013). *Computational paralinguistics: Emotion, affect and personality in speech and language processing*. John Wiley & Sons.

Scott, D. B. (2003). *From the Erotic to the Demonic: On Critical Musicology*. Oxford University Press.

Scott, L. N., Levy, K. N., & Pincus, A. L. (2009). Adult attachment, personality traits, and borderline personality disorder features in young adults. *Journal of Personality Disorders, 23*(3), 258-280. https://doi.org/10.1521/pedi.2009.23.3.258

Scruton, R. (1997). *The Aesthetics of Music*. Clarendon Press.

Scruton, R. (2011). Rhythm, Melody, and Harmony. In T. Gracyk & A. Kania (Eds.), *The Routledge Companion to Philosophy and Music* (pp. 24-37). Routledge.

Seeger, A. (1987). Why Suyá sing: A musical anthropology of an Amazonian people. Cambridge: Cambridge University Press.

Seriès, P., Stocker, A. A., & Simoncelli, E. P. (2009). Is the homunculus "aware" of sensory adaptation?. *Neural Computation, 21*(12), 3271–3304. https://doi.org/10.1162/neco.2009.09-08-869

Sharp, C., & Fonagy, P. (2015). Practitioner Review: Borderline personality disorder in adolescence – recent conceptualization, intervention, and implications for clinical practice. *J Child Psychol Psychiatry, 56*(12), 1266-1288. https://doi.org/10.1111/jcpp.12449

Shelemay KK (1998). *Let jasmine rain down: Song and remembrance among Syrian Jews*. University of Chicago Press, Chicago, IL

Shetler, D. J. (1990). Crossing Disciplinary Lines for Music Learning. *Music Educators Journal, 76*(5), 32–35. https://doi.org/10.2307/3400989

Shonkoff, J. P., Garner, A. S., Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, & Section on Developmental and Behavioral Pediatrics (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics, 129*(1), e232–e246. https://doi.org/10.1542/peds.2011-2663

Slobin M (1993). *Subcultural sounds: Micromusics of the West*. Wesleyan University Press, Hanover, NH.

Slobin M (2003). The destiny of 'diaspora' in ethnomusicology. In M Clayton, T Herbert, R Middleton, eds, *The Cultural Study of Music: A Critical Introduction* (pp. 284–296). Routledge, New York and London.

Small, C. (1998). *Musicking: The Meanings of Performing and Listening.* (UPCC book collections on Project MUSE). Hanover: University Press of New England.

Smith, N. A., & Trainor, L. J. (2008). Infant-Directed Speech Is Modulated by Infant Feedback. *Infancy, 13*(4), 410-420. https://doi.org/10.1080/15250000802188719

Snow, C. E. (1972). Mothers' speech to children learning language. *Child Development, 43*(2), 549–565. https://doi.org/10.2307/1127555

Solms, M., & Leuzinger-Bohleber, M. (Eds.) (2016). *The Unconscious: A Bridge Between Psychoanalysis and Cognitive Neuroscience.* Routledge.

Soskolne, C. (2000). Transdisciplinary approaches for public health. *Epidemiology, 11*(Suppl.), S122.

Spitz, R. (1945). Hospitalism: An Inquiry into the Genesis of Psychiatric Conditions in Early Childhood. *Psychoanalytic Study of the Child, 1*, 53-74. https://doi.org/10.1080/00797308.1945.11823126

Stainsby, T. H., & Cross, I. (2016). The perception of pitch. In S. Hallam, I. Cross & M. Thaut (Eds.), *Oxford Handbook of Music Psychology* (2nd ed., pp. 63-79). Oxford: Oxford University Press.

Stark, E., & Flitcraft, A. (1988). Personal power and institutional victimization: Treating the dual trauma of woman battering. In F. M. Ochberg (Ed.), *Post-traumatic therapy and victims of violence* (pp. 115–151). Brunner/Mazel.

Stern, D. N. (1985). *The Interpersonal World of the Infant: A View from Psychoanalysis and Developmental Psychology.* Basic Books.

Stern, D. N., & Bruschweiler-Stern, N. (1998). *The Birth of a Mother: How The Motherhood Experience Changes You Forever*. Basic Books.

Stern, D. N. (2002). *The First Relationship*. Harvard University Press.

Stern, D. N. (2010). *Forms of Vitality: Exploring Dynamic Experience in Psychology, the Arts, Psychotherapy, and Development*. Oxford University Press. https://doi.org/10.1093/med:psych/9780199586066.001.0001

Stumpf, C. (1885). *Musikpsychologie in England: Betrachtungen über Herleitung der Musik aus der Sprache und aus dem thierischen Entwickelungsprocess, über Emprismus und Nativismus in der Musiktheorie* [Music psychology in England: Reflections on the derivation of music from language and from animal evolution, on empiricism and nativism in music theory]. Breitkopf & Härtel.

Stumpf, C. (1911a). *Die Anfänge der Musik* [The origins of music]. Leipzig: Barth.

Stumpf, C. (1911b). *Konsonanz und Konkordanz. Nebst Bemerkungen über Wohlklang und Wohlgefälligkeit musikalischer Zusammenklänge* [Consonance and concordance. Along with notes on harmony and pleasantness of musical tone combinations]. *Beiträge zur Akustik und Musikwissenschaft, 6*, 116–150.

Stumpf, C. (2013). *Tonpsychologie* (Vol. 1). Cambridge University Press. (Original work published 1883).

Sundberg, J., Nord, L., & Carlson, R. (1991). *Music, Language, Speech and Brain: Proceedings of an International Symposium at the Wenner-Gren Center, Stockholm, 5–8 September 1990*. Red Globe Press London. https://doi.org/10.1007/978-1-349-12670-5_24

Taíz, L., & Zeiger, E. (2010). *Plant physiology* (5th ed.). Sinauer Associates.

Tarr, B., Launay, J., & Dunbar, R. (2014). Music and social bonding: "self-other" merging and neurohormonal mechanisms. *Frontiers in Psychology, 5*. https://doi.org/10.3389/fpsyg.2014.01096

Tchaikovsky, P. I. (2005). *Guide to the Practical Study of Harmony* (E. Krall & J. Liebling, Trans.). Dover publications. (Original work published 1900).

Temperley, D. (2001). *The cognition of basic musical structures*. MIT Press.

Terefenko, D. (2014). *Jazz Theory: From Basic to Advanced Study*. Routledge.

Terhardt, E. (1984). The concept of musical consonance: A link between music and psychoacoustics. *Music Perception, 276-295*.

Thaut, M. H., & Hoemberg, V. (2014). *Handbook of Neurologic Music Therapy*. Oxford University Press.

Thompson, G. A., McFerran, K., & Gold, C. (2014). Family-centred music therapy to promote social engagement in young children with severe autism spectrum disorder: A randomized controlled study. *Child: Care, Health and Development, 40*(6), 840-852.

Tomaino, C. (2017). A tribute to Oliver Sacks (9 July 1933 –. 30 August 2015). *Approaches: An Interdisciplinary Journal of Music Therapy, 9*(1), 174-176.

Tomlinson, G. (2015). *A Million Years of Music: The Emergence of Human Modernity*. Zone Books.

Torsell, P. (n.d.). *Chant Talk, Ep. 2 - Introduction to Chironomy (conducting Gregorian Chant) & Rhythm* [Video]. YouTube. https://www.youtube.com/watch?v=aU-epezE8iI&ab_channel=PatrickTorsell

Tragesser, R. S. (1984). *Husserl and Realism in Logic and Mathematics*. Cambridge University Press.

Trainor, L. (2008, May 29). Science & music: The neural roots of music. *Nature, 453*(7195), 598-599. https://doi.org/10.1038/453598a

Tramo, M. J. (2001). Biology and music. *The Neurosciences and Music, 20-26*.

Tramo, M.J., Cariani, P.A., Deguette, B., & Braida (2003). Neurobiology of harmony. In Peretz, I., & Zatorre, R. J. (Eds.). (2003). *The Cognitive Neuroscience of Music* (pp. 127-151) Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Trehub, S. E. (2003). The developmental origins of musicality. *Nature Neuroscience, 6*(7), 669-673. http://dx.doi.org/10.1038/nn1084

Trehub, S. E. (2003). Musical predisposition in infancy: an update. In Peretz, I., & Zatorre, R. J. (Eds.). (2003). *The Cognitive Neuroscience of Music* (pp. 3-20) Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Trehub, S. E., Becker, J. V., & Morley, I. (2015). Cross-cultural perspectives on music and musicality. *Philosophical Transactions of the Royal Society B, 370*(1664), 20140096. https://doi.org/10.1098/rstb.2014.0096

Trehub, S. E., & Nakata, T. (2001-2002). Emotion and music in infancy. *Musicae Scientiae, Spec Issue, 2001-2002*, 37–61. https://doi.org/10.1177/10298649020050S103

Trehub, S. & Trainor, L. (1998). Singing to infants: Lullabies and play songs. *Advances in Infancy Research, 12*, 43-77.

Trehub, S. & Unyk, A., & Trainor, L. (1993). Maternal singing in cross-cultural perspective. *Infant Behavior & Development, 16*, 285-295.

Trevarthen, C. (1979). Communication and cooperation in early infancy. A description of primary intersubjectivity. In M. Bullowa (Ed.), *Before Speech: The Beginning of Human Communication* (pp. 321-347). London, Cambridge University Press.

Trevarthen, C. (1980). The Making and Breaking of Affectional Bonds. By John Bowlby. London: Tavistock. 1979. Pp 184. £6.50, £2.95 (paperback). *British Journal of Psychiatry, 137*(4), 390–390. https://doi.org/10.1192/S0007125000071932

Trevarthen, C. (1999). Musicality and the intrinsic motive pulse: evidence from human psychobiology and infant communication. *Musicae Scientiae, 3*(1), 155-215. https://doi.org/10.1177/10298649000030S109

Trevarthen, C. (2003). Infant Psychology Is an Evolving Culture. *Human Development, 46*(4), 233–246. https://doi.org/10.1159/000070372

Trevarthen, C. (2008). The concept and foundations of infant intersubjectivity. In S. Bråten (Ed.), *On being moved: From mirror neurons to empathy* (pp. 51-76). John Benjamins Publishing.

Trevarthen, C., & Aitken, K. J. (1994). Brain development, infant communication, and empathy disorders: Intrinsic factors in child mental health. *Development and Psychopathology, 6*(4), 597–633. https://doi.org/10.1017/S0954579400004703

Trevarthen, C., & Delafield-Butt, J. (2013). Biology of shared experience and language development: Regulations for the intersubjective life of narratives. In M. Legerstee, D. W. Haley, & M. H. Bornstein (Eds.), *The Infant Mind: Origins of the Social Brain* (pp. 167-199). The Guilford Press.

Tsang, C. D., Falk, S., & Hessel, A. (2016). Infants prefer infant-directed song over speech. *Child Development,* 88(4), 1207-1215.

Turino, T. (1993). *Moving Away from Silence: Music of the Peruvian Altiplano and the Experience of Urban Migration*. University of Chicago Press, Chicago, IL.

Turino, T. (1999). Signs of imagination, identity, and experience: A Peircian semiotic theory for music. Ethnomusicology, 43(2), 221–255. https://doi.org/10.2307/852734.

Turino, T. (2008). *Music as social life: The politics of participation*. University of Chicago Press.

Turino, T. (2009). Four fields of music making and sustainable living. The World of Music, 51(1), 95-117.

Turker, S., Reiterer, S. M., Seither-Preisler, A., & Schneider, P. (2017). "When Music Speaks": Auditory Cortex Morphology as a Neuroanatomical Marker of Language Aptitude and Musicality. *Frontiers in Psychology, 8*, 2096. https://doi.org/10.3389/fpsyg.2017.02096

Turner, R. E., & Ioannides, A. A. (2010). Brain mapping of music: Evidence from neuroimaging techniques. In P. J. Rentfrow & D. J. Levitin (Eds.), *Foundations in Music Psychology: Theory and Research* (pp. 147-170). MIT Press.

Turner, J. C. (1985). Social categorization and the self-concept: A social-cognitive theory of group behavior. In E. J. Lawler (Ed.), *Advances in Group Processes: Theory and Research* (Vol. 2, pp. 77-122). Greenwich, CT: JAI Press.

Turner, J.C. (1991). *Social Influence*. Open University Press, Milton Keynes.

Turner V. (1974). Liminal to Liminoid, in Play, Flow, and Ritual: An Essay in Comparative Symbology. *Rice Institute Pamphlet - Rice University Studies, 60*, no. 3 (1974) Rice University: https://hdl.handle.net/1911/63159.

Turner, V., Abrahams, R. D., & Harris, A. (2017). *The Ritual Process: Structure and Anti-Structure*. Routledge.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.

Van der Kolk, B. (2014). *The Body Keeps the Score: Brain, Mind, and Body in the Healing of Trauma*. Penguin Publishing Group.

Van Der Schyff, D., Schiavio, A., Walton, A., Velardo, V., & Chemero, A. (2018). Musical creativity and the embodied mind: Exploring the possibilities of 4E cognition and dynamical systems theory. *Music & Science,* 1. [https://doi.org/10.1177/2059204318792319]

von Franz, M.-L. (1980). Individuation in Fairy Tales (R. F. C. Hull, Trans.). Shambhala.

von Helmholtz, H. L. F. (2009). *On the Sensations of Tone as a Physiological Basis for the Theory Of Music* (A. Ellis, Trans.). Cambridge University Press. (Original work published 1875).

Voicecouncil. (2012, July 7). *What is melismatic singing?* [Video]. YouTube https://www.youtube.com/watch?v=PRS2grauL4I&ab_channel=Ain%27tNoOtherFan

Wallin, N. L., Merker, B., Brown, S. (2001). *The Origins of Music*. Amsterdam University Press.

Watson, J. B. (1925). What the Nursery has to Say About Instincts. *The Pedagogical Seminary and Journal of Genetic Psychology, 32*(2), 293–326. https://doi.org/10.1080/08856559.1925.10534070

Watzlawick, P., & Beavin, J. (1967). Some formal aspects of communication. *American Behavioral Scientist,* 10(8), 4-8

Weber, G. (1851). *Versuch einer geordneten Theorie der Tonsetzkunst* (Eng. trans.). Mainz. (Original work published 1817–1821, 3rd ed. 1830–1832).

Weil, S. (1956). *The Notebooks of Simone Weil*, trans. Arthur Wills, 2 vols. (New York, 1956), 1:59; hereafter abbreviated N.

Welch, G; Himonides, E; Saunders, J; Papageorgi, I; Sarazin, M; (2014). *Singing and Social Inclusion*. Frontiers in Psychology, 5, Article 803. https://doi.org/10.3389/fpsyg.2014.00803

Wheelwright, P (1959). *Heraclitus*. Princeton University Press.

Wilde, O. 'The Disciple.' (2022). In *Modern Humanities Research Association eBooks* (pp. 190–191). https://doi.org/10.2307/j.ctv2phprrp.68 (Original work published in 1894)

Wilson, M., & Cook, P. F. (2016). *Rhythmic Entrainment: Why Humans Want To, Fireflies Can't Help It, Pet Birds Try, and Sea Lions Have To Be Bribed. Psychonomic Bulletin & Review, 23*(6), 1647-1659. https://doi.org/10.3758/s13423-016-1013-x

Winkler I, Haden G, Lading O, Sziller I& Honing H. (2008). *Newborn Infants Detect the Beat in Music. Proc. Natl Acad. Sci. USA, 106*, 2468–2471. https://doi.org/10.1073/pnas.0809035106

Winnicott, D. W. (1939). *The Deprived Mother. New Era in Home and School, 21*(3), 75–82.

Winnicott, D. W. (1941). *Review: Flügel, J. C., The Moral Paradox of Peace and War. New Era in Home and School, 22*(3).

Winnicott, D. W. (1942). *Why Children Play. New Era in Home and School, 23*, 149–152.

Winnicott, D. W. (1945). *Primitive Emotional Development. International Journal of Psychoanalysis, 26*, 137–143.

Winnicott, D. W. (1948). *Environmental Needs; the Early Stages; Total Dependence and Essential Independence*. In *The Collected Works of D. W. Winnicott (2016)*. Oxford University Press. https://doi.org/10.1093/med:psych/9780190271350.003.0027

Winnicott. (1949). *The Ordinary Devoted Mother and Her Baby: Nine Broadcast Talks (Autumn 1949)*. [Distributed privately].

Winnicott, D. W. (1949). *Mind and Its Relation to the Psyche-Soma. The International Journal of Psychoanalysis, 30*(4), 225-234.

Winnicott, D. W. (1951). *Transitional Objects and Transitional Phenomena: A Study of the First Not-Me Possession. International Journal of Psycho-Analysis, 34*, 89–97.

Winnicott. (1953). *Transitional Objects and Transitional Phenomena. Collected Papers: Through Paediatrics to Psycho-Analysis (pp. 229–242).* [CW 5:4:24]. Also published in *Playing and Reality (pp. 1–25).* London: Tavistock, 1971. [CW 9:3:5]; and *The Collected Works of D. W. Winnicott*. New York: Oxford University Press, 2017 [1951 version] [CW 3:6:6]

Winnicott, D. W. (1954). *Mind and Its Relation to the Psyche-Soma [1949]. British Journal of Medical Psychology, 27*(4), 201–209.

Winnicott, Donald W. (1958). *Metapsychological and Clinical Aspects of Regression within the Psycho-analytical Set-up*. In *Collected Papers: Through Paediatrics to Psychoanalysis*. London: Tavistock (Original work published 1954)

Winnicott, D. W. (1955). *The Depressive Position in Normal Emotional Development. British Journal of Medical Psychology, 28*, 89–100. https://doi.org/10.1111/j.2044-8341.1955.tb00884.x

Winnicott. (1956). *Primary Maternal Preoccupation. Collected Papers: Through Paediatrics to Psycho-Analysis (pp. 300–305)*. Tavistock Publications.

Winnicott, D. W. (1956). *The Theory of the Parent-Infant Relationship. International Journal of Psycho-Analysis, 37*, 55-61.

Winnicott. (1958). *The First Year of Life: Modern Views on Emotional Development. Medical Press, March 1958, 3–14*. [CW 5:4:6]

Winnicott. (1960). *The Theory of the Parent-Infant Relationship. Collected Papers: Through Paediatrics to Psycho-Analysis (pp. 266–275)*. Tavistock Publications.

Winnicott. (1965). *The Maturational Processes and the Facilitating Environment: Studies in the Theory of Emotional Development*. Hogarth.

Winnicott, D.W., (1966). *The Location of Cultural Experience*. In *Lesley Caldwell, and Helen Taylor Robinson (eds), The Collected Works of D. W. Winnicott: Volume 7, 1964 - 1966*. (New York, 2016; online edn, Oxford Academic, 1 Dec. 2016), https://doi.org/10.1093/med:psych/9780190271398.003.0075

Winnicott, D. W. (1967). *The Concept of Transitional Objects and Transitional Phenomena. International Journal of Psycho-Analysis, 48*, 19-26.

Winnicott, D.W., (1969) *The Use of an Object and Relating Through Identifications*. In *Lesley Caldwell, and Helen Taylor Robinson (eds), The Collected Works of D. W. Winnicott: Volume 8, 1967 - 1968*. (New York, 2016; online edn, Oxford Academic, 1 Dec. 2016), https://doi.org/10.1093/med:psych/9780190271404.003.0066

Winnicott, D.W. (1970/2016). *Basis for Self in Body*. In *The Collected Works of D. W. Winnicott*. Oxford University Press. https://doi.org/10.1093/med:psych/9780190271411.003.0044

Winnicott. (1971/2016). *Creativity and Its Origins*. In *The Collected Works of D. W. Winnicott*. Oxford University Press. https://doi.org/10.1093/med:psych/9780190271411.003.0054

Winnicott, D. W. (1971). *Playing and Reality*. Routledge.

Winnicott, D. W. (1967). *The Location of Cultural Experience*. In *L. Caldwell & H. T. Robinson (Eds.), The Collected Works of D. W. Winnicott: Volume 7, 1964 - 1966* (pp. 95–103). New York: Oxford Academic. https://doi.org/10.1093/med:psych/9780190271398.003.0075. Originally published in *International Journal of Psychoanalysis, 1967, 48*, 368–372. Also published in *Playing and Reality (pp. 95–103)*. London: Tavistock, 1971.

Winslade, J., & Monk, G. (2000). Narrative Mediation: A New Approach to Conflict Resolution.

Wissner, R. A. (2012). *Music and Conflict*. Edited by John Morgan O'Connell and Salwa El-Shawan-Castelo-Branco. *Urbana and Chicago: University of Illinois Press, 2010*. 289 pp. ISBN 9-870-250-7738-8. *Popular Music*. https://doi.org/10.1017/s0261143012000207

Wittgenstein, L. (1953). *Philosophical Investigations* (G. E. M. Anscombe, Trans.). Basil Blackwell.

World Health Organization (WHO). (1993). *The ICD-10 Classification of Mental and Behavioural Disorders*. World Health Organization.

Wrangham, R. & Conklin-Brittain, N. (2003). *Cooking as a Biological Trait. Comparative Biochemistry and Physiology: Molecular and Integrative Physiology, 136*, 35-46. Doi: 10.1016/S1095-6433(03)00020-5

Wundt, W. M. (1910). *Principles of Physiological Psychology. Vol. 1 / by Wilhelm Wundt... ; tr. from the 5th German ed. (1902) by Edward Bradford Titchener.* (E. B. Titchener, Trans.; 2nd ed.). S. Sonnenschein & Co., Ltd.

Yi, W. K. (1999). *Is Music the Most Important Thing We Ever Did? Music, Development, and Evolution*. Seoul National University Press.

Zarlino, G. (1968). The art of counterpoint (Pt. III, Eng. trans.). (Original work published 1558).

Zarlino, G. (1983). On the modes (Pt. IV, Eng. trans.). (Original work published 1573).

Zatorre, R. J. (2003). *Neural Specializations for Tonal Processing.* In Peretz, I., & Zatorre, R. J. (Eds.), *The Cognitive Neuroscience of Music* (pp. 231-246). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198525202.001.0001

Zatorre, R.J., Chen, J.L., & Penhune, V.B. (2007). *When the Brain Plays Music: Auditory-Motor Interactions in Music Perception and Production*. *Nature Reviews Neuroscience, 8*, 547–558. https://doi.org/10.1038/nrn2152

Zimmerman, D. H., & Wieder, D. L. (2017). Ethnomethodology and the problem of order: Comment on Denzin. In J. D. Douglas (Ed.), *Everyday life: Reconstruction of social knowledge* (pp. 285-298). New York: Routledge.

Zuckerkandl, V. (1956). *Sound and symbol: Music and the External World*. London: Routledge & Kegan Paul.

Zwiebach, B. (2004). *A First Course in String Theory*. Cambridge University Press. https://doi.org/10.1017/CBO9780511841682

APPENDIX 1

AUDIO FILES AND LINKS

AUDIO FILES:

1. TRACK 1: John Cage - Williams Mix
2. TRACK 2: Yoko Ono - Toilet piece/Unknown
3. TRACK 3: Rory White. Song of Songs *(Hebrew Sephardic or Mizrachi Cantillation manner)*
4. TRACK 4: Gregorian Chants – Benedictine Monks
5. TRACK 5: King Crimson - 21st Century Schizoid Man (Including "Mirrors")
6. TRACK 6: Pink Floyd - Interstellar Overdrive
7. TRACK 7: Debussy: Prélude à l'aprés-midi d'un Faune | François-Xavier Roth & London Symphony Orchestra.
8. TRACK 8: Wagner - Die Meistersinger von Nürnberg, Act 1/3
9. TRACK 9: Elgar Violin Sonata (Nicola Benedetti and Alexei Grynyuk)
10. TRACK 10: Strauss: Don Juan / Petrenko · Berliner Philharmoniker
11. TRACK 11: Beethoven: Symphony No. 5, First movement (Benjamin Zander, Boston Philharmonic Orchestra)
12. TRACK 12: Ritchie Valens - La Bamba.
13. TRACK 13: The Beatles – I Want to Hold Your Hand
14. TRACK 14: Jazz. Charlie Parker – All the Things You Are
15. TRACK 15: Bambuco viejo. Grupo Bahia Trio – Bambuco Viejo
16. TRACK 16: Björk - Vulnicura (Full Album)
17. TRACK 17: Manuel Torres – Tarantas: Que Me Den Las Espuelas

A more comprehensive playlist has been curated with the music references used throughout this thesis.

Please click on the following link:

https://open.spotify.com/playlist/3OrZXKXFaTkgxNFu54CbEF?si=c77710f3aa474dd1