

Choral Conductors' Understanding of the Relationship between Language Reading and Music Reading in the Context of Children's Choirs

Yvonne Higgins Murphy

BEd, MEd, Dip. Kodály Institute, L.L.C.M. (T.D.)

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Dublin City University

School of Theology, Philosophy, and Music

Supervisor: Dr Patricia Flynn

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Abbreviations

CM	Community Choirs
CN	Conservatory Choirs
CPD	Continual Professional Development
CT	Cathedral Choirs
M.Ed.	Master of Education Degree
PS	Primary School Choirs
ORFS	Oral Reading Fluency Scale
SM	Sheet Music
SN	Staff Notation
WAM	Western art music
WSN	Western staff notation

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List of Presentations

1. Higgins, Y. (2025, June 4). *Unlocking children's thinking with and through notation in Irish choral practice* [Paper Presentation]. Unlocking Voices – Shaping Music Education Futures, 32nd European Association for Music in Schools & 10th ISME European Regional Conference, Évora, Portugal.
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Yvonne Higgins Murphy

Abstract

This research investigates the connection between reading printed texts and reading music notation. The context of the research is choral practice in children's choirs, and the research informants include 16 choral directors of children's choirs drawn from four distinct Irish choral contexts: cathedral choirs, conservatoire-based choirs, community choirs and school choirs. The research aims to investigate the extent to which theory in developing language reading fluency can inform and extend theory in music reading fluency. The literature review reveals a gap in theory and practice: while language literacy has developed a rich theoretical understanding to inform its practical approaches, music reading has retained a largely functional approach informed by a heritage of practice rather than overarching theories. The research proposes the need for a shift in our understanding of music reading from primarily production of sounds to fluency in meaning making and thinking through notation - as we do with words. It locates four relevant concepts from language literacy: language rich environment; competency in word recognition (sight words) and decoding; fluency for comprehension and meaning making in reading and proposes the need for a similar understanding of music fluency. Using a mixed methods qualitative approach drawing on constructivist grounded theory, it includes the perspective of the researcher as research instrument investigating theories and ideas drawn from (language) reading literature whilst working with a group of children in a 'Choirlab' context in preparation for three in-depth interviews with each expert practitioner. In addition to their consideration of the four concepts, the research reveals conductors' working theories and in-depth understanding of music literacy across a range of choral contexts. The research proposes new ways of thinking about communicative, meaning-making approaches to music reading in choral contexts that will be useful for future thinking in this area.

1 Introduction

Choral singing is widely valued as an artistic and social cultural activity (Bartel & Cooper, 2015). Benefits of musical engagement through choral singing for participants and communities are frequently cited in research literature (Doyle, 2019, Hallam, 2015; Livesey et al., 2012). In Ireland there is, by international standards, a relatively small but vibrant choral sector within which there is increasing interest and support for developing choral singing opportunities for children and young people. One of five key themes of the Creative Ireland Programme, ‘Creative Youth,’ included development of ‘a strategy to develop and extend choral singing’ as one of the strategic actions identified in its Creative Ireland Youth Plan (2017-2022). Sing Ireland, the national organisation for the support, development and promotion of all forms of group singing in Ireland launched a ‘YouthSing’ initiative in 2021. As part of this initiative, supported by Creative Ireland, resources in Irish or of Irish cultural heritage were commissioned for use with young singers in formal (school) and informal settings. Prior to this, in 2008, a report commissioned by the Arts Council/An Chomhairle Ealaíon, ‘*Raising Your Voice: Towards a policy for the development of choral music in Ireland*’ provided a comprehensive overview of choral music practice in Ireland at that time. One area highlighted as needing development was choral singers’ music reading skills. As outlined in the report, ‘lack of formal training (particularly in ensemble and sight-singing), and a lack of support for on-going development in choral singing is a barrier to the development of standards in the choral sector’ (2008, p. 28).

My interest in investigating children’s music reading, their musical thinking as they engage with music notation, began whilst working with children who were experiencing reading difficulties. As a primary school teacher, working on the one hand in supporting children with special educational needs and on the other with a school-based choir, I was struck by potential connections between reading language and reading music. Both types of engagement are based on symbolic representation; one of language in printed words and the other of music in notation. This prompted me to reflect on the discrepancy between the facility with which most children use a written representational system for language and a relative lack of facility in using a written representational system for music. When children experience difficulties in gaining (language) reading proficiency, there is extensive research that conceptualises and informs our understanding of the processes so that appropriate interventions can be designed. It is well understood that proficient language readers use written language texts for more than decoding. Readers read to learn, to communicate, to express feelings, and for enjoyment. Reading is understood

to be a secondary language process, closely tied to children's thinking and learning in language (Perfetti, 1999). I was unsure that this broad understanding was as widespread in relation to music reading.

In comparison to the interest taken in developing children's ability to read printed language and the range of theoretical understanding gained in research (Ehri, 2020; Elliman & Oslund, 2019, Flewitt, 2012, Ouellette & Sénéchal, 2017, Snowling et al., 2022), a rather small amount of research has been undertaken on developing the ability to read music notation (Hodges & Nolker, 2011; Sloboda, 2005). Despite the existence of practice-based manuals or handbooks, research that conceptualises and theorises this practice is limited. Although sight-singing in choral contexts is noted by Hodges & Nolker (2011) as one of the more consistent streams in applied research (e.g., Demorest, 1998, Killian & Henry, 2005), music reading research is largely based upon sight-reading for playing an instrument (Hodges & Nolker, 2011; Sloboda, 2005). It is also a much under-investigated skill when compared to the research literature on other skills and processes involved in musical engagement such as listening, many aspects of performance practice, or composing. Most research studies of music reading in the English-speaking research literature are technique or strategy driven rather than based on any directly articulated underlying theory of music reading (Hodges & Nolker, 2011).

The emphasis on the ability to read music notation, long prized as an essential musical skill, has decreased in recent times in part through the pluralisation of music practice and in recognition of the existence of a vast variety of aural musical traditions and increased use of technology (Green, 2002; Dahl, 2009). Whilst the ability to read music is not a prerequisite for musical engagement in the same way that the ability to read language text is almost essential for full membership of society, the facility to read music is considered an important factor in developing overall musical competence and for full membership of the Western classical music community (Sloboda, 2005). The wider concept of reading as developing other competencies and thinking skills is understood in language reading but does not appear to be consciously understood in music, with much of the practice limited to the level of decoding rather than comprehension or meaning making.

With this in mind I had to consider if this in fact was the accepted function of music notation; to act as instructions for a performance, which once decoded, could be discarded so as not to get in the way of a performance. I needed to consider that I might be engaged in a form of wishful thinking, wanting music notation to be a vehicle for thinking, imagination, communication and discovery in the way that a reader might engage with a language text. It is acknowledged that language and music are two very different human constructs. This research is not attempting to equate the two. However, there are some similarities as well as differences. Written language is a representation of something which, like music,

begins aurally and/or orally. There is considerable research on the knowledge children bring to written language from their lived experience (Perfetti & Staffura, 2014, Castles, Rastle, & Nation, 2018). The enrichment of lived language experience is recognised as important in developing children's language literacy. It is considered to have an important role in achieving the goal of developing reading comprehension and fluency. Music reading handbooks or manuals frequently refer to the principle of 'sound before symbol' but often begin in an atomised way and do not connect these to the sound world children have experienced. Our understanding of children's language reading development could help to extend children's facility with music reading and lead us to think beyond decoding to fluency, comprehension, and meaning making in and through notation.

Language and music when represented in written form look very dissimilar. A key difference relates to the nature of what each aims to represent. Language text is presented as single sequences of words, whereas notated music can describe different events occurring simultaneously. The problem of how to link up parallel streams of information is fundamental to the development of and decoding of a music score (Sloboda, 2005). In relation to Western Standard Notation (WSN), even when notated music is presented as a single line, it contains implicit harmonic or metric implications. This is also where we find similarities in meaning making between music and language. While music has more dimensions than language, if a reader understands these, they will be reflected in the performance just like expression or intonation in reading.

In notated language, sounds are mapped onto a system of graphemes (letters) with varying levels of orthographic clarity (e.g., English is described as having a very dense orthography whereas a language such as Finnish has a clear orthography) (Castles et al., 2018). A reader's purpose is to decode the written language to recognise the words and construct meaning from the text. Comprehension is conveyed in the fluency of reading, the use of expression and emphasis, and the grouping of words.

There is likely to be an implicit expectation of this meaning making among choral music practitioners even if not extensively explored in the limited research on developing music reading in children's choral contexts. WSN does more than represent individual sounds, it represents pitch and rhythmic relationships between notes and groups of notes. It has a sense of direction, of moving towards and falling away, and this is often what a choral director strives to emphasise in a performance. The notation itself conveys something of the structure of the music to a reader, an experienced reader will convey this in their performance from the score. This is recognised as important in terms of a composer communicating with a performer. In Sloboda's (2005) words:

Music notation is therefore, the medium, or language, of his [i.e., a composer's] communication. It is not simply a set of instructions for performance ... it actually embodies aspects of the structure, or meaning, of the music which would not be present in a *physical* description of the sounds (i.e., details of frequency, duration, and amplitude of various notes) [*emphasis in original*]. (Sloboda, 2005, p.5)

1.1 Research Context

Although availability can vary according to regional demographics, Irish children interested in choral singing have a range of choral contexts from which to choose. Children's choirs, as immersive learning environments, can be found in formal education contexts such as primary and secondary schools, third-level conservatories or independent music schools. Separately, children's choirs, often with long-standing traditions, exist in cathedral and church settings. Another category are community choirs which may be supported by local authorities, other institutions or set up by individuals.

Given the differences between choral contexts and the potential differences in practice in relation to use of music notation, four categories of choirs were selected for the research: 1. Cathedral Choirs (CT), 2. Conservatory Choirs (CN) (children's choirs based in third-level institutions offering degrees in music performance), 3. Community Choirs (CM) and 4. Primary School Choirs (PS). Four conductors from each of these choral contexts (16 in total) were invited through purposive sampling to participate in the research.

1.2 Research Aims and Objectives

There are three main aims in the research:

1. To develop new ways of thinking about and understanding children's development of music reading fluency.
2. To investigate if theory in developing language reading fluency would be useful for developing music reading fluency in the context of children's choirs.
3. To reveal implicit theories of children's music reading held by experienced choral directors of children's choirs.

The conceptual framework addresses:

- a. Conceptualising connections between our understanding of children's developing language reading fluency and music reading fluency.
- b. Identifying key concepts from the language reading literature which may have potential to extend our understanding of music reading fluency.
- c. Analysing how these concepts from language reading literature relate to a range of practical pedagogical approaches for developing music reading.
- d. Examining the characteristics and operating principles of a range of music representation systems in use, including WSN, Solmization, and rhythmic syllabic systems.
- e. Exploring how the identified concepts might operate through working with a 'Choirlab', developing activities with and for a children's choir and collecting examples of children's engagement with each of them.
- f. Developing an understanding with experienced choral conductors of the extent to which concepts from language reading fluency relate to, or can inform, children's development of music reading fluency.

To support the research aims the following questions are addressed.

1. To what extent is sheet music or notation of any kind used in choral practice within selected categories of children's choirs in Ireland?
2. Do choral conductors of children's choirs consider reading music as having the potential to develop children's musical thinking?
3. Do choral conductors perceive musical understanding as enabling fluent music reading?

1.3 Research Significance

Whilst this research is not unique in calling upon principles, theories or understandings from language reading research, its significance lies in the fact that this is the first time that a systematic approach has been brought to using aspects of language reading theory as an investigative lens to support children's music reading in an Irish choral context. The researcher brings expertise and experience in the domains of both language reading literacy and music, to the process of co-constructing knowledge with

research participants who are expert practitioners in the domain of choral music. Additionally, this research draws on expert practice within four distinct types of children's choirs in Ireland.

The research seeks to answer the question of how reading music notation, and the processes involved, are understood by expert choral conductor participants. It explores current practices in distinct settings and suggests ways in which children's fluent music reading can be fostered and supported in choral contexts.

In relation to the methodology employed, the research contributes an additional aspect to methodological approaches to co-constructing knowledge at a deep level with expert participants using a preparatory study with children.

1.4 Research Approaches

The research uses a qualitative, mixed method approach drawing on two perspectives. First is that of the researcher as research instrument (Kesson, 2010) investigating theories and ideas drawn from the literature whilst working with a group of children in a 'Choirlab' context. Children's perspectives were gathered indirectly during choral workshops. The second perspective is that of 'expert practitioner' choral conductors. Cochran-Smith and Lytle (2009) describe practitioners as "deliberative intellectuals who constantly theorize practice as part of practice itself" (p. 2). A belief that expert choral practitioners similarly theorize their choral practices and hold implicit theories of children's music reading informed this research approach.

The first phase of the research design, the Choirlab preparatory study, had a dual purpose: to expand my thinking through exploring, with a group of children, questions that had arisen in the literature and to gather artefacts of children's sense-making and musical thinking in relation to music notations in a real-life context.

In the second phase of the research, three semi-structured interviews were conducted with each of the 16 choral conductor participants drawn from four different categories of choir available to children in Ireland. Through purposive sampling, four conductors were selected from the following categories of choirs: cathedral choirs, choirs based in conservatories, community choirs and choirs based in primary schools.

1.5 Researcher's Position Statement

According to Denscombe (2017), a defining feature of ethnographic research is “the significance it attaches to the role of the researcher’s ‘self’ in the process of research” (p. 90). A researcher’s identity, values, and beliefs influence every aspect of the research. I recognise that my own ‘ethnographic baggage’ (Madden, 2017) impacts on how I understand, analyse and interpret at every stage of the process. In support of the research outcomes, the purpose of the account below is to provide some insight into the possible influence of this researcher’s ‘self’.

I was very fortunate to grow up in a family where musical engagement was valued. My musical interests and endeavours were both encouraged and supported by enthusiastic parents. My formal musical learning began with song singing in primary school followed soon afterward by the start of many years of enjoying piano lessons, culminating in performance and teaching diplomas. Not unusually for secondary schools in Irish towns, music was not available as a subject. Instead, I studied for Junior and Leaving Certificate Music with my piano teacher. Music also featured informally in family and social life during school years. Together with my brothers and friends, I was a member of the local town band, playing clarinet. Separately, I sang in choirs both in primary and secondary school and in church and community settings.

To use Burnard’s (2011) ‘Rivers of Musical Experience’ metaphor, there were three ‘critical incidents’ that led me to this research. The first was being introduced to the Hungarian or Kodály approach to music whilst studying for a B.Ed. degree in St. Patrick’s College, Drumcondra. Although I had a little experience of using Sol-fa in sight singing, it was during an intensive summer course that I first really experienced internally hearing and understanding musical sounds represented by symbols in notation, through thinking in sound using Sol-fa. Years later I studied, with the support of a Sarolta Kodály Scholarship, at the Kodály Pedagogical Institute in Kecskemét, Hungary. Subjects taught included solfège, choral conducting, and pedagogy. As part of pedagogy, I observed children’s music classes on a weekly basis in the local Kodály School in the town and marvelled at the teachers’ skills and children’s progression in music reading. I discovered a passion for choral conducting. On completion of my studies, I returned to Ireland to my work as a primary school teacher and to start working on a part-time basis with student primary teachers in St. Patrick’s College. I was keen to apply my new learning and wanted to continue making music with others through choral singing. In addition to conducting primary school, college, and church choirs, I founded and conducted a chamber choir where members had varying levels of music literacy skills. I was fascinated by differences I observed in how adult singers with and without music reading skills negotiated using a score to learn repertoire. The contrast I observed between children’s ease and skill in music reading (which included an ability

to internally hear sounds from notation) in Hungary, with difficulties experienced by Irish choral singers in decoding notation troubled me and continued to niggle below the surface over several years.

In 2004 I completed an M.Ed. degree. The subject of my thesis was Children's Classroom Composing Process. Composing had been introduced to Music in the Irish Primary School Curriculum in 1999. I found myself unsure of how to support children in classroom composing despite my years of instrumental lessons, B.Ed. experiences of Music (both as an Arts subject and of 'Curriculum Music'), and my studies in Hungary. Observation of children's musical thinking in sound as they collaborated in group composing tasks inventing their own music, together with seeing this thinking reflected in the 'invented notations' they created to help them remember their compositions caused me to wonder how music thinking processes could be brought to music reading. This was 'critical incident' number two.

As I progressed in my primary teaching career, in addition to teaching whole-class groups I gained experience of working in support settings, teaching children with special education needs. Whilst working in small-group contexts or with individual children, I had opportunities to observe and support children in learning to read. This specialised focus on the teaching of reading prompted me to upskill, consult colleagues, attend CPD courses and read extensively. Through my work in teaching children to achieve reading fluency I became aware of the wealth of approaches and materials available to teachers underpinned by key concepts and theories developed through decades of research. I wondered whether similar research was available to underpin music reading in choral contexts.

'Critical incident' three was the award of a PhD scholarship in Performance Music Education by Music Generation (An Irish National Music Education Programme that aims to transform the lives of children and young people through access to high quality performance music education in their locality). This enabled me to begin a quest, supported by 'more knowledgeable others' to co-construct knowledge about children's music reading in choral contexts with 'expert practitioner' choral conductors of Irish children's choirs.

1.6 Thesis Structure

The account of the research is presented over seven chapters. This first chapter introduces the research aims and objectives, the context for the research and approach taken. It presents the researcher's position statement, describes the significance of the research and provides an overview of the thesis structure. Chapter two presents an analysis of relevant literature presented in three discrete sections. Literature Review 1 reviews theories of language reading fluency, research on music reading and theories on general musical development. Literature Review 2 examines operational principles of representational systems for music whilst Literature Review 3 reviews underpinning principles of

approaches to music reading within four pedagogical approaches to music, two classic twentieth century ‘methods’ instigated by Zoltán Kodály and Émile Jaques-Dalcroze, and two contemporary approaches devised by Gary Karpinski and Bruce Adolphe.

Chapter three outlines the research design and methodology adopted for the research including the research aims and objectives, the research design, analytical strategy and ethical considerations to ensure research integrity. Chapter four describes the ‘Choirlab’ preparatory study phase of the research. It details the aims, context, data analysis and outcomes of four streams of investigation carried out with a group of children in a choral ‘lab’ context: children’s music reading, their experience of music in everyday life, strategies and approaches for developing their ability to image sounds, and children’s representations of music are investigated in light of concepts from language reading.

Chapters five presents findings that emerged from the analysis of interviews conducted with choral conductors in light of the research questions. Chapter six discusses key findings in light of the three literatures reviewed and outcomes from the Choirlab preparatory study.

In the concluding chapter overall research findings are presented in relation to the research aims and implications of the study are discussed. Limitations of the research are outlined and ideas for how future research can build on the findings from this study are proposed. Recommendations based on the findings are proposed.

The next chapter, chapter two, discusses the literature analysed to build a conceptual framework for this research.

2 Literature Review

2.1 Introduction

This research seeks to examine the potential that theoretical concepts from language reading fluency may have to inform and extend theory in music reading fluency. It also investigates how these might be useful to choral directors of children's choirs in informing their approaches to developing music fluency and meaning making whilst reading music.

This chapter reviews a range of research to provide a foundation for this research which addresses the following research aims:

1. To develop new ways of thinking about and understanding children's development of music reading fluency.
2. To investigate if theory in developing language reading fluency would be useful for developing music reading fluency in the context of children's choirs.
3. To reveal implicit theories of children's music reading held by experienced choral directors of children's choirs.

The chapter is presented in three broad sections as follows. Section one, which focuses on reading fluency, has three subsections. The first provides an overview and discussion of current theories of language reading development to provide a foundation for the research. It identifies key concepts and theories with the potential to expand our approach to music reading. Subsection two examines music reading fluency, while subsection three looks at how music reading relates these to current understandings of children's musical development and music reading capacities in relation to singing from notation.

Section two addresses the tension between assumptions of music notation as instructions for performance, or as having an epistemic function, representing human thinking in music and a means of communicating meaning. It examines the principles and processes that underpin the operation of music representation systems, prior to analysing the characteristics of a range of notational developments or music representation systems. Of particular interest are protonotation systems developed to assist singers in reading or learning to read Western Staff Notation (WSN).

The third section examines four pedagogical approaches to music teaching with the purpose of investigating how music reading is understood and developed within each. Two classic pedagogical

approaches, the Kodály and Dalcroze approaches, are examined together with two more recent approaches proffered by Karpinski and Adolphe.

2.2 Literature Review 1: Language Reading Fluency, Music Reading, Music Development

To understand a text, a reader must have a degree of fluency with which to accurately recognise and expressively read words to construct meaning. Achieving reading fluency is complex and requires the development and application of skills at various grain sizes of reading (e.g., within word, sentence, paragraph, text) during different stages of development. These areas are strongly intertwined but for the purposes of discussion they are outlined separately under the following headings: oral reading fluency; decoding (connecting sound and symbol); automatic word recognition (sight words) and comprehension.

2.2.1 Oral reading fluency

LaBerge and Samuels' (1974) seminal theory of automatic information processing in reading highlighted the role of 'accuracy' (correct decoding of words) and 'automaticity' (instantaneous word recognition) in fluent reading. They outlined how, during reading, visual information is transformed through a series of processing stages (in visual, phonological and episodic memory systems) until it is finally comprehended in the semantic system (LaBerge & Samuels, 1974). They believed that this processing is learned, and that learning could be at an 'accuracy' level which requires a reader's focus or attention to decode correctly, or at an 'automatic' (or recognition) level, which does not require focused attention. Fluent readers automatically recognise words without having to focus on accurate decoding. This frees cognitive resources for use in construction of meaning of text. As Pikulski and Chard (2005) explain:

If attention is drained by decoding words, little or no capacity is available for the attention-demanding process of comprehending. Therefore, automaticity of decoding – a critical component of fluency – is essential for high levels of reading achievement. (Pikulski & Chard, 2001, p. 551)

Whilst agreeing on the importance of accuracy and automaticity, Kuhn et al., (2010) were concerned that an over-emphasis in the literature on these aspects of fluency was resulting in fluent reading being too narrowly defined. Though not the first to highlight the significance of 'prosody', (e.g., Dowhower, 1991, Rasinski, 2004) they proposed this definition of fluency which adds oral reading 'prosody' as a key component of fluent reading.

Fluency combines accuracy, automaticity, and oral reading prosody, which, taken together facilitate the reader's construction of meaning. It is demonstrated during oral reading through ease of word recognition, appropriate pacing, phrasing, and intonation. It is a factor in both oral and silent reading that can limit or support comprehension. (Kuhn et al., 2010, p. 240)

Oral reading prosody is described as reading “with appropriate expression or intonation coupled with phrasing that allows for the maintenance of meaning” (Kuhn et al., 2010, p. 233) and is considered a critical component of reading fluency. Kuhn et al. (2010) describe it as the music of language. By this they mean the pace and emphasis, the rise and fall of intonation and expression that gives meaning to words. Drawing on Hirschberg's (2002) work on the role of prosody in oral communication they explain:

Prosody captures the rise and falls of pitch, rhythm, and stress – the pausing, lengthening, and elision surrounding certain words and phrases that is found in the pull of linguistic communication. (Kuhn et al., 2010, p. 234)

They describe the psycholinguistic function of prosody in oral language as providing a cognitive skeleton that allows a listener to hold a sentence in working memory long enough to work out its meaning.

By cognitively bracketing key informational units such as phrases, prosody assists in maintaining an utterance in working memory until a more complete semantic analysis can be carried out. (Koriat et al., 2002, as cited in Kuhn et al., 2010, p. 237)

Rupley et al., (2020) suggest that the cognitive framework created by the rhythm of speech is also important to understanding written language. This points to the importance of prior oral and aural language experience upon which to draw in reading, and by extension in music reading.

Prosody can be equated with expression, which communicates meaning, in music. For example, the type of expression by a performer that signals a cadence at the end of the piece leads the listener to expect an ending. Each of these aspects of fluency, accuracy, automaticity, and prosody, affect a language reader's ability to understand language texts and because of the functional similarities, likely by extension, music notation. Accuracy and automaticity in word ‘decoding’ skills (sounding and blending letter sounds into spoken words) and in ‘word recognition’ are deemed critical in the early stages of learning to read text and an ability to read fluently, whilst also important in early reading, is understood to be critical to later reading success (Kuhn & Stahl, 2003). Indications are that this might also be the case for music reading. In a later part of this research this is explained further.

The language reading literature also identifies practise at reading as key to developing oral reading proficiency (e.g., Allington McGill-Franzen, 2021). Stanovich's (1986) widely cited paper, on exploring individual differences between readers in reading ability, highlighted a reciprocal relationship between children's reading achievement and the volume of reading in which they engage. In other words, practice at reading improves reading. In what he described as a 'Matthew effect', he highlighted that reading is an important mechanism for vocabulary development and noted that rich vocabulary not only enables more efficient reading but also contributes to comprehension. He pointed to significant differences between good and poor readers in their enjoyment of reading and in their motivation to read.

The very children who are reading well and who have good vocabularies will read more, learn more word meanings, and hence read even better. Children with inadequate vocabularies-who read slowly and - without enjoyment - read less, and as a result have slower development of vocabulary knowledge, which inhibits further growth in reading ability. (Stanovich, 1986, p. 381)

Sustained practice is a concept widely recognised as benefiting music performance. What is of significance here is not only the frequency of practising a skill and therefore improving in it, but the depth and enrichment that can come from encountering a breadth of music elements, gestures, and patterns and increasing the 'recognising' of what could be considered a music vocabulary.

Fluency is an important concept in language reading development. A fluent reader is perceived to be reading with understanding. Of particular interest to this research is that the reading research literature is also rich in ideas for interventions to support readers who experience reading fluency difficulties (Rayner et al., 2001). Approaches suggested for developing children's oral reading fluency include a focus on scaffolded or assisted practise during repeated (or 'deep') reading of passages and on 'wide' reading (reading broadly on a topic, developing conceptual knowledge and vocabulary). Whether practise involves repeated reading of texts or wide reading of similar texts, the act of reading improves children's oral reading fluency. Kuhn et al. (2010) citing Logan (1997) and Samuels (2013) remind us that automaticity in reading occurs on multiple levels and connects to comprehension in multiple ways. They assert that it is the interaction between various levels of processing that is central to a reader's construction of meaning from text. Practise at reading facilitates this.

In music, notations capture and communicate the structure and relationships within the music represented. Extensive practise of music reading is likely to impact on sight-reading automaticity. In choral contexts, repeated reading of scores is a means of both learning new repertoire and rehearsing

familiar pieces. Singing pieces within and across genres ('wide' reading) occurs as part of choral learning. These aspects of choral practice echo fluency-oriented instruction strategies used in language reading.

2.2.1.1 Learning to connect symbol and sound - Breaking the code

Developing fluency, or as Kuhn et al., (2006) describe it "the transition from deliberate, monotonous reading to fluid and expressive reading" (p. 358), starts with recognising individual words. But to learn to read words, a reader must first learn how the representation system for their language works. This section outlines how children learn to connect the symbols of a writing system with the sounds of their language and considers whether similar processes could be at work in music reading.

To learn to read words, beginning readers must first 'break the code' of the writing system for their language which, in the case of English, means learning the alphabetic principle. This means that they must "acquire the insight that the visual symbols of the writing system (graphemes or letters) represent the sounds of the language (phonemes)" (Castles et al., 2018, p. 11). Two key types of foundational knowledge are required to learn the alphabetic principle: knowledge of the writing system for the language, that is, knowledge of the letters of the alphabet on the one hand, and phonemic awareness, the metalinguistic skill or ability to segment, blend and manipulate individual sounds in spoken words (e.g., identify the three *sounds/phonemes* in cat as *c-a-t* or blend the four sounds in s- t-o-p to form the word stop). This insight that letters represent sounds in alphabetic writing systems does not come naturally to children. It requires explicit instruction (referred to as phonics instruction) but, as a constrained skill, usually develops relatively quickly with practice in the early stages of learning to read (Castles et al., 2018, p. 11). Castles et al. (2018) also observe that 'an intimate and reciprocal association' exists among children's letter knowledge (knowledge of the writing system, ability to recognise and write letters), their phonemic awareness (facility with sounds of language) and their skill in alphabetic decoding (sounding out and blending letters to translate printed to spoken words). Ouellette and Sénéchan (2017) support this, observing that young children's early spelling attempts or 'invented spellings' both reveal and contribute to their developing awareness of the alphabetic principle and to phonological awareness. They describe invented spellings as "a manifestation of children's' ability to represent in print what they hear in speech" (p. 77).

Phonemic awareness is a subset or finer grained understanding of phonological awareness - the knowledge of, or 'conscious sensitivity to' the sound structure of language which develops initially aurally and orally and both underpins and is further developed in early reading (Concannon-Gibney, 2019, p. 16). As Concannon-Gibney, drawing on Pufpaff (2009) outlines, it develops from having an awareness of larger linguistic units such as words within sentences or syllables within words to

phonemic awareness, awareness of individual sounds within words. Developing this facility with the sound structure of language together with knowledge of the writing system are key for learning to read in the early stages. What is interesting here is a reader's awareness of larger linguistic units as well as decoding individual elements.

To read music notation, young singers, similarly, need to acquire the insight that the symbols used in scores represent music (i.e., sounded music) and be taught to break this musical code. WSN, unlike English, is not an alphabetic orthography and its symbols represent many layers of musical information. Further insight into this will be found later in this chapter on music representation systems. Three implications for music reading however, come from this, awareness of individual phonological elements of music, combining these into larger musical units and linking these to knowledge of larger musical units in everyday life.

2.2.1.2 Automatic recognition of words at sight - 'Sight words'

Ehri (2005, 2014, 2020) explored how knowledge and skill in letter-sound relationships (orthographic mapping) enables automatic recognition, pronunciation, and, if in a reader's oral vocabulary, understanding of printed words thus contributing to fluency.

Following Stanovich (1980), Ehri (2005a) describes the hallmark of skilled reading as "the ability to read individual words accurately and quickly in isolation as well as in text" (p. 135). She acknowledged that a reader can call upon particular strategies to read unfamiliar words such as:

- decoding (working out unfamiliar words by blending the letter sounds)
- analogy (e.g., using a known word such as 'might' to read unknown words 'plight' and 'fright'. (following Goswami, 1986)

However, she insisted that fluent reading of texts depends upon a reader having a bank of 'sight words' in memory, words that a reader knows and reads from memory (Ehri, 2005a, p. 135). A 'sight word' is recognised spontaneously because seeing the word in print activates the word's pronunciation, meaning, and syntactic role stored in memory, without a reader's intentional use of strategy. Echoing Pikulski and Chard (2005), Ehri (2005a) succinctly explains the value of automatic 'sight word reading'.

Being able to read words from memory by sight is valuable because it allows readers to focus their attention on constructing the meaning of the text while their eyes recognize individual words automatically. If readers have to stop and decode words, their reading is slowed down and their train of thought disrupted. (Ehri, 2005a, p. 135)

Two important characteristics of reading words ‘by sight’ that Ehri highlighted were particularly interesting in relation to reading music notation: ‘unitization’ and ‘automaticity’. Unitization refers to the fact that words come to be read as single units with no pauses between word parts. Secondly, when words are known by sight, a reader recognises them automatically as they read text, without conscious effort. As Ehri explains:

Readers learn to process spellings of words as phonemic maps that lay out elements of their pronunciations visually. Beginners become skilled at computing these mapping relations spontaneously when they read new words. This is the critical event for sight word learning. Grapheme-phoneme connections provide a powerful mnemonic system. They provide the glue that bonds letters in written words to their pronunciations in memory along with meanings. Once the alphabetic mapping system is known, readers can build a vocabulary of sight words easily. (Ehri, 2005, p. 172)

If the concept of ‘sight words’ is useful for extending our approach to music reading, we would need to consider what constitutes a ‘sight event’ in music that could be grouped or grasped by the eye and drawn complete from memory. For a choir learning a new song from notation, are all sounds individual or are there units of musical meaning and a sequence of learning towards recognising units of meaning? Are there groups of notes that could be ‘unitized’, that is, recognised as belonging together as musical units whose sounds and meanings could be automatically activated by sight of the ‘units’ in notation? These could be facilitated through musical mnemonic devices such as Sol-fa.

For clarity, in relation to language reading literature, it is important to note that Ehri’s use of the term ‘sight word’ is distinct from other ways in which the term ‘sight word’ is used¹. Ehri’s use of the term refers to every word (including ‘tricky words’) stored in memory and recognised ‘at sight’ in text through activation of its pronunciation and meaning, an automatic process facilitated by an ability to decode (translate written symbols to spoken words). Thus, skilled readers rarely need to decode words as they have an extensive store of sight vocabulary. Both concepts may be used in music reading.

¹ In common primary classroom practice and in research literature ‘sight word’ is sometimes used to describe words with irregular spelling patterns (e.g., said, come) that occur frequently in children’s texts. As these words, also referred to as ‘tricky’ ‘high-frequency’ words, do not follow the usual spelling-to-sound mapping, they are often taught as whole words using a ‘look-and-say’ approach where words are presented individually (for example on flashcards) for children to learn to recognise and are included in word lists for practising at home. Rather than mapping letters to sounds, tricky words are learned through repeated practise of looking at and naming the words, and other multisensory approaches such as chanting the letters of and writing the words and, as a result they can be recognised in printed texts.

Ehri (2005) described how readers progress in their fluency at recognising words from memory at sight. She outlined the development of word-reading skill as progressing through four phases; pre-, partial-, full- and consolidated-alphabetic phases (Table 2.1). Each phase reflects the predominant type of knowledge that readers apply to read and spell words.

Table 2.1: Ehri's (2005) Phases of Sight Word Reading Development

Pre-alphabetic	Readers use distinctive visual cues (e.g., 'oo' in look) and context cues but not letter-sound relationships to read and write words.
Partial alphabetic phase	Readers use their developing knowledge of letter names or sounds to read and write but cannot decode unfamiliar words. Most words are read or written using partial letter-sound connections (e.g., initial and final letters).
Full alphabetic phase	Readers learn words by forming complete connections between letters and sounds. They have acquired the ability to decode unfamiliar words through applying a more complete knowledge of grapheme-phoneme connections within words to read and spell them from memory
Consolidated phase	More sight words are retained in memory. Grapheme-phoneme connections in common patterns become consolidated into larger units or 'chunks' such as rimes, syllables, morphemes making multisyllabic word easier to read.

Recognising or reading words from memory depends upon automatic application of letter-sound relationships. This decoding skill allows readers to access pronunciations of words and through them their meanings if the words are familiar in oral form. Once again, the importance of a reader's oral vocabulary as being foundational for reading is highlighted. In the early stages of reading, a reader's oral vocabulary supports word recognition. As readers progress, new vocabulary can be learned through independent reading. It is possible that in music reading, choral directors implicitly focus singers' attention on groups of musical meaning that provide the experience to facilitate this type of fluent music reading. It is also possible that this is not developed through a series of phases such as Ehri suggests in language reading.

Share's (1995) highly influential 'self-teaching hypothesis' in reading is also of potential significance in relation to how a choral singer might learn new 'musical vocabulary' through singing from music notation. He proposed that in language reading, the act of decoding unfamiliar words operated as a self-teaching mechanism. Focusing on the letters in a word and the sequence in which they occur (their spelling patterns) during the act of decoding, enables a child to independently develop both word-specific and general orthographic knowledge (spelling patterns). With very little exposure, a word becomes known and part of a reader's sight vocabulary. Share's self-teaching hypothesis explains how readers who have achieved a certain level of decoding skill can independently recognise and rapidly expand their vocabularies of sight words through reading (Share, 1995; Castles et al., 2018). Their

ability to connect symbol and sound enables this learning mechanism. Echoing Stanovich, (1986), practise at reading improves reading. This prompts the question of whether a singer's facility with decoding notation enables this self-teaching mechanism to operate in music reading and whether this outcome in choral settings is dependent on a setting where singers are regularly required to read large volumes of music.

2.2.1.3 Reading comprehension – models & development

Understanding or making meaning from printed text in language reading involves much more than recognising and understanding individual words. This section explores how the complex phenomenon of reading comprehension is understood and developed in language research literature to consider possible implications for understanding in music reading.

Despite decades of research, reading researchers struggle to fully understand and explain how individuals come to construct meaning from printed text. Reading comprehension is considered one of the most complex behaviours in which humans engage (Elleman & Osslund, 2019). Theoretical models of comprehension proposed to guide practice and research range from broad models depicting relationships and interactions among comprehension subcomponents to models of specific comprehension processes (Elleman & Oslund, 2019). Comprehension models are presented below with a view to considering whether they could be useful for thinking about how singers understand and construct meaning from notation.

Gough & Tunmers' (1986) 'Simple View of Reading', conceptualised reading comprehension as the product of decoding skill and language comprehension. Taking the 'Simple View', a reader who struggled to comprehend text could be assisted by discovering whether intervention should be aimed at improving either decoding skills or language comprehension skills, or both. With time and research, it became clear that in the early stages of reading, poor decoding skills constrain comprehension. In later stages, once decoding skills are achieved, it is a reader's understanding of spoken language that can limit or support comprehension (Language and Reading Research Consortium, 2015).

Taking a 'simple view' of music reading points to a need for a reader to bring both musical decoding skills and oral and aural musical experience to musical reading. However, whilst the 'Simple View of Reading' was a very useful starting point for thinking about comprehension, subsequent research considered it to represent too limited a view of reading comprehension in that it did not take account of the multiple ways in which factors involved in reading comprehension interact during reading.

Perfetti and Stafura's (2014) 'Reading Systems Framework' proposing a 'wide-angled view' of reading comprehension aimed to capture the breadth of component subsystems involved in reading

comprehension. They include word recognition processes in the framework and suggested word knowledge as the key link between word identification systems and comprehension systems. Word meanings stored in long term memory are described as both the output of word identification processes and the input to higher level comprehension processes. The framework identified three key areas that underpin and affect reading comprehension or, as they put it, the framework “makes the following claims about reading comprehension:

- 1) Three classes of knowledge sources are used in reading: linguistic knowledge, orthographic knowledge, and general knowledge (knowledge about the world, including knowledge of text forms, e.g., text genres).
- 2) The processes of reading – decoding, word identification, meaning retrieval, constituent building (sentence parsing), inferencing, and comprehension monitoring – use these knowledge sources in both constrained ways (e.g., decoding uses orthographic and phonological knowledge, but not general knowledge) and in interactive ways (e.g., inferences use general knowledge and propositional meaning extracted from sentences).
- 3) These processes take place within a cognitive system that has pathways between perceptual and long-term memory systems and limited processing resources.” (Perfetti & Stafura, 2014).

An interesting aspect for music reading is the extension of the types of knowledge that are used in reading. What could the parallels for music reading be? If comprehension or sense-making is the goal, knowledge of how music is used and heard within a culture seems an important addition to knowledge of the notation system, and of particular significance in general knowledge of music and genres of music that singers bring to music reading.

Reading processes might include those already discussed, decoding and recognition of musical units of meaning (or musical ‘sight words’) in notation but also higher-level comprehension processes involved in constructing understanding from notation. Further exploration of the types of knowledge that a child draws upon and brings to music reading in choir would be necessary here.

Griffiths et al.’s (2011) review of theoretical models of reading comprehension for the CampusReader project also emphasise this broad and interdependent approach. This project was dedicated to designing and evaluating electronically delivered reading strategies for individuals whose severe reading impairments affected their reading comprehension and access to further education. They very cogently summarised their findings in three overarching principles:

1. “Text comprehension is a dynamic, interactive process between the individual, the text, the reading activity (i.e., purpose) and the larger socio-cultural context for reading (Best, Rowe, Ozuru, & McNamara, 2005; RAND Reading Study Group, 2002; Stanovich, West, & Harrison, 1995; Verhoeven & Snow, 2001).
2. When an individual reads, interactions occur involving both ‘top down’ and ‘bottom up’ reading and cognitive processes (Glushko, 1979; Glushko, 1981; Kintsch & Van Dijk, 1978; Kintsch, 1988; Kintsch, 1998; LaBerge & Samuels, 1974; Lundberg, 1991; Rumelhart & McClelland, 1986; Stanovich et al., 1995; Verhoeven & Snow, 2001; Verhoeven & Perfetti, 2008).
3. Successful comprehension and retention depend on the ability to reliably access and integrate background knowledge, and the ability to generate, maintain and update iterative forms of meaning constructions (Baddeley, 2000; Ericsson & Kintsch, 1995; Verhoeven & Perfetti, 2008; Zwaan & Radvansky, 1998)” (Griffiths et al., 2011, p.1)

The first principle reflects the active role of the reader within a particular social context(s) constructing meaning from text including a reader’s motivation and emotional engagement with text. The second principle highlights a categorisation for different processes and their interactions during reading while the third emphasises background knowledge and experience with language as part of what is brought to and used during reading. Each of these have potential resonances with an extended understanding of music reading.

2.2.1.4 ‘Bottom-up’, ‘Top-down’ and ‘Interactive’ approaches

Approaches to reading that start with the printed text are often referred to as ‘bottom-up, ‘code-based’ or ‘skills emphasis’ approaches whereas approaches that take account of the conceptual knowledge that a reader brings to reading are often referred to as ‘top-down’, ‘meaning-emphasis’ or ‘whole language’ approaches (Pressley & Allington, 2015, pp. 18-19). There have been long standing and well-documented arguments in the reading research literature between advocates of the two approaches. At one end of a continuum, ‘bottom-up’ processes emphasise explicit teaching of decoding skills so that a reader can translate printed text to spoken words. Learners are explicitly taught how to map the sounds of a language to the letters of the writing system or code for the language allowing a reader to ‘decode’ words to recognise and understand them in printed text (reading words from part to whole) (Pressley & Allington, 2015). Criticisms of over-emphasis on a phonics approach in teaching reading included accusations that children were engaged in mere skill and drill activities, learning to ‘word name’ or ‘bark at print’ (Samuels, 2007) whilst decoding and pronouncing words, but without reading for understanding or meaning. Interestingly, music educator

Keith Swanwick (1999) used this same criticism of ‘barking at print’ for approaches to music notation. This criticism could be made of singers who accurately decode musical sounds from notation but who do not sing fluently or meaningfully with expression and understanding or have an overall concept and intention for the direction of the music.

At the opposite end of the continuum, in ‘top-down’ or ‘whole language’ approaches, construction of meaning was prioritised as the driving force in reading rather than letter- or word-level processes. (Pressley & Allington, 2015, pp. 33-34). An advocate of this approach Goodman (1967), influenced by Chomsky’s development of linguistic theories, mistakenly believed that reading was a natural by-product of immersion in print experiences analogous to the human capacity for learning language. He described reading as ‘a psycholinguistic guessing game’ where learning to read was ‘more about learning to guess words well, based on the meaning cues in the text and the prior knowledge brought to the text by the reader’ (Pressley & Allington, 2015, p. 34). In ‘whole-language’ approaches, children were encouraged to recognise words by sight through the use of graphic, semantic, and syntactic cues rather than by explicit decoding of letters within words. Word recognition skills were believed to develop naturally through immersion in print experiences where beginning readers were believed to discover letter-sound regularities from experiencing print and having opportunities to write using invented spellings in meaningful contexts. (Pressley & Allington, 2015, p. 36). Where bottom-up approaches focused attention on the printed text, top-down approaches recognised that the prior experience or knowledge that a reader brought to a text created expectations and influenced how it was understood. Following decades of debate and the emergence of approaches (such as Rumelhart’s (1985) Interactive Model) that incorporated and/or prioritised elements of both traditions and, importantly, took account of a reader’s stance and purpose for reading, there is now a broad consensus that, on the one hand, the ultimate goal of reading is the construction of meaning and, on the other, learning to use effective decoding skills is critical for learning to read in an alphabetic orthography (alphabetic writing system) (Scanlon & Anderson, 2020). Rumelhart’s (1985) ‘interactive’ model of reading describes complex, simultaneous interactions between bottom up and top-down processes and highlights the influence and interaction of various sources of knowledge during reading to facilitate comprehension.

In relation to skilled readers, Castles et al. (2018) highlighted a consensus that a skilled reader constructs a mental representation of the situation described in the text as they read (through analysis of words and their syntactic roles in sentences and drawing upon information in the text and from the reader’s relevant background knowledge). They tell us that comprehension is not:

a verbatim record of what has been read, replicating its form and structure; instead meaning emerges from the formation of a *situation model* (e.g., Kintsch, 1998; Zwaan & Radvansky, 1998) that builds dynamically as people read, culminating in a rich representation of the text that goes beyond what is stated explicitly. (Castles et al., 2018, p. 28)

The background knowledge that a reader brings to the text includes knowledge of language such as syntax and word meanings but also knowledge drawn from personal experience of living in the world such as knowledge of events and temporal relations, emotions and characters etc. (Castles et al., 2018). A reader draws on background knowledge to make inferences within and between sentences in the text to construct meaning. Skilled readers generate inferences automatically but can also intentionally use strategies to support their comprehension. This combination allows readers to actively construct meaning as they read, and to adapt their strategy use and focus to match the difficulty of the text and the purpose for which they are reading (e.g., for pleasure, to gain information). Castles et al. (2018) describe reading comprehension not as a single entity but rather as:

The orchestrated product of a set of linguistic and cognitive processes operating on text and interacting with background knowledge, features of the text, and the purpose and goals of the reading situation. (Castles et al., 2018, p. 28)

The RAND Reading Study Group report (2002) succinctly captures the breadth of what an individual reader brings to a text below.

The reader brings to the act of reading his or her cognitive capabilities (attention, memory, critical analytic ability, inferencing, visualization); motivation (a purpose for reading, interest in the content, self-efficacy as a reader); knowledge (vocabulary and topic knowledge, linguistic and discourse knowledge, knowledge of comprehension strategies); and experiences. (Snow, 2002, p.xiii)

Echoing this view, Elleman and Oslund (2019) identified common components that were important across models that they reviewed and proposed key areas to target to improve instruction and learning in reading comprehension. They advocated an early and sustained focus on developing background knowledge, vocabulary, inference, and comprehension monitoring skills in reading instruction for comprehension. Explicit instruction in reading comprehension strategies was also supported by the National Reading Panel (2000). It appears then that there is a consensus that when bottom-up decoding and word recognition skills are mastered, top-down approaches are key to facilitating comprehension.

Musical understanding in reading can also be construed as a dynamic, interactive process between the individual, music notation and the nature of the reading activity within a larger socio-cultural context. Like the reading of text, some music comprehension processes are ‘bottom up’ data-driven processes (focused on the recognition of notes or patterns of notes and rhythms) whilst others involve activating ‘top down’, conceptual processes (for example, in placing a note within a phrase, knowing where it is leading to). The ability to generate, maintain and update mental representations of music is key in music contexts. As Lehmann and Davidson (2002) observe:

Music making entails perceptual ... cognitive ... and motor skills. These skills function, interact and evolve in complex ways. (Lehmann & Davidson, 2002, p. 542)

Sloboda (1985) notes this inextricable link between the type of musical fluency that indicates understanding in relation to expert music performance. Details of a performance are managed through highly automated procedures leaving a performer free to attend to higher-order aspects of the music. Fluency is required for understanding to be conveyed and understanding the music aids fluency in its performance. The music is meaningful to the reader. Therefore, the performer makes musical meaning in performance.

In relation to music reading, Sloboda (1985) gives an example of automaticity in action where an experienced sight-reader’s hands automatically take up the correct configuration for familiar scale passages, allowing the reader’s attention to be focused on expressive factors (Sloboda, 1985). Whilst this example is of reading whilst playing an instrument, automaticity in music performance is not concerned solely with motor processes. More critically, it involves musical thinking and comprehension processes. In addition to the practise involved, the mental processing of many separate notes as single integrated and automated units, like word or phrase recognition in language reading, is key in developing fluency in music reading and performance. A person’s interaction with music involves forming an abstract or symbolic internal representation of the music. This is sometimes described in the literature as auditory imagery (Brodsky et al., 2003) or musical imagery, (Gelding et al., 2021). The development of music representations is achieved through the handling of the materials of music, one aspect of which is notation. This is analogous to language use, where speaking and writing abilities draw upon a stock of experience with language, which includes experience with written language texts.

2.2.1.5 Sociocultural perspectives - emergent literacy

Conceptions of literacy and reading have expanded over time from a focus on skills and cognitive processes that individual readers use to understand text to a wider understanding of reading and writing as social practices:

Social practices that are always embedded in particular cultural contexts and that are shaped by the purposes they serve and the activities they are part of. (Papen, 2005, p. 1)

Literacy is understood to be ‘emergent’, in that the informal literacy knowledge, skills and understanding that children bring to learning to read from interactions with parents, family and their environments is recognised as a foundation for formal learning. From a sociocultural perspective, learning to read and write is viewed not as a particular set of skills to be learned but more as:

A set of social practices for making meaning from text, specific to particular social contexts into which children are gradually initiated by the people around them and through which they engage in important socially defined activities. (Gee, 2003 in Schwanenflugel & Knapp, 2016, p. 35)

These social practices are rooted within a child’s everyday life and community. Neaum (2017), drawing on Barton et al. (2000), supports this view of literacy as a social practice and tells us that the rich literacy experiences with which children come to school (such as spoken language, use of technology, experience with drawing and art materials, observation of others’ handwriting and using technology for writing) give literacy practices function and meaning.

Sociocultural literacy researchers warn against taking a deficit view of the language and literacy skills of children whose homes, cultures and communities’ literacy practices differ from those of school. Instead, they recognise the *funds of knowledge* (Moll et al., 1992) that children bring to learning to read. Research drawn on sociocultural theories also recognises the prevalence and influence of popular culture and media on children’s literacy practices (Marsh, 2006; Hagood, 2003).

If this principle is applied to music, one would expect that musical skill and prior musical experience would be key to what a child brings to learning to use notated music. This would include their facility in music making, the contexts in which they have encountered music and music making, the stock of ‘musical vocabulary’ that has been built up and the understanding they have acquired of particular features of music. Children are born into and become immersed within the musical worlds of their families and immediate environments, shaping both their musical identities and musical development (Campbell & Lum, 2007). Children who sing in choirs are likely to have developed a range of musical

skills acquired through a combination of enculturation and training (Sloboda, 1985) that they bring to choral settings. This may include their experiences with music in popular culture, involvement with traditional music as well as instrumental learning. Awareness of the musical vocabulary and experiences that singers bring to music reading in choir has the potential to expand thinking on approaches to developing music reading fluency.

Strickland & Riley-Ayers (2007) remind us that oral language skills encompass listening comprehension (attending to and responding with understanding to spoken language), verbal expression (using language to communicate) and vocabulary development. Vocabulary development is considered within two distinct categories; ‘receptive vocabulary’ words that children understand when heard in context and ‘expressive vocabulary’ the language that children can use. This vocabulary feeds into children’s facility with vocabulary in reading and writing. An understanding of children’s musical vocabulary as contributing to music reading has potential for expanding approaches to developing fluent music reading.

In addition to reading as an aspect of social practice, Kennedy et al. (2012, p. 61-62) draw attention to research on multimodal practices of young children in homes and in school that highlights their competency in “making meaning from a range of modes across a variety of media, such as computers, television and electronic toys (Flewitt, 2011; Wolfe & Flewitt, 2010)” and encourages the use of multimodal approaches in literacy practices. Flewitt (2012) also includes:

the different modes that people use as they engage in face-to-face interaction (such as gesture, gaze, artefacts and language). (Flewitt, 2012, p. 296)

Children’s meaning making and multimodal practices are also evident in their musical lives and, consequently, on the ‘funds of knowledge’ (Moll et al., 1992) that they bring to their learning in music literacy. Researchers such as Barrett, 2005; Campbell, 2010; and Lamont, 2002, describe children’s musical interactions as broadening out from those within the family setting to contexts that include friends, communities and virtual communities. Davis (2015) describes children being enculturated into popular music styles “through television, radio, movies, music videos, and games, and through personal music devices and social media” (p. 265). Christenson (as cited in Davis, 2015) highlights that this association with popular music does not begin abruptly at the onset of adolescence but rather “evolves over the years from early childhood to adolescence” (p.266) and that listening to music plays a crucial role in this evolution. Far from being passive recipients in their interactions with music, Barrett (2003) describes contemporary children as ‘meme engineers’ who actively control their

listening experiences. Awareness of the agency and rich experience that children bring to music reading has potential resonances with an extended understanding of music reading.

2.2.1.6 Conclusions

Reading is understood to be part of a broader range of language literacy skills that include speaking, listening, and writing. Analysis of research literature on language reading fluency has suggested several concepts and processes as having potential for music reading fluency. These include: ‘sight words’, decoding skills, prosody (expression) and comprehension.

1. ‘Sight words’: Automatic retrieval from memory of the pronunciation and meaning (and syntactic role) of a word on sight of the word in print facilitated by ‘untization’ and ‘automaticity’.
2. Decoding skills as developed and supported by
 - i. Phonemic and phonological awareness (before and during reading)
 - ii. Accuracy and automaticity in mapping the sounds of the language onto the symbols of the writing system (letter/sound or grapheme/phoneme correspondence acting)
3. Prosody: Appropriate expression coupled with phrasing when reading that allows for the maintenance of meaning.
4. Comprehension and meaning making as facilitated by the types of prior knowledge a reader brings to a text.
 - a. Linguistic knowledge (a foundation of oral and aural experiences)
 - b. Knowledge of the writing system for the language (orthographic knowledge)
 - c. Knowledge of the world (general knowledge and experience of living in the world)

2.2.2 Music reading fluency

In comparison to the wealth of research available in language reading, a relatively small amount of research has been conducted in music reading. Research on music reading has lacked both a theoretical underpinning and a clear research focus resulting in what Hodges & Nolker (2011) describe as “a feeling of a scatter-shot approach, rather than a sustained research agenda that builds from study to study” (p. 81). Although choral sight-singing is identified as one consistent stream of applied research in music reading, a relatively small amount of research literature is directly related to the development of sight singing from music notation (Hodges & Nolker, 2011). Much of the literature concerns reading in relation to playing an instrument. Music reading for instrumental performance has been

considered a transcription task ‘where information in one form (notational) is converted to another (kinaesthetic)’ (Fine, Berry & Rosner, 2006, p. 433). Gudmundsdottir (2010) observes that music reading on an instrument “does not necessarily require internal representations of pitch as sight-singing does” (p. 332). Whether in relation to instrumental playing or sight singing from notation, most of the research on music reading is practice-based rather than theoretical.

The wider research on music development has some aspects that could usefully form a foundation for an expansion of thinking in this area. This section of the literature review considers aspects of the literature on music reading, music development, and music representation to consider how each resonates with the ideas identified from language reading.

2.2.2.1 Sight-reading and musical understanding.

Sight-reading is a skill used in both language and music. However, it can be a misleading term. It is not the ‘in the moment’ process it seems to describe but is based on an already developed deep knowledge. This is well recognised in language reading where fluency and comprehension are the goal. Almost all reading of language is deep knowledge-based sight-reading (Sloboda, 1985). In music reading, notation is often used in learning or memorising a piece for performance without a score. However, whatever the purpose, a music reader similarly relies upon prior musical knowledge. Music notation acts as an *aide mémoire* to cue or trigger sounds already known from memory. Musicians differ in their abilities to sight-read music notation and, as Mishra (2014) observes, it has been the focus of pedagogical intervention since medieval times when Guido d’Arezzo (discussed later) first proposed a method of teaching sight-singing.

2.2.2.2 Interventions in music reading research to improve sight-reading accuracy.

Findings from a meta-analysis of sight-reading experiments carried out by Mishra (2014a) highlight the important connections between fluent sight-reading from notation and musical understanding. The purpose of her research was to investigate whether experimentally tested sight-reading interventions positively influenced sightreading accuracy. Ninety-two studies were included for analysis encompassing sight-reading and sight-singing interventions with groups of varying age and experience. Mishra (2014a) reported what whilst most of the primary studies reported non-significant effects for treatment (intervention), “when considered as a whole, the body of research suggests that treatments have a positive effect on sight-reading and that this effect varies by treatment type” (p. 145). She also noted that treatments affected instrumental sight-reading and sight-singing in the same way and that there were no significant differences in considering the age and level of experience of the participants.

In her analysis, treatments were grouped into ten categories, adapted from those developed by Hodges (1992). The categories were: Aural Training, Collaborative Activities, Controlled Reading, Creative Activities, Instrumental Training, Interval Drill, Movement, Notation (altered notations), Rhythmic Drill, and Singing/Solfege. The interventions that were found to significantly and positively affect sight-reading were in the treatment categories of Aural Training, Controlled Reading (control of the amount of content that a reader sees at a time and pace of presentation), Creative Activities and Singing/Solfege. It was an unexpected finding that rhythmic training and movement activities did not contribute to sight reading significantly. In a subsequent meta-analysis of separate rhythmic and melodic sightreading interventions however, movement activities were found to enhance rhythmic sightreading, highlighting sight-reading as a multi-modal activity (Mishra, 2016).

Mishra's (2014) research also found that sight-reading generally improved during the primary studies for both the control and the treatment groups. She suggested that this finding supports the idea that practising sight-reading improves sight-reading skills. This resonates with findings on reading-fluency development in the language reading literature. Repeated reading of texts and the reading of several texts within genres are recognised evidence-based strategies used to improve reading fluency (Rayner et al., 2001). A separate link to fluency development in language reading was her (2016) preliminary finding that melodic sight reading is positively affected by sight reading with accompaniment or in a group (a 'collaborative' treatment). 'Assisted' strategies (such as choral reading and paired-reading) are used to support fluency development in language reading.

A second significant way in which her findings link to those in language reading research is in the recognition that reading involves much more than just decoding symbols. Higher-level comprehension processes which draw upon a reader's previous knowledge, understanding and experience are understood as being key to reading fluency in language reading literature. Her analysis revealed that interventions, such as solfege, that encouraged a deeper musical understanding and, from this, the development of musical expectations were the most effective in improving sight-reading skills.

The use of moveable-do solfege emphasized the tonal construction of the music possibly allowing for predictions based on expected harmonic progressions. (Mishra, 2014, p. 148)

Like language reading, sight reading goes beyond the simple visual decoding of notational symbols in that it is 'a musical activity that relies on expectations developed during previous musical experiences' (Mishra, 2014, p. 147).

Aural training. Aural training, advocated in the sound-before-symbol philosophies of Pestalozzi, Rousseau, Gordon, Kodály and Suzuki, also emerged as linking with developing musical knowledge, and as benefitting sight-reading skill. It encourages an understanding of the music as a whole and the development of expectations that allow for more sophisticated predictions during sight reading. “Rather than constructing the music from individual notes or patterns, the reader is instead scanning ahead to determine whether predictions are fulfilled” (Mishra, 2014, p. 147).

Creative Activities. This emphasis on sight-reading drawing upon a reader’s musical knowledge was also demonstrated in interventions based on creative activities such as composing and improvisation.

Training in composition and improvisation allows the sight-reader to predict the structure of the piece based on previous knowledge of musical structure. In addition, improvisation also requires thinking ahead in the music and the production of material that is stylistically appropriate; a skill that appears to transfer to sightreading. (Mishra, 2014, p. 147)

In Mishra’s (2014) view, the results of the study can be interpreted as supportive of Sloboda’s (Sloboda, 1984) understanding of sight-reading as a form of musical perception and understanding. Her findings echo his view of sight-reading as more than just a visuo-motor task, but a task that also engages cognitive processes, tapping into the musical knowledge of the performer (Mishra, 2014).

Reading ahead. Findings from the controlled reading interventions showed that pacing procedures, forcing the eyes forward in the music, resulted in better sightreading. Mishra (2014) notes that whilst controlled reading interventions may be useful in targeting readers whose sight-reading difficulties result in difficulties in decoding notation or in scanning ahead, the interventions previously mentioned which are aimed at promoting understanding of the underlying structure of a piece may be more beneficial.

Thinking in sound or ‘audiating’ in music reading. A separate significant finding in her research is the role that auditory perception plays in the sight-reading process. Mishra refers to cognitive research (Fine et al., 2006; Kopiez & Lee, 2008) which confirms that auditory representations influence sight-reading. She also cites neurological research (Haslinger et al., 2005) which confirms that auditory processing is evident even when auditory feedback is removed. This resonates with Gordon’s (2007) theory of auditory imagery and the role of audiation in promoting musical understanding in sight-reading. Gordon coined the term ‘audiation’ to describe a process that he believed was fundamental to music aptitude, achievement, and learning. In his view, audiation involves “hearing and comprehending in one’s mind the sound of music that is not, or may never have been, physically present” (Gordon, 2007, p. 399). In effect, ‘audiation’ is thinking sound internally. He explains that

when we listen to music, we instantly aurally perceive the sounds but that it is not for a moment or so after the sound is heard that we audiate and give meaning to that sound. Notational audiation is not simply decoding symbols theoretically without hearing the music. It involves transcending the visual symbols representing the sound of the music and hearing the music that the symbols represent. As he attests:

Unless we can audiate the music that we read and write in notation, we cannot give musical meaning to notation. All we can do is attempt to take theoretical meaning from notation. In that case, we are ‘faking’ the reading of notation. If we cannot audiate, the best we can do is decode notation. Reading notation should not be an act of decoding, it should be an act of audiating. (Gordon, 2003, p. 79 in Mishra, 2014a, p. 147)

Mishra’s (2014) meta-analysis highlights the importance of activating musical knowledge and the role of auditory processing in sight-reading. Aspects of the interventions she describes echo Sloboda’s (2005) suggestions for acquiring instrumental sight-reading proficiency. Whilst his focus was upon instrumental sight-reading, many of the suggestions can be adapted for sight-singing. Mishra’s (2014) research on improving sightreading accuracy has highlighted interventions that have potential for improving children’s music reading in choral contexts. Interventions found to be most effective for improving sight reading were training in aural skills, use of singing and solfege, creative activities (improvising and composing) and controlled reading (controlling the content and pace of material viewed). Rhythmic training (involving use of counting, syllables, movement and rhythmic drill) was found to enhance rhythmic sight-reading, rather than melodic or combined rhythmic and melodic reading whilst collaboration and instrumental training benefitted melodic sight reading (Mishra, 2016).

Henry (2011) who had previously investigated concurrent sight singing of rhythm and pitch in target melodies, found that singers prioritised melodic accuracy over rhythmic accuracy, with rhythmic accuracy predicting success in melodic accuracy, but not vice versa. Additionally, singers with instrumental experience were better able to integrate rhythm and pitch information from notation, highlighting the role of musical experience and knowledge in music reading as in language reading. Mishra (2016) observed that there was a growing body of neurological research to support the idea that rhythmic and melodic sight reading are two distinct neurological processes, and that research further supports the idea of a multi-sensory executive integration process that can be enhanced by training. She suggested that interventions used to improve sight reading should recognise that interventions to improve rhythmic, melodic and combined rhythmic and melodic reading may vary.

More recent research has continued to focus on achieving music reading, including sight-singing, accuracy. Pomerleau-Turcotte et al., (2023) investigated (college-level) singers' awareness and use of cognitive strategies in sight-singing. Interestingly, from a language reading view, they include 'decoding notation', 'relying on automatic skills' and 'using musical knowledge' in the categories of strategies listed by participants. Fournier et al. (2019) developed an inventory of cognitive strategies related to sight-singing for use in aural skills pedagogy where 72 cognitive strategies were identified, drawn from a combination of research literature, professional books, sight-singing manuals and interviews with music students and aural skills teachers. Four main categories of strategies emerged: 1. reading mechanisms, 2. sight-singing, 3. reading skills acquisition and 4. learning support. Pitch decoding, pattern building, and validation (checking accuracy) strategies were included in reading mechanisms. Sight singing strategies were described in relation to both preparation and performance. Music vocabulary enrichment was included as one strategy within reading skills acquisition. Symbolic association (e.g., use of solmization), internalisation and rehearsal or practising techniques were the other in this category. Within the 'learning support' category, strategies in self-regulation, time management, attention, stress management and motivation were identified.

The music reading research literature reviewed above focuses on interventions and strategies for acquiring sight singing skills with particular emphasis on accuracy in decoding pitch and rhythm. References to expressive aspects of sight singing are rare. It would appear that current and past emphasis is on achieving sight singing accuracy as a first step towards expressive, fluent music reading.

2.2.2.3 Research drawn from language reading

Research that considers children's music reading in relation to their learning in language reading often describes how training in music can benefit language literacy skills (e.g., Strait & Krauss, 2011; Hansen et al., 2014) or focuses upon understanding underlying neural architecture in both domains (e.g., Patel, 2003). Links have also been made in relation to music reading.

McPherson and Gabrielsson (2002) drew analogies with children's reading of text when exploring the question of when to introduce notation to young instrumental learners. Citing Schleurte (1977) they highlighted the language experience that children bring to learning to read text in relation to music reading for instrumental playing.

Like reading text, learning to become musically literate involves more than linking visual cues with instrumental fingerings; otherwise instrumentalists become button pushers 'to whom

notation only indicates what fingers to put down rather than what sounds are desired’.

(Schleuter, 1977, as cited in McPherson & Gabrielsson, 2002, p. 104)

Mills and McPherson (2015) hypothesised on children’s progression in music reading as follows: Levels of text and musical processing comprised processing of 1. Features; 2. Letters/musical notes and signs; 3. Syllables/intervals; 4. Words/groups; 5. Word groups/motifs or note grouplets, 6. Idea/musical phrase or figure, 7. Main idea/musical idea and 8. Themes/musical subject.

My research extends this work by drawing upon choral conductors’ understandings of the extent to which concepts and ideas from language reading literature can extend and support thinking on music reading in choral contexts.

2.2.3 Theories of musical development

Extensive literature on musical development and musical understanding can be drawn upon to inform music reading. Language reading theory draws upon and is influenced by theories of child development (e.g., Connor 2016). Conversely, children’s progress in reading is one means of assessing aspects of development. Gudmundsdottir (2010) suggests that acquisition of music-reading skills is closely related to children’s levels of cognitive development. McPherson and Gabrielsson (2002) similarly relate developmental issues with implications for teaching in relation to music literacy.

The ways in which musical development is conceived affect expectations of learners’ achievement in music reading. Some conceptions have been problematic for music reading. For example, there is, in literate societies, an expectation that all children will develop the ability to read and to learn from text, and that, unless there are other factors at play, reading is an attainable skill. If a child struggles to learn to read, interventions are put in place to support progress. This has not been the assumption for music reading nor indeed for musical development.

2.2.3.1 Perceptions of musical development

The notion of ‘talent’ has prevented a general acceptance that all children have an innate capacity to develop in music. The achievements of individuals, particularly in music performance, rather than inspiring others, have led to a belief that there is something exceptional about musical ability or musical excellence. Sloboda & Davidson (1996) cite two widespread myths about musical excellence. The first is the notion that high levels of musical accomplishment are rare. The second is that high levels of skill are “predicated on unusual early musical attributes or capacities” (p. 176). They dispel the first myth by referring to literature on non-Western cultures where musical achievements are

commonplace across societies (Blacking, 1973; Merriam, 1967). The second, they refute with reference to studies of interviews of parents of successful young musicians (Sloboda & Howe, 1991) where no distinctive behaviours were observed in children, who later became proficient, that differentiated them from other children. In their view, music performance ability builds on a very common human heritage, rather than a rare set of special characteristics. Like children's progress in reading texts, parental interest and support was found to be of more influence in children's musical progression and achievement than innate capacities. Notions of 'talent' per se are, therefore, not useful for thinking about musical development unless as Sloboda (2005) suggests it is re-construed and conceived of as existing in equal measure in most of the population. Hargreaves' (1986) solution to the problem of talent is to re-posit musical talent or ability as musical competence and suggests that there is a normative level of music competence in society just as there is a normative level of language competence in society.

In addition to recognising musical competence as normative in society, considering the notion of expertise can also be useful for thinking about music reading. Sloboda and Davidson (1996) characterize musical expertise in performance as having two broad dimensions: the technical and the expressive (an ability to produce sounds fluently and communicate meaning). Technical and expressive musical dimensions echo the distinction in language reading between accuracy in decoding words from print and fluent expression of understanding or meaning. Whilst technical skills are recognised as necessary for accuracy, they are deemed insufficient for a musical performance. As in reading text aloud, it is expression that gives notated music meaning in performance. This can be both a useful and limiting concept for music reading if accurate decoding and expression of meaning are not integrated and remain separate. A fluent language or music reader automatically and accurately decodes whilst making and communicating meaning in expressive performance as one activity rather than as separate tasks. In Sloboda and Davidson's (1996) view, a performance is rendered expressive when it highlights important structural features of the music to a listener such as cadence points or phrase peaks. Musical understanding, they suggest, is tied to internal abstract structural representations of the music. They propose that expressive performance is rule-governed and suggest five characteristics of expressive performance as follows: (1) First is that expressive performance is 'systematic' in that use of particular expressive devices by performers are related to structural features of the music; (2) it displays 'communicability' insofar as listeners can infer structural features of the music from the use of expression; (3) it shows 'stability'; (4) it displays 'flexibility'; and (5) expressive performance evidences automaticity. Like skilled language readers, experienced performers are not always aware of the details of how expressive intention is translated into action (Sloboda and Davidson, 1996).

The automatization of a rich knowledge of structure or pattern can lead to the experience and appearance of ‘intuition’, when a skilled performer simply ‘knows’ what to do, without being aware of any cognitive effort in producing a solution. (Sloboda & Davidson, 1996, p. 175)

They believe that this knowing comes about when a musician “has a large repertoire of expressive responses that can be mobilized in performance in response to specific musical structures without overt conscious deliberation” (Sloboda & Davidson, 1996, p. 175). Automaticity is achieved through practice on the one hand, and through developing musical understanding, on the other. The skill practice and musical understanding that appear to be prerequisites for fluency in musical performance would also appear to be necessary for music reading. Through performing, a learner develops knowledge of how music works. Resonating with how knowledge of language informs reading of print, this is one type of musical experience that informs music reading.

2.2.3.2 Enculturation and normative musical capacities

One avenue of musical development encountered by all in a population is that of enculturation, learning that occurs because humans are predisposed to learning from their environments and their experiences of being in the world (Sloboda, 1985). Children are born into and become immersed within the musical worlds of their families and immediate environments, shaping both their musical identities and development (Lum & Shehan Campbell, 2007). Unlike ‘training’, which involves explicit instruction and self-conscious effort on the part of the learner, through enculturation music skills are developed without explicit instruction or conscious effort to learn (Sloboda, 1985). Musical understanding acquired through enculturation creates music expectations which are brought to and applied in music reading. Social and cultural contexts of learning need to be identified to explain competence in terms of individual psychological developments (Hargreaves, 1996; Light & Blaye, 1991).

2.2.3.3 Musical development and learning theory: Audiation

A cognitive model of musical development that focuses on musical learning through both experience and training is Gordon’s Learning Theory (2007). The key tenet of Gordon’s theory is audiation which he likens to comprehension in language. As he explains:

Sound itself is not music. Sound becomes music through audiation, when, as with language, you translate sounds in your mind and give them meaning . . . Audiation is the process of assimilating and comprehending (not simply rehearing) music we have just heard performed or have heard performed sometime in the past. We also audiate when we assimilate and

comprehend in our minds music we may or may not have heard but are reading in notation or composing or improvising. (Gordon, 2007, pp. 3-4)

He describes four ‘vocabularies of music’ (1) listening, (2) speaking, (3) reading, and (4) writing and often uses analogies with language in outlining and explaining his theory. His concept of ‘notational audiation’ is significant for this research in that ‘hearing’ music internally from notation is viewed as central to understanding notated music.

If you hear musical sound and give meaning to what you see in music notation before you perform it, before someone else performs it, or as you write it, you are engaging in notational audiation. (Gordon, 2007, p. 7)

He described eight different types of audiation and proposed six stages of audiation which he suggested follow a developmental sequence. As Hargreaves and Lamont (2017) note, Gordon (1976) developed a ‘complex and detailed’ account of music learning within three interrelated music learning sequences targeting skills, tonal content and rhythm content. However, they suggest that Gordon’s contributions to musical aptitude testing (e.g., Gordon’s (1965) Musical Aptitude Profile) may be of more significance and impact than that of his music learning theory. Further, they question whether his theory is too narrowly focused for widespread applicability in different social and cultural environments. Nonetheless, for this research, his concept of notational audiation is useful for thinking about how internally heard sound prompted by patterns in notation can contribute to musical understanding in music reading.

2.2.3.4 Musical development as creative thinking

Speaking and writing are understood to be the complementary literacy skills to listening and reading for interacting with and developing language. Some theories of musical development stem from exploring individual’s improvising and composing. If musical development were conceptualised in terms of creative thinking (as in constructing or creating), Webster’s (2002) model of creative thinking in music could be usefully considered. Webster emphasises that creative thinking is not a process “reserved only for those who are labelled genius. It can be defined and identified in us all” (Webster, 1988, p. 34). Whilst developed in relation to composing, his model incorporates interactions between the individual, the activity and the environment, that echo the RAND reading study group’s emphasis on the interactions that occur between the reader, the text, the purpose, and the sociocultural context for reading in language reading (Snow, 2002). Webster proposes that the critical musical ability to think in sound is developed through listening, performing and composing activities. His Model of Creative Thinking Process in Music (2002) suggests a thinking process incorporating interactions

between enabling skills (aptitudes, conceptual understanding, craftsmanship, aesthetic sensitivity) and enabling conditions (motivation, divergent-convergent thinking, environment, and personality) and a shift between divergent and convergent thinking to achieve an intended creative product. The concepts of enabling skills and conditions, together with the notion of convergent and divergent thinking have potential for conceptualising musical thinking in music reading.

If musical development is conceived of as proceeding through phases of development in competency where a gradual accumulation of organised skills and knowledge occurs in a smooth, continuous fashion with age, Hargreaves and Galton's (1992) composite Model of Artistic Development, offers "an approximate map of the normative development of musical competence, with some broad landmarks for evaluating the competencies of individual children" (Hargreaves, 1996, p. 167). The model draws on research by Swanwick & Tillman (1986), Bamberger (1991), Moog (1976), and Trehub et al. (1984) whereby the cognitive rules and strategies observed to underlie listening and generative skills in music were: (1) Sensorimotor or 'Presymbolic'; (2) Figural; (3) Schematic; (4) Rule Systems; and (5) Professional or 'Metacognitive'. Within music, developmental progressions were described for singing, melodic perception, composition and musical representation. An awareness of children's developing abilities has potential for understanding children's progress in music reading.

2.2.3.5 Musical development as symbolising sounds

It is significant for this research that children's own representations of music were considered sufficiently important to warrant their inclusion in Hargreaves and Galton's (1992) Model of Artistic Development. If musical understanding is an important part of fluent music reading, researching children's invented notation to reveal their understanding may be useful in illuminating the elements of this.

Much of the research on children's invented representations of music, particularly in the research carried out by Gardner and his colleagues at Harvard, builds upon Bruner's Cognitive Developmental Model (1966). Bruner proposed three modes of representation applicable across domains of learning. They were evident through the type of representation that children engage with: the enactive, iconic and symbolic modes. Enactive representations of understanding drew upon physical means or actions as representations. Iconic representations could involve use of pictures or icons to represent understanding whereas symbolic representations were more abstract and could involve words (rather than pictures), numbers or repurposing of other existing symbol systems or an abstract use of an invented symbol system. Bruner insisted that although these modes of understanding may emerge successively, later modes do not replace the earlier and all three can be drawn upon in developing understanding.

Research on children's invented notations demonstrates children's increasing musical knowledge and development in musical thinking. How they represent music shows how they understand music and what aspects they are aware of and give attention to. Bamberger's (1991) pioneering research on intuitive and formal types of musical knowledge, for example, draws upon children's capacity to represent their musical thinking (Hargreaves & Lamont, 2017). In a seminal study (1991) she distinguishes between what she describes as 'figural' and 'metric' modes of representation in notations produced by children in response to rhythm patterns and suggests that figural and metric forms of musical understanding might represent different 'hearings' of a piece that are not mutually exclusive (Hargreaves, 1986).

I conclude that the goal of musical development is to have access to multiple dimensions of musical structure, to be able to choose selectively among them, to change focus at will.
(Bamberger, 1991, p. 4)

Importantly, children's invented notations help to shape their 'internalised active organizing constraints' (1991, p. 15). Musical symbols help children's musical understanding in a cognitive process involving several levels, which she referred to as 'multiple hearings' (Runfola & Swanwick, 2002). Like Hargreaves and Galton (1992), Bamberger appears to conceive of musical development as an accumulation of musical skill. However, whilst she suggests that there may be hierarchical stages in which early structures are integrated into later ones, she stresses the interchangeability of levels rather than a fixed sequence of development. Her thinking is reflective of Bruner's (1966) on the development of representation through enactive, iconic and symbolic forms where he highlights that the ability to use later symbolic modes does not displace the use of the earlier modes (Harrison & Pound, 2003). Runfola & Swanwick (2002) criticise the fact that her observations do not "comprehensively reflect the nature of musical activities and behaviour and are not valid across a range of musical activities or modalities" (p. 379). They go on to criticise lack of consideration of the interaction between natural development inclinations of individuals and children's cultural environments in which this development occurs (Runfola & Swanwick, 2002). Despite these criticisms, Bamberger's work is regarded as seminal in revealing children's musical thinking through their invented notations and is described in more detail in the next section. The collection and analysis of children's invented notations has been increasingly focused upon in developmental research in music.

Swanwick and Tillman (1986) advanced a 'spiral' model of general musical development (drawing on Piaget, 1951) that emerged from research and analysis of children's compositions. The model describes four levels of musical behaviour or 'transformations' through which children progress,

‘mastery’, ‘imitation’, ‘imaginative play’, and ‘metacognition’. At each level children give attention to different aspects of music moving from ‘materials’ (sensory impressions, response to and control of sounds), ‘expression’ (perceiving and using sounds expressively), ‘form’ (noticing and creating structures) and ‘value’ (valuing of music, having awareness of their own musical thinking). The third dimension of the model describes a shift from individual, personal musical experiences towards a ‘social sharing’. At level one, ‘mastery’, children move from ‘sensory’ to ‘manipulative’ use of sound materials showing increasing technique. At level two, ‘expression’ there is a shift from ‘personal expressiveness’ to the ‘vernacular’, showing an awareness of and a move towards fitting in with musical conventions. Level three involves a shift from ‘speculative’ to ‘idiomatic’ where children knowledgeably experiment with form. At level four, ‘metacognition’, there is a shift from symbolic to systematic expression, from strong personal commitment to and identification with particular pieces to an awareness of one’s own thinking and appreciation of stylistic and theoretical aspects of music. Whilst this model was based on children’s progression in composing, it points to aspects of music that a child notices and attends to at different stages. The sequence from sensory awareness of sounds to expression, to form or awareness of structural relationships to value or thinking about one’s own thinking in music could be useful in thinking about stages of development or progression in music reading.

Davidson and Scripp, members of Gardner’s Project Zero team at Harvard, used children’s invented notations as a means of gaining insight into children’s musical thinking. Several other music development researchers also include analysis of children’s invented notations to inform their thinking on musical development (e.g., Barrett, 1997; Barrett, 2001, 2005a; Davidson & Scripp, 1989; Gromko, 1994; Pramling, 2009, Upitis, 1992).

Children’s invented notations are also cited as being useful preparations for reading standard notation.

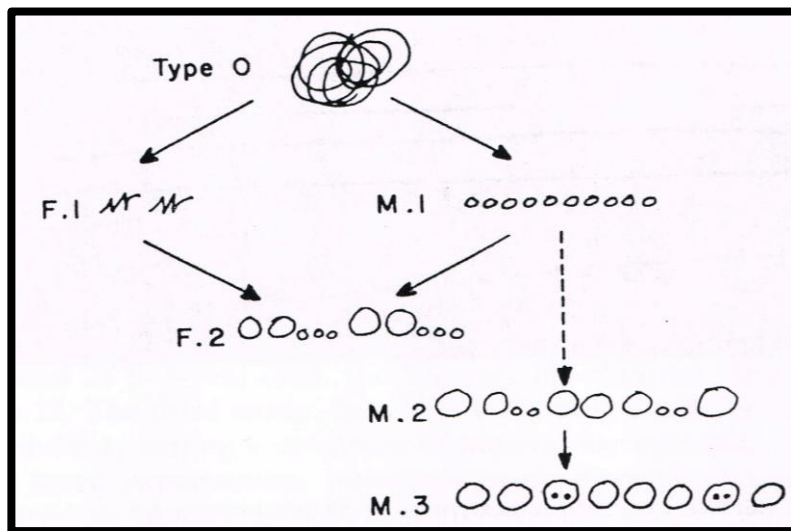
An activity that can prepare young beginners for learning to read staff notation is to encourage them to invent their own notations to represent pieces they already know. This provides them with the metamusical awareness that will enhance their progress towards understanding why staff notation looks and works the way it does. (Mills & McPherson, 2015, p. 180)

In their early writing, children both learn about and reveal their understanding of language and the language writing system when inventing (scribbles) or using the materials of the system to communicate and express ideas.

2.2.3.6 Researchers' use of children's invented notations to reveal their musical thinking

Bamberger's Study of Children's Understanding of Rhythm. One widely cited piece of research in this category is Jeanne Bamberger's study on children's developing musical understanding of rhythm. In her book, *The Mind behind the Musical Ear*, Bamberger (1991) describes how children in a fourth-grade class notated a rhythm pattern that they had invented as part of a class composition. In response to the instruction to "Put down on paper whatever you think will help you remember the class piece tomorrow or help someone else to play it who isn't here today" (p. 23) children made drawings which she later examined. The event served as a type of pilot study for a later broader investigation of children's developing understanding of rhythm (Bamberger, 1991). The 186 children in this study included children from four- to twelve-years of age, the majority of whom did not have experience of standard notation. This meant that the children used their own invented notations to record the patterns. She noted that all the children could recognize, remember and produce the pattern represented in various ways in their diagrams. An analysis of the invented notations enabled Bamberger to create a typology of notations shown in Fig. 2.1 that reveals differences in how children 'heard' or understood the pattern.

Figure 2.1: Bamberger's Typology of Drawings



Bamberger, 1991. (Type 0: Action equivalent; F1 and F2: Figural; M1, M2, and M3: Metric)

In addition to action equivalent scribbles (Type 0 in Fig. 2), two patterns became apparent: one relating to two distinct modes of representing rhythm patterns, figural (F1 and F2) and metric (M1, M2, M3); the other relating to children gaining precision and detail in recording rhythms. Bamberger describes

how the enactive ‘rhythmic scribbles’ or ‘primitives’ (Type 0) reflect the lived experience of a child who does not separate the action of clapping a pattern from the sounds generated. The invented notations of children at type 1, both figural and metric, showed that these children tended to record the number of sound events in a pattern accurately, (a significant development from Type 0) but they recorded it in two distinct ways which, she suggested, reflected two distinct ways of hearing the pattern. F1 (F meaning ‘figural’) children’s ‘played drawings’ revealed that they heard the overall rhythm pattern as two identical shorter patterns. M1 (M meaning metric) children’s notations, on the other hand did not. They tracked each individual sound in the pattern without reflecting any repetition or differences between sound events.

A second development occurs at Type 2. At this point both F2 and M2 children’s notations show an accurate number of sound events. However, whilst M2 ‘metric’ notations evidence children’s measuring the duration of sounds in relation to each other as in standard notation, F2 does not. F2 notations do however suggest that the notators continue to hear the pattern as being made up of two identical figures. M3 notations suggest a further progression where the children hear the sound events in relation to an underlying pulse/metre.

Whilst the typology suggested a general line of progression from type 0 to type F2 or M2/3 Bamberger argued for the existence of ‘multiple hearings’. She believed that the notations in the typology reveal two distinct modes of ‘hearing’ the pattern and that both modes are necessary if children are to apprehend all aspects of the pattern fully. She suggested that progression in understanding of rhythm is not linear but rather lies in the ability to shift focus from one mode of hearing to another complementary way. It is the interaction between these complimentary modes that enriches understanding in the listener. This concept of progression involving the use of an expanding number of strategies rather than progressing from using one to another recurs in research which has involved the collection and analysis of children’s invented notations (Barrett, 2001). It was through investigation of children’s invented notations that these complimentary modes were uncovered and provided a window into children’s musical thinking, hearing and understanding.

A second example of research from this category of researcher-driven use of invented notations comes from the Harvard Project Zero Notations Study (Davidson & Scripp 1988; 1989). As part of this research project Davidson and Scripp carried out a three-year longitudinal study of five- to seven-year-old children’s notations across various rhythmic, melodic, and structural contexts to investigate children’s musical understanding and development.

Previous studies that tracked children’s development in the two musical dimensions of perception and performance suggested that untrained children between the ages of four and seven develop into

surprisingly sophisticated musical listeners and performers. Davidson and Scripp (1988), however, believed that this two-dimensional view left important questions regarding children's levels of musical understanding unanswered. This prompted their interest in children's initial representations of their performance knowledge through invented notations as they believed that this 'third dimension' of children's musical cognitive development could provide additional insights.

Davidson and Scripp's (1988) research design allowed the researchers to analyse children's representational development alongside their performance development across various musical contexts, for example rhythm patterns, pitch patterns, a familiar song and a new song. In the spring of each of the three years of the study, thirty-nine musically untrained children were asked to perform the following tasks:

- reproduce short rhythmic or melodic patterns,
- recall a familiar song (Row, Row, Row Your Boat) and
- learn a short unfamiliar song (Davidson & Scripp, 1988).

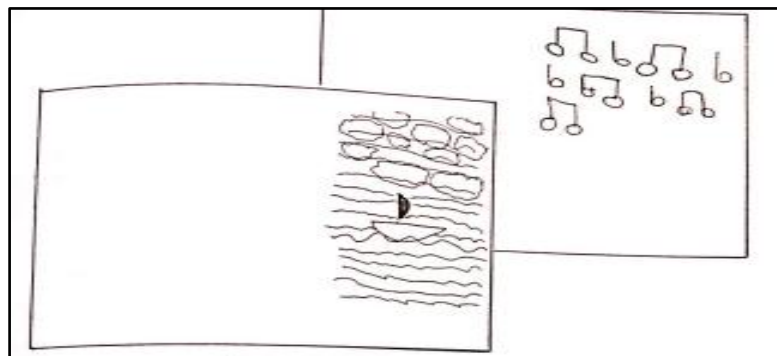
When the song was known, children were asked to "write the song down on your paper so that someone else who doesn't know the song can sing it back" (p. 202). They were encouraged to "use any mark they wished to write down the music if it helped them remember the sound of the rhythms or melodies" (p. 202). Immediately upon completing their notations, children were asked to perform each item while reading from their 'music books' to 'see if the music book would work for someone who couldn't remember the clapping or the singing' (Davidson & Scripp, 1988. p. 202). Later in the session the experimenter asked each child to read back the notations in the 'music book' in random order to ensure that the children were using their own notation rather than recalling the musical fragments from memory. Finally, at the end of the twenty-minute session, each child was asked to explain "how the music book works" (p. 203).

Davidson and Scripps' analysis of notations invented in response to the song Row, Row, Row Your Boat resulted in the construction of a typology of children's invented notations which, they suggested, pointed to development trends in young children's representational knowledge. They found that young children use an extremely wide range of invented and borrowed graphic symbols to create increasingly sophisticated notational systems. The children adapted and organized various families of graphic symbols into symbol systems that mapped particular musical dimensions of the songs. The researchers outlined examples for each category of symbol systems, as follows:

The pictorial system involved the use of picture notations that recorded the song as a global event or action. The example below (Fig. 2.2) shows two pictorial representations, a picture evoking the song

title and a picture of musical notes. This representation type was regarded as a primitive and ineffective system of notation.

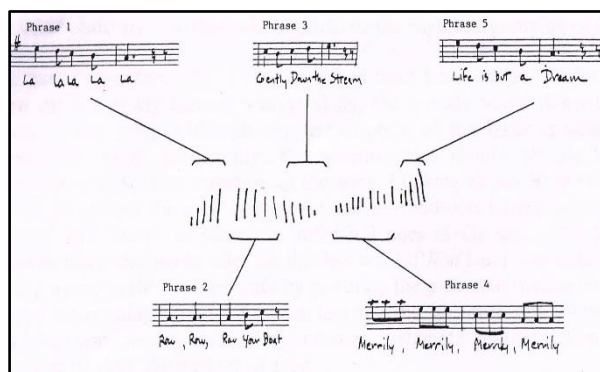
Figure 2.2: Emily's (age 6) Pictorial Representations



(Davidson & Scripp, 1988, p. 205)

The *abstract patterning system* usually featured lines and dots that the children used to represent individual melodic units/notes of the song and 'record the rhythmic groupings, underlying pulse, melodic contour or phrase structure' (p. 204). Whilst it could be difficult to discern which musical dimensions were being coded, it was evident to Davidson & Scripp that the 'abstracters' were interested in capturing the rhythmic and melodic relationships of the notes of the song. They noted the importance of including children's comments on their representations. To understand the use of vertical lines in Figure 2.3, for example, researchers needed to record her explanation that smaller lines indicated higher notes. They also noted her use of spacing to indicate phrase boundaries.

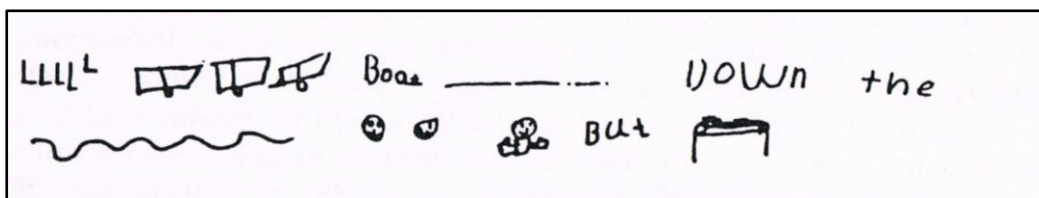
Figure 2.3: Janet's (age 6) Abstract Patterning System with Corresponding Phrases of Row, Row, Row your Boat



(Davidson & Scripp, 1988. p. 206)

The rebus system tended to feature ‘elaborate and flexible *alternations* of icons, conventional signs, and words children use to record the text of the song’ (p. 206). Close examination of rebus makers’ notations often revealed inconsistent but imaginative ways of capturing various salient dimensions of the song. For example, the omission of ‘your’ following the three boat icons for ‘Row, Row, Row’ in Figure 2.4 suggest to Davidson and Scripp (1988) that Aaron may have been tracking the underlying pulse of the phrase rather than every unit of text in the sample below.

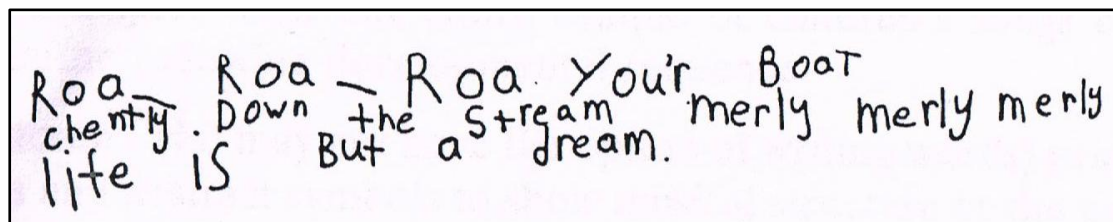
Figure 2.4: Aaron’s (age 6) Rebus System



(Davidson & Scripp, 1988, p. 207)

The text system – used words, letters, or approximations of conventional language symbols children typically use to record the text of a song (Figure 2.5). Text notators often used the graphic layout of the song to illustrate verse structure, direction of pitch or the rhythmic grouping of the song but would usually lack ‘consistent, systematic representation of rhythmic or pitch dimensions of song’ (p. 208).

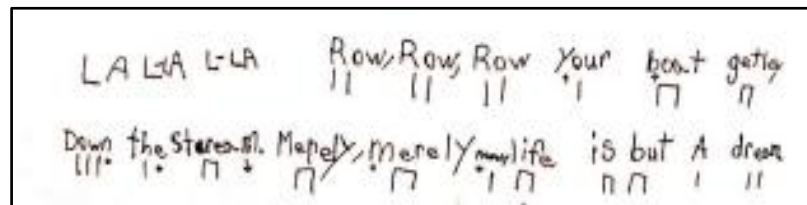
Figure 2.5: Eleanor’s Text System



(Davidson & Scripp, 1988, p. 207)

The combination/elaboration system – displayed simultaneous use of abstract symbols and words to represent the text and musical dimensions together. ‘Elaborators’ are children who consistently employ abstract symbols to modify the text to show how the words are to be sung rather than merely recording the words of the lyrics (Figure 2.6). ‘Combiners’ are children who record both the text and abstract patterning of the ‘notes’ as two separate and equally necessary ingredients of the song’ (p208).

Figure 2.6: Mary's (age 6) Elaboration and Combination System



Source: Davidson & Scripp, 1988, p. 208

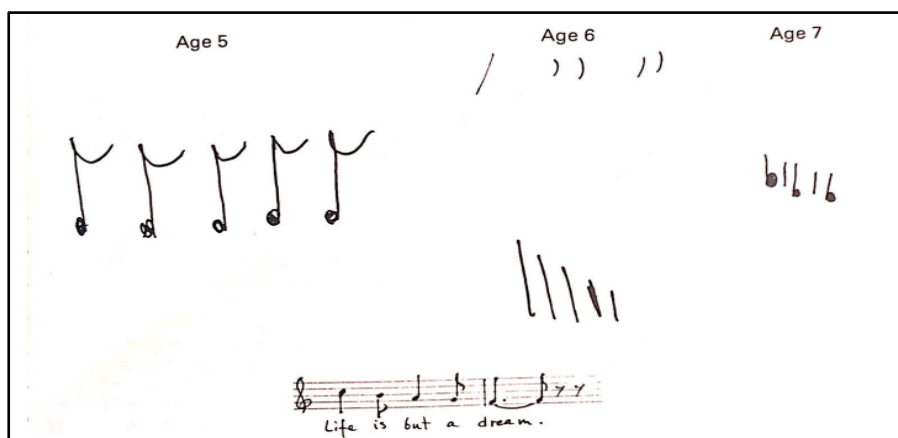
An important finding was that “young children, untrained in music notation, can invent rich and articulate representations of the songs they know.” (p. 197). Children displayed varying ability in encoding the song title, the song story, the song text and the most important musical features of the melody, its underlying rhythmic pulse, pitch contour or phrase structure. They noted that in the notations of the most gifted notators there was evidence of children attending to several musical dimensions simultaneously.

Developmental Trends. Having identified categories of symbols used, the researchers next examined the data gathered over the three years to discover whether there was any evidence of developmental trends in children’s representations of songs between the ages of five and seven. There was considerable evidence for a developmental trend in children’s symbol system use. The sequence of development indicated that pictures of abstract patterns used to represent songs at age five would be superseded by words combined or modified with abstract symbols as children develop.

Within this aspect of the study two results were important to the researchers’ understanding of the children’s music representational development: First, the researchers were surprised to find that, contrary to their expectations five-and six-year-old children predominantly used abstract patterning systems rather than drawing pictures to represent the song. They concluded that the five- and six-year-old children’s preference for the use of abstract patterning symbol systems rather than drawing on their language literacy skills suggested that the children in the study perceived music “as a separate domain requiring its own symbol system uniquely suited to the task of representing musical features” (p. 212). Secondly, as children progressed to using their newly acquired writing skills to transcribe the text of the song, they represented important musical features as well as the words of the song. This was particularly evident at seven years of age when there was a dramatic increase in the use of elaborating marks or abstract patternings in conjunction with the text.

Davidson and Scripp (1988) examined their data for evidence of progression in the degree of representation of the musical dimensions of the song. At age five and six, children were able to represent the song “only at the level of musical units” (p. 214). The samples below (Figure 2.7) show children’s representations of the last phrase of Row, Row, Row Your Boat. The five-year-old uses note symbols to show the number of units in the phrase, one-to-one correspondence. The examples from six-year-olds show rhythmic grouping of notes in one, and, separately, melodic contour in the other. The seven-year-old’s sample, on the other hand, demonstrates both rhythmic grouping and the melodic contour integrated into one representation.

Figure 2.7: Developmental Sequence of Young Children’s Notation of the Final Phrase of Row, Row, Row Your Boat Showing Increasing Control over Dimensions in Notation.



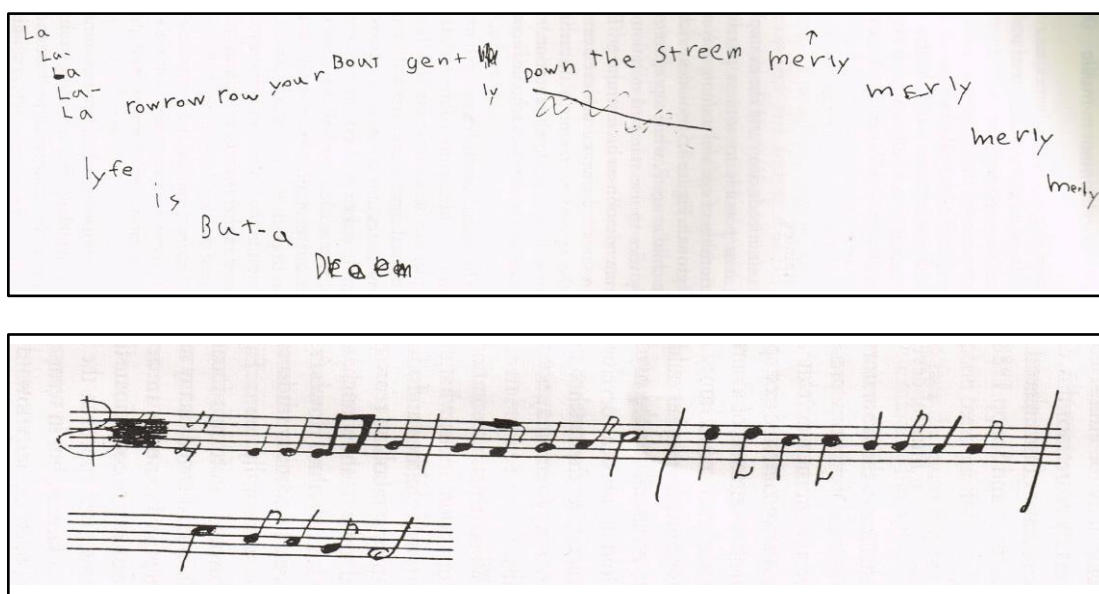
(Davidson & Scripp, 1989, p. 65)

Typically, Davidson & Scripp (1988) found that at age seven, there was a dramatic increase in children’s representational skills. Children demonstrated higher levels of rhythmic structure or pitch relationships in their notations of song. Over the three-year study, there was a difference in the levels of representation of pitch and rhythm with rhythm notation levels being relatively weaker. The results suggested that young children were better able to develop notations that “consistently show the melodic contour rather than the surface rhythms or underlying pulse of the song” (p. 214). Children’s choice of symbol system in representing the song appeared to have little bearing on their representational development. The more sophisticated the level of children’s representation the less of a factor the choice of specific symbol system became. The vehicle of expression becomes less visible with development.

Working with older music students, Davidson, Scripp and Welsh, (1988) observed a conflict between how music students perceived and represented a familiar song, observing that, without intervention, the conflict between perception and conception becomes more pronounced as students get older. Worryingly, “the conceptual ... or the top-down model which informs the choice of what to represent, appears to “deafen” the ear to the actual shape of the specific song” (p. 70).

In a significant separate component of the longitudinal study, Davidson and Scripp investigated differences between musically naïve children and sixteen-year-old trained music students in their representations of the song Row, Row, Row Your Boat (Figure 2.8).

Figure 2.8: Two Notations of Row, Row, Row Your Boat made by a 7-Year-Old and a 16-Year-Old Music Student.



Davidson & Scripp, 1989, p.70

They noticed a puzzling disparity between the understanding that younger children can show using invented notations and that of older students using standard notation. If an individual is familiar with the song, Row, Row, Row You Boat, it is possible to recognise the song from the child’s notated version above which uses the placement of words to indicate pitch relations (complete with the last phrase sung to la as an introduction). Whilst the music student has included graphic symbols indicating clef, a time signature, notes on stave to indicate pitch and duration levels, it is not possible to read back the song from the unsuccessful attempt to capture it in standard notation. Davidson and Scripp (1989) suggest that in terms of Bruner’s representation theory, the music student has selected a more

sophisticated symbolic representation system but in relation to Fischer's (1980) skill theory, the notation does not evidence co-ordination of rhythmic and pitch dimensions. This was even though the 16-year-old in question could play the song from given notation on his instrument with ease. Where the music student sang the correct version of the song from the incorrect notation, the seven-year-old used her invented notation as an *aide mémoire* for the important features for performance of the song. The child invented notation at the level of her musical understanding but the conservatory student was unable to integrate his understanding of the song with the task. They suggested that this points to many music students at the start of their professional training, knowing "more *about* musical symbols than they can *use* successfully" (p. 69). In Davidson & Scripp's work, children's invented notations informed the design, data collection, analysis and ultimately the findings of the research. Furthermore, their work highlighted differences in the degree to which children and students could understand and operate invented and standard notational systems.

2.2.3.7 *Musical development as socially and culturally mediated*

Elliott's (1995) praxial philosophy of music education views music as a social practice. Reacting against an accepted view of music as an aesthetic object, he calls for musical engagement as a socially situated and contextualised practice. Musicianship involves rich procedural knowledge and is a rich form of thinking and knowing. This socially situated view of music and musicianship chimes with a view of music reading as an aspect of emergent literacy in language reading. The 'enactive, creative and self-actualizing' ways of interacting with notation in musical praxis are far removed from 'technical' decoding. Sociocultural approaches to learning in music appear particularly apt for considering children's learning in choral contexts.

2.3 Literature Review 2: Characteristics of Music Notations

The nature of a language's writing system is crucial in determining what it is that children need to know to make meaning with print (Castles et al., 2018). It influences how children learn to associate the symbols of the writing system with spoken language (Castles et al., 2018). This section begins by situating representational systems for music in the broader context of external representation of human thinking before exploring principles and processes of music representation systems in use in different parts of the world.

2.3.1 External representations

Written forms in which human thinking is represented are important not only to individuals for remembering or clarifying thinking but, crucially, as a means of externalising thinking for the purpose of communicating with others. This is generally understood for notating language and is often understood for music in the domain of composing. However, in performing, it is very often limited to a decoding tool. Kaput et al. (2002) highlight the importance of external representations to thinking and communication across a range of disciplines saying:

“The means “we use to present and represent our thoughts to ourselves and to others, to create and communicate records across space and time, and to support reasoning and computation constitute a central part of any civilisation’s infrastructure” (Kaput et al., 2002 as cited in Tolchinsky, 2007, p 1) External representations fulfil this function because they satisfy the three critical characteristics of all external representations outlined in Table 2.2 (Tolchinsky, 2007, p. 1).

Table 2.2: Three Critical Characteristics of External Representations (Tolchinsky, 2007)

External Representations have	
1. ‘Double Face’ (Sebeok, 1996, p.34)	Like all symbols, ‘they are what they are’; yet at the same time, they evoke or point to something beyond themselves.
2. Intentionality	They are not produced accidentally; they are created (and can be interpreted) purposely by people.
3. Permanence	Unlike the sounded music, which is itself a symbol system, notations have physical or material permanence in that they are not ephemeral, they endure. Consequently, they can facilitate making abstract entities more concrete, graspable and memorable in exact or precise ways.

Music notations, as we shall see, exhibit Tolchinsky’s three features and operate as external representations of human thought although the question of the extent to which any music notation can capture the many and varied aspects of the sounded music it seeks to represent arises in relation to music. External representations are multifunctional objects, functioning as “communicative referential tools encoding a diversity of content and as epistemic tools – ‘*objects to think with*’” [emphasis in original] (Tolchinsky, 2007, p. 2). WSN and Tonic Sol-fa, have these functions. In music, a composer uses notation as a means of communicating and understanding musical ideas. A reader will comprehend these ideas and communicate them in performance through understanding the system and bringing knowledge and experience to the system of music representation.

2.3.2 *Principles and processes of notation systems*

Broadly speaking, music notations operate in one of two ways: by attempting to guide a performer's production of the sounds required to produce music on an instrument; or by attempting to represent the music as it sounds in space and time. Bent et al. (2001) succinctly capture this dual functioning in their definition of notation as “a visual analogue of musical sound, either as a record of sound heard or imagined, or as a set of visual instructions for performers” (2001, Notation). Notation that instructs on sound production is ‘operational’ or ‘production-oriented’ (e.g., contemporary guitar chord grids) whilst notation that represents sounds in music is ‘representational’ in that it represents musical sound and functions through prompting a reader to bring those sounds to mind (e.g., Western Standard Notation (WSN) and Tonic Sol-fa).

Bent et al., (2001) describe WSN as “a complex multiple hybrid system with very low redundancy, partly technical and tablature-like, partly representational” (Section II, 8). As such, it presents challenges for music meaning making for those not familiar with its symbols and operating principles. This has implications for singers learning to use WSN. Like language scripts, notations evolve in distinct social and cultural contexts, and these influence their development, purpose, and norms of use. (Bent et al., 2001). Many types of music notation are in use around the world including ‘oral notations’, spoken syllables, numbers, words or phrases (Bent et al., 2001). Whatever the system, oral or written notation combines two functions. It is an aid for memory that is reminding the performer of something already known, and a means of communicating musical ideas. Bent et al. (2001) also tell us that in written forms, it also allows for fixing or manipulating ideas during composition, it equips a performer with performance information about a piece, allows for the preservation and communication of music over time and distance, facilitates the study and analysis of music through a score and allows a proficient music ‘reader’ to hear a piece of music internally without the need for instruments. To fully engage, therefore, with the WSN music representational system, thinking in sound is required rather than simply following a set of instructions especially, though not exclusively, in relation to singing from notation. The shift from decoding to recognising and sense making we find in language reading can also be seen to apply here.

In addition to notation operating as a thinking tool, Schuiling (2019) points to the ‘ubiquity and diversity’ of notational practices in music, suggests that “notation is a significant part of human beings’ musicking behaviour” (p. 429). Resonating with this research’s focus, he highlighted the social, epistemic and creative processes involved in practices of writing and reading music when reacting against what he described as a narrowly musicological or music-theoretical focus on notation solely for its representation of musical content or structure.

Interacting with representational systems for language is also viewed as a social practice. One of the means through which children interact with language and improve (language) reading skill, is through writing. Writing, however, does not entail exercises that capture strings of unconnected words but rather involves the creation of meaning using description and narrative often based on their own life experience. ‘Writing’ or capturing musical ideas on paper could afford children similar opportunities in relation to music. Furthermore, helping children to uncover guiding principles of existing notational methods through linking these with their own invented ways of representing music appears to be rich in possibilities for developing deep understandings of how music works. This links with wider learning theories of representation and meaning making (e.g., Bamberger, 2011; Barrett, 1997, 2004; Bruner, 1966).

2.3.2.1 Materials Used in Representational Systems for Music

The social and cultural context in which a notation is developed influence its use and the form that it takes (Bent et al., 2001, SI, I). As Bent et al. (2001) remind us, written notations are a feature of literate societies and develop only after a representation system or script for language has been created. They often use elements of the language representation system and follow the conventions of the language. The earliest known books of Western European chant contain words alone to represent the music (Kelly, 2015). WSN developed initially for vocal music which, unlike instrumental music, included lyric text. Initially representation focused on pitch as rhythm was embodied in the words. The developing notation system followed the direction of European writing and conventions of sentence and phrase. This was not enough, however, to capture the multiple dimensions of music. Readers of chant notations were steeped in experience of the stylistic performance nuances of the repertoire. They brought this knowledge to reading the chant representation system.

According to Bent et al., (2001, Section I, I) a music notation requires firstly, a collection of ‘signs’ of some kind and secondly a convention as to how those signs relate to one another. If the notation system is written, then an additional spatial arrangement of the signs on paper [or other surface] is required to make a system of the assembled signs (Bent et al., 2001, Section 2, 1). The written system of sounds and their inter-relations is analogous with the system of musical sounds the signs represent. In the same way that children borrow from other systems at their disposal to represent music (Barrett, 2004), the materials of notation have been adopted and adapted from other systems and evolved over time to meet needs as illustrated in Table 2.3. In addition to borrowing from language representations, written music notations can often be seen to have developed from oral representations of music.

Table 2.3: Materials used in Notations

Phonic signs	Letters	Syllable-signs	Word-signs (logo-syllabic signs)*	Numerals
Graphic signs	Geometric shapes	Lines, Curves	Dots	Grids

*signs that convey both the meaning of the word and its sound in speech

(Derived from Bent et al., 2001, Notation, Section II)

We can see this borrowing from language representation systems in Table 2.3, derived from Bent et al., (2001). Phonic signs include letters, syllables, and logo-syllabic signs whilst graphic signs can include geometric shapes, lines, dots, curves, and grids. When used in notations, these signs exhibit Sebeok's (1996) double-face quality, as Bent et al. (2001) explain, 'either they have meaning (like word signs and numbers) or they belong to some system of ordering (like letters and in some cases syllables).

In relation to the use of graphic and phonic signs for tempo and expression, Fallows (2001) tells us that these markings may be "the most consistently ignored components of a music score" (Fallows, Tempo and expression marks, 2001, 1). Yet, they are key to supporting a reader in creating an expressive performance. He suggests that this is as a result of notes being 'objective facts' whereas dynamics for example are contextual. SN is in his view relatively precise in expressing dimensions such as pitch and duration whereas tempo and expression are more subjective. WSN is described by Bent et al. (2001) as a hybrid notation system because it uses elements from both categories of signs, contributing to the visual information with which a singer must become familiar in learning to read. Whilst these are part of established music notational systems, they are also used by children when representing music in their invented notations. The next section examines some of the purposes for which notation is used.

2.3.3 *Purposes for which notation is used*

Whether oral or written, phonic or graphic, production-oriented or representative of sound, notations of various types developed as a means of musical problem-solving in relation to learning and performing vocal and instrumental music and are evidenced in examples from diverse genres and times in many different parts of the world.

2.3.3.1 *An Aid to Memory for Vocal Music*

One category of ‘problem’ was that of a performer needing to remember how a piece of music proceeds, to ‘fix’ it or make it concrete. A second was for a reader to be able to read an unknown piece from notation at sight for the first time. Dunsby reminds us that:

Without the practice and use of memory, music is literally unthinkable [...]. Since music is a temporal phenomenon, it relies completely on our ability to store and relate musical information. (Dunsby, 2001, 1)

Addressing the first problem, many notations developed and functioned as ‘*aide mémoires*’ for performers. As *aide mémoires*, not all the musical information relating to pieces was necessarily represented. Often, it was only difficult or unusual aspects most likely to be forgotten that were included, the other musical information being taken as given. This is highlighted in Hiley & Szendrei’s (2001) reference to early plainchant notations as “written reinforcement of the singer’s memory” ((Notation, III, S1, (iii)). The function of neumes, (graphic signs such as lines, curves, dots, hooks, placed above written text in plainchant notations that could be angled upwards or downwards), was to prompt their reader to remember the essential features of a melody that had been already learnt aurally, not to discover it for the first time.

In relation to the second ‘problem’ (reading an unknown piece from notation) a singer would have a repertoire of typical melodic gestures implied by the genre and mode of a piece stored in memory upon which to call when interpreting the notation (Hiley & Szendrie, 2001, Notation III, S1 (iii)). In early plainchant notations, rhythmic information was contained in the text. As in language reading where sight of a word prompts memory of its sound and meaning, the neumes operated as mnemonics, calling on a singer’s previous experience and memory of the music repertoire to be sight-read thus enabling the singer to aurally image the music from the notation. (Hiley & Szendrie, 2001, Notation III, S1 (iii)) This mode of functioning underlines the role of previous engagement with an aural memory store of the music that is brought to the music sight-reading task. This cueing along known patterns allows unknown pieces to be discovered or sight read for the first time. It is analogous to the experience of language that a reader brings to a language text, enabling thinking and meaning making in relation to the content.

2.3.3.2 *Sight-Reading and Oral Transmission skills*

Oral syllable mnemonic systems are important in learning to sight-read and perform vocal music, in addition to being used for teaching and learning instrumental music. They are often based on solmization. Solmization is the practice of associating vocal syllables with pitches as a mnemonic

device to indicate pitch relationships or melodic intervals (Hughes & Gerson-Kiwi, 2001). Although the syllables used can be an arbitrary selection, they are often borrowed from an existing order (for example alphabet letters or numbers). Whilst we are familiar with this in Western Art Music from Tonic Sol-fa, the practice of solmization is not solely a Western phenomenon. Systems of this type have been used in the main musical cultures of the world and, in the Western world, are known to have existed in classical antiquity (Hughes & Gerson-Kiwi, 2001). Their purpose was to aid in the oral transmission of music, either through direct teaching or as a means of memorizing music aurally perceived. Many notational systems draw upon the use of solmization syllables and their abbreviations in representing musical ideas in written form. Solmization systems in use outside Europe include systems from Japan, China, Bali, India (See Appendix R).

2.3.3.3 *Western European Solmization*

In Western Europe, the most used syllable system to represent the diatonic scale is *do-re-mi-fa-so-la-ti* with semitones occurring between *mi-fa*, and *ti-do*. Sharpened and flattened pitches are denoted by vowel changes in the vowel (e.g., fi for sharpened fa and ta for flattened ti).

Solmization for the Western European diatonic scale developed from the system dating from the 11th century traditionally attributed to the music theorist and pedagogue Guido d'Arezzo. This solmization was based on the text and melody of *Ut Queant Laxis*, a hymn to St John (Hughes & Gerson-Kiwi, 2001). A particular feature of this melody was that the first syllables of the opening six lines of the hymn *ut, re, mi, fa, sol, la* coincided with a stepwise rise of the pitches sung to the syllables from C to A, strengthening their referential or double face character. This meant that the syllables operated in relation to an established musical order, that of the hexachord (Hughes & Gerson-Kiwi, 2001). The main pedagogical principle of this system is that within the hexachord C to A, described as a 'natural hexachord' (*naturale*) the interval between *mi* and *fa* was always a semi-tone. This also applied when the syllables were placed on the pitches G to E, the 'hard hexachord' (*durum*), and later F to D, the 'soft hexachord' (*molle*) (Hughes & Gerson-Kiwi, 2001). Each syllable indicated the function of a pitch within a mode. Singers familiar with the hymn tune were taught to internalise the solmization syllables to the point that when presented with unknown music to be sight read and given a reference point, they could use the syllables as a mnemonic device to call to mind the sounds (i.e. pitches) that the written symbols represented. As the music in question was liturgical chant, the rhythm followed the text of the chant and did not need to be notated. In addition to the solmization system itself, a teaching device known as the Guidonian Hand upon which the syllables were placed was used for pedagogical purposes, reinforcing the idea of physical and gestural notation. Gerson-Kiwi (Hughes & Gerson-Kiwi, 2001) is not alone in suggesting that Guido d'Arezzo's solmization system was a

mnemonic device of great technical and psychological insight. Kelly (2015), for example, describes it as revolutionary.

Important to this research, Gerson-Kiwi (Hughes & Gerson-Kiwi, 2001) highlighted what she described as the most essential feature of the Guidonian system, the fact that each syllable indicated the pitch's function (*voces*) within a modal context rather than its single identity (*claves*) in absolute pitch. This is significant for choral singers in relation to voice leading and predicting or expectation during music reading. Through this feature, and through practice in changing from one hexachord to another (known as *mutation*) an inner orientation within the continuum of sound was encouraged rather than a sole focus on absolute pitch. The tradition of using 'model' songs for solmization purposes is still in current use in Arab and Hindu traditions by singers and instrumentalists and, as Gerson-Kiwi notes, are "a constant point of mental reference for them when improvising" (Hughes & Gerson-Kiwi, 2001, Solmization, II, 1)

D'Arezzo's system arose out of a need to help his singers to learn hymns more efficiently through learning to sight-read. Through this use of solmization, the notation acted as an aide-mémoire, where sight of symbols in notation activated sounds and sound patterns that singers had already stored in memory, reminiscent of sight words in reading language texts.

Notation systems that use mnemonics to represent musical sound, rather than functioning as tablature, promote music thinking. They communicate and capture music as idea which readers can make sense of. Even when functioning as tablature, instructions for producing sounds, references are sometimes made to the learning of mnemonics as helping instrumental performers to hear or 'think' a piece internally as they play, rendering the performance more musical (Hughes, 2000).

The next section examines a category of notations described as 'invented notations'. These include simplified versions of standard notation designed to facilitate sight reading through use of phonic and/or graphic signs. The translation of standard notation into Tonic sol-fa, for example, facilitates reading in the same way as using knowledge of the alphabetic principle to decode operates in language reading. It can make abstract notes concrete intervals and can make singing the notes in music reading easier.

2.3.3.4 Simplified Standard Notation Practices - Protonotations

From the beginning of the 16th century, many notation innovations were devised in attempts to solve the problem of making sight-reading easier to learn, some of which have had far reaching influence. Most were based on the practice of solmization, often indicating pitch simultaneously in two different ways: through use of conventional standard notation on the one hand augmented by some alternative

means of identifying the pitches on the other. Alternative ways of indicating pitches included either letter-names of notes or solmization syllables; or the use of distinctive note shapes or numerals representing the solmization syllables (Bent et al., 2001). For further elaboration see Appendix S.

During the 19th century, notational systems were developed in the English-speaking world that were based on seven-syllable solmization systems. The most well-known and well-regarded system was the Tonic Sol-fa system, developed by John Curwen from a sight-singing method devised by Sarah Glover. Tonic Sol-fa used alphabet letters as abbreviations of the syllables representing the degrees of the major scale (d, r, m, f, s, l, t, d'). Vowel changes were incorporated to indicate accidentals. The spacing between letters and symbols was used to indicate the duration of notes proportionally whilst dots and colons were used to separate beats. In Curwen's Tonic Sol-fa system, the use of a stave, conventional notes, rhythm signs and time signatures was rejected in favour of letters and symbols only. To support sight-singing from this notation, hand signs and a device known as a Modulator were used in teaching. This system was recognized as being economical and well suited to relatively uncomplicated vocal music (Rainbow & McGuire, 2001). It allowed songs to be printed without having to use a stave and musical graphics. It was adapted and used in Germany and Poland and was widely diffused through Christian missionary work and popular ballads. More recently, it is widely used (without spacing and octave indications) by African musicians for vocal music (Rainbow & McGuire, 2001).

Whilst used effectively to aid the rapid acquirement of sight-reading skills, Tonic Sol-fa's limitations became evident in music with frequent modulations. Its use was also criticized because of a belief that using Tonic Sol-fa was preventing singers from engaging with standard notations. Sol-fa syllables were later taken on and used in relation to sight-reading and analysis in the Hungarian Kodály Method.

These types of simplified or prototype notations were based on solmization principles and evidence notation in use as an efficient teaching tool for developing sight-reading skills. However, as noted by Tan et al. (2009), one problem with alternative notation for transitional purposes is that "students may become dependent on the feature that is originally intended only as a temporary mnemonic device" (Tan et al., 2009, p. 21).

2.3.3.5 Children's Invented Notations

Many music and music education researchers include the use of children's invented notations in their repertoire of tools for data collection and analysis. These types of notations provide a means of capturing a visual record of how children represent sound and of the musical thinking that goes into this.

‘Invented notations’ are two- or, at times, three-dimensional drawings, pictures, patterns, shapes or marks that are made by children and others in response to music mirroring ontological solving of the problem of capturing sound patterns. Children’s ability to generate graphic notations of music has long been valued as a way of bringing them to standard notation, what Barrett (1997) calls ‘the culturally agreed symbol systems of the adult literate world’ (p. 2). Inventing their own notations gives children a method of engaging with and understanding the principles of the standard notation they will read from. This is like children experimenting with writing and learning to use the conventions of language writing. Also, these types of notation can be windows into the world of children’s musical thinking, what they are paying attention to and are aware of in music. In responding to music in invented visual ways, children often reveal their musical understanding and thinking. Unlike conventional or standard notations, which have developed over centuries, invented notations are intuitive and idiosyncratic (Barrett, 1997). Their functioning as external representations of musical thinking, both as communicative referential tools and as epistemic tools (Kaput et al., 2002 as cited in Tolchinsky, 2007), has made their use very valuable in both music and music education research.

Three uses of invented notations have thus been identified. Firstly, they are a way into using standard notation, practising the same structures and procedures used in standard notation and solving problems of representation. Secondly, they provide a means of revealing musical thinking and understanding revealing how children see relationships between notes, phrasing, rhythm and metrical patterns. and, thirdly, they function as a thinking tool (a means of holding or fixing sounds to organise or manipulate them in some way and be able to internally ‘hear’ them). Invented notations have been used by researchers for a range of different purposes illustrated in Table 2.4.

Table 2.4: Researchers’ Purposes for use of Invented Notations

Purpose	Researchers
To access musical thinking to understand the processes involved in engaging with music	Barrett, 1997; 2001 Reybrouck et al., 2009
To investigate musical development and reveal what children pay attention to at different stages and the increasing complexity of integrating particular aspects	Bamberger, 1982 Davidson and Scripp, 1988
To access musical understanding	Gromko, 1994
To improve teaching and learning; To facilitate musical communication	Barrett, 2005
To investigate differences between cultures	Dunbar-Hall, 2006
To compare the experiences of novice and trained musicians revealing that notational skill may not transfer between musical domains	Davidson, Scripp & Welsh, 1988
To investigate the influence of musical instruction, that notational skill is not naturally ‘caught’, training is required	Davidson, Scripp & Welsh, 1988

2.3.4 *Conclusion*

This survey of ways in which music is, and has been notated, across genre, place, and time highlights the multiple ways in which it has been represented, underpinned by two broad guiding principles, production of sounds and representation of sounds. At a practical level, tablature type notations instruct a performer on how to produce necessary sounds, either through visual representations of an instrument or through aural means. Pitch and temporal aspects are represented with pitch usually represented on a vertical axis whilst rhythmic and metric aspects are generally represented on a horizontal axis. The signs through which musical aspects are represented can function in relation to each other on the one hand, or in relation to a fixed reference point on the other. In WSN both graphic and phonic signs are used to indicate expressive aspects. Melodic and rhythmic information in representations facilitate a decoding of musical information, more than a holistic construction of meaning. It is through music's expressive aspects that this meaning is communicated in performance. Expression is an integral part of meaning in both language and music meaning.

A significant observation for this research is the consistent use of mnemonic syllables to aid learning and support fluency in performance in relation to pitch and rhythm. Whilst some mnemonic syllables function as tablature to produce sounds, Table 2.5 shows how the use of such syllables prompts learners and performers to imagine or think in sound in advance of singing or playing.

From Table 2.5, we see that solmization is a method used across cultures that is remarkably similar in intent to make abstract intervals concrete to aid in thinking in sound from notation. Use of solmization syllables echoes a language reader's facility in manipulating and thinking about sounds of language, phonological awareness.

Table 2.5 Solmization Syllables for Pitch across Several Different Cultures

	Mnemonic syllables	Pitch relations and function
Japanese	i-ro-ha-ni-ho-he-to (the initial 7 syllables of an established order of 48 characters)	Functions in the same way as Western letters A to G in WSN with repetition for octaves. Based on the first line of an ancient Japanese poem <i>Iroha</i> .
Chinese	Gong-shang-jue-zhi-yu	Represents a pentatonic scale
Balinese	Ding-dong-dèng-dung-dang	Represents a 5-note slendro scale
Indian Classical Music	Sa-re-ga-ma-pa-dha-ni	Correspond to the Western solfege system
English-speaking countries	Do-re-mi-fa-so-la-ti	Represents relations between pitches in a diatonic scale, (semitones between mi and fa, and ti and do) with repetition for octaves. Developed from Guido d'Arezzo's solmization for major hexachord based upon a hymn to St John (<i>Ut queant laxis</i>)
	Fa-So-La-Mi	Represents relationships between pitches in diatonic scale using a reduced set of syllables
Arab & Hindu	Use of vocal syllables	Vocal syllables derived from 'model' songs to represent pitch relations

What this review of literature reveals is that the operation of notations relies upon musical memory and aural imagination, particularly in relation to sight singing. Notations that operate referentially and use mnemonics to call upon memorized stores of rhythmic or melodic patterns depend upon a reader's previous direct experience of music. Notations, such as 20th century graphic notations, where signs function relative to each other rather than a fixed reference point, call upon both memory and imagination for interpretation. In all cases, musical experience precedes notation and continues to be deepened by notation.

Notations are not context free. They are invented, used and developed in connection with musical practices and reflect understandings of practitioners within genres. They typically borrow from other representational systems such as language notations and often borrow from notations of other musical traditions. They can be used prescriptively for the purposes of guiding performance or to facilitate or enhance music teaching and learning. In addition, they can be used descriptively for the purposes of transcription, study and analysis. They vary in the degree to which details of the music is specified and may contain all the information required for a performance or contain just enough information so that a musician familiar with a genre would know how to perform. Some 20th century composers went a step further and sought to create visual scores that could be interpreted flexibly to produce a range of performances.

In essence, this sample of notation systems reveals aspects of human musical thinking at various points in time, in diverse parts of the world in relation to representing many different types of music. As well as reading to perform from notation, one of the ways through which we come to understand how music works is through practice in representing it using signs and symbols.

Gudmundsdottir (2010) remarks on the fact that little conscious effort has been made to improve music-reading instruction through comprehensive study of the tenets of music reading. Investigation of choral conductors' implicit theories of children's music reading may reveal an understanding of this from choral practice. From this analysis, some potential approaches to enhancing and developing children's musical understanding have arisen. One may be to afford them opportunities to explore the representation of music, especially as their notational development has been described as ontological in nature (i.e., following a similar path to that of music notation's development and evolution through time) (Odam, 1995). Another, following O'Brien (1974) and echoing Gudmundsdottir (2010) could be to focus children's learning on ways of understanding its underpinning operational principles rather than on surface symbols in light of the complex, sophisticated nature of WSN. Hultberg, (2002) distinguishes between two approaches she found that young instrumental students took to notation; a 'reproductive' approach where the printed score had a normative function prescribing how a piece should be played; and an 'explorative' approach where the score operated as an invitation to a performer "to seek out implicit meaning according to the musicians' individual judgement, within a frame of agreed understanding in Western tonal music that they share with the composer" (Hultberg, 2002, p. 185). There is potential in fostering an explorative rather than a prescriptive approaches to notation. In language reading a 'reproductive' approach is akin to accurate and automatic decoding and recognition of words in print. However, fluent reading implies a deeper understanding of and interaction with a text.

2.4 Literature Review 3: Underpinning Principles of Pedagogical Approaches

Music reading is informed by a rich heritage of practice rather than overarching theories. This heritage includes twentieth century ‘grand methods’ inspired by influential figures such as Shinichi Suzuki (1898-1998), Carl Orff (1895-1982), Émile Jaques-Dalcroze (1865-1950), and Zoltán Kodály (1882-1967) among others. Any method or approach to teaching music is based upon underlying theories of learning whether or not these are consciously applied. Each of the twentieth century approaches above has addressed music reading as an aspect of music learning and pedagogy and comparisons are often drawn between language literacy and music reading.

Suzuki, for example, based his ‘talent’ approach on his observations of children’s learning of language through listening, imitating, and interacting with others. His belief that everyone is born with an ability or ‘talent’ to learn and that learning to play violin could be as simple as learning language given the right environments and conditions, gave rise to the Suzuki approach (Shibata & Kanazawa, 2001). Observations on language acquisition appear to have prompted an emphasis on parental involvement in lessons and practise, an early optimal age for beginning instruction (facilitated by various child-sized violins) and repeated hearings of music to be learned by rote (Shehan, 1986). Repertoire selected from folk and classical genres was presented in a graded sequential manner and frequently revisited to apply new conceptual knowledge and skill (Benedict, 2010). The influence of language learning processes on Suzuki’s thinking can perhaps be seen most noticeably in the deliberate postponement of the teaching of music reading skills (a subject of some criticism) in favour of initial development of expressive and analytical listening and playing skills. Significant for this research is that, although focused on instrumental music learning, Suzuki’s approach highlights that musical engagement and rich aural experience are a prerequisite for and condition of music reading. Expressive, communicative musical expression is fostered and brought to music reading for instrumental musical performance.

Composer Carl Orff’s approach also offered perspectives on using language as a starting point for music making. His ‘idea’ for integrating primarily music and movement but also speech and drama in music education (Shamrock, 1986) was informed by his concept of ‘elemental music’, “a synthesis of gesture, poetic language and music” (Fassone, 2001, S1). His *Schulwerk*, which evolved from a collaboration with Dorothee Günther, became an approach in which children were active participants in improvising, listening to and performing where music was ‘a unity of movement, dance, and speech’ (Benedict, 2010). Despite the publication, with Gunild Keetman, of five volumes of *Orff-Schulwerk: Music für Kinder*, an instructional sequence is not suggested. Instead, children’s rhymes and songs are arranged and presented as possible models for how they could be used as starting points for improvisation and performance through speaking, singing, body percussion, and playing percussion

instruments, particularly the wooden barred instruments Orff devised (e.g., xylophones, metallophones) based on African and Asian folk instruments. Barred instruments facilitate children's experimenting and improvisation using canon, ostinato, and bordun techniques.

Movement and improvisation are fundamental to his approach. Notation (including drawing upon graphic notation) is introduced early in the context of musical engagement to deepen experience and to enable students to record their compositions (Benedict, 2010). The emphasis on children's agency in their musical learning across a breadth of activities and social interaction in the Orff approach point to the significance of this type of engagement in building an aural and physical reservoir of sounds and skills to bring to music reading.

As Suzuki and Orff approaches were more closely aligned with instrumental rather than choral practice, approaches that developed from the work of Kodály and Dalcroze were selected for this research as representative of twentieth century approaches for in-depth analysis.

Contemporary approaches to music teaching take account of research in music theory and cognition, that was not available to instigators of 20th century approaches, in addressing music reading. Music theorist, Gary Karpinski's approach (2007), was selected as the third pedagogical approach for review. Conscious that one aim of this research is to develop new ways of thinking about music reading, a desire to go beyond confirming established and accepted approaches led to the selection of contemporary composer, author and interdisciplinary thinker, Bruce Adolphe as the fourth approach for analysis.

The purpose of this section is to uncover theoretical underpinnings of each approach to development of children's musical thinking in relation to their engagement with musical notation. Of the four approaches examined, two address music instruction from early years schooling to professional levels of education (Kodály and Dalcroze) and two are primarily concerned with the thinking and skills of third level music students and professional musicians (Adolphe and Karpinsky). Music theorist, Karpinski's approach (2007) is grounded in research in music cognition. All were initially inspired by undergraduate students' difficulties in thinking in sound. The Kodály and Dalcroze approaches, like other twentieth century approaches have come to be known as 'methods', seminal approaches to music education. The ideas they espouse are found throughout music education and are often uncontested in their use and influence. Adolphe and Karpinski are more recent approaches that may indeed have been influenced by classic approaches but take a much broader perspective. A limitation of these approaches is that other than Karpinski (e.g., Karpinski, 2000), more is offered in terms of practical methodologies than in theorising or relating ideas to broader educational theories of learning symbol systems.

2.4.1 *Historical context*

The twentieth and twenty-first century innovations in music pedagogy examined here evolved in response to philosophies and instructional methods of previous centuries. Reading from notation that embodies thinking in sound, musical fluency and understanding or ‘comprehension’ has been a concern in music pedagogy for centuries. The teaching of group singing, that is the musical context for this study, progressed from aural and oral learning by rote in early medieval times, to the early attempts by the Benedictine monk, Guido d’Arezzo, at teaching his choristers to sight read music using solmization syllables in the 11th century which has been described in section 2.3.3. His pedagogical innovations underpinned the later development of the moveable-do solmization system, using this syllabic notation as an aide-mémoire and providing a means to audiate sounds and recognise notated sounds in this form (Bent et al., 2001). Additionally, his work contributed to the development of WSN (Hiley, 2001, Section 2). This tradition has continued throughout the twentieth and current century with a balance in emphasis between rote learning and music meaning making from notation.

As national systems of education developed across Europe during the 19th century, music became established as a school subject. Child-centred theories of education influenced approaches to music teaching. Thinkers such as Jean-Jacques Rousseau (1712 - 1778), Johann Heinrich Pestalozzi (1746 - 1827) and F. W. A. Froebel (1782 - 1852) promoted musical experience as part of general education because of its importance as a means of self-expression. In their view, music could contribute to a child’s intellectual, imaginative and aesthetic development (Plummeridge, 2001, Schools, Section 3, 1). Rousseau and Pestalozzi in particular influenced thinking and practice in 19th century group music teaching methods in three significant ways:

1. musical literacy skills were prized and considered prerequisite to the development of musical understanding;
2. musical experience of sounds preceded the introduction of symbols/notation (sounds before symbols); and
3. musical instruction took account of children’s age and intellectual maturity, usually resulting in the use of ‘interpreting’ or alternative simplified notations such as Rousseau’s number system (Plummeridge, 2001, Schools, Section 3, 2).

These principles permeate 20th century approaches to music education and continue to greater or lesser degrees to influence music teaching in the 21st century. They are noticeable in the four approaches discussed in this chapter.

2.4.2 *The Kodály approach*

Zoltan Kodály (1882 – 1967), the Hungarian composer, ethnomusicologist, and music educator was the instigator of a philosophy and system of music education that became known outside of Hungary

as ‘The Kodály Method’. The Kodály method is an approach to music teaching and learning based on singing that focuses upon enhancing an individual’s ability to think in sound through the development of music reading and writing skills whilst working predominantly with folksong (initially Hungarian followed by folksongs of other countries) and Western classical art music.

2.4.2.1 Background and context

In common with other 20th approaches to music education, Kodály’s initial concern for music education came about because of his dismay at the music literacy levels of students entering the Zeneakademia, the highest music school in Hungary in the early 1900s (Choksy, 1988). To be musically literate, in Kodály terms, was akin to language literacy and meant “‘literate’ in the fullest sense of being able to look at a musical score and think sound, to read and write music as easily as words” (Choksy, 1988, p.11). Thinking in sound in relation to notation referred to as ‘inner-hearing’ was regarded as a fundamental musical skill in the Kodály approach.

Preserving and passing on Hungary’s cultural heritage was a significant factor in the development of the Kodály approach, not only in light of centuries of political and cultural oppression (Dobszay, 1972) but also because folksongs in simple forms that were accessible by children, communicated both “artistic and national cultural value” (p. 24). This heritage became the vehicle for developing music reading and understanding.

In the Kodály approach, in common with the then French and Italian contemporary practices, singing was advocated as the best means to develop music literacy and understanding. The development of music reading and writing skills (understood to include thinking in sound) through singing, were key principles of the approach and were considered prerequisites for learning to play an instrument. Through its use of Hungarian children’s games and songs, followed by Hungarian folksongs and folksongs of other countries the Kodály approach aimed, as Kodály expressed it “to make masterpieces of world music literature public property, to convey them to people of every kind and rank” (Kodály, Zoltán, 1974, p. 160). Using this repertoire, music reading and writing skills are developed in a reciprocal process enabling decoding skills and automatic recognition of sounds and patterns in notation. Through practice, children’s musical ‘vocabularies’ and experience are enriched, facilitating meaning making from notation. From a current perspective, in emphasising folksong and Western classical art music, little account was taken of the experience of music that children bring to music reading from their everyday environments, a knowledge source for comprehension recognised in language reading.

Through working with students and colleagues, Kodály initiated what he intended to be a comprehensive system of music education, spanning Hungarian schooling from nursery school to college level. He did not personally devise a syllabus or a defined sequence of learning. Instead, under his guidance and encouragement, colleagues and former students developed pedagogical materials and methodologies for use. Unsurprisingly, the first musical materials used in this singing approach were Hungarian folksongs. Whilst other ‘grand methods’ of the 20th century include singing together with developing reading and writing skills, a defining feature of the Kodály approach is its reliance on a vast repertoire of folksong analysed and organised for teaching purposes in a sequential order in which particular musical elements were to be presented in a delineated learning sequence. The sequence of learning was dictated by the frequency with which music elements occurred in the folk song repertoire and took account of the developmental level of the learners. In general terms, learning proceeded from singing simple children’s game songs to pentatonic, modal and diatonic music, developing implicit understandings of scale systems ‘by ear’.

That children’s music education be started as early as possible was an important principle of the approach. Learning through play, movement and social interaction at nursery level was viewed as critical and a lost opportunity if missed. Similarities in language and music acquisition processes appear to be acknowledged in Kodály’s insistence that children should begin music learning by learning their ‘musical vernacular’ in the same way that they first learn language – aurally. The voice was considered a child’s first instrument and singing songs in their Hungarian ‘musical mother tongue’ the initial means of developing musical awareness. This unconscious development of an aural store of music, acquired through kinaesthetic musical play, then became part of formal teaching in presenting musical concepts ‘consciously’. Echoing Pestalozzi’s (1746-1827) child-centred ideas, learning through the senses and through direct participation were viewed as a preparation and foundation for future learning. Pestalozzi also emphasised the importance of singing and had advocated for music instruction for all children. The concept of ‘sound before symbol’, another Pestalozzian principle, underpins the Kodály approach as does the idea of matching the level of instruction to a child’s intellectual maturity (Plummeridge, 2001). Music is experienced and learned aurally and kinesthetically within social learning contexts before the introduction of notation. The sound before symbol principle also relates to music notation functioning as an aide mémoire for a music reader, where sounds stored in aural memory are activated by sight of the notation.

2.4.2.2 *Strategies for accuracy and automaticity in music reading*

On his visits to England, Kodály witnessed high choral standards and became acquainted with the Tonic Sol-fa system of Curwen (1816-1880) developed from Glover's (1786-1867) initial system, in its turn a development of Guido d'Arezzo's solmization syllables.

Glover's system was adopted by John Curwen (1816 – 1880). Drawing on Pestalozzi (1746 – 1827), Mason (1792 – 1872), and Chevé (1804 – 1864), Curwen, in turn, synthesised various techniques (including the use of hand gestures to represent the relationships between pitches both visually and kinaesthetically) into a system for teaching sight-singing (Colles et al, 2001). He encouraged his pupils to feel and describe the character or quality of individual notes, arguing that each produced its own 'mental effect' (Rainbow & McGuire, 2014 Section 2, 3). He and, later, his son John Spencer Curwen (1847 - 1916) promoted Tonic Sol-fa as a learning tool and published music materials notated in Tonic Sol-fa. The system was taken on and used widely in the UK.

Sol-fa use was incorporated into the Kodály approach together with Curwen's hand signs, both with minor modifications. Relative Sol-fa solmization became a key aspect of the Kodály approach to developing music reading, writing, and thinking skills relating to pitch.

Common to all instructional levels was the principle of moving from the known to the unknown. Melody and rhythm are treated separately, with particular melodic or rhythmic elements isolated for an instruction period. This allowed students to achieve automaticity in decoding pitch and rhythm separately before integrating these aspects, a level of complexity absent in language reading. This approach is reflective of the Pestalozzian principle of teaching one thing at a time, whether rhythm, melody or expression, and practising each separately, "before the child is called to the difficult task of attending to all at once" (Abeles et al., 1984, as cited in McPherson & Gabrielsson, 2002). There is an emphasis on working musically using real music rather than practising musical elements in isolation. For example, to avoid the problem of a focus on one element, and to integrate them in practice, a lesson might begin with children singing a song, continue by working on an element taken from the song and a return to perform the song with a more conscious understanding of the element explored before the lesson ends. This is again ensuring meaning making as well as skill development.

In common with Pestalozzi, teaching is through induction rather than presenting theory or principles before experience. In relation to pitch, for example, children initially experience and practise selected intervals informally or 'unconsciously' in the context of their song singing, building an aural repertoire from which to work over time. An example of the use of Relative Sol-fa solmization in teaching is presented below.

2.4.2.3 Accuracy and automaticity in reading and writing melody

Within the Kodály system, the interval of the minor third is the first interval taught, with the minor third between the fifth and third degrees of the major scale. This is a commonly occurring interval in Hungarian children's songs and is thought to be a universally common pattern in primitive and young children's music. Children are led to 'discover', for example, that a song that they are very familiar with uses only two notes, a high and a low, and are told that the higher note has the name 'soh' and the lower, the name 'mi'. Hand-signs for soh and mi are introduced and used to visually and kinaesthetically reinforce the relationships between the pitches sung. Children practise sight-singing from a teacher's hand-signs for a time before being introduced to the notes presented on a stave (which could be a 1-, 2-line stave initially). Reminiscent of the Guidonian hand, but not used in the same way, a hand stave where fingers are extended horizontally to form lines and spaces may also be used by teacher and singer to indicate where notes are in relation to each other.

Memory skills and musical thinking (referred to as 'inner-hearing') skills are developed through sight-reading exercises where children silently read (inner-hear) melodic phrases (in this case phrases containing soh and mi) presented by the teacher with hand-signs. Children watch, sing internally and memorise phrases before singing them aloud, using handsigns to support their thinking. 'Inner-hearing' or thinking the music is also encouraged when sight-reading from the stave. A teacher may use a 'flying note', (a pointer with a note head attached, adapted from Chevé's (1804-1864) 'moving rod') to point out how a melody unfolds on a blank stave (Szönyi 1973/1990). In an adaptation of this, the notehead is coloured red on one side and green on the other. The teacher sings key anchor pitches aloud from time to time in support whilst singers follow the notation singing phrases internally (on red) before singing them aloud (on green). As children progress in their sight-reading skills, new songs can be presented and learned through music reading. In common with language reading, 'learning to read' is similarly a precursor to 'reading to learn'.

Staying with the soh-mi minor third interval example, children show that they have correctly identified note patterns in phrases sung to them, by echo-singing the phrases using hand-signs and sol-fa names. To achieve this they often echo sing the teacher's phrase as heard (often a phrase from a song), repeat the phrase omitting the words and singing on a neutral syllable (e.g. lu) whilst using high and low gestures to trace the contour of the melody (gestural notation) to work out the sol-fa names of the melody notes before, finally, singing the melody using sol-fa names accompanied by the appropriate hand-signs. These types of practise drills prepare children for simple music dictations. To visually represent dictations children might use manipulatives (e.g. counters) on simplified staves. Alternatively, they might write the sol-fa for the melody using initial letters to abbreviate the sol-fa

names. Learning is facilitated through making multi-modal representations of the interval in different contexts.

The next step in the Hungarian pitch learning sequence is the presentation of ‘lah’ which, in Hungarian folksong, appears as an upper-changing note of soh. Children might be engaged in working out the sol-fa names of melodic phrases from songs and be given a phrase in which they discover a new note for which they do not have a name. This new note, which is higher than soh, is then named as lah. The cycle of practices described for soh and mi is then repeated to include exercises using soh, mi, and lah before the next new note or interval is introduced. This sample sequence of melodic learning demonstrates the multiple modes used by children and teachers to represent melody within the Kodály approach. These include verbal (solmization); physical (gesture and hand-signs); written (sol-fa initials, dots on simplified stave, hand stave). Melodic work proceeds to the introduction of the full pentatonic scale followed by the major, minor and modal scales with accidentals introduced as they are needed in relation to scales. Following Glover, the Kodály approach advocates part-work as soon as is feasible for learners. This is viewed as the best way to achieve good intonation. If learners experience difficulty when sight-reading particular intervals, a technique from the Galin-Paris-Chev  method called ‘points d’appui’ is used. This is where a pitch easier to ‘find’ is inserted and sung silently or ‘heard’ internally before the second pitch of an interval is sung aloud, bridging the gap.

The level of detailed planning and practice evident to ensure automaticity in reading melody, in the example above with young children is typical of the Kodály approach at successive levels of teaching and echoes work in early language reading literacy. As learners progress, their aural repertoire is expanded to include folksong of other countries and Western classical genres. Relative Sol-fa solmization use as a learning tool is continued, with students becoming proficient in using it to sight-sing and to develop and demonstrate understanding of more complex materials. Music reading, writing, and, as part of these, thinking skills, are both called upon and developed as students engage in studying genres using authentic musical materials.

In the teaching of language reading, there is a recognition that writing can enhance the reading process. Writing, in this sense, is understood to be a student’s ‘voice’ or thinking. In the Kodály approach, improvisation (musical thought ‘in the moment’ akin to speaking in language terms) is used more to reinforce learning than to foster expression. Given the importance placed on improvising and composing in current thinking in music education (Swanwick, 1979; Runfola & Swanwick, 2002), it is remarkable that this widely used approach to music teaching does not place more emphasis on improvisation skills.

2.4.2.4 Accuracy and Automaticity in Reading and Writing Rhythm.

Rhythmic understanding is supported using rhythm solmization adapted from the Galin-Paris-Chev  method. Each syllable represents a particular note duration, for example, ta is a crotchet whilst ti-ti represents two quavers. The syllables are never written, rather, they are spoken in response to notated rhythm. Again, as with earlier representations of pitch, this is a concrete capture of an abstract event.

When reading or writing rhythm patterns a simplified ‘stick notation’ is used initially. This is essentially standard rhythmic notation written on a level across a surface without using a stave or note-heads (except in the case of minims). Like melodic progression, the introduction of rhythmic elements is drawn from the folk song repertoire with duple meters introduced first (before progressing ‘ultimately to irregular and intermixed’ metres (Miller, 1980). A sense of metre, developed through movement in song games, underpins rhythmic development. This musical experience and understanding are brought to the fore in music reading. Sight-reading of rhythm patterns entails saying the rhythm syllables whilst clapping the patterns. Dictated patterns might be represented by individual children with stick manipulatives; by small groups of children using their body shapes to visually represent rhythms; or by individuals physically writing rhythms on paper.

When the reading and writing of rhythm and melody are combined, notated songs can be presented in one of two ways: on a stave akin to standard Western notation (which could be simplified to a 1, 2, or 3-line stave) or in stick notation (i.e. rhythmic notation without a stave with sol-fa names (indicated by initial letters) placed under each note stem.

As there was a dearth of suitable materials at the time, Kod ly composed exercises to ensure that ample materials were available for this to be achieved at each level. Achieving mastery or automaticity in skills through incremental skill-building in the context of singing is emphasised. Inner-hearing from notation, a focus on the aural foundation that singers bring to reading from notation and attention to the multi-dimensional aspects of reading within the Kod ly approach are significant to this research.

2.4.3 The Dalcroze approach

The second approach to music teaching examined is that of  mile Jaques-Dalcroze (1865 – 1950), the Swiss composer, musician and educator who developed an approach to music teaching and learning involving bodily movement, known as ‘eurhythmics’.

2.4.3.1 Background and context

Like Kodály, Dalcroze came to the teaching of music from the standpoint of a composer. Lussy's (1828-1910) influence on his thinking is apparent in Dalcroze's emphasis on the physical manifestation of rhythm, in the attention to differentiating between various types of rhythmic and metric accentuation (e.g., 'metric accent', the accentuation of strong beats and 'pathetic accent', the accentuation of weak beats) and in the adoption in music of terms derived from metrical theories of classical poetry (Haward & Ring, 2001). Dalcroze spent a term as assistant director of the Algiers Théâtre Municipal in North Africa, where he became interested in the complex Middle Eastern rhythms of local Arab musicians, inspiring his curiosity in connections between rhythm and movement (Odom, 2005).

In addition to formal music studies, it is likely that Dalcroze's interdisciplinary interests and experiences also informed his thinking from his training in gymnastics to his collaboration with singers, writers, artists, dance teachers, and theatre people in concerts and stage productions of his compositions (Odom, 2005). This rich experience of cross disciplinary creative work perhaps accounts for the openness to movement and improvisation that later characterised the Dalcroze approach.

In his work with conservatoire students Dalcroze noted that harmony students lacked the capacity of inner hearing and were composing by rules rather than being able to hear the music they were writing. In short, they were unable to think in sound or make musical sense or meaning in reading. In addition, instrumental students who were often technically very advanced were unable to reveal their musicality in expressive performance. He argued that excellent playing technique alone did not allow students to meaningfully connect with the music they played. Dalcroze was convinced that the best means of unlocking student's musical feeling and thinking was through bodily experience of rhythm.

Dalcroze criticised the fragmented nature of music teaching at conservatoire level in ways that prized theoretical knowledge over experiential learning. He argued against "the absurdity of studying harmony without the previous acquirement and practice of inner hearing" (Jaques-Dalcroze, 1921, p.1). Thinking in sound in relation to notation was therefore considered a fundamental skill for a musician in both the Kodály and Dalcroze approaches. Additionally, Dalcroze noticed that students sang more musically and accurately when they accompanied their singing with rhythmic gestures. He decided to precede his lessons in written harmony by what he called "special exercises of a physiological nature aimed at developing the hearing faculties" (Jaques-Dalcroze, 1921, p. V) and began to experiment with incorporating movement exercises into ear training classes "to develop more acute inner hearing as well as an inner neuromuscular feeling for music" (Mead, 1986, p.44). For Dalcroze and Kodály, music was comprised of more than ordered sounds and therefore, aurally

imaging music should include a capacity to feel and communicate its expressive qualities. This echoes the expectation in language reading that a reader interacts with and responds to a text. Although initially these exercises were intended for conservatoire students, Dalcroze soon extended his ideas to the teaching of young children believing, like Kodály (and Pestalozzi before him) that music learning should start early.

Both Kodály and Dalcroze maintain that early childhood aural experiences of music feed into a child's later ability to engage with written representations of music. Dalcroze observed differences in older and younger students noting that whilst "with older students acoustic sensations were hindered by futile intellectual preconceptions" younger children "appreciated them quite spontaneously, proceeding in due course quite naturally to their analysis" (Jaques-Dalcroze, 1921, p. V). This resonates with research (Davidson, Scripp, & Welsh, 1988) which found older music students unable to use standard notation accurately to record a well-known song on the one hand, whilst younger children using invented notations which included symbol systems familiar to them could record the song more accurately. Through his work with young children Dalcroze found that "once the ear is trained to the natural sequences of sounds and chords, the mind no longer experiences the slightest difficulty in accustoming itself to the various processes of reading and writing" (Jaques-Dalcroze, 1921. p. V).

Dalcroze, like Kodály, believed that students needed to develop an aural repertoire upon which to draw when learning to read or write music. This resonates with Pestalozzian thinking that students should not be taught concepts or rules before they experience the concept or rule in practice. In Dalcroze's case, however, the aural repertoire is learned and understood not only through listening and singing but also through the body.

There are two physical agents by means of which we appreciate music. These two agents are the ear as regards sound, and the whole nervous system as regards rhythm. (Jaques-Dalcroze, 1917, p. 14)

Dalcroze's concept of inner-hearing appears to incorporate more explicitly the expressive elements of music. In the Dalcroze approach, what he called 'rhythmic movement' is incorporated into musical learning and conceptual understanding of music is based on those experiences. Dalcroze sought "to create by the help of rhythm a rapid and regular current of communication between brain and body" (Jaques-Dalcroze, 1917, p. 16). Inaccuracies or lack of precision in performance have their origin in a:

lack of co-ordination between the mind which conceives, the brain which orders, the nerve which transmits and the muscle which executes (Jaques-Dalcroze, 1917, p. 15).

Expressive playing also depends upon the co-ordination of the muscular system and rapid communication between brain and limbs. Any faults “if not corrected in the first years will reappear later in the musical technique of the individual” (Jaques-Dalcroze, 1917, p. 15). He sought through rhythmic movement exercises to help students towards authentic expression rather than imitation in performance. In valuing student’s learning through musical experiences over acquiring musical knowledge through learning about music, the Dalcroze approach chimes with Elliot’s (1995) ‘thinking in action’ or ‘praxial’ musical knowledge (Elliott, 1995). As in the Kodály approach, conceptual understanding of rhythmic and tonal aspects of music are developed separately at first. However, in the Dalcroze approach rhythm receives primary attention, because of Dalcroze’s belief that movement reflecting rhythm in humans, unlike pitch, is instinctive.

The Dalcroze approach incorporates three inter-related and inter-dependant components: Rhythmic Solfege or Ear Training; Improvisation; and Eurhythmics. Whereas the Kodály system uses a ‘movable-do’ solmisation system, Dalcroze rhythmic solfege uses ‘fixed-do’ solmisation to develop student’s understanding of pitch and tonality, after the French practice at the conservatoire at the time. Unique to Dalcroze’s approach to solfege, is the inclusion of rhythm and movement exercises in fostering students’ inner hearing and sense of pitch.

Learning through improvisation is common to both approaches. However, it is highly constrained in the Kodály approach and used more to practise learned skills within specific contexts. In the Dalcroze approach, whilst reinforcing learning, improvisation appears to be used more to encourage the use of internalised learning in independent, fluent, musical thinking. (This resonates with the use of spoken and written language in the development of independent fluent language reading skills.) Improvising skills are developed through a range of settings. For example, in response to an instructor’s playing, students improvise through movement, reacting in the moment to verbal or musical instructions. Conversely, a student might improvise movement while others respond vocally, or on an instrument. Improvisation skills learned through bodily movement, inform students expressive abilities when improvising on their own instruments.

Improvisation, practised as an art and a science, is based upon all the traditional rules of harmony and composition; its function is to develop rapidity of decision and interpretation, effortless concentration, the immediate conception of plans, and to set up direct communications between the soul that feels, the brain that imagines and co-ordinates, and the fingers, arms and hands that interpret; and all this, thanks to the education of the nervous sensibility which unites into one organic whole all particular sensibilities – whether auditory,

muscular or constructive faculties – in time, energy and space’. (Jaques-Dalcroze, 1932, p. 371)

The third and most distinctive component of the approach is Eurhythmics (the name often used to describe the whole approach), considered Dalcroze’s most significant contribution to music teaching. The term is from the Greek ‘eu’, meaning good, and ‘rhythmos’, meaning movement or flow. Through eurhythmic exercises students internalise rhythmic expression ‘to the point’ as Anderson (2012) describes it “where students no longer had to rely on the complexity of thought to understand rhythm” (p. 27). Achieving automaticity in recognising and understanding rhythm patterns perceived aurally would contribute significantly to students’ ability to recognise patterns in written format, that is, music reading skills.

2.4.3.2 Strategies for accuracy and automaticity in music reading

Types of exercises included in eurhythmics include: ‘follows’; ‘quick-response’ activities; ‘canons; and ‘ball exercises’. A ‘follow’ is where a student literally ‘follows’ the music in movement, showing what he or she hears. This could involve stepping the beat or the rhythm, stepping the beat whilst showing the rhythm using hands or, perhaps, maintaining a simple pattern whilst changing tempo dynamics or articulation. The music is realised or represented physically. Quick-response activities involve reacting to a signal (musical or verbal) by changing the physical movement in some way. Canons are frequently used where music is played, and students are instructed to follow after at a specified distance. Interrupted canons involve a teacher playing a pattern and stopping whilst students respond in movement to the pattern. These kinds of exercises promote quick thinking, as students improvise a movement response ‘in the moment’. Students are often required to carry out exercises alone before interacting with others. This move towards social learning allows students to learn different ways of expressing what is heard through movement. Learning how to make sense of and group musical ideas within a phrase is often explored through exercises that focus on developing an understanding of the elements of anacrusis, crusis, and metacrusis. Social sharing in this context allows for the sharing of what Bamberger refers to as ‘multiple hearings’. These types of exercises foster understanding of the dynamic flow of energy in a phrase. Ball exercises are also used to explore the interplay of space, time, and energy (Anderson, 2012).

Whilst often outlined separately, Dalcroze insisted that the three components of Eurhythmics, Solfege and Improvisation, complement and reinforce each other. Although Dalcroze has written about the development of his approach at different stages (e.g., 1921, 1930) a clear view of progression in the sequence of learning can be difficult to ascertain. The fact that the approach is student or child-centred could account for this in that every group of students is different and will have different needs to which

a teacher will respond. Despite the existence of extensive writings on the approach, its key teaching tenets appear to be learned through experience. In fact, it could be said that what is handed on through mentorship is more akin to a set of guiding principles than a method or system. What was important was the handing on of musicality rather than the preserving of a system of teaching.

Several writers have attempted to distinguish key aspects of the Dalcroze approach. Mead (1994) identifies four basic premises, summarised below, that she believes encapsulate the philosophy of Dalcroze and apply to all musical learning whatever the age of the student:

1. Eurhythmics awakens physical, aural, and visual images of aspects of music in the mind.
2. Through integrating eurhythmics, solfege (ear-training) and improvisation, students' listening, performing and creative skills are strongly based on working to improve communicative, expressive musicality rather than a sole focus on intellectual understanding.
3. Music may be experienced through speech, gesture, and movement. These can likewise be experienced in time, space, and energy.
4. Humans learn best initially when learning through multiple senses. Music should be taught through the tactile, the kinaesthetic, the aural, and the visual senses. (Mead, 1994)

Vanderspar (1984) describes the Dalcroze learning process in terms of phases of representation. Table 2.6 illustrates a progression from experience to analysis with notation introduced in phase three.

Table 2.6: Vanderspar's (1984) Dalcroze Learning Process as Phases of Representation

Phases	Activities
Phase One	• Emphasis on experience, rather than analysis • Movements are based on natural skills • Physical, vocal and aural experiences precede the introduction of written symbols • Exercises exploring time, space and energy are used through activities and games in which students practice starting and stopping; use natural travelling and stationary movements (such as walking, running, stretching, curling); and activities that require balance and release of tension • Students are helped in their exploration using equipment such as toys, balls, hoops, ropes, scarves
Phase Two	• Introduction of basic components of music with emphasis still on experience rather than analysis • Through movement exercises students explore agogic aspects of music; expressive qualities of variations of speed and duration; dynamics and intensity; accents and grouping of beats • Pitch and register are explored horizontally in terms of melody and vertically involving simultaneous multiple sounds resulting in counterpoint, polyrhythm, harmony and texture
Phase Three	• Notation is used to facilitate analysis of the rhythmic and musical features previously explored • Reading and writing music facilitate analysis and extended study and development of musical features
Phase Four	• Synthesis or application of learning and involves realization of composed music and original compositions in movement.

Reading and writing music in phase three facilitate analysis and extended study and development of musical features. This resonates with Mead's (1986) observations on what students bring to the process of reading music through learning within the Dalcroze approach.

Students must develop a storehouse of aural and kinaesthetic images that can be translated into symbols and, upon recall be performed at will. This is the key to music reading. This source of musical ideas becomes a repertoire for expressive performance and a means towards a more sensitive perception. (Mead, 1986, p. 45)

Intrinsic to the approach is the principle of the need for repeated practise to develop musical skill, understanding, and automaticity. As Ingham (1917) outlines:

Physical movements repeatedly performed create corresponding images in the brain; the stronger the feeling for the movement, i.e., the more the pupil concentrates while making that movement, the clearer will be the corresponding mental image, and the more fully will the sense for metre and rhythm be developed. (Ingham, 1917, p. 49)

And again, stressing the importance of complementing the ear with the body:

Consciousness of sound can only be acquired by reiterated experiences of the ear and voice; consciousness of rhythm by reiterated experiences of movements of the whole body (Jaques-Dalcroze, 1921, p. 80).

Wis (1993) notes a further advantage of experiencing musical concepts initially through bodily movement.

The bodily realisation of qualities of music enables the learner to experience them without naming them, thus avoiding the use of language, a discursive form, as a means of grasping a non-discursive form (Wis, 1993, as cited in Juntunen & Hyvönen, 2004, p. 205).

Juntunen and Hyvönen (2004) appear to confirm this when they suggest that metaphor could explain how bodily experience of music works in developing musical understanding.

This level of knowing is situated between the pre-reflective and the conceptual domains ... Later when the student is taught to become aware of the bodily experience in relation to, for example, a written form of this rhythmic pattern (a quarter and an eighth note) the conceptual level of knowledge is reached based on the earlier experience. In short, the bodily metaphor for a musical concept which could be referred to aurally in teaching, is explored through bodily movement and put in musical context (Juntunen & Hyvönen, 2004, p. 206).

Swanwick (1999) uses the idea of metaphor in relation to how musical thought and production in the arts generally can be explained. Metaphorical processes allow us to see new relationships between things (Swanwick, 1999).

Within the Dalcroze approach, teachers are encouraged to emphasise the bodily, the pre-reflective level of knowing with young children and to consider carefully when reflective, conceptual thinking is meaningful. Nevertheless, the children are always encouraged to use their imagination, to find various ways to move with music as well as to become aware of the qualities of movement and music (Juntunen & Hyvönen, 2004, p.206)

In this respect, the Dalcroze approach allows for individuals to be more creative in their responses to music. There is an expectation that there is no single correct response. In his writings Dalcroze emphasised that education must teach children to know themselves. In this sense his thinking resonates with that of Elliot's on 'personhood' (Elliott, 1995). In Dalcroze's words:

The acquisition of all the plastic, dynamic, and agogic qualities indispensable to rhythmist or dancer, actor, or mime, will make him only an adapter, a transposer, an automaton, unless these technical qualities are controlled by wealth of fancy, a supple, elastic temperament, a generous spontaneity of feeling, and an artistic, responsive nature. All *Plastique*² education, therefore, should aim especially at the arousing of natural instincts, spontaneity, individual conceptions. The culmination of studies in moving plastic is certainly the direct expression of aesthetic feelings and emotions without the aid of music or even speech.' (Jaques-Dalcroze, 1924, p. 26)

Dalcroze highlights here the importance of an individual learning to think musically and imaginatively for him or herself rather than merely acquire technical skill. In relation to music reading, a reader hears and responds to sounds in notation to form a personal interpretation.

Physical movements both represented and demonstrated students' understanding of what was being listened to, aiding memory. The better a student could represent music in movement, the better he or she could recognise it in music notation and read from it fluently with automaticity. Physical representations of music offer windows on student's musical thinking in ways similar to children's

² *Plastique Animee* refers to a visual analysis of a piece of music using the body as the vehicle either individually or in groups.

written invented notations as described by writers such as Bamberger, (1991), Davidson & Scripp (1989), and Barrett (1997).

The Dalcroze approach to music learning facilitates the development of the ability to think in sound through developing understanding of and communicating the meaningfulness of music. Through exercises, he sought to:

Enable children to listen to sounds before executing or writing, to evoke the thought of a note before its interpretation. (Dalcroze, 1921, p. 9)

Dalcroze methodologies value learning individually and in groups, recognising the social aspects of learning. Its approaches highlight the role of physical representation of music for thinking in sound and audiating from notation for this research.

2.4.4 Karpinski's approach to aural skills acquisition

The third approach examined is a contemporary approach to aural skills training designed by American music theorist Gary S. Karpinski, Professor of Music in the Music Theory programme of the University of Massachusetts.

2.4.4.1 Background and Context

Karpinski's approach is developed from the standpoint of a music theorist, researcher, and pedagogue drawing on a significant body of psychological research on music cognition in addition to writings of music theorists of the past and insights from musicology. He presents it as a *Manual for Ear Training and Sight Singing* (Karpinski, 2007) in staged instructions and exercises. It is supported by an accompanying CD-ROM containing graded excerpts from real music literature selected and organized to follow the learning sequence of the manual. There is also an anthology of supplementary sight-reading material drawn from Western classical literature *Anthology for Sight Singing* (Karpinski & Kram, 2007) and an *Instructor's Dictation Manual* (Karpinski, 2007a). Karpinski (2000) is the only one of the four music pedagogues critiqued in this chapter who provides a rationale and underlying thinking on aural skills acquisition in his book.

Karpinski (2000a) suggests that learning to hear and read music with understanding and facility is arguably the most important goal for musicians, noting that aural training has been of interest to music teachers as far back as the beginning of the last millennium. Over centuries, and into the 1800s aural training, as a distinct discipline, came to focus around two activities: sight singing and dictation (Karpinski, 2000a). 'Reading and performing' and 'Listening', the two pillars of Karpinski's approach align with these activities. He does not see these in isolation from real music practice.

Karpinski (2000a) is critical of the rise in popularity and practice in the twentieth century of “‘atomistic’ training: drill, practice, and testing of the identification and performance of small, acontextual musical elements” (5.2) and the dissemination of this practice through the growth of textbooks and computer-assisted instruction software. In his view, most contemporary aural training includes an over-emphasis on these atomistic skills (for example, identifying and singing intervals and chord qualities and inversions) combined with the more contextual skills of dictation and sight singing. Citing experimental and clinical evidence, he argues that there is “little connection between the ability to identify intervals acontextually and the ability to do so in a [real world] tonal context” (2000a, 5.2). He criticises the use of artificially constructed music for pedagogical purposes, arguing instead for the use of real music literature. This reflects current thinking in language literacy teaching, where there is a growing emphasis on reading ‘real’ literature in a variety of genres and a concern about transfer of drills and skills to real life situations. It also resonates with the intention of using folk music and Western art music as ‘literature’ in the Kodály approach.

In his own approach to aural skills training Karpinski (2000) opts to conceptualise aural skills within the broader categories of the musical behaviours of ‘listening’ on the one hand, and ‘reading and performing’ on the other. He justifies the grouping of reading and performing together because both skills are prerequisites for and outcomes of sight reading. In his view, the two complementary areas of listening, and reading and performing, require and foster reciprocal skills. Further, he suggests that students benefit from studying musical concepts and skills by using the same approach to both listening and reading and performing. He describes thinking in music as occurring when music listeners understand what they hear and when music readers understand and ‘auralize’ what they read. Karpinski’s aim is to develop what he calls ‘literate’ music reading and performance. By ‘literate music reading and performance’ he means reading and performing “through, with, and for *musical understanding* [my emphasis]” (Karpinsky, 2000, p. 6) so that the notes are meaningfully expressed rather than executed with accuracy alone. This resonates with language reading where fluent reading requires more than accuracy in decoding words and understanding draws upon broader linguistic and general knowledge. For music reading, Karpinski explains:

Musically meaningful reading and performance simultaneously stem from and foster an understanding of such factors as key, meter, and harmonic function (Karpinsky, 2000, p.6).

His aim of helping students to “hear the music you see and see the music you hear” (2007, xi) aligns well with this current research into the development of children’s music reading fluency. In developing the reciprocal skills of listening and reading and performing, his goal is to develop students’ ability “to

think *in* music” (Karpinsky, 2000, p. 4). This resonates with Gordon’s (2007) ‘notational audiation’ and with a language reader’s interaction with text during reading.

Unlike Kodály and Dalcroze, Karpinski does not propose his method for the development of music thinking skills in children. Perhaps as a result, he is less concerned with child-centred learning theories and more focused upon developing a learning sequence derived from years of research in music cognition and perception. He appears to take how music works and is perceived by listeners as his starting point for investigating how college-level musicians acquire the many skills involved in musical behaviour.

Both Kodály and Dalcroze emphasised the need for students to have developed an aural foundation or a store of musical experiences already in their minds upon which to draw when reading and writing. This resonates with the development of an aural language vocabulary through immersion in rich language environments for language reading fluency. The Kodály approach intends for this store to be developed through singing Hungarian folksongs and art music. Dalcroze also used singing but considered that listening experiences involving rhythmical bodily movement also developed aural imagery. Karpinski treats the problem of ensuring an aural foundation differently. Quoting music educator, David Elliott (1993), he observes that to understand music, listeners require ‘the same kinds of knowing as the performer’ (Elliott, 1993, as cited in Karpinski, 2000, p. 6). Rather than developing an aural repertoire in advance of reading skills, Karpinski’s approach integrates the development of ear training with sight singing. Probably because he is working with adult learners, he presents and explains music concepts using appropriate musical terminology before continuing to explain the separate implications for the application of this new knowledge in sight reading and in listening activities. In addition, he contextualises new learning in follow-on exercises which can include writing tasks (such as transcribing, transposing, or graph-making), improvising and composing activities, or conducting exercises. Chapters in the manual address musical concepts and skills in terms of both disciplines (i.e., ear training and sight singing) in a sequence he describes as ‘skills-based’ informed by advances in music theory and analysis, and music theory pedagogy.

2.4.4.2 Strategies for accuracy and automaticity in reading rhythm

In Karpinski’s approach simple duple and triple meters are introduced first. These are followed by the introduction of quadruple meters, compound meters, and later more advanced metric concepts and skills (Karpinski, 2007). Whilst the Kodály approach also followed a clearly defined sequence in metre and rhythm, it was derived from the regularity of their occurrence in Hungarian folksongs. Karpinski’s sequence progresses from using rhythms containing notes of one beat and longer, “followed shortly by half-beat notes, and then a succession of shorter divisions and triplets are introduced as the book

progresses” (Karpinski, 2007, p. xiv). Whilst his examples are drawn from music literature, real music seldom moves from long to shorter durations in this way.

2.4.4.3 *Strategies for accuracy and automaticity in reading and writing melody*

Karpinski credits Heinrich Schenker’s theories with having influenced crucial aspects of how he approaches pitch. For example, “both harmony and voice leading play important roles in the listening and singing exercises” (Karpinski, 2007, p. xiii). Students are led to “read and hear certain melodic figures through understanding the notion of structural pitches” (2007, p. xiii). He explains that advances in music theory pedagogy inform the emphasis in the manual on the importance of tonally functional thinking, “specifically in terms of scale degrees and their characteristic functions” (2007, p. xiii). This type of thinking creates expectations of melodic function in a reader’s mind, for example that a leading note on the seventh degree of a scale will rise to the tonic at the end of a section or that a fourth will tend to fall at the end of a phrase. Scale-degree thinking influences the teaching methods and organization of pitch materials in the manual whilst studies of tonic inference affect instructions on how to understand pitches while listening (Karpinski, 2007).

Scale degree is referred to in the manual in two ways: 1) with caret numbers (i.e., numbers 1 to 7 each topped by a circumflex (^) and 2) with movable-do solmization (i.e., *do, re, mi to ti.*) Use of both systems simultaneously facilitates association of specific syllables with specific scale degrees. They are presented in combination in the text, separated with a forward slash (e.g., 1/*do*, 2/*re*, etc.).

Karpinski (2000) explains that he selected both scale-degree numbers and moveable-do solmization systems for use because each explicitly models the tonal functions of the tonic and the scale degrees that relate to it. (2000). The manual generally uses a parallel, functional approach to movable-*do*, where all tonics (major, minor, modal) are solmized using *do*, therefore using a *do*-based minor system. (The *la*-based minor solmization is used only to introduce the natural minor and the modes.) The reason given for this decision is that using a *do*-based minor allows labelling to illustrate similar tonal functioning in parallel keys. He cites as an example the labelling of the dominant triad in both major and minor keys as ‘5/*sol* - 7/*ti* - 2/*re*’. Pitch materials are presented in tonal function order, starting with:

diatonic melodies that skip only among members of the tonic triad and then adding skips to certain prefix neighbors, melodies that outline other diatonic chords, chromaticism and so on.
(Karpinski, 2007, p. xiv)

Explicit harmonic thinking is embedded in the presentation of materials so that the performer can hear this meaning and the intended direction can be heard in the sight singing.

Whilst fluency in solmization benefits accuracy in sight singing, it also supports understanding. Karpinski cites Rogers (1996) to highlight meaning making as the goal in music reading.

The real goal of tonal sight singing is not just accuracy; it is to hear the music in a particular way – a way that is musically nuanced, that is shaped and directed by goals, and a way that respects the encoded tensions and internal-movement proclivities of the specific environment. The job of sight singing is context sensitivity and the enculturation of *tonal bearings*. (Rogers, 1996, as cited in Karpinsky, 2000, p. 147).

Progression, in Karpinski's approach appears not only to be influenced by theories of music perception and cognition, but also in terms of a particular adult perception of what is musically easy towards what is musically more difficult. Karpinski states that the first eleven chapters are restricted in terms of pitch, meter, and rhythm to afford students time to develop certain fundamental aural skills "unencumbered by the complexities of more difficult musical content or music notation" (Karpinski, 2007, p. xv) Whilst the decision not to use standard notation to represent music in the initial stages appears justified in that it allows learners to develop fluency without having to deal with the complexity of standard notation in initial stages, the decision not to present music in any key other than C major until chapter 11 appears rather curious.

2.4.4.4 Reading and Performing Skills

Karpinski's approach to music reading is characterized by his attempt to approach musical skills and concepts from two different but interconnected skill areas: listening and reading and performing. His skills-based approach presents and explains musical concepts verbally initially and then applies this new learning in both listening and reading and performing exercises, unlike Kodály and Dalcroze approaches. Karpinski asserts that a balance can be struck between practice and preparation of skills in isolation and sight reading so that, new concepts and prepared materials should ultimately feed into the experience of sight reading so that "the process of reading music extemporaneously relies more and more on the informed mind of a skilled reader" (Karpinski, 2000, p.191).

Within reading and performing Karpinski devotes much attention to sight-singing skills. He justifies this, citing Ottman (1956) who states that sight singing is useful as a "musical aid in development of mental imagery of the symbols of printed music which in turn leads to higher levels of musicianship and artistic achievement" (Ottman, 1956, as cited in Karpinski, 2000, p. 145)

In addition to its being a musical aid, Karpinski (2000) suggests that sight singing is also useful as a tool in developing and revealing music reading skills. He divides sight-reading skills into two categories: those that are "fundamental and beneficial to good sight singing and good music reading in

general” (p.145), which are “most efficiently learned before the introduction of music notation” (p.145) on the one hand; and those “involved in sight reading from actual music notation” (p. 158) on the other. From the outset, Karpinski conceives of sight singing as a complex skill, that draws upon a student’s musical conceptual understanding and understanding of how notation operates; is influenced by a student’s experience of reading and performing a wide variety of music literature; and affected by the amount of time and effort expended on sight reading activities (Karpinski, 2000).

2.4.4.5 *Fundamental (Pre-notation) Reading and Performing Skills*

The fundamental sight-reading skills Karpinski identifies as best learned before the introduction of notation include: vocal production; inculcating scale and solmization; establishing collection and tonic, establishing pulse, tempo, and meter; aural imagery prior to sound production; and reading from protonotation. In identifying ‘fundamental’ pre-reading skills, Karpinski is essentially acknowledging the need for an aural foundation or prior musical experience upon which to draw in music reading, similar to that necessary for language literacy. These topics are discussed below in the order in which they are presented and addressed by Karpinsky in his chapter on fundamental reading and performing skills (Karpinski, 2000, p. 145).

2.4.4.6 *Vocal Production, Inculcating Scale and Solmization*

Like Kodály and Dalcroze, Karpinski regards the singing voice as a tool that all musicians should be able to use. In common with Kodály and Dalcroze, he advocates the use of solmization for the reading (and listening analysis) of pitch. Rather than selecting movable-*do* solmization as in the Kodály approach or fixed-*do* solmization as in the Dalcroze approach, he opted to use a movable-*do* system that uses a *do-* (as opposed to Kodály’s *la-*) based minor. Both systems, in his view, have intrinsic value: fixed-*do* instruction being more suitable for developing skills such as pitch reading, use of clefs and transposition whilst movable-*do* is better suited to skills of tonic inference or scale-degree function. His belief is that whichever system is selected, the benefit of using solmization lies in its ability to unlock the meaning and sounds of music notation for a reader (Karpinski, 2000).

In terms of music reading and performance, the ability to auralize (i.e., imagine or think in sound) and sing basic tonal structures is considered as axiomatic for a musician. However, he too recognises that students need support in developing these skills. Like Dalcroze, and differing from the Kodály approach, he considers the major scale a convenient starting point as it includes all members of the diatonic collection in scale-degree form. He suggests exercises and drills for developing fluency in attaching solmization syllables to the pitches of the scale so that the syllables become associated with

particular scale-degree function. Without achieving fluency, solmization is of little use in music reading, in his view. Exercises he suggests include:

- singing ascending and descending scales in sol-fa starting from the lowest and highest pitches
- singing scales involving the use of cues to change direction
- singing sequentials where an initial pattern is given and is copied
- singing ‘functional progressions’ that is, note-pair resolutions (such as 7-1, 5-1, 4-3) following Danish composer and pedagogue Jorgen Jersild (1966)

He notes that singing Jersild’s note pairs in different keys facilitates what Rogers (1996, in Karpinski, 2000) called “a vigorous, multifaceted, concentrated, and extended workout for hearing melodic function and for acquiring tonal bearings” (p. 150). All of these he suggests are best practised without notation. These exercises require a type of ‘mental gymnastics’ similar to those used in Dalcroze and Kodály contexts in relation to achieving fluency in solmization. Automaticity in solmization is a goal in each of the approaches examined thus far.

2.4.4.7 Establishing Collection and Tonic

In addition to fluent solmization, Karpinski (2000) suggests that there are two musical parameters that sight-singers must develop an ability to establish before approaching the reading of a piece of music: the diatonic pitch collection (‘the pitches that make up the scale, chords and the patterns within a key’ (p.151); and the tonic. The diatonic pitch collection is given by a key signature. The tonic, however, must be determined from the particular structural relationships among the pitches. Musicians, in his view, need to be able to establish and manipulate both parameters independently (Karpinsky, 2000).

He suggests that giving a single starting pitch before sight-reading exercises emphasises the ‘collection’ rather than the tonic and scale and believes that the ability to establish a diatonic collection from a starting pitch is particularly useful for readers when music modulates. This is one context in which he agrees with the use of acontextual practising of producing intervals. Again, he suggests a procedure (drill) for establishing a collection in the mind to be practised until it becomes automatic:

- Listen to the starting pitch
- If necessary, sing by whole steps to reach the nearest half step within the collection
- Sing the nearest half step to fix its position
- Sing by whole steps to reach the other half step in the collection
- Sing that half step to fix its position
- (optional) sing the entire scale.

To establish the tonic he adds the following steps:

- sing by steps to reach the tonic
- sing the tonic and dominant pitches
- (optional) Sing tonic and dominant chords.

Whilst he recommends that this drill be learned and assessed out loud, he continues to suggest that it should become an auralized process as quickly as possible. Establishing collection and tonic, therefore, become incorporated into music thinking skills for music reading.

2.4.4.8 Establishing Pulse, Tempo, and Metre

When reading familiar music from notation, Karpinski recommends auralizing a passage of the music in tempo before starting to read. However, with unfamiliar music Karpinski advises selecting a steady slow tempo, akin to the Kodály approach's use of a 'learning tempo' when sight-reading. He highlights the importance of continuity, both mental and physical, between the pulse and tempo established before performing and that used during performance. Exercises he suggests to improve or develop a student's ability to control a tempo include: listening to recordings of pieces at specific tempi; learning to establish tempi from memory according to M.M. marking without recourse to any external reference such as a metronome or clock; preparing individual melodies at several different tempi; and learning to maintain a reasonably average tempo while exercising musically expressive deviations from it. Like Dalcroze, and Kodály to a lesser extent, he draws on the use of physical motions such as foot tapping, head or torso movements, and conducting, to help students to embody a pulse they establish. He suggests that conducting is among the most musical and practical means for students to establish and express metre. In his approach he frequently uses conducting in conjunction with sight singing on the basis that it "establishes and communicates a sense of pulse, tempo, and metre in a single activity" (Karpinski, 2000, p. 156).

2.4.4.9 Aural Imagery Prior to Sound Production

The skills outlined above – establishing collection tonic, pulse, tempo and meter – for assessment purposes need to be performed aloud. However, in Karpinski's view, for a musician, they are procedures which should be internalized as quickly as possible and are prerequisites for interpreting and understanding individual notes when reading from music notation and thinking in sound.

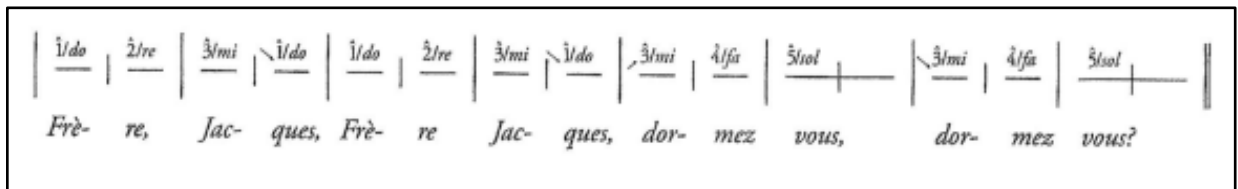
Reading from Protonotation

Whilst, in common with Kodály and Dalcroze, Karpinski believes that reading and writing contribute to the development of fundamental music skills, he considers WSN too complex a system for use in initial stages. He suggests instead that an additional means of developing sight-singers' fundamental reading skills in meter, rhythm and pitch is through preparing and reading at sight, melodies presented in the protonotation system he developed. This thinking is like that of the Kodály approach in the use

of a simplified notation involving rhythm, pitch, and metre for initial reading and writing activities. Karpinski is influenced by and frequently draws upon classic methods that precede his approach.

His protonotation incorporates an element of graphic notation in that he uses vertical and horizontal lines to indicate metric and rhythmic information respectively, together with solmization syllables presented with scale degree numbers to represent pitch. An extract from the French folksong *Frere Jacques*, presented in protonotation at Figure 2.9, is an example from the manual.

Figure 2.9: Frere Jacques Presented in Karpinski's Protonotation



He includes tasks in which students translate musical exercises recorded in protonotation to WSN and vice versa having acquired specific skills as a means of familiarising students with the operating principles of standard notation and applying their knowledge to the system.

Reading and Performing Skills for Engaging with Standard Music Notation

Karpinski addresses several issues relating to sight-reading from standard music notation. Many of the types of skills he outlines are also skills that are addressed in the teaching of language reading (for example scanning, reading ahead, chunking). Some skills are common to both categories he devised – that is, the pre-notation and with notation categories. Initially, he advises that readers engage in some basic procedures to orient sight-readers before singing. These include scanning the music in advance, translating pitches into solmization syllables, translating rhythms into syllables. In addition, he recommends visual and mental chunking of metric groupings, rhythmic patterns, scalar passages, arpeggiations, and harmonic implications.

Students should begin by orienting themselves to the global parameters of a piece, by examining the global information presented at the beginning of a stave in advance of sight-singing. By this he means the symbols indicating instrument or voice, clef, key signature, meter and tempo. Once the tonic and diatonic collection are established, he advises that readers orient themselves in a score by locating the tonic on the stave as a point of reference in advance of mentally locating the other degrees of the scale. He notes, citing Fletcher (1957) that:

The tonal centre, identified with a specific staff-location at the beginning, held in mind during the entire decoding [reading] procedure ... is the point of reference by which the ambiguities in the visual code [notation] are resolved (Fletcher, 1957, as cited in Karpinski, 2000, p. 159)

A beneficial procedure he attributes to Steve Larson called ‘mumbling’ is akin to the purpose of ‘flying notation’ in ‘silent-reading’ exercises in the Kodály approach. Karpinski (2000) explains it as “a kind of rapid reading somewhere between freely scanning out of sequence on the one hand and reading actively in real time on the other” (p. 163) with the aim of identifying particular pitch aspects that will provide anchor points for sight-singing. In language reading, students are often afforded opportunities for silent reading of passages in preparation for reading aloud.

A task a reader must carry out whilst reading in real time is the translation of pitches and rhythms into sol-fa and rhythm syllables. When this skill is automatic students can use solmization syllables to unlock the musical meaning encoded in music notation thus enabling reading music with meaning in mind rather than just decoding notes. Another skill which, in his view, depends on music thinking abilities is intonation.

Good intonation depends on performers’ abilities to auralize pitches ... Without a specific pitch in mind to aim for, a performer cannot possibly auralize proper intonation” (Karpinski, 2000, p. 171).

The ability to recognize rhythmic or pitch patterns contributes to meaningful reading. Karpinski observes that “as readers theoretical knowledge and speed of comprehension grow, so, too can their abilities to parse meaningful chunks within this advance field of vision” (Karpinski, 2000, p. 174). He describes two processes through which a music reader accurately performs rhythmic patterns in music; “matching the pattern against a mental inventory of previously learned patterns” (i.e., recognising a known pattern automatically similar to word recognition) or working out an unfamiliar pattern in real time (akin to decoding unknown words).

A separate area that facilitates accurate and musically meaningful musical performances of reading is the ability to perceive and understand the harmonic implications in music.

In fact, musically convincing and satisfying performances of tonal music depend heavily on performers’ abilities to think and act harmonically. Performances without a sense of harmonic motion are lifeless and uninteresting, devoid of one of the most essential elements of tonality itself. Performances that incorporate the logic and emotions of harmonic change and progression are cohesive and compelling. (Karpinski, 2000, p. 180)

Understanding the underlying harmonic context leads a reader to anticipate melodic direction and avoid error. Strategies for developing musicianship of this kind include singing arpeggiated chord progressions; visual and mental chunking of harmony (described as “taking in groups of pitches with a single fixation of the eyes and making sense of those groups *as groups*” [original emphasis] (p. 181); structural singing and voice leading (Karpinski, 2000).

Importantly, in addition to the skills above, skilled reading includes the incorporation of performance and expression instructions. Karpinski (2000) notably makes this observation in relation to aural skills training (in which he includes music reading).

So much aural skills training is focused on rhythm and pitch that it seems to stand across a wide abyss from the actual world of musical performance. To bridge this distance and to make aural skills training as *musical* as possible, instructors must integrate such important musical features as tempo, dynamics, articulation, accent, and phrasing into their curricula. (Karpinski, 2000, p. 187)

He urges the inclusion of tempo and dynamic indications (both static indications and indications of gradual change, e.g., *allegro/accelerando*; *piano/crescendo*) together with articulation markings as early as possible in sight singing materials. He also highlights a need to nurture what he calls the ‘art’ of phrasing in shaping phrases “through proper breathing and the judicious addition of musically appropriate changes in tempo, dynamics, articulation, and accent” (p. 189) This echoes the role of prosody in fluent language reading.

Karpinski’s understanding of the reading process in music appears to chime with frameworks of language reading, the stimulus for this research, in that it includes a dynamic interaction between top-down conceptual processes and bottom-up decoding processes supported by aural experience and musical memory skills.

2.4.5 Adolphe’s approach to improving the musical imagination

The fourth approach to be examined is the approach that contemporary American composer, pianist and music scholar, Bruce Adolphe, developed to awaken and improve the musical imaginations of performers, listeners and composers. Whilst not an all-encompassing music method, Adolphe’s work is included in this research because of his interest in using cross-disciplinary experimentation to enhance creative musical thinking and emotional engagement with music, what he calls the ‘musical imagination’. In the reading for performing sounds or meaning making debate on music reading, there are several ideas in Adolphe’s approach that could prove useful in broadening the approach to music reading fluency to resonate with language reading fluency. The text upon which I will draw for the

purpose of examining his theories on music thinking is *The Mind's Ear: Exercises for Improving the Musical Imagination for Performers, Composers, and Listeners* (Adolphe, 2013).

His aim in devising the exercises in the text was to develop students' ability to hear music internally 'in the mind's ear' in the fullest sense, complete with timbre, colour, and expression and consequently to facilitate expressive performing skills. He believed that the creative energy of many young performing musicians was not fully nourished by practising, performing, and the conventional theory and solfege classes (Adolphe, 2013).

The primary goal of developing the mind's ear is to improve the ability to imagine and remember music, to hear music in silence, and to be able to hear in the mind music that is printed on the page without the aid of an instrument. Another benefit of this skill is the ability to imagine how one might play a phrase before physically trying to do so on an instrument. This is essential to freeing oneself from habits and discovering deeper levels of interpretation as a performer. (Adolphe, 2013, p. 2)

He is concerned with encouraging musicians (at any age or ability level including professional musicians) to engage more fully with creative aspects of performance such as imagination, interpretation, and authenticity through developing meaningful personal connections with music. Like Dalcroze and Kodály, his work stems from a concern with an over-emphasis on technique at the expense of musical expression. Key to his theory of music learning is the idea that imaging sound from notation is an essential skill for a classical musician.

To hear in silence means to imagine vividly how music sounds, so vividly that it can be heard in the mind as if it were really being played. To be able to hear music in silence while reading a part or score is an essential skill for a professional musician. (Adolphe, 2013, p. 8)

Kodály and Dalcroze developed their ideas on imaging sound from notation early in the twentieth century. Working within today's digital reality, Adolphe argues that the skill of aural imaging is still key for a 21st century musician.

Far from being rendered irrelevant due to new technology, developing the mind's ear is essential to freeing the imagination. A composer (or any musician) should be able to dream of new musical ideas while reclining on a couch....without a computer or any external device. The brain's the thing. (Adolphe, 2013, p. 9)

Like Dalcroze, Adolphe approached the training of the musical imagination to help students who, whilst capable of playing technically difficult music, did not seem to be able to bring authentic

emotions into play by connecting more deeply with the essence of the music and communicating it during performance. Echoing Dalcroze he states that bringing authentic emotions into play during performance is not the same as imitating the emotional posture of one's teacher or favourite artist, "nor is it the same as 'indicating' emotions by employing clichéd physical gestures, whether they are deliberate or unconscious" (Adolphe, 2013, p. 2). Both Dalcroze and Adolphe are concerned with a player's ability to make musical meaning and integrating this in developing musical reading fluency just as in language reading fluency, the meaning is in the reading, not added on afterwards.

Inspired by the work of practitioners in the discipline of theatre Stanislavsky, Adler, Strasberg, Grotowski, and others, Adolphe turned to the techniques used to train actors to get in touch with their emotions, stimulate their memories, and free their imaginations (Adolphe, 2013). His approach is based to a great extent on theatre games. He believes that in addition to instrumental practice, the musical inner-life of a performer must also be addressed. Following actors' techniques for truth or authentic performance, Adolphe believes that strengthening emotional memory, imagination, and the mind's ear can lead to more meaningful interpretations, more communicative performances, and quicker learning of material.

Adolphe is not concerned with mapping out a sequence of progression from early childhood to adult musicianship and, whilst some of his exercises can be completed by individuals without musical training, most require prior musical knowledge or experience – confirming the assertions in the Kodály and Dalcroze approaches that prior direct aural musical experience is key to aural imaging from notation. As Adolphe warns, most of the exercises require a basic musical knowledge, including familiarity with the timbres of musical instruments and a rudimentary understanding of scales and harmony. Some exercises are designed to be completed in silence, in the mind's ear. In other words, some exercises are designed to promote thinking in sound. Others require more advanced skills in performance or composition. Adolphe recommends that musicians should try all the exercises, even those that seem to require no musical knowledge or experience, because these exercises can help enliven the aural imagination significantly.

Crucially, Adolphe believes that the musical imagination and the mind's ear can be improved by practising appropriate exercises, just as is typically done with instrumental technique. The key to imagining, in his view is the development of musical memory.

A refined memory, capable of hearing in the mind a piece that one has heard previously as if it were happening in the present moment, is the complementary skill to imagining unheard music. By trying to hear loudly in the mind something one has heard before, and then altering

the memory slightly, one is already imaging new music. This is a step toward composing.
(Adolphe, 2013, p. 9)

Adolphe appears to be drawing on two distinct approaches to authentic performance in acting developed in the United States following interpretations of Stanislavski's approach: Strasberg's looking inside oneself or 'emotional recall' on the one hand and the use of imagination in response to a script as in Meisner's emphasis on improvisation on the other. Where singing and listening were key modes of developing musical memory and aural imaging in Kodály's approach, listening and responding through movement in Dalcroze's and listening analytically through dictation activities in Karpinski's, Adolphe seeks to develop musical thinking skills through musical thinking in improvising and composing activities. As an example, one exercise in aural imaging asks students to imagine the timbre of a trumpet and then to alternate its dynamic. It is not just pitch that is the focus here but the specific timbre of a trumpet.

Exercises address a wide range of techniques and approaches to engaging the musical imagination, including the following:

1. suggestions for imagining music in silence that one may do alone,
2. performance games for the solo player to aid inner hearing, musical imagination wider than pitch and rhythm,
3. group games with and without instruments,
4. games involving a wide variety of improvisation procedures,
5. experiments in musical imagining that involve composing. (Adolphe, 2013, xi)

Within the first category, exercises are designed to be completed individually. He draws on extra-musical stimuli for example, the first of his 'warm up' exercises involve visual imagining, as he believes that most people find it easier to imagine visual images than sounds. This then progresses to sound imagining. Some exercises ask participants to imagine everyday sound materials, for example a telephone ring tone, whilst others address particular musical devices and aspects of musical syntax, such as deceptive resolutions of dissonant harmonies. He explores creating what he calls 'deceptive situations' with everyday sounds before moving on to exploring surprise, expectations, suspension, and anticipation in music. He draws upon making extra-musical or multi-modal associations. For example, as a means of exploring deceptive cadences or surprising resolutions in music, he suggests conjuring up the smell of almonds whilst listening to a major chord in your mind's ear played on three trumpets.

Interestingly he frequently advises not to sing whilst completing a ‘hearing in silence’ activity “as that changes the relationship between your listening and imagining” (p. 43). Adolphe talks about the benefits of doing the exercises alone but also the benefits of a group of students sitting in silence together, imaging the sounds and events as read by the teacher. He comments that they can share verbal descriptions of their experiences, resonating with Vygotsky’s (1980) social learning. He advises that students be given time “to find their way in any exercise, to try it more than once, and to come back to the exercise another day, after having tried some of the other games in the book” (p. xxii). Practising the skill of imagining is key to improving.

Returning to a favourite exercise regularly, perhaps once a week as a standard warm-up for class, can lead to remarkable improvements and a sense of ease with a formerly challenging task. (Adolphe, 2013, xxii)

Adolphe argues for the inclusion of composing and improvising in college-level music courses for all music students. In addition, he suggests that music students should have opportunities to take classes in other disciplines such as drama or dance, somewhat similar to Dalcroze. In his view, cross-disciplinary experimentation allows a musician to discover and nurture his or her emotions and inner-life, enriching expressive authentic music performance. Whilst acknowledging, like Dalcroze and Kodály, that technical skill is necessary, technique on its own is not a goal. In Adolphe’s view, it should serve the music, “a good technique serves the imagination” (p. 7).

Sometimes it is necessary to isolate a technical problem to solve it, to work it through, but even then, it is better to link it to a musical thought than to let the technical problem become ‘the point’. (Adolphe, 2013, xvii)

In common with Kodály and Dalcroze, and following method acting, Adolphe (2013) asserts that education, including music education should encourage self-exploration. In his view, self-exploration is a path to understanding others and a way to free the imagination for creative work. Composing music is about exploring and discovering feeling and thoughts through the process of working in composing. Echoing Elliott, he notes that “often, one discovers what one ‘has to say’ *through* music rather than bringing already formed nonmusical thoughts to the table, although that is also a completely valid approach” (p.4).

Pedagogical implications of Adolphe’s thinking include cognizance of the fact that the manner in which a task is presented influences the creative engagement of students. Adolphe’s notes that the way we teach can inspire creativity or dull it. When presented as a technical exercise, the assignment is a test of skill alone and does not engage a sense of fun or artistic engagement. Playful engagement is an

important aspect of imaginative work. As Adolphe observes, “in a music theory assignment, the goal is to demonstrate an understanding of the material; but in a composition assignment, the goal is to express an idea with clarity” (Adolphe, 2013, xvii).

Authentic musical engagement needs to be personally meaningful. In Adolphe’s view it is vital that a composition student be emotionally engaged with every phrase, and excited by every choice made. This has implications for teachers in making musical tasks meaningful, including engaging with music notation. He encourages the use of problem solving as an approach to creative thinking. An example in a written musical assignment is to suggest that students try the opposite of whatever is comfortable to do. In other words, they should set themselves challenges to overcome. “Such challenges stimulate new responses, get the mind working differently, and so open up new channels for creativity” (Adolphe, 2013, xviii).

One such challenge is imagining sound from notation or as Adolphe describes it ‘reading and hearing printed music in silence’. Activities address this in different ways. For example, in an activity called ‘note exchange’ a reader is asked to write a phrase consisting of six notes of equal length on manuscript paper. The reader should play the notes on an instrument and listen attentively to them. Following this, he or she should try to hear them in the mind (in silence). Adolphe then suggests changing the pattern slightly and trying to hear the altered sequence in silence internally before checking its accuracy on an instrument. The exercise is extended to include similar exchanges with rhythms and chords. This exercise involves using memorised sounds encoded in notation to imagine or internally hear a new sequence. Memory skills are key to this.

Another type of activity for promoting music thinking in relation to notation is to listen to a recording of a single-line melodic instrument for which the reader has the score. In this activity Adolphe uses real music with real instrumental timbres rather than a reader’s internal singing voice. The reader is instructed to listen to the music phrase by phrase whilst reading the notes on the page. Having listened to the first phrase a number of times, the reader should try reading the printed notes ‘playing back’ internally the music exactly as heard. In effect, Adolphe is modelling for the reader the type of activity involved in ‘reading’ a phrase from a score, i.e., calling to mind sounds associated with notated symbols in memory. When this has been achieved, the reader is instructed to try to hear it played more slowly or with different articulations or dynamics. Having interacted with the original first phrase, the reader should then try to hear the next phrase internally before checking its accuracy by playing the actual recorded version. Adolphe suggests progressing to working with music with two voices before tackling a trio or quartet. Attentive listening, memory skills and improvising skills are called upon to facilitate internal hearing of notated phrases in this exercise. It is clear from these examples that in

Adolphe's thinking, imaging sound from notation is a musical skill which can be learned through imaginative work. The sequential nature of learning progressing from tasks with simple dimensions to tasks with multiple dimensions resonates with Fisher's (1980) theory of skill development.

In other exercises, music reading skills are used as a starting point for improvising. For example, Adolphe suggests using a single line of music extracted from a Haydn or Mozart string quartet as a starting point. He encourages the reader to 'play' with the notation by copying out several phrases without using a time signature or bar lines. He instructs the reader to treat the melody as an ordered series of pitches only, raw material for rhythmic ideas. Ideas could include making changes to note values, removing rests, creating a triplet etc.. He asks the reader to imagine the music with accents in different place than in the original and instructs the reader to notate the accents in interesting new places, draw slurs that create new phrases different to the original to let a new rhythmic scheme emerge. To finish, he encourages readers to draw in new bar lines that reflect the new accents and phrases and add new time signatures. He suggests that the reader perform the new version of the piece playing it for someone who knows the original to find out if he or she can recognise it. In this exercise Adolphe uses notation as a starting point for musical thinking. Playful interaction with notated raw material allows for the creation of a new piece, or if not a piece, interaction with new ideas.

Adolphe's exploration of cross-disciplinary ideas and activities highlight their potential in promoting creative musical thinking in relation to music notation. Unlike the emphasis within the Kodály, Dalcroze, and Karpinski approaches on singing to develop inner hearing, he advises practice at imagining and listening to sounds 'in the mind's ear' through exercises and games drawn from other disciplines, particularly acting. For him musical imagining is a skill that can be developed through practice at remembering, imagining and manipulating sounds in the mind. Further, he urges that music should be imagined in its fullest sense complete with timbres, colour and expression, echoing the prompting of thoughts and ideas from text in a language readers mind when reading fluently and with comprehension. Using representational materials of music in multiple ways allows a music reader to gain mastery over them as thinking tools rather than solely as decoding tools.

He believes that music thinking skills are also developed through musical thinking within improvising and composing activities. He argues strongly that students should be helped to make meaningful personal connections with music to facilitate the development of expressive performing skills and deeper levels of interpretation.

Summary

Four approaches to music teaching were surveyed to examine the theoretical underpinnings of each as they relate to this research on developing children's music reading. Two of the approaches inspired by well-known 20th century European composers, Emiles-Jaques Dalcroze (Switzerland) and Zoltan Kodály (Hungary), address music teaching and learning from early years education to college or professional musicianship levels and have gained wide acceptance and use. Two have been more recently developed by American musicians, Gary S. Karpinski and Bruce Adolphe, and target the development of aural skills and musical imagination respectively in undergraduate students and professional musicians. Karpinski's approach is systemised into a method or approach whilst Adolph's is based more generally on an imaginative principle, with examples of imaginative exercises. Each of the approaches was inspired to some extent by the instigator's attempt to solve undergraduate students' difficulties in thinking in sound, in relation to music reading and writing.

Both the Kodály and Dalcroze approaches are child-centred developmental approaches to music teaching and learning with an emphasis on the use of age and ability-appropriate pedagogical methods. Pestalozzian principles inform both approaches, and the philosophy of each includes the holistic education of an individual and the nurturing of an individual's potential to contribute to society. Whilst the teaching and learning sequence is not as clearly discernible in the Dalcroze approach, both the Kodály and Dalcroze approaches are highly systematic and sequential in nature. Implicit in the Dalcroze approach is the development of musical feeling, but the interpretation has tended to emphasise rhythm, pitch, melody rather than other meaning making aspects of music.

Karpinski's approach to aural skills training for third level students, though not a developmental approach, is also highly systematic with a learning sequence that he describes as skills-based which is informed by psychological research on music perception and cognition. He conceives of his approach as a focused programme of study on aural skills to be integrated with or to support and enhance work in more theoretically based music courses such as the study of harmony. He includes a focus on the musical context and wider musical meaning such as apprehending key, metre, etc. and structural aspects such as phrasing in expressive reading of music. Contemporary composer Bruce Adolphe's exercises for performers, listeners and composers, is not designed as a systematic, sequential method of music instruction but more as a set of principles and approaches. Exercises assume a level of decoding skill and move to meaning making, expressive reading of music, and development of flexible sense making through music representation. Drawing upon techniques used in acting and theatre, he focuses instead on designing exercises for improving imaginative musical thinking to stimulate and practise inner-hearing in a broad sense, including thinking in relation to notation where thinking is

assumed to include sounding in the mind. Adolphe's description of the use of imagination in reading includes broader aspects of music than rhythm and pitch and echoes the excitement and motivation in the interaction between a reader and text from language reading.

2.5 Principles and Practices to Inform the Research

While these approaches are all practical methods rather than research theories of developing the musical skill, understanding and wider capacities to fluently read from music notation, they resonate with theory developed in a small amount of music research and with aspects of language reading theory and research. Among other important aspects, all four approaches prize the musical skill of thinking in sound as an essential musical skill and seek to develop this ability in students. Thinking in sound is the ability to imagine and hear music in the mind in a way that entails more than simply recall. One aspect of this, the ability to hear or imagine notated music without the aid of an instrument, whilst described in different terms, is considered key within each approach. Kodály's 'internal hearing', Dalcroze's development of 'aural faculties', Karpinski's 'auralizing' and Adolphe's 'reading and hearing printed music in silence' all refer to the ability to image musical sounds from music notation, resonating with Gordon's (2003) theory of audiation. In all these approaches the ability to think in sound, including the ability to think in sound in relation to notation, is a fundamental aspect of musical behaviour. It goes beyond decoding for performance of sounds to not only comprehending and reading music in a way that indicates and communicates this, but also reading and hearing in the mind, having this as a flexible capacity capable of being modified and changed in our minds.

In addition to music thinking, other aspects important to develop meaning making in music reading and that also resonated with previous research and theory explored included:

- Means of developing musical thinking
- The life experience in and outside music that students bring to reading notation
- The importance of musical memory
- Musical meaning
- Use of multi-modal representations
- Visual/graphic/written representations of music/protonotations
- Internal aural and motor representations
- Reading and writing
- Solmisation systems for pitch
- Rhythmic solmization systems
- Use of authentic music literature
- Individual and social learning

Each of these will be explored below.

2.5.1 *Means of developing musical thinking*

All four approaches focus on developing music thinking or meaning making skills rather than merely music ‘execution’ skills for music reading. The Kodály approach achieves this through singing, developing an aural foundation with which to respond meaningfully and with comprehension to notation in reading and writing. Listening skills underpin and are developed through these activities. The Dalcroze approach takes a broader view. In addition to singing as part of solfege, Dalcroze practitioners seek to develop music thinking and understanding skills by giving students opportunities to experience music and musical concepts through the body. Improvising (physically, vocally, on an instrument), whether reacting in the moment to musical stimuli, or inventing in response to stimuli is a key means of fostering the ability to think in sound within the Dalcroze approach and leads to automaticity in recognition from notation, facilitating fluent reading. Whereas both Kodály and Dalcroze approaches use learners’ social interactions to develop music skills, movement between individual and social learning activities is more evident in Dalcroze methods, particularly in relation to *plastique animé*. Both Kodály and Dalcroze approaches are based on Pestalozzian principles that include experiencing before conceptualising.

Karpinski develops musical thinking through reading and writing skills, preceded by conceptual information and supported using protonotation and follow-up improvising and conducting activities. Adolphe uses games, exercises, imagining and improvising activities to promote musical imagination being used and controlled in listening, performing and composing activities in which he includes some exercises based on notation.

Within each approach students are called to think in music. Karpinski for example instructs students to ‘sing in your mind’. Adolphe urges students to ‘hear in the mind’s ear’, Kodály and Dalcroze ask students to ‘inner-hear’ melodies and rhythms. This ability builds upon students’ aural music foundations.

2.5.2 *What students bring to the reading of notation*

All the approaches evidence the need for an experiential aural foundation for thinking in sound to facilitate fluent reading from notation. In the Kodály approach, this is achieved through singing and listening activities drawn initially from Hungarian cultural heritage. Concepts are experienced ‘unconsciously’ before being introduced ‘consciously’. Dalcroze draws on singing and on listening with the body together with improvising. Even Karpinski, who claims to focus upon developing listening, and reading and performing skills simultaneously in relation to particular musical concepts rather than building an aural repertoire in advance, draws upon students’ previous aural knowledge of

folksongs in developing particular skills (for example rhythm and solmization skills). Adolphe, in activities such as calling on readers to imagine listening to a scale played by a clarinet, is assuming a prior familiarity with clarinet timbre. Similar to the prior knowledge of language that students bring to the language reading process, prior aural experience of music is a prerequisite in the music reading process.

2.5.3 Musical memory

Musical memory is thought about in two ways, in relation to developing musical memory skills on the one hand and in relation to notation operating as an aide mémoire prompting thinking on the other. In the Kodály approach, memory skills are developed through singing and writing activities. In the Dalcroze approach, bodily movement strengthens musical memory in addition to clarifying listening and reinforcing understanding of musical phenomena. Musical memory skills are also developed through learning songs and melodies by ear. Memory skills are included in non-musical general capacities that are enhanced through movement exercises such as mental and physical alertness (Juntunen, 2016).

Karpinski highlights the importance of short-term memory for pitch as being a key factor for cognitive musical processes. The ability to remember and isolate the pitches used in a melody is essential for understanding and working with diatonic and tonal music, in his view. He suggests that conceptual understanding aids and supports memory in the context of dictation activities in music listening. ‘Chunking’, that is hearing or recognising individual pitches as patterns (such as triads, sequences) facilitates memory in dictation. Recognition of these patterns in notation facilitates fluent music reading with understanding.

Adolphe’s thinking on musical memory is more holistic. In his view the key to imagining is memory. He believes that “a refined memory, capable of hearing in the mind a piece that one has heard previously as if it were happening in the present moment, is the complementary skill to imagining unheard music [i.e., composing]” (Adolphe, 2013, p. 9). He stresses the importance for a musician to have a vivid musical memory, including memory of intonation, tone quality, articulation and expressive features. He encourages musicians to work on improving aural memory skills until they match the level of visual memory skills. Drawing on theatre and acting techniques, he includes using emotional memory together with imagination and the mind’s ear to lead to more meaningful and communicative interpretations and performances of music.

2.5.4 *Musical meaning*

Each of the approaches links music thinking skills with musical understanding or meaning making. Music is meaningful at two inter-related levels: at the level of personal significance for a musician and at the level of understanding the internal structures in the music. Each approach is concerned with what is viewed as an historical over-emphasis on the teaching of technical aspects of music making at the expense of expressive aspects, linked to meaning. Deeper interpretation and communication in performance is understood to come about because of musical meaning making, including meaning making in relation to notation. Both Dalcroze and Adolphe prize imaginative, playful interactions with music through improvising as a means of deepening awareness of its expressive qualities which in turn impacts on music meaning making and skill in music reading.

2.5.5 *Use of multi-modal representations*

Making multiple representations of music is one way of approaching meaning making evident in these methodologies. Swanwick (2002) describes how metaphorical processes at play in music listening can make music significant or meaningful for a listener. The Dalcroze approach is unique in its particular use of bodily experience of music as a metaphor for developing musical understanding (Juntunen & Hyvönen, 2004). Listening with the body is integral to the Dalcroze approach. In eurhythmics, bodily movement is used to represent music in different ways in individual and/or group movement in time and space during improvising activities and in response to listening. ‘Plastique animé’ is a particular means of visually representing music by exploring the physical representation of music through group movement. Dalcroze techniques reflect a view of musical understanding as embodied knowing.

Physical representation of aspects of music through movement is used to develop and reinforce understanding of concepts in the Kodály approach. Here the use is more constrained, for example children may be asked to accompany singing with marching, clapping, rhythmic movements to develop pulse awareness. Gesture and handsigns are used to represent and support learning in pitch. Similarly, Karpinski uses conducting as a means of representing and reinforcing metre and pulse awareness together with handsigns to represent pitch movement and relationships. Adolphe, whilst advocating that musicians should be trained in movement and posture as a routine part of their education, and suggesting some imaginative conducting activities for representing pulse within his exercises, does not emphasise physical representations of music.

2.5.6 *Visual/graphic/ written representations of music/ protonotations*

Kodály, Dalcroze and Karpinski use graphic (whether drawn or written) representations of music. WSN is considered too complex a system to use initially in these three approaches, and simplified

notations or ‘protonotations’ are used in each. These protonotations allow teachers and students to focus on particular music aspects for a time. They also operate as thinking tools for learners and pedagogical tools for teachers, allowing both to make musical concepts visible. In early childhood settings, pictures are sometimes used as iconic representations of rhythm in the Kodály approach, whilst gesture-like drawings for phrasing may be used in Dalcroze settings. Manipulatives such as counters, match sticks, felt material staves are used in the Kodály approach whilst ribbons, scarves, balls and hoops and other manipulatives are used in the Dalcroze approach.

2.5.7 Internal aural and motor representations

Whilst all approaches foster music thinking skills, Adolphe is unique in his explicit focus on the use of inter-disciplinary techniques to promote the ability to create internal aural representations of music in response to his musical imagining exercises. This approach’s emphasis on improving the musical imagination, to be able to manipulate and be flexible in this thinking, through practising musical imaging as a skill was a surprising and exciting find in relation to this research into developing new ways of thinking about children’s development of music reading fluency. Separately, Dalcroze’s emphasis and inclusion of developing motor imagery, in addition to aural imagery for music, was an interesting strategy.

2.5.8 Reading and writing

Whilst all approaches advocate that music experience and understanding should precede working with standard music notation, there is a recognition in each that musical understanding can be deepened and developed through interacting with the materials of music through reading and writing activities. Encouraging students to listen to and record what they hear through dictation exercises is used to greater and lesser extents in all the approaches.

Kodály and Dalcroze approaches use a simplified notational system for rhythm and pitch, initially as a preparation for the use of standard notation. Connected to this simplified notation are solmization systems for pitch and rhythm. The ability and facility to listen to and notate music using standard notation is also an ultimate goal in Karpinski’s approach but the ‘protonotation’ that he developed for initial use is particularly interesting in relation to musical learning and understanding. His ‘protonotation’ involves more than merely recording what is heard, it functions as an instructional and learning ‘thinking tool’ during listening and as a means of visually representing the interrelationships between different aspects of the music perceived. He advocates the use of his protonotation as a tool for aiding analysis and memory, for recording musical thinking and as a means of revealing a student’s musical thinking to him/herself and others during the process. The protonotation he has devised for

pulse allows a listener/teacher to represent and explain perception of pulse at various levels through the use of long and short vertical lines. Rhythmic features are recorded within the pulse and metric framework using horizontal long and short lines, drawn from Curwen's system. This awareness of different levels of pulse resonates with Bamberger's (1994) 'different hearings' in relation to rhythmic representations. It could be said that what Karpinski is trying to achieve visually with protonotation, Dalcroze sought to achieve using physical representation. Both are a form of action equivalent. Learning through working with the materials reflects constructivist theories of learning (e.g., Piaget, Vygotsky, Swanwick).

2.5.9 Solmisation systems for pitch

The vertical axis is used as a metaphor for the pitch in all approaches. Within this, there are several solmization systems used for making the tonal relationships between pitches clear.

The Kodály system favours the use of moveable-*do* solmization with a *lah*-based minor scale. Interval relationships are further supported using adapted Curwen handsigns when singing 'to sol-fa'. The Dalcroze approach traditionally uses a fixed-*do* solmization but, more recently, some practitioners have incorporated moveable-*do*. Unique to the Dalcroze approach is the combination of solfège with rhythmic movement. Both approaches also include solfège exercises in sight singing melodies using absolute pitch or letter names of pitches or numbers indicating scale degree. Karpinski uses numbers to indicate scale degree function in addition to fixed-*do* solmisation syllables simultaneously in singing and listening exercises, with occasional use of *lah*-based minor. In all approaches, when translating sung pitches to written form, the initial letters for solmisation syllables (do, re, mi, fa, sol, la, ti, do) are generally used in combination with a simplified rhythm notation system.

In all approaches, it is believed to be essential that students develop an understanding of tonality to understand how Western classical music works. Solmization systems are used to develop this understanding in each of the approaches and an emphasis on achieving fluency in their use is evident. Fluency in solmization is developed in advance of, and through, working with notation, echoing phonological awareness development in language reading. Solmization is understood to be a powerful tool in unlocking sounds and facilitating understanding of musical meaning in notation.

2.5.10 Rhythmic solmization systems

The Kodály and Karpinski approaches use a solmization system for rhythm. The Kodály approach bases its rhythm syllables on an adaptation of the French time-names system. Whilst the French rhythm syllables can also be used in the Dalcroze approach, Dalcroze practitioners (similar to Orff practitioners) are more likely to use word mnemonics combined with movement during rhythmic

training (such as ‘walking’ for crochets, ‘running’ for quavers in duple time, ‘gal-lop-ping’ for quavers in compound metres) (Jaques-Dalcroze, 1921). There is more emphasis on developing an understanding of rhythmic modes within the Dalcroze system than on naming individual rhythmic elements (Johnson, 1993). Several rhythm solmization or syllable systems are available for use. Karpinski (2000) recommends Takadimi as “the most systematic and comprehensive system of rhythmic solmization in use today” (p. 81). In his view, Takadimi is a “functional system of rhythm solmization that most closely models the aural understanding listeners engage in when they apprehend rhythms in relation to pulse and meter” (p. 82). Takadimi uses the syllables for South Indian Carnatic music on Western tonal music and was devised by Hoffman, Pelto and White in 1996 drawing upon the Kodály, Gordon, and McHose/Tibbs rhythm syllable systems (Hoffman, Pelto, & White, 1996). Rhythm syllable systems are used to develop fluency in reading (and writing) rhythm in ways similar to that in which pitch solmisation systems facilitate musical understanding and thinking in relation to reading (and writing) melody.

2.5.11 Use of authentic music literature

The use of real music literature is important in each of the approaches. Karpinski questions the validity of using contrived melodic figures in aural skills training wondering why, if they do not exist in real music, these melodies are used in aural training. ‘Real’ music in the approaches includes folksongs and classical music repertoire. In the Kodály approach choral music Kodály composed for children to fill gaps in the literature is included. Within the Dalcroze approach, music is often improvised by the teacher at the piano.

2.5.12 Individual and social learning

As educators, all the instigators of the different approaches value the importance of developing the person of the learner in addition to developing the musical understanding and skills of the learner in authentic musical engagement. In Kodály’s writing, it was an individual’s duty to develop their musical skills to the highest standard, and to become a cultural person who would contribute to society. For Dalcroze, operating within the early twentieth century French philosophical emphasis on individuality, developing the musical individual’s self-knowledge to enable authentic expression was key. Karpinski, located in the 21st century, aims to support college-level students’ music learning through applying research on music cognition to the development of both ear training and sight singing. Adolphe’s purpose is to enable an individual’s emotional engagement and clarity of expression in music through engaging the musical imagination.

Within each approach individual and social learning methodologies are used but the emphasis on individual and social learning approaches varies. In Kodály methodologies, learning and skill development is often supported within a group context initially with students performing tasks in smaller groups and pairs before, if appropriate, performing a task individually. Whilst singing instruction is based in class groupings and choir settings, emphasis on inter-personal interactions are more evident in approaches used with younger children, for example working with manipulatives or games. Dalcroze, on the other hand, drew on collaborative meaning making methodologies with both children and adults in addition to individual learning tasks. Karpinski's emphasis on skill development is aimed more towards individual learning whilst Adolphe uses individual and group approaches, citing the richness of group reflection on thinking.

2.6 Implications for this Research

The first aim of this research is to develop new ways of thinking about and understanding children's development of music reading fluency. This examination of approaches to music teaching and learning corroborates existing theories on children's musical learning in that it has demonstrated that children's musical thinking can be developed through engaging in each of the three main areas of musical activity: performing (singing in particular), listening (including movement and writing), and improvising and composing. Engagement, whether individual or in groups, should be playful, meaningful and involve multi-modal representations of music through for example, gesture, physical movement, visual representations (invented notations, protonotations or standard notation).

It has, however, highlighted the importance of adding theories of embodied knowing to the theoretical framework and the value of developing musical memory skills. In addition, it has re-emphasized the importance of stimulating the musical imagination through cross-disciplinary techniques and reconsidering the significance of sensory approaches to music learning.

2.7 Conclusion

A broad scope of literature was required for this research because of the complexity of the phenomenon of music reading. Each of the four areas reviewed, 1) theories of language reading fluency, 2) research on music reading and music development, 3) principles and processes underpinning the operation of music representation systems and 4) pedagogical approaches to music reading within classic and contemporary approaches, informed the conceptual framework.

From the research literature on language reading Kuhn et al.'s (2010) research on Oral Reading Fluency and its components, accuracy, automaticity and prosody (or expression) was key to

developing thinking for music reading fluency. Ehri's (2005) theory of automatic sight word recognition and the significance of orthographic mapping or phonemic awareness for this, was also critical in that the automatic processes in operation in word recognition were useful for considering automatic processes in reading from notation. Perfetti and Stafura's (2014) thinking on categories of knowledge sources that a reader draws upon to construct meaning during reading were helpful in considering the types of knowledge sources a music reader might call upon when reading notation. The concept of literacy as 'emergent' (Papen, 2005; Neaum, 2017) was important for considering the understanding and skill children bring to music reading from everyday life, an understanding reflected in Sloboda's (1985) thinking on musical development and enculturation.

In music, Mishra's (2014) meta-analysis of interventions to improve sight reading, particularly her pointing to the interventions that had the most significant impact, provided categories within which to consider conductors' practices and investigate connections with language reading fluency. The emphasis on the critical role of imaging sound from notation during music reading within the four pedagogical approaches was key for the research. Adolphe's thinking on developing the musical imagination provided new perspectives. Also significant were the multi-modal approaches to learning and, in the Dalcroze approach, the perception of musical understanding as embodied. Bent et al.'s (2001) research on representation systems for music provided insights into the development of WSN and its underpinning principles. This was important in considering the WSN representation system in relation to a music reader's ability to decode musical information and in thinking about knowledge of the music writing system required for music reading in relation to Perfetti and Stafura's (2014) categories of knowledge sources for language reading. These key concepts, theories and pedagogical practices informed my thinking for the design of the research, outlined in the chapter three.

3 Research Design & Methodology

The purpose of this research is to develop new ways of thinking about and understanding the development of children's music reading fluency, assessing the potential of theory from language reading fluency to do this, and using this theory to investigate choral directors' implicit and practical understandings of this process. It addresses the dichotomy found in the research literature between the rich theoretical understanding of language reading that underpins and informs its practical approaches and the largely functional approach to music reading informed by a heritage of practice rather than overarching theories.

A qualitative mixed-method approach was selected as the most suitable to address the research aims and objectives. This chapter outlines the methodology used. It begins by outlining the research aims and objectives. It includes discussion of a) Research Design, b) Analytical Strategy, c) Trustworthiness, d) Ethical Considerations, and e) Limitations and Delimitations of the study. It concludes with a brief summary.

3.1 Research Aims and Objectives

There are three overarching aims for this research.

1. To develop new ways of thinking about and understanding children's development of music reading fluency
2. To investigate if theory in developing language reading fluency would be useful for extending thinking on children's music reading fluency in the context of children's choirs
3. To reveal implicit theories of children's music reading held by experienced choral directors of children's choirs

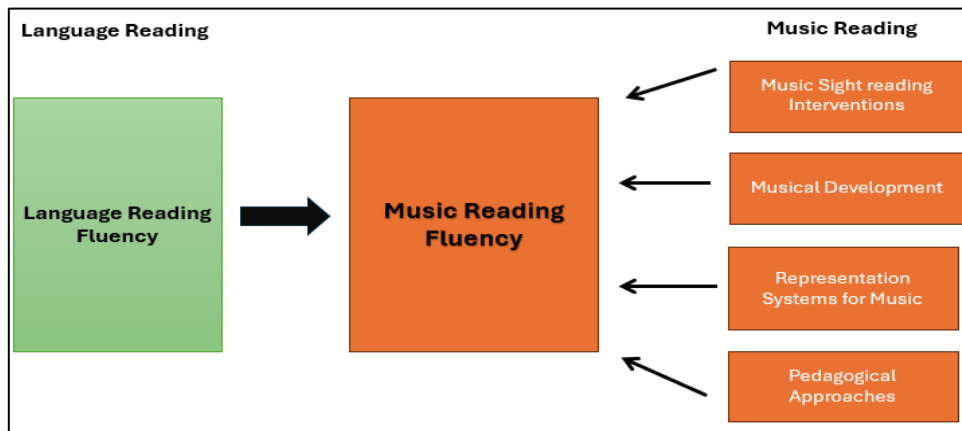
The research objectives achieve these by:

- a. Conceptualising connections between our understanding of children's developing language reading fluency and music reading fluency.
- b. Identifying key concepts from the language reading literature which may have potential to extend our understanding of music reading fluency.

- c. Analysing how these identified concepts from language reading literature relate to a range of practical pedagogical approaches for developing music reading.
- d. Examining the characteristics and operating principles of a range of music representation systems in use, including WSN, Solmization, and rhythmic syllabic systems.
- e. Considering how the operating principles of notation systems might relate to concepts from language reading identified as having potential to extend our understanding of music reading fluency.
- f. Exploring how the identified concepts might operate through working with a 'Choirlab', developing activities with and for a children's choir and collecting examples of children's engagement with each of them.
- g. Developing an understanding with experienced choral conductors of the extent to which concepts from language reading fluency relate to, or can inform, children's development of music reading fluency.
- h. Investigating whether reading music notation is considered by choral conductors of children's choirs as having the potential to develop children's musical thinking and competencies.

A conceptual framework from the literature identifies key concepts on language reading fluency (word recognition 'sight words', decoding, fluency, and comprehension) and relates these to three types of music literature: 1) the research on music reading and music development, 2) characteristics of notation used in choral contexts and 3) practical pedagogical approaches to developing music reading fluency.

Table 3.1: Conceptual Framework



There are two phases in the research: (1) The first phase is a ‘Choirlab’ (a series of workshops with children) to explore the concepts identified, to deepen researcher knowledge of the concepts and to develop material for the second phase of the research; (2) Phase two is a series of in-depth semi-structured interviews with experienced children’s choral directors to tap into their implicit knowledge, gaining perspectives on the usefulness of these concepts and co-construct an extended understanding of the role of music reading fluency in children’s choirs and the concepts from language reading fluency that could support this.

3.2 Research Design

To strengthen and drive the research, careful consideration was given to selecting an approach that would achieve a congruence of research questions, research data and processes of analysis (Richards & Morse, 2013, p.1). In keeping with the research purpose, a qualitative mixed-methods design, drawing upon ethnographic principles was deemed the most appropriate. Taking ‘a cultural lens to the study of people’s lives within their communities’ (Eriksson & Kovalainen, 2015) key ethnographic principles drawn upon include a commitment to:

- collection of data in ‘real-world’ settings (Hammersley & Atkinson, 2007),
- contextualising of data and analysis, underpinned by a belief that people or phenomena cannot be studied independently of their social and cultural environments (Lincoln & Guba, 1985),
- use of multiple modes of data gathering to achieve detailed holistic description, with an emphasis on understanding social behaviour from an ‘emic’ perspective, the meaning that participants place on social and cultural practices,

- researcher reflexivity in recognising the researcher as part of the research and to making explicit how a researcher's cultural beliefs, attitudes and assumptions, influence the design, execution, and interpretation of the research (Draper, 2015),
- discovery oriented research with an emphasis on data and analysis which moves from detailed description to the identification of concepts and theories which are grounded in the data collected within the setting (Pole & Morrison, 2003), and
- ethical consideration and conduct of research.

Unlike quantitative researchers, qualitative researchers work in natural settings because of a belief that behaviour and, thereby, data are socially situated context-related, context-dependent and context-rich. The context or naturalistic setting for my research was children's choirs. Realities, in qualitative research are understood to be multiple, constructed and multi-layered (Cohen et al., 2011, p17). Researchers are research instruments whose tacit knowledge is inescapable. (Lincoln & Guba 1985, p. 39-43). Data analysis is inductive rather than deductive. Theory emerges from the data as researchers generate rather than test hypotheses. Meaning is constructed by both the researcher and the participants, and multiple perspectives are valued in efforts to generate findings through reflection and inductive reasoning.

In the qualitative research literature, I drew upon Richardson's (2000) metaphor of a crystal, further developed by Ellingson (2009), as a central image for qualitative research providing multiple lens through which to examine and understand a phenomenon when selecting data collection methods. Denzin and Lincoln (2011) similarly observe the value of multiple ways of looking in qualitative research as:

Qualitative researchers deploy a wide range of interconnected interpretive practices, hoping always to get a better understanding of the subject matter at hand. ...each practice makes the work visible in a different way. Hence, there is frequently a commitment to using more than one interpretive practice in any study. (Denzin & Lincoln, 2011, p. 4)

To assist in research design, I reviewed literature by researchers expressly interested in uncovering or revealing children's musical thinking in their studies to investigate the approaches they had employed (i.e., Bamberger, 1982, 1991, 2005; Barrett, 1997, 2001; Blair, 2007; Davidson & Scripp, 1988, 1989; Davidson, Scripp & Welsh, 1998). Approaches drawn upon resonated with strategies for creative data gathering suggested by Kara et al. (2021) calling for greater use of creative research methods in education.

Perspectives were sought from the viewpoint of ‘expert practitioners’ which included choral conductors and researcher as research instrument perspectives. Indirectly children engaged in choral workshops also provided a perspective through the researcher’s use of reflexive journaling whilst taking a teacher-as-researcher position in the phase one preparatory study. Data gathering, therefore, involved the use of two data gathering techniques: researcher reflexive journaling in the context of the Choirlab preparatory study and qualitative, semi-structured interviews. These techniques are explored below.

3.2.1 *Teacher as researcher*

Within educational research, “practitioner research serves as a means of conceptualising the critical role of teachers’ knowledge and actions in student learning, school change, and educational reform” (Cochran-Smith and Lytle, 2009, p. 5).

Despite criticism concerning lack of methodological rigour, generalisability, and objectivity, teacher research is context-specific with an intention to improve practice (Kesson, 2010). Implementation issues can also be challenging.

Action research and descriptive inquiry are two types of teacher research involving a cyclical process of problem-posing fact-finding, planning, acting, reflecting, and evaluating the results of actions. Kesson (2010) identifies three main forms of action research representing contrasting methods, purposes, and values: technical, practical (also called deliberative or interpretive), and critical. He describes practical action research as being oriented towards understanding practice, solving practical problems, and involving “interactive communication, collaboration, deliberation, negotiation, detailed description, and interpretation” (Kesson, 2010). Descriptive Inquiry developed from phenomenology and focuses upon close observation and detailed written description of perceptions. Studies conclude in “shared oral inquiry processes oriented toward developing deeper pedagogical understanding and informed practice” (Kesson, 2010). Advocates of descriptive inquiry believe that:

Disciplined perception works to overcome habitual perception and conditioned biases, broadens the range of pedagogical actions and responses, and allow for deeper layers of meaning to emerge from classroom events. (Kesson, 2010, p. 844)

Whilst the research is neither action research nor descriptive inquiry, it draws on principles of both.

3.2.2 *Rationale*

Music reading, like language reading, is a multi-faceted, complex phenomenon. As this research sought to generate theory for music reading through relating these two phenomena, a holistic rather

than singular methodological approach was necessary. The overarching approach was qualitative rather than quantitative, reflecting a) a belief that people or phenomena cannot be studied independently of their social and cultural environments (Lincoln & Guba, 1985), b) a view of reality as multi-layered and constructed, and c) an understanding of behaviour and data as socially situated context-dependent and context-rich (Cohen et al., 2011). Within this overarching approach, Ethnography (Hammersley & Atkinson, 2007), Creative Research Methods (CRM) (Kara et al., 2021) and Constructivist Grounded Theory (CGT) (Charmaz, 2014) were informing methodologies.

Ethnography inspired the interrogation of concepts and ideas with children in a naturalistic Choirlab setting prior to research interviews to strengthen the research by facilitating an ‘emic’ perspective and providing the researcher with opportunities for developing a deeper understanding of concepts through reflexive journaling in the context of working as researcher-as-research-instrument. The purpose of this was to facilitate a deeper engagement with conductors and, by making the children’s artefacts available in the interview, prompt a deeper dialogue with conductors.

Gathering of artefacts created by children with which to access the depth and richness of conductors’ thinking in semi-structured interviews reflects the call of CRM for creativity in approach and mindset to data gathering. This approach facilitated, albeit indirectly, the gathering of children’s perspectives reflecting children’s imagination, intuition and ingenuity in responding to the concepts and ideas from the literature.

This research sought to co-construct knowledge with expert choral conductor practitioners. A Constructivist Grounded Theory (CGT) approach aligned with the research purpose through its a) endorsing of existing theory as a starting point for research, b) valuing of researcher experience and knowledge, c) acknowledgment of the collaborative nature of inquiry where knowledge is co-constructed by researchers and participants. Additionally, a CGT approach strengthened the analysis through its emphasis on insightful interpretation through iterative, comparative, and abductive methods.

Collectively, the potential that an overarching qualitative methodological approach with the additional lens of informing methodologies, Ethnography, CRM and CGT and associated data gathering and analysis methods provided a strong rationale for the research’s holistic methodological approach.

3.2.3 Phase one: Choirlab preparatory study

The purpose of the preparatory study was three-fold. First to support the author as researcher in developing and exploring ideas drawn from the conceptual framework. Second, to develop materials

which could be the subject of discussion with choral directors and third, to reflect on the outcomes of the Choirlab activities and their implication for the research.

Participants and Recruitment. A group of children, aged between nine and twelve years, who were members of a choir in a primary school were invited to participate in ten Choirlab workshops. Within these sessions children participated in activities designed to explore ideas that emerged from the three reviews of literature for the research. Activities which were aimed at providing children opportunities to represent and give voice to their musical understanding or sense-making included drawing, writing, singing, and moving in relation to music (Kara et al., 2021).

The criteria in the purposive sampling of child participants were that the children were participating in research which was developmentally appropriate in that they:

- were already proficient in using spoken language and at reading language texts
- could articulate their thinking in relation to their engagement with music notations
- could represent their understanding using symbol systems
- were members of a group with experience of learning together.

An invitation to participate was extended to all members of the choir to ensure that a core number would be available for each Choirlab session.

Data gathering in the Choirlab included researcher field notes, researcher reflexive journaling and collection of artefacts (work samples created by the children in the Choirlab activities such as drawings, writing, audio-recorded samples of singing). Sample artefacts were later used to elicit discussion and reflection with choral conductors during interviews (Kara, 2020).

I adopted a researcher as research instrument or teacher-as-researcher position. As a participant observer, I had a critical appreciation of my positionality in terms of bringing my ‘ethnographic baggage’ to the research context (Madden, 2017, p. 22). Reflexive journaling and the creation of field notes were used during work with children as they participated in activities within the preparatory study Choirlab context. Following each journaling episode, the journal was discussed with a critical friend (Mat Noor and Shafee, 2020) to guard against and reveal any researcher assumptions.

3.2.4 Phase two: Semi-structured interviews with choral conductors

Building on the Choirlab, the purpose of the interviews with choral conductors was to deconstruct choral conductors’ implicit theories of children’s music reading in choral contexts and, together, to investigate the usefulness of selected concepts from theory in language reading fluency (automatic recognition of words, decoding, fluency and comprehension) for music reading fluency.

Two methodologies were used in data collection for phase two of the research: (i) Reflexive interviewing to foster deeper understanding (Pessoa, Harper, Santos, and Gracino, 2019) and (ii) Co-constructing (Packer, 2017) with choral conductor participants. The purpose of my interviews was the co-construction of theory with expert practitioners. In emphasising the centrality of human interaction for knowledge production and the social situatedness of research data, Kvale's (2007) conception of an interview was useful in planning for data collection.

The research interview is an inter-view where knowledge is constructed in the inter-action between the interviewer and the interviewee (Kvale, 2007, p. 2)

I drew on Packer's (2017) conception of a research interview as a 'joint production' between interviewer and interviewee where meaning is co-constructed and shaped in the interaction between individuals. Following Woods (1986) I sought to form relationships with interviewees that would promote "a feeling of togetherness and joint pursuit of a common mission rising above personal egos" (p. 410) through being open about the purpose of the interviews and opting for a semi-structured approach. My role as a lecturer in music education in initial primary teacher education and choral conductor strengthened the sense of integrity. The interviews were exploratory in nature and sought both description and interpretation of conductors' experiences (Kvale, 1996).

In line with Morrison, (1993) prompts and probes were considered in the framing of questions. Prompts enabled the researcher to clarify topics or questions. Probes were included to facilitate asking respondents to "extend, elaborate, provide detail for, clarify or qualify" their responses. Use of probes allow a researcher to address "richness, depth of response comprehensiveness and honesty" (Cohen et al., 2011, p. 420). Conscious of Fowler's (2009) caution that the greater the use of prompts and probes, the more danger of bias entering the interview, prompts and probes were used judiciously with language planned to avoid leading answers. Careful attention was paid to this in the pilot interviews conducted.

Three individual semi-structured face-to-face interviews of one hour's duration each were planned. The focus of the first interview was on learning about the context within which each conductor worked, the music background or training that each conductor brought to their work, each conductor's thinking and observations on their experiences of whether and how children's music reading skills were developed in his or her choral context including the use made of music notation and other forms of music representation (sol-fa, gesture, etc.). During the second interview, conductors were asked to consider their experiences in light of theories from language reading and from music education research literature. The third interview explored theories of comprehension, fluency and meaning

making in language reading in relation to music reading (See Appendix K, L, M for interviews 1, 2, and 3.). Artefacts from the Choirlab were used to deepen the discussion.

Consideration was given to framing questions that would elicit the kinds of data sought before the interviews to generate rich descriptions. Active listening and providing appropriate verbal and non-verbal feedback to respondents were also considered and piloted in advance. Every effort was made by the researcher to handle each interview situation sensitively and professionally, whilst remaining alert to the possibility of interviewee fatigue. At the start of each interview the purpose of the interview was shared with the participant. An initial pilot of each interview schedule was carried out with three conductors who were not participants in the study to ensure clarity of questions and to allow the researcher to practice interviewing skills (Berg, 2004).

3.2.5 Participant selection and recruitment

Purposive sampling was employed to ensure that the research would reflect a range of choral contexts available to children in Ireland and to ensure that the views of conductors of choirs involving both boys and girls would be included. Four conductors from each of the following types of choir settings were invited to participate: cathedral choir; conservatory choir, community choir; and primary school choir. By including conductors of choirs formed for different purposes with, potentially, variations in their practices in relation to music reading, I hoped to gain insights from a range of perspectives into choral conductors' theories of music literacy and approaches to developing music reading in choral contexts. In addition, conductors of diverse types of choirs, could, potentially, have experienced a variety of approaches to literacy in their own musical formation. The selection criteria for choral conductors were that conductors:

- direct choirs of children between 9 and 12 years of age;
- use music notation/symbolisation with their choirs;
- represent a range of methods of developing children's music literacy; and
- could attend three one-hour face-to-face meetings with the researcher.

Sixteen choral conductors were recruited representing the four contexts and included six male and 10 female conductors. Conductors were asked to participate in three one-to-one interviews of an hour's duration each with the researcher. Participants were invited to discuss and share their experience and insights into how children learn to make meaning from music notation. They were also asked to consider aspects of language reading theory in exploring ways in which language reading fluency could relate to and/or extend music reading fluency. This phase of the research was carried out during the Covid-19 pandemic and so the individual face-to-face interviews were conducted on individual

Zoom video meetings. This proved advantageous in terms of sharing artefacts during interviews, and in enabling conductors to select a time of day for interviews that best suited their schedules. In addition, online meetings did not necessitate researcher or participant travel or selection of a suitable meeting venue. DCU protocols for the use of the Zoom Video Conferencing Platform in research were followed. Appendix O describes the choral settings within which each of the participants worked to contextualise their thinking.

In designing both phases of the research, I acted as a qualitative research *bricoleur*, using the aesthetic and material tools of my craft, “deploying whatever strategies, methods, or empirical materials were at hand” (Becker, 1998, as cited in Denzin and Lincoln, 2011, p. 4). Through the data gathering techniques included in the research design, perspectives were gained from three sources: choral conductors (expert practitioners); the researcher (teacher-as-researcher) and those of the child participants in the Choirlab. The artefacts the children created, together with their observations and explanatory comments gave voice, albeit indirectly, to the experiences of the children included in the research.

3.2.6 Analytical strategy

Data analysis is drawn upon Constructivist Grounded Theory (CGT) based upon congruence between constructivist and researcher perspectives on the nature of reality and development of knowledge; a desire to co-construct theoretical understanding with research participants about developing children’s music reading fluency in choral settings; whilst reflectively incorporating existing theories together with my previous knowledge and experience.

Grounded theory (GT) is a systematic inductive approach to research and theory construction originally formulated by sociologists, Glaser and Strauss in the 1960s in response to the over-emphasis they perceived on research focused upon verifying existing theories rather than generating new knowledge. CGT, developed by Kathy Charmaz a student of Glaser and Strauss evolved from the original ‘classic’ GT (Glaser & Strauss, 1967), later referred to in the literature as ‘classic’ or ‘Glaserian’ GT (GGT) to reflect the divergent paths subsequently taken by the two originators, Barney Glaser and Anselm Strauss.

While GGT and CGT have ‘familial’ similarities (Kenny & Fourie, 2015) in that they share distinctive methodological GT techniques, they differ significantly, however, in their philosophical underpinnings and methodological guidelines (Kenny & Fourie, 2015).

Although not explicitly stated, GGT is shaped by positivist and/or postpositive perspectives. Its goal is to facilitate, through analysis, the natural ‘emergence’ or ‘discovery’ of theory ‘grounded’ in data

rather than deduced from ‘grand theories’. In GGT, a researcher’s role is that of a detached expert observer, separate from the data. Diminishing or neutralising researcher bias is key. To this end, review of literature is delayed preventing a researcher being influenced by preconceived ideas. Further, a research question or guiding theory is not a requirement at the outset. Objectivity is facilitated through rigorous constant comparison coding procedures during analysis. In GGT the generated theory is as objective as humanly possible, has explanatory power and is presented around a core unifying theme (Glaser, 2002, as cited in Rieger, 2019).

CGT, on the other hand, is underpinned by a relativist ontology, in which the existence of multiple realities is recognised, and employs an interpretative methodology. In contrast to GGT’s concern with researcher objectivity, CGT assumes and values a subjective epistemology where the researcher and participants’ co-construction of knowledge and mutual interpretation of meaning is sought. In line with a constructivist view of research as influenced and informed by context, CGT endorses use of research literature from the start of the research process. Use of existing theory can orient the research, develop theoretical sensitivity, and guide the research by providing ‘points of departure’ from which to develop ideas (Charmaz, 2014, p. 30). Researcher experience and knowledge is valued. In addition to constant comparison coding procedures, reflexivity and abductive reasoning are emphasised as a means of avoiding any forcing of preconceived ideas on the data. As CGT emphasizes multiple realities, the constructed theory presents an insightful interpretation of the studied phenomenon rather than an objective ‘discovered’ theory focused on explaining causality. A CGT may be presented as related theoretical concepts without an underpinning unifying theme.

As an iterative, comparative, interactive, and abductive method (Bryant & Charmaz, 2007; Charmaz, 2006) in which a researcher goes back and forth between analysis and data collection as each informs and advances the other, CGT’s strength resides in its comparative methodology and in its interactive essence (Charmaz, 2006, 2014). CGT strategies can be used while using a variety of data collection methods, including interview and ethnographic data.

The interpretive approach taken in this research aligns well with constructivist GT. Both qualitative and constructivist grounded theory approaches acknowledge multiple realities and subjectivities. Values are understood to shape what stands as fact (Charmaz, 2011). Researchers attempt, where possible, to investigate phenomena from inside a phenomenon. Knowledge is co-constructed by researchers and participants. Constructivist grounded theorists acknowledge that research processes and products are influenced by a researcher’s starting points and standpoints (Charmaz, 2011).

Adopting Henwood and Pidgeon’s (2003, in Charmaz 2011, p. 366) concept of ‘theoretical agnosticism’ rather than pretending ‘theoretical innocence’, I conducted a review of literature on

language reading, music reading and music development, theories of representation, and audiation (thinking in sound) in advance of data gathering. This allowed me to focus the research questions and objectives. Henwood and Pidgeon (2003, in Charmaz, 2011) contend that researchers should subject all possible theoretical explanations of a phenomenon to rigorous scrutiny, “whether from the literature or their own analysis” (p.366). Reflexivity throughout inquiry is an integral part of the constructivist research process. The first phase of the research, therefore, involved researcher reflexive journaling of observations and reflection on investigative work conducted with a group of children in a Choirlab context. Journal entries formed part of the data for analysis. During the second phase interviews and in subsequent analysis I was conscious of my positionality in relation to participants, data and interpretation and of the need to reflect critically on ‘the self as researcher’, ‘the human as instrument’ (Guba & Lincoln, 1981 in Denzin & Lincoln, 2011, p. 124).

Following interviews, the audio-recordings were transcribed, and transcripts sent to each interviewee to check for accuracy of transcription and meaning. Following checking and any edits, the transcripts were analysed using a constant comparative analysis. NVivo software was used to assist in data management and analysis. Initial coding was completed using this software.

A constant comparative method of analysis was used to analyse journal entries from phase one and interview transcripts from phase two to identify emerging theories and develop conceptual frameworks. In line with Charmaz (2011) this means that:

- data was compared with data as codes were developed,
- data was compared within codes,
- codes were compared and tentative categories formed from significant codes,
- data and codes were compared with these categories,
- major categories were treated as concepts,
- concepts were compared with concepts (including comparing concepts with disciplinary concepts)
- nascent analyses emerged and took form. (Charmaz, 2011, p. 295)

As researcher I recognised that analytical comparisons made during a particular phase of inquiry shape what is done in the next phase and cannot be determined beforehand. I interacted with participants, data, codes, and tentative categories, moving back and forth between data collection and analysis. During analysis ideas were tested and emerging theoretical concepts checked (Charmaz, 2011). Data

gathered in the context of the Choirlab was analysed and emerging themes informed subsequent discussion with the choral conductors, allowing cross-checking of findings.

3.3 Ethical Considerations

A key concern in considering ethical issues in relation to research is the protection of participants (Berg, 2004; Marshall & Rossman, 2011). Whilst no serious ethical threats were anticipated, in planning and conducting this research, ethical issues relating to both child and adult participants were considered at every stage. The research adhered to the ethical procedures of Dublin City University and received approval from the Research Ethics Committee (Appendix I). It aligns with the Higher Education Authority (2020) Principles of Good Practice in Research within Irish Higher Educational Institutions and the HEA National Policy Statement on Ensuring Research Integrity in Ireland.

3.3.1 Phase one: Choirlab preparatory study

Permission was sought from the Board of Management of the School which the child participants attended to distribute copies of the Invitation Letter (Appendix B), Plain Language Statements (Parent & Child versions Appendix E, F), Parent Informed Consent form (Appendix G), and Child Informed Assent form (Appendix H). Written informed consent via an Informed Consent form was sought and received from the parents of each child participant. A Plain Language Statement was provided which outlined what children would be asked to do, addressed participant anonymity, detailed plans for the reporting and dissemination of data and addressed secure storage of research-related records and data. In addition, children's agreement to participate and to share samples of their work with other conductors and the research supervisor was sought separately via a Children's Plain Language Statement and Child Assent Form.

3.3.2 Phase two: Interviews with choral conductors

Similarly, informed consent was received from each of the conductor participants (Appendix D). Participants were advised via the Plain Language Statement (Appendix C) that, whilst every effort would be made on the part of the researcher, it was not possible to guarantee complete anonymity/confidentiality of participant identity given that Ireland has a relatively small population, particularly in relation to choral activity, and that the research would describe conductors' music backgrounds and choral contexts. To counter this threat, in addition to the use of pseudonyms, more than one conductor from each type of choir setting was invited to participate. Significant identifying characteristics of choral contexts were anonymised to strengthen confidentiality. Data protection measures were also taken. Audio-recordings of interviews made for transcription purposes were

downloaded from the audio device and stored with other data gathered on a password protected, encrypted computer on St. Patrick's Campus, Dublin City University. In addition, following Bloomberg and Volpe (2012), both child and adult participants' rights and interests were considered of primary importance in relation to choices regarding the reporting and dissemination of data. In line with Dublin City University policy, a personal data security schedule for the research was approved by DCU Research Ethics Committee.

There were no direct benefits to the child or adult participants. Child participants may have benefited indirectly from taking part in the Choirlab activities. Adult participants may have experienced incidental intrinsic benefit through contributing to the development of the field of performance music education. Each conductor will receive a summary of the research findings following submission of the thesis.

3.4 Research Integrity

3.4.1 *Trustworthiness*

Guba and Lincoln (1998, in Denzin & Lincoln, 2011)) suggest 'credibility', 'dependability', 'confirmability' and 'transferability' as appropriate criteria to evaluate trustworthiness of qualitative research. In qualitative research, trustworthiness replaces quantitative research concepts of 'validity' and 'reliability'.

Credibility (or validity) is a key component in research design and involves consideration of both methodological and interpretive validity (Mason, 1996). Methodological validity concerns how well matched the logic of the method is to the kinds of questions that posed and the kinds of explanation that the researcher attempts to develop (Mason, 1996). Interpretative validity is concerned with the quality and rigor of data analysis and interpretation (Mason, 1996).

To enhance methodological validity the research questions were investigated from two distinct perspectives: that of researcher as research instrument (teacher-as-researcher) and expert choral conductor practitioners. Data gathering involved three separate methods: researcher reflexive journaling and collection of artefacts from child participants which, indirectly, allowed for the perspective of child participants to inform the research and semi-structured interviews. Use of multiple data sources and methods facilitate better understanding of phenomena, allow for cross-checking of findings, and are a key feature of qualitative practices (Denzin & Lincoln, 2011).

Steps taken to strengthen interpretive validity included the researcher giving a 'public account of the self' Denscombe (2017), in which personal assumptions, perceived beliefs, interests, experience,

expertise and personal ‘ethnographic baggage’ were outlined. To strengthen reliability, the reflexive journal was written up immediately after each Choirlab workshop (Lofland, 1971) and discussed with a critical friend (Coghlan and Brydon-Miller 2014) to check for and reveal any researcher assumptions. Sample artefacts of children’s work were reviewed and discussed with a colleague in advance of interviews. Coding of sample interview transcripts and their analysis were discussed with the research supervisor.

Dependability is explained by Lincoln and Guba (1985) as whether the findings are consistent and dependable with the data collected. The related concept of confirmability is also concerned that findings result from the research rather than an outcome of the biases and subjectivity of the researcher (Bloomberg & Volpe, 2012). ‘Transparency of method’ (Merriam, 2009) in this research was addressed through maintaining a detailed account of how all the data were analysed and interpreted by means of an audit trail (Lincoln & Guba, 1985) which documented the evolution of my thinking and the rationale for choices and decisions made during the research process (Bloomberg & Volpe, 2011). Transferability of findings was addressed through depth, richness and detailed description in relation to participants, contexts and in the case of the Choirlab, activities.

3.4.2 Limitations and delimitations of the Study

In line with all research, a potential limitation of the study was a threat of researcher bias. Researcher subjectivity, however, is recognized and valued in an interpretive approach.

A second possible threat was participant reactivity (Maxwell, 2005). In relation to the Choirlab, the children knew they were involved in a research project and knowing that their work counted as research, they were eager to cooperate.

Participant reactivity in relation to choral conductor interviewees was addressed through consideration of participant anonymity during the research design. A conscious attempt was made to create an interview dynamic that was conducive to honest and open dialogue. Sharing samples of artefacts created as part of the researcher’s choral work in the Choirlab facilitated trust-building. As researcher, I continued to reflect on ‘how and in what ways’ I might be influencing participants (Bloomberg & Volpe, 2012).

Study delimitations include a deliberate focus on children’s choral settings in Ireland, specifically settings that include children aged between nine and twelve. The research investigates perspectives of choral conductors in relation to children’s musical thinking in and through music notation in choral contexts. Children’s choirs where notation or other form of symbolization were not used were not a focus of this research. Neither was music reading in the context of playing instruments targeted for

investigation. Theory in language reading fluency and comprehension was used as a starting point for researcher reflection.

3.5 Summary

This chapter provided a summary of the study's research methodology. It began by outlining the research aims and objectives and offered a rationale for the selection of a qualitative mixed method approach. Data gathering strategies, semi-structured interviews with choral conductors and researcher reflexive journaling in teacher-as-researcher role were critiqued together with a justification for the use of purposive sampling. A rationale for using a constructivist grounded theory approach to data analysis was provided and an overview was given of plans for data analysis. Strategies employed to strengthen trustworthiness were outlined. The chapter concluded with an explanation of the study's limitations and delimitations.

4 Phase One: Choirlab Preparatory Study and Outcomes

This chapter describes the first of two phases of this qualitative mixed-methods study, the ‘Choirlab’ preparatory study phase of the research, which was carried out with a group of children in advance of interviews with 16 expert practitioner choral conductors. It details the aims, the context, data analysis and outcomes of four streams of investigation.

4.1 The Choirlab Preparatory Study

The preparatory Choirlab aspect of the research design had a dual purpose. The first was to expand my thinking through exploring, with a group of children, concepts that had arisen in the literature to inform the discussions that I would have with expert choral conductor practitioners. The second was to gather artefacts of children’s musical sense-making in relation to music notations in a real-life context for use in phase two data gathering to prompt discussion. Finally, through their engagement in Choirlab activities, to gather children’s perspectives.

Four streams of investigation arose from the research literature in relation to the research objectives.

Activities were devised in the context of the Choirlab to investigate:

1. Concepts and ideas from language reading: accuracy and automaticity in decoding, in recognition of ‘sight words’ (Ehri 2005, 2020), fluency (Castles et al. 2018; Ehri, 2005, 2020; Kuhn et al., 2010).
2. The relevance of children’s experiences of music in their everyday lives to their learning to read notations. This arose from the understanding in theories of language reading of the importance of a child’s informal learning in their environment when learning to read (Neaum, 2017).
3. Strategies and approaches to developing the ability to image sounds. This was prompted by the highlighting of this skill in each of the four pedagogical approaches and from Gordon’s (2007) work on notational audiation.
4. Children’s representations of music in relation to revealing and developing their musical understanding.

Whilst these streams of investigation are presented separately above, in practise, activities were often inter-related and overlapping. The context in which these activities occurred is outlined below.

4.2 Research Context for the Choirlab Preparatory Study

The context in which the research was undertaken was a mainstream boys' school with a Catholic ethos in a predominantly middle-class socio-economic suburb of Dublin city in which the researcher had previously worked. Pupils of the school experienced music in class as one of the subjects of the primary school curriculum. In addition to formal class curriculum, pupils could opt to attend a variety of after school activities which ranged from sport activities to French, Art, Chess, Science and Digital Learning classes. The Choirlab was set up as an after-school activity rather than a taught aspect of curriculum.

Choirlab participants were all members of the Harmony Boys Choir, so called because the group was originally formed to sing the harmony/descant lines within a larger choir comprising many classes that sang for school liturgies and celebrations. Each year a group of approximately twenty-five pupils was drawn from pupils in 4th to 6th classes. As the number of places was limited, pupils auditioned to become members of this choir and although many children were eligible, only a small group were selected each year. This meant that a place in the 'Harmony Boys' was highly prized. It was this group of children, selected through purposive sampling, that I worked with in Choirlab workshops.

The boys ranged in age from ten to twelve years old. Nine children were in fourth class, eleven in fifth class and seven were in sixth class. Their formal musical backgrounds were varied. For the purposes of the research, I categorised their formal musical experience with instruments (including voice) outside school into three groupings: boys with limited/no formal experience; boys with moderate experience and boys with extensive formal experience. Children with 'limited or no experience' had either no, or less than two months, experience of formal instrument lessons. They included children who had never studied an instrument, tried an instrument for a period and stopped or had just started learning an instrument. 'Moderate experience' included boys with experience of learning an instrument for three years or less. 'Extensive experience' was defined as having studied an instrument for four or more years or learned more than one instrument over a four-year period and/or having experience of singing in a church choir where singers were trained in the use of notation. Twelve boys had limited or no formal music instrument learning experience. Six boys had moderate formal experience and nine had extensive experience. Of these nine, two were current members of this church choir, one had been a member for two years and a number of others had auditioned for or 'tried out' for this choir. Two were traditional instrument players and two played orchestral instruments. Instruments studied included piano, guitar, recorder, tin whistle, drums, trumpet, saxophone, fiddle, and choir/voice. In addition to their formal musical training, the children brought their informal everyday experiences of music to the research.

The weekly Choirlab sessions were of an hour's duration and were held directly after school in the children's school building. Initially the sessions were held weekly but as the term progressed this changed to twice weekly. The sessions were held during the last term of the school year and, given that the organisation of class tours and sports fixtures could impinge on attendance, an invitation to participate was extended to and accepted by the twenty-seven current members of the 'Harmony Boys' to ensure that a core number was available for each Choirlab session.

As these children had expectations of choir workshops, each session began with a vocal warmup and included singing. A summary overview of activities within sessions and the concepts to which they relate is included in Table N.1 at Appendix N.

4.3 Methods of Data Analysis

Through designing activities in each area of investigation data included 1) the researcher-practitioner's reflexive journal; 2) artefacts created by the children and 3) notes from debrief conversations with children in relation to their artefacts. The first stage in the analytic procedure was to organise and prepare the data for analysis. A data management system, NVivo, was used as a tool for storing and managing data. Data was converted into a format that was compatible with the software programme. The reflexive journal (completed following each Choirlab session) and debrief conversations with children in relation to artefacts were typed; artefacts created by the children individually and in groups were photocopied or photographed. Activities which involved children answering questions in a written format were transcribed to an Excel format. An inductive approach was taken to the analysis. Through initial coding, data was coded into discrete units (Lincoln and Guba, 1985) and then further coded into categories to assist me in describing and explaining the processes through which the children worked in relation to aural imaging, representation and reading processes. Whilst coding was inductive, it was influenced by the researcher's reading of research literature and the conceptual framework.

The remainder of this chapter discusses outcomes from four streams of investigation addressed in the sessions: children's music reading in light of insights from language reading, children's experiences of music in their everyday lives; strategies and approaches to developing children's ability to image sounds and children's representations of music; children's representations of music. As one purpose of the Choirlab was to prepare for interviews with choral conductors in phase two of the research, implications for the next phase of the research were also considered.

4.4 Children’s Music Reading in light of insights from Language Reading

Oral reading fluency and comprehension processes are understood to be strongly inter-related in the reading of language. As Kuhn et al. (2010) remind us:

Fluency combines accuracy, automaticity, and oral reading prosody, which, taken together facilitate the reader’s construction of meaning. It is demonstrated during oral reading through ease of word recognition, appropriate pacing, phrasing, and intonation. It is a factor in both oral and silent reading that can limit or support comprehension. (Kuhn et al., 2010)

Accuracy involves recognising words and elements of words with increasing rapidity whilst automaticity combines speed, effortlessness, autonomy, and lack of conscious awareness. Prosody is concerned with expression of meaning. Kuhn et al. (2010) describe prosody as the ability to read “with appropriate expression or intonation coupled with phrasing that allows for the maintenance of meaning”. They consider it a critical component of reading fluency (Kuhn et al., 2010, p. 233).

Whilst in language reading words are the “basic units that readers’ eyes pick up and process to construct meaning out of print” (Ehri, 2005, p. 168), in music reading, the number of notated sounds connected meaningfully can vary. In addition, there can be more than one way in which the same set of notated sounds can be perceived as being grouped (Bamberger, 1991). Teaching children to map the sounds of the English language to the letters of the alphabet facilitates the development of decoding skills and of a sight vocabulary, words whose pronunciation and meaning are triggered spontaneously in memory on sight of the word in print. Teaching children to map the sounds of music to representations of music in notation (or sol-fa) that might result in the equivalent to sight words in music is a more complex endeavour. One of the Choirlab activities was designed to investigate the possibility of ‘musical sight words’, children’s reading of patterns of related sounds.

4.4.1 Introduction of musical ‘sight words’

The first task is to explore what might constitute ‘sight words’ in music. Drawing upon Kodály pedagogy, children were taught to sing ‘sight words’ or patterns using solmization, the music strategy that associates musical sounds with syllables denoting scale degrees. In addition, the sight words were taken from the songs that the children learned during the sessions to draw from a common aural foundation of sound patterns. Given the research time constraints, I decided to focus on patterns based on the tonic, second, and third degrees of the diatonic scale in a falling pattern (i.e., sol-fa syllables, mi, re and do). Over the course of the sessions the children learned songs containing mrd patterns. Songs selected for preparing the mrd tone set included: Bow, wow, wow; Little Liza Jane; Rocky Mountain; Circle Left; Ding-Dong; and John Kanaka. Strategies used for introducing sight words

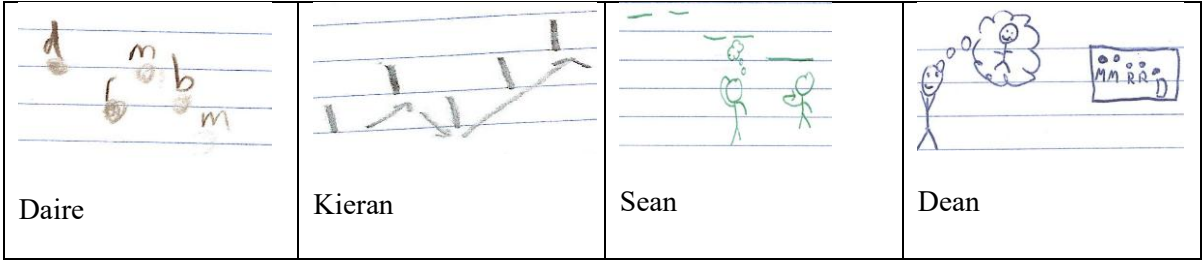
included: experiencing the phrase aurally within a song; singing the phrase in isolation; representing the phrase as an aid to memory (through, for example, gesture, paper/pencil, counters); presentation of sight words on a 5-line stave; singing the phrase from the stave; visually imaging the pattern and writing it from memory on a stave; and finding the phrase within a notated song. The rationale for inviting children to make their own representation of the patterns in advance of presenting them in standard notation was to investigate whether representation could be used to develop and enhance children’s ability to read the patterns.

The first musical sight word introduced was the final motif from the American folksong Rocky Mountain ‘Do remember me’ (Figure 4.1). The children had previously learned and represented the complete song during a group task using coloured card. On this occasion the children were asked to work individually and “put something in their notebooks to help them remember the phrase”.

Figure 4.1: Do Remember Me



Figure 4.2: Children’s Representations of Discrete Sounds in Do Remember Me



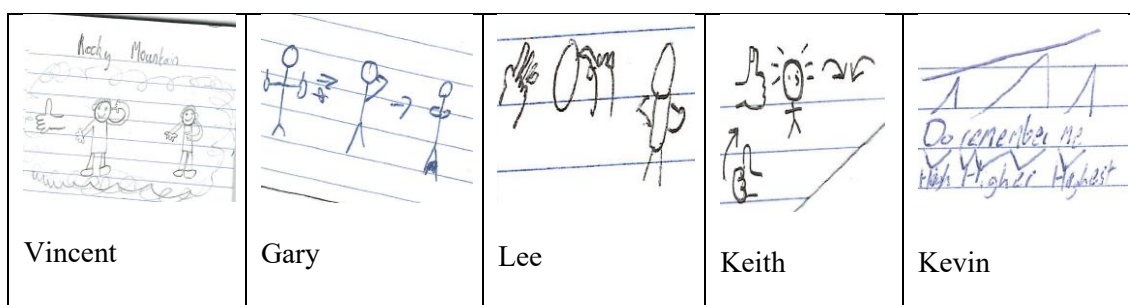
(Note: The blue lines in the background are page lines in the children’s notebooks and are not part of their representations.)

In terms of ‘meaningful units’ or how the children perceived the phrase, four children represented its five discrete sounds (matching the number of syllables) (Figure 4.2). Daire used five dots labelled with the initial letter of each syllable of the lyrics. Kieran used five vertical lines at different heights spatially on the page. Sean used short and long dashes spatially arranged to represent the pitch and rhythmic grouping and relative duration of the notes. Dean, in addition to using spatially positioned dots that reflected the pitch, drew upon his previous training to label the dots using m, r and d. Kieran

and Dean's representations also reflect a sense of the unfolding sounds as belonging together in a larger unit or phrase echoing language reading comprehension 'at various grain sizes'.

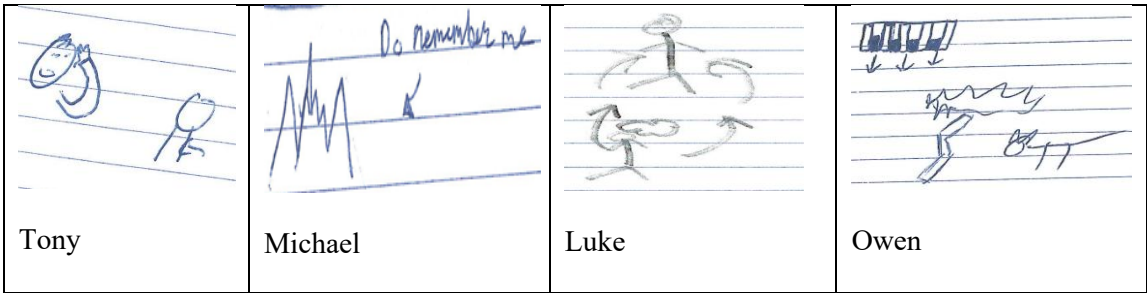
Some of the children's representations reflect a grouping of sounds according to the lyrics of the phrase (Figure 4.3). Vincent and Gary's pictorial representations together with Lee and Keith's iconic representations are visual analogues of their gestural representations of the meaning of the lyrics resulting in three pictured ideas. Kevin's enactive representation is also divided according to the lyrics.

Figure 4.3: Pictorial, Iconic and Enactive Representations of Do Remember Me According to Lyrics



In Figure 4.4, Tony, represents the lyrics with two images using pictorial representation. Michael's enactive drawing tracks the sounds as one complete event. Luke and Owen's representations draw upon their imaginative associations with the meaning of the lyrics. Luke explained that the lower stick figure is remembering the other 'because he died'.

Figure 4.4: Representations of Do Remember Me According to Lyrics, Phrase and Imaginative Association

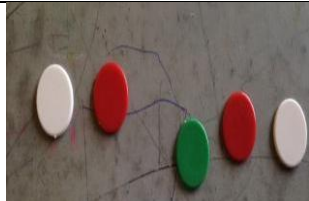
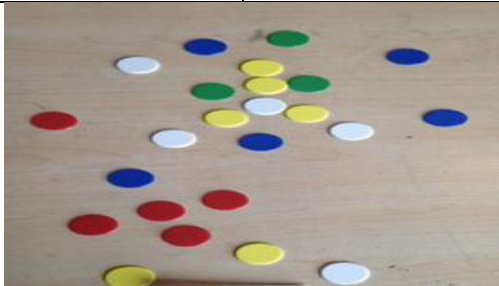
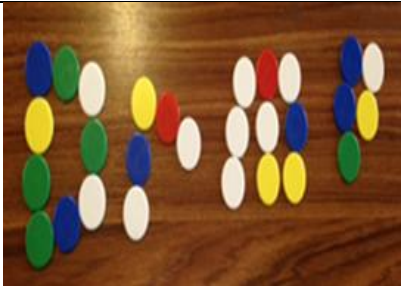


I next asked the children if they could find a way to show ‘Do remember me’ using counters (Figure 4.5). Six boys opted to worked in (three) pairs.

In contrast to the pencil and paper notations, when the children represented the ‘Do remember me’ pattern using counters, nine of the eleven representations represented the discrete sounds of the phrase. Only two did not: Luke repeated his pencil and paper global picture representation of a man remembering another man who had died reflecting his imaginative association with the expressive intent of the lyrics; Enda and Kevin used counters to make the initial letters of the lyrics Do and remember, and the word ‘me’. The remaining representations represented the discrete sounds of the pattern. Three representations presented the sounds in a linear form. Owen and Lee’s arranged the five counters in a horizontal line whilst Tony’s line was vertical. When I asked why he had arranged the counters in this way he explained “because there are five beats”. Michael’s representation comprised a horizontal line of seven counter stacks that reduced in height across the page. When he sang the pattern and pointed out the counters, he pointed at the last three stacks for the word ‘me’. I asked him about this later during a debrief conversation.

He sang from the counters again explaining “I just thought that there was a tiny bit of an echo”. His pointing, in addition to showing the duration, seemed to capture in gesture the forward momentum and the fading nature of the last notes of the phrase. (Choirlab Debrief of ‘Do remember me’ counters representation)

Figure 4.5: Representations of Do Remember Me Using Counters

		
Owen & Lee	Tony	Michael
		
Kieran	Sean	Dean & Vincent
		
Keith	Daire	Gary
		
Luke		Enda & Kevin

Michael's use of the word 'echo' and Tony's reference to 'beats' highlighted for me the challenges that children encounter in trying to verbalise what they perceive in music.

I then asked why the stacks were different heights. "They're the notes going up and down", he explained. He had used the relative heights of the stacks to capture the pitch contour of the phrase and the notes within it. (Choirlab Debrief of 'Do remember me' counters representation)

Michael's counters representation revealed more aspects of his musical thinking than his enactive drawing of the phrase. In addition, his singing from the counter representation reflected the strong influence of enactive representation.

Whilst Michael used the relative height of the counter stacks to represent the relative pitches of the pattern, other children represented pitch spatially. Kieran, Sean, and Dean and Vincent's horizontal descending placement of the counters indicate an awareness of pitch contour and of a rhythmic grouping of notes. Whilst Kieran represented each sound with one counter, Dean and Vincent, working together, and Sean, working separately had used a stack of counters for the last note 'me'. "We have a stack because 'me' is held for longer," Vincent explained.

Three children represented this rhythmic grouping differently. Keith and Gary arranged four of their counters in a two under two square pattern for 'Do-re-' and 'mem-ber'. The final note in Keith's representation is a single white counter. Gary, on the other hand, laid a row of overlapping counters beneath the square for 'me'. When he sang the pattern from this notation during a debrief conversation, I noticed that he didn't elongate 'me' in the way that he had done expressively during the session. This may have been because he had forgotten what the counters stood for, memory being key to the operation of notation. Alternatively, the reason may be that he was singing alone rather than at the same time as others in the debrief conversation. Daire had used two white counters to separate the top two red counters from two green counters below and a second two white counters to separate the green from the single yellow. Initially, Daire didn't remember the phrase that his counters represented. He did, however, remember how his representation operated, pointing to the strength of influence of pointing out the pattern on memory.

He explained, whilst pointing at the coloured counters (but not the white counters that separated them) that, "It goes one, two, stop (indicating the two white counters beneath), one, two, stop (indicating the two white counters beneath), one." When I reminded him that he had represented the phrase 'Do remember me' he sang the words from his representation, pointing to the coloured counters only. I asked why he hadn't pointed to the white counters. He

explained that his reason was “because the white bit isn’t coloured”. He appeared to use the white counters to signify which sounds in the pattern belonged together. He continued to explain “so the red is the highest and the yellow is the lowest” suggesting that his pattern represented the pitch contour of the pattern. Indicating the counters, he explained, “those two [the red counters for ‘Do re-’] are kind of joined together, these two [the green counters for ‘mem-ber’] have two notes in it and this one [the yellow counter for ‘me’] has one note in it”. (Choirlab Debrief of ‘Do remember me’ counters representation)

Daire’s invented paper notation had represented the discrete sounds of the pattern with dots labelled with the initial letter of each syllable. His counters representation revealed a more nuanced understanding of pitch and rhythmic grouping.

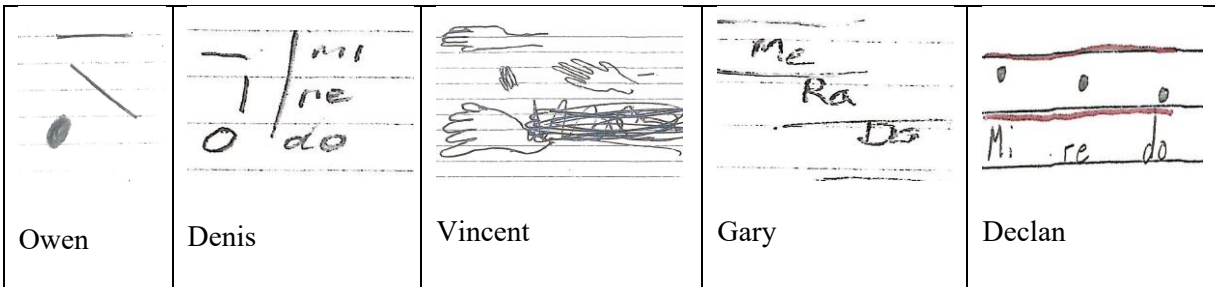
Having invited the children to represent the pattern in two different ways, I then introduced the pattern in standard notation on a flashcard and sang it on a neutral syllable. In order that the children would attend to it closely I used a strategy for teaching the spelling of a word. I asked the boys to look carefully at the pattern and try to remember how it looked, close their eyes and visualise the pattern on the stave and, finally, to check their visual memory for the pattern by writing the pattern on a stave individually. Half (seven) of the children wrote the pattern accurately on the stave. In the attempts of five of the children whose attempts were not accurate, rhythm was more accurately represented than the pitch element of the pattern. The remaining two children had correct pitch and but small rhythmic errors. Overall, (with the exception of the value of the last note) the rhythmic grouping was more successfully remembered and represented on the stave. A question arising from this for me to discuss with the choral conductor participants was on children’s accuracy in reading and whether they have noticed a difference in children’s accuracy between rhythm and pitch. A separate question relates to whether opportunities to represent music could be useful in preparing fluent expressive music reading that reflects understanding gained through meaning-making during representation activities.

The final activity with this pattern was a ‘spot the word’ type task in the equivalent of a teacher read-aloud from a Big Book in language literacy. With the notation of the song Rocky Mountain displayed on an interactive whiteboard (IWB) and the boys gathered at the screen, I sang through the song on a neutral syllable whilst pointing at the notes. When finished I asked if any boy had spotted the pattern that they had written down earlier. Most raised their hands to indicate that they had found it. Some of the children outlined the strategies that had helped them find the phrase. One boy (Vincent) commented aloud to himself that he had seen it [the pattern] twice. He later explained that he knew that the last note was an unfilled one (minim) and that he knew the name of it (E). (Choirlab Session 7)

Two other children pointed to the fact that they knew where in the song the pattern occurred and therefore where to look. Owen explained the strategy by which he had searched for the pattern saying “I cut it down into sections”. Initially he had scanned each line but then divided the line up to allow him to search more easily. Another child indicated that he had called upon both his aural memory of the song and his visual memory of the notation saying that he knew that the phrase was at the very end of the song “and also the position of the notes” helped him. The contribution of both visual and aural processes in music reading is another topic for discussion with expert choral practitioners.

A second example of working with a sight word was from the children’s song *Bow wow wow*. I taught the song to the children aurally. They sang and showed the contour of the melody using gesture before isolating the final descending mrd ‘bow, wow, wow’ pattern. The downward direction of the pattern was highlighted and, on this occasion, the notes named as m, r, and d. The children practised singing the pattern using sol-fa syllables and accompanying hand signs from my hand sign representation of the pattern. I invited the children to represent the pattern in their notebooks so that they would remember it (Figure 4.6).

Figure 4.6: Representations of mrd



Perhaps as a result of being introduced to and using the handsigns, the children’s representations were closely tied to their gestures. Of the seventeen children present for the session, fifteen incorporated the gestural hand sign representation in some way. Thirteen children used lines and circles to represent the sounds and gestures placed in a vertical pattern (e.g., Owen). Four of this group in addition, labelled the symbols using the mrd sol-fa syllables (e.g., Denis). Two drew hand icons representing the hand signs. One (Vincent) placed the hands in vertical order, the other labelled the hands and presented them linearly (Liam). Only two of the children did not represent the gestures. Gary placed the sol-fa syllables in a descending diagonal pattern between four horizontal lines. Declan used descending dots placed linearly between red lines for each sound and labelled underneath each dot as mi, re and do. Declan often signals musical sounds by placing dots between red horizontal lines.

Following their recording of the pattern in their notebooks, I displayed a card showing ‘another way’ of representing the pattern (i.e. 5-line stave with 3 crochet notes on second line, first space, and first line). I pointed and sang ‘m,r,d’. I then asked them to work in pairs to place three counters on an A4 size stave and sing the pattern. This was a means of reinforcing the links between the mrd sounds and notation patterns in the same way that writing a word could help to strengthen the word in memory. The children sang from their counter representations. Only one pair’s representation was incorrectly placed. The final task was to take a piece of manuscript paper and write the pattern on a 5-line stave. Thirteen of the seventeen children copied the pattern accurately. Naming the notes in sol-fa and reinforcing their sounds using handsigns appeared to support children’s accuracy.

The use of the manuscript paper appeared to trigger some children’s previous musical experience resulting in dissonance.

I noticed a conflict of knowledge sources for some children during this activity. One child, Vincent, was pointing to the sight word mrd, and asking “But doesn’t it start with doh? Isn’t doh the first one? Why do we start with mi?” He had familiarity with using sol-fa, he could list the sol-fa names of the diatonic scale and appeared to know that doh was the first degree of a major scale. The ‘sight word’ approach obviously jarred with his previous experience.

Separately, Vincent and Liam who were sitting and working together, initially referred to the notes using absolute names for the lines and spaces of the stave, saying in response to my questioning “that’s the note on the piano”. I regretted not having asked them to sing the ‘sight word’ using letter names to find out if the letter names would prompt the sight word ‘mrd.’ (ChoirLab Session 8)

The interaction between formal musical knowledge that children bring to music reading from instrumental music lessons and their learning in sight-reading in choral contexts was another area to explore with the choral conductor participants. Separately, because of time limitations and in an effort to limit the skill and cognitive load for the children, I had presented both songs in the stave position of the key of E major without showing the children that this pattern could be presented in different places on the stave. One child appeared to call on his previous musical experience and his aural memory or aural imagery for sounds presented visually on the stave.

Liam commented that I wasn’t singing the tune at the correct pitch. I wonder whether he has perfect pitch (or a good memory for pitch relating to notation arising from his choral /instrumental experience), as he appeared to know that I was singing at too low a pitch to

match the notation on the board. (I had notated the song with doh on the first line of the stave to be able to show mrd on the stave rather than with leger lines. I needed to transpose the song to a comfortable singing range for the boys to teach it. (Choirab session 8).

Later in the session I presented the mrd pattern, gave a starting note and asked the boys to ‘think it’ and then to sing it aloud together in the same way that a language sight word could be presented on a flash card for children to recognise and read. The children recognised and sang the pattern as a group accurately. The next activity was to find this pattern in notated songs, *Bow wow wow* and *Hot Cross Buns*.

The challenge was to sing the songs from the page together and identify the mrd patterns in the written notation. The songs were presented without words on a 5-line stave. I made no reference to key/time signature. We sang on pitch using words. (Choirab session 8)

Having sung through *Bow wow wow* together, I asked them to find the mrd pattern in the song and circle it. Following our singing of *Hot Cross Buns* from notation, I asked the boys to sing it inside their heads and circle any mrd pattern they find.

Whether it was because we were coming towards the end or because of the nature of this activity, I could feel a falling energy dynamic in the room. I began to wonder whether it was only the visual pattern that they were identifying in the notation, divorced from the sound? They all appeared to identify and circle the mrd patterns. I later saw that two boys, Tony and Daire, only circled the mrd pattern when it occurred at the end of a line of notation. They didn’t appear to recognise the mrd pattern in the middle of the line/stave even though we had all sung the songs together. (Choirlab Session 8)

At the start of the next session I checked, presenting the pattern on a flashcard, whether the boys recognised and could accurately sing the mrd sight word. There were twenty children present (three more than last week). A show of hands indicated that fourteen recognised and remembered by looking at it what the pattern was, six did not. Two of the six said that they could remember the gestures that matched the pattern but not the pattern itself. The role of gesture and handsigns in supporting children’s aural memory and visual recognition of patterns will be a topic to pursue with the choral conductor participants. When they sang the pattern aloud individually, eight of the fourteen boys who recognised the pattern sang it using the mrd sol-fa syllables. Four sang on a neutral syllable. Tony sang correct pitches but reversed the order of the sol-fa names and Vincent sang ‘Bow, wow, wow’. His mental representation or image for this pattern appears to include both mrd and Bow, wow, wow.

4.4.2 *Sight-reading activities*

In language reading, word recognition and decoding skills facilitate reading of text. In addition to learning to recognise patterns of notes ‘musical sight words’, the children engaged in sight-reading music ‘texts’ i.e., music notations. The first sight-reading activity was a group activity. I displayed the song *Hot Cross Buns* on the interactive white board (IWB) without lyrics, gave a starting note and encouraged the boys to sing using sol-fa syllables. I had decided not to follow what I would instinctively do in keeping with Kodály principles of preparation for sight singing. I did not prompt or prepare the sight singing and was interested to discover how the children would fare without my help. As a group, they read the notation accurately and reasonably fluently. Later I considered factors contributing to their success.

On reflection the boys already knew the song *Hot Cross Buns*, so in effect they were ‘reading’ from memory prompted by the notation – perhaps in the same way that children recognise sight words automatically from memory when reading language. This meant that in addition to ‘reading’ the melody correctly, they also sang the rhythm of the song accurately. Included in their memory or representation of the song was its melody, rhythm and word, the structure also implicitly. (Choirlab Session 9)

Gary had noted similarities in the structure of *Hot Cross Buns* to another children’s nursery rhyme *The Grand Old Duke of York*, commenting that it sounded the same as “when they were up, they were up”. He had recognised the structural similarities between the two songs (i.e., a short phrase followed by a rest, a short phrase followed by a rest, a longer ending phrase).

The children were not as successful at reading the second piece of notation, an extract from the song *Au Clair de la Lune*. Although the extract contained only the notes m, r, and d, they found this a more challenging task. As they sang, I pointed to the notation on the screen. Whilst singing through the first phrase the duration of m was sung accurately but this was, I suspected, accidental. It appeared to result from a lack of speed in decoding the r which followed directly after. My pointing out of the notes would also have helped here. The interval m to r caused difficulties. Singing the correct pitch for r and, simultaneously, naming it accurately proved challenging, a higher level of skill or fluency was required. The second phrase of the music was identical to the first. However, this time the duration of m was shorter than required and the interval from d to m was inaccurate.

Some boys named m as r but sang the pitches accurately, some named the notes correctly but sang incorrect pitches, some appeared to sight read it accurately. I am mindful that there are many skill dimensions (Fischer, 1980) involved in even a decoding of the individual notes

from the notation: identifying the name of the note correctly in sol-fa; singing the correct pitch for this note; and performing the rhythm/duration of each note accurately. In addition, the boys were sight-reading a song that was unknown to them. (Choirlab Session 10)

In the next session I reviewed songs the children had learned that contained the tone-set mrd and, in preparation for new sight-reading tasks, I introduced a musical sight word that included the interval from d to m. For the next task, I asked the children to work in pairs and set them the task of figuring out how the music on a hand-out sheet would sound given that the notes used were m, r, and d and that it started on m. The unnamed tune was a variant of *Mary had a Little Lamb (Merrily we roll along)*.

They worked in pairs and the room was filled with sounds of their attempts to decode the notation – singing and talking to each other about the music as they tried to sing the notation ... After a period, I asked various pairs to sing from the notation to see if any pair had worked it out. As each pair sang aloud from the notation, they sang correctly in sol-fa up to the repeated m ‘mmm’ at the end of the first phrase. Some named the notes in sol-fa as m but sang to the tune of ‘mss’. (Choirlab, Session 10)

The first pair who sang recognised that their singing did not match the notation and made three attempts to fix it before they managed to sing it correctly. I noticed that on their third attempt they started directly at the ‘mmm’ section rather than singing from the start of the piece. I asked the group to follow the notation as I sang. They listened and, watching carefully, joined in and, as one, sang ‘mmm’ instead of ‘mss’ at the end of the first phrase. When I pointed out that that was not what the music ‘said’, and asked why they were singing it differently there was a chorus of answers, one of which was an exasperated “because that’s what I’ve learned!”

Kevin identified the song as *Mary had a Little Lamb*. When I asked how he knew, the group spontaneously started to sing *Mary had a Little Lamb* using the song words whilst pointing to the notation and changing the last phrase to ‘wah, wah, wah, wah, wah’ in cartoon fashion. The aural image of the very similar song held in memory was called to mind by the notation of the first bars, which were identical. Once recalled, this memorised tune over-rode the visual cue of the notation in performance, even when children recognised that the notes they were singing differed from those on the page. (Choirlab Session 10)

The significance of aural imagery for sight-reading and of the impact of children’s aural foundation on music reading was highlighted for me here. In addition to the impact of previous aural experience on the sight-reading exercise, the challenge of integrating different notation systems arose. I asked the

children to sing through the notation to see if they could locate the notes that were different to those that they had in their minds and to circle them.

The room once more was filled with the sounds of pair-work – singing, arguments, problem solving-sounds and, every once in a while an instruction to “Circle!”. I watched as Vincent and Liam sang aloud from the notation for themselves using the song lyrics (as did several others). “It’s there!” Vincent pointed. Later I heard them singing from the notation in sol-fa and noticed that the sol-fa names were written (as words) beneath the stave. When I asked them about it, Vincent explained that he had written the sol-fa names to help him. He went on to explain that, because he plays piano he “would always think of a note on that line as G” so the sol-fa was to remind him to use the sol-fa name. His familiarity with standard notation and the use of absolute letter names was causing him difficulty in naming the notes in sol-fa. He had experience as a choral singer where notation was used (with sol-fa). The two systems seemed to be in competition as he read the music. I asked whether he was reading the notes or the words underneath, he answered ‘notes’ and then considered his response for a moment and changed his answer to ‘both’. Liam, his partner, interrupted to ask me whether the note should not be fah “because it’s a G# and fah is a semitone from m so it’s fah?”. Liam appeared to be influenced by the key signature at the start of the piece. Previous knowledge of one system that he cannot, perhaps, fully operationalise and relate to the other, is causing confusion. He and Vincent sing the scale d, r, m, f, s, l, ti, d as they discuss the naming of the notes again. (ChoirLab Session 10)

The final sightreading task was to sight-read the first two phrases of the folksong *Au Clair de la Lune* individually from the IWB. I gave an E starting pitch and asked all of the children to sing the tune internally ‘inside their heads’ whilst I pointed out the notation. The boys followed and appeared to be singing internally as I pointed. Volunteers then sang from the IWB.

Darren volunteered first. He found it difficult to take/match the starting note, and, although he named the notes accurately using sol-fa, his singing was not accurate. He named the first three pitches as doh but the pitch of each successive note rose. In terms of the skill dimensions of the task, naming the pitches accurately, singing the pitches, and performing the rhythm accurately, he achieved one. However, as he progressed, whilst the individual pitches were not accurate, the contour of particular patterns was followed (e.g. mrrd). By the end, his sight singing was more akin to speaking. As he finished he commented, “I didn’t get the first note”. Perhaps the starting note was too high. I had given an E–doh starting pitch to match the

notation in E major. Later I wondered whether, having sung many of the songs in the keys of C or D major, this could have affected Darren's difficulty at pitch-matching the E as doh. Karpinski (2007) highlights the importance of tonal context as a factor in sight reading. (Choirlab Session 10)

Matching the starting pitch and maintaining the pitch of the repeated doh also proved difficult for two others who volunteered. The interval from doh to mi continued to challenge individual children. It had needed more preparation and practice to facilitate fluent reading.

It occurred to me that if I been working on a language reading task, I would have scaffolded their reading more, isolating particular words in advance of reading and perhaps inviting children to read sentences or passages together (choral reading) to enhance fluency in advance of asking children to read individually. In addition, listening to others inaccurately sight-reading *Au Clair de la Lune* could have affected each subsequent boy's attempt. In relation to the repeated doh at the start of the piece, this was the first time that they would have encountered this pattern. In terms of sight words, this hadn't been encountered by the children before. More preparation was needed for the boys to achieve success at this sight-reading task. (Choirlab session 10)

I was curious about how aware the children were of their accuracy levels. Individual answers revealed some children's levels of awareness. The two boys present with choral experience answered. Liam explained that when he "was trying to go from d to m, I kept going flat on m". This was an accurate description of his sight-singing, suggesting that he had imagined the sound accurately but had produced it incorrectly. Vincent's explanation addressed two issues. One was the need to hold a pitch in his memory for when it was needed.

He described how "there could be a whole bar without 're' and 'then you'd have another bar that would have 're' and you'd completely forget'. (Choirlab Session 10)

He asked to use the notation displayed on the IWB to discuss the second issue which arose in response to Rory saying that he found going from mi to re hard. I had asked why he thought this was so, given that they had all sung the mrd pattern frequently and accurately from the 'sight word' flashcard.

Vincent began speaking and pointing to the notation but changed to singing to explain his point. He spoke about how "we would always know mrd and then it goes mr and we go straight into that bar and that's like the same note so we'd have to do it fast instead of going 'mrd'". Vincent appeared to be saying that his familiarity with the pattern mrd meant that this

was what he would have expected to find in the notation. When singing r, he would have expected d to be next in the pattern but instead he had to quickly change from singing the expected doh to repeating r, before continuing to doh. (Choirlab session 10)

Practise at singing mrd had built up an expectation that ‘d’ would follow ‘r’. I asked the boys whether they could find any patterns in the music. One pointed out the repeated bars in the notation. Whilst all the children noticed the pattern on examining the notation (or having someone point it out), no one appeared to have noticed the repetition earlier in the task. I was mindful that I had approached the sight-singing activity by asking them to sing internally as I pointed to the notes on the IWB rather than encouraging them to examine the whole tune first visually.

4.4.3 *Guess the tune*

The last sight-reading activity was a ‘Guess the Tune’ from its notation task. The children worked individually or in pairs to guess the tunes notated on the hand-out. For the first tune I had used one of the adverts that the children had cited in the house plan activity. I observed them trying to work out the answers.

How do I present or teach both rhythmic and pitch aspects of a musical unit without separating them? Use of gesture appears to be a means of capturing the rhythmic dimension without cutting across a child’s simultaneous use of sol-fa names to help decode pitch. (Choirlab Session 10)

I overheard Gary sight-singing the tune of *Switch to Energia.ie* correctly from the notation. He didn’t recognise it initially –perhaps because of the slow tempo at which he sang from a lack of fluency in decoding. Whilst he could decode the notes accurately, he did not automatically recognise the tune. He knew that he knew the tune but he couldn’t name it. It was only after I sang it from the notation at a faster tempo that the boys identified the tune correctly.

As I gathered up the sheets at the end of the session, I noticed that Daire, one of two boys working together, had written on their page in response to ‘Can you name this tune?’ ‘Yes, but he doesn’t know the tune “because she got mrd things in our heads”. (Choirlab Session 10)

Whilst children revealed varying levels of musical understanding in their representations of phrases and patterns, the challenge was to use this understanding to inform their music reading skills. Areas for exploration with expert choral conductors are listed below.

4.4.4 *Implications for the next phase of the research*

When considering a discussion of music reading with conductor participants, one important question is the purpose for which notation is used. Questions arising from Choirlab sessions to explore with choral directors include topics such as:

1. Steps taken to develop children's accuracy and fluency in reading music.
2. Whether they approach sightreading of music holistically or by addressing aspects separately.
3. Whether they use collaborative approaches (pair/group).
4. Whether they have noticed differences in children's accuracy levels in reading rhythm and pitch.
5. Whether they include sightreading practise in rehearsals.
6. Steps taken to scaffold children's sightreading of new material.
7. Whether opportunities to listen to pieces that children will learn in advance of reading notation could be useful in preparing fluent expressive music reading that reflects understanding gained through meaning-making during representation activities.
8. The contribution of both visual and aural processes in music reading.
9. The role of gesture and hand signs in supporting children's aural memory and visual recognition of patterns.
10. The necessity of practise of solmization to develop fluency with its use.
11. The use of skimming, scanning visual processes.
12. Managing the challenge of integrating children's varying notational knowledge.

4.5 Investigating Children's Experiences of Music in their Everyday Lives

Theories of reading comprehension highlight the importance of the knowledge and experience that children bring to the reading process. One knowledge source is children's 'knowledge of musical language', knowing how music works. This understanding develops from the aural bank of musical vocabulary that children acquire through experiences of music in their everyday lives.

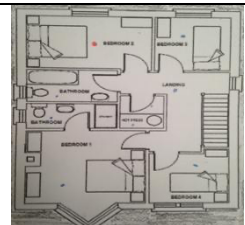
It was against this backdrop that I sought to investigate the types of 'songs in their heads' (Campbell, 2010) that the Choirlab participants were bringing to the research. The rationale for this was to acknowledge the children's social and cultural practice on the one hand, and to investigate the aural foundations that these contemporary Irish children were bringing to the research on the other. If an aural store of melodies was key to developing notational audiation (Gordon, 2007), I wanted to investigate whether a theory of music reading should include a focus on the funds of knowledge (Moll et al., 1992) children develop from interacting with music in their everyday lives. What types of sounds and sound patterns did they already have in their heads which they brought to music reading, including music expectations for comprehension? As teacher-researcher, I was particularly conscious that direct questioning was not likely to yield answers free from peer influence. In addition to informal discussion that arose during sessions in relation to other activities, I drew upon Donegan's (2011) investigation of

music in European Schools to devise an activity through which I could gain some insight into the children's aural stores of sound.

4.5.1 House Plan activity

The children were asked to work in groups to complete the task. Each group was given a blank copy of the plans below. Each individual within the group used a particular colour of pencil/marker to mark on the generic house plan the places where each child, in his own homes, interacts with music in some way. I deliberately included a car in one of the plans as informal discussion with friends and colleagues suggested that this was often a site of music listening in family contexts. The children were asked to write down on individual post-its the music that they came across in these locations. My interests were more focused on the 'sounds' that children interacted with rather than the site of interaction, but the maps provided a prompt to memory and a vehicle through which I could gather information. Samples of completed house plans are displayed in Figure 4.7.

Figure 4.7: House Plan Activity Samples of Children's Work (Blueprint Home Plans, 2019)

			
Front Face	Ground Floor Plan	First Floor Plan	Individual post-its

The children's answers revealed the individual and shared nature of their out-of-school musical experience in their home environments. Children indicated that they interact with music through listening, singing, performing and watching. Davis' (2015) observations on the enculturation of children into music through various media and devices was confirmed in relation to this group. Through this activity and previous discussion, it emerged that seven children have compiled playlists on Spotify (two with circa seventy songs), two use Deezer, a French online streaming service, whilst another uses Audiomac. Other media used were YouTube, iTunes, personal or parents' mobile 'phones, car and house radio, and family members singing (with/without headphones). Categories of the music repertoire they listed included: classic pop music (or in one child's words 'Oldies songs'); Contemporary Pop music; Music from Children's Films/Musicals; Music from TV/Radio; Classical music; Folk music, and Music identified as from a particular source. Some music was identified by the name of an artist or group, some by the name of the song or track. Some, but not all, of the children

who were learning instruments or were choristers included this repertoire on their lists. Table N.2 (Appendix N) presents a summary of this repertoire.

My focus in this activity was on finding samples of repertoire with which all the children would be familiar to use melodies known to as many of the children as possible in music imaging and reading activities. Whilst some of the music listed by individual children overlapped, one category emerged that all appeared to recognise, radio and TV advertisements.

When they started writing down the tunes, one child sang a jingle from an advertisement which caused me to stop and consider what other adverts they were thinking of. What other adverts do they all know? I whipped out my recording device and recorded any advert they mentioned to find out whether they really did know them. I deliberately didn't cue them musically. Instead, I counted to three and waited. The McDonald advert is obviously in their heads but there were a range of others (Senator windows; Apple Green; Go Harvey Go; Peelie Peelie; The Champions (soccer theme song); Noyex Numann; Prepaid Power; Quote Devil; Flash; and a song advertising Euro Cycles ... One category of 'Sounds in their Heads' that emerged today is Advertisement jingles. This is hardly surprising given that these jingles are deliberately designed or invented to be memorable and are played routinely on television and radio. (ChoirLab Session 2)

This familiarity was confirmed in a later session in response to my asking why it was that children their age would be familiar with an advertisement relating to a cleaning agent for washing machines. One child observed:

Unless you've had your childhood brain pumped you know the *Washing machines last longer with Calgon* ad. It's on Nickelodeon and RTE Junior. (ChoirLab Session 7)

When I examined the advertisement jingles later to investigate the aural musical vocabulary these children had in common, I was struck by the differences in complexity between the rhythmic and pitch aspects the jingles contained. The 'Flash' jingle excerpt, shown in Figure 4.8 contained only two notes, a major second interval but included crotchet, crotchet rest, quaver, semi-quavers and a tied quaver over a bar-line. 'Switch to Energia' used only the mediant, supertonic and tonic with quaver, semiquaver and crotchet rhythms. The 'Quote Devil' was based on a major triad, 'Senator Windows' on a first inversion triad but both used syncopation liberally.

Similarly, in one of the songs they listed, Happier (Figure 4.9), whilst the melody was predominantly based on a do-pentatonic scale, the rhythm was more complex. On examination, the lyrics appeared to

‘unlock’ the rhythmic pattern. The opening line of the song also used a question and answer technique for the melody to lyrics ‘I want you to be happier’.

Figure 4.8: Sample of Advertisement Jingles sung by Choirlab Children

Flash! Ah_____ cleans up the im-poss-i-ble.

Sen-a-tor Win_____dows,_____ We pro-TECT your home

Switch to En-er-gi-a . i e.

The Quote De-vil's al-ways got one hell of a quote_____

(Note: notated by researcher from children's singing of advertisements)

Figure 4.9: Happier Excerpt (from Happier by Bastille and Marshmello)

Late-ly, I've been, I've beenthink-ing I want you to be hap-pi-er, I want you to be hap-pi-er._____

Music and popular culture in children's lives emerged as a recurring theme across a range of the activities that children completed in the Choirlab sessions. During a separate activity where children were asked to invent a gestural representation of a song phrase, one child borrowed from the Macarena whilst another used a footballer 'dabbing' gesture.

Another child commented that the gesture was the Macarena. Suddenly, unprompted the whole group began to sing 'One maca, two maca, three Macarena, four maca, five maca, six Macarena' This reference to popular culture reminded me of how the influence of 'previous knowledge', experience of the world or popular culture are recognised in children's learning to read language. But do we take account of this in music reading? ... Children's references to 'dabbing' and Macarena have reminded me of my research into classroom composing where

children drew on popular culture in their compositions. (As in language writing, they draw on their own lives). (Choirlab Session 1)

In a session following one in which children had engaged in a representation task involving advertisements children asked about the possibility of continuing the activity. The ‘Name the Advert’ aural imaging task prompted a high level of engagement.

As soon as the children were seated in the room one of them asked ‘Can we do that thing we did last week with the ads?’ They seem to have really enjoyed engaging with materials from their musical culture when creating representations in relation to the radio/tv adverts ... The atmosphere was lively, they engaged excitedly, and I had to work at making sure that they had a chance to think individually before responding. For one image one boy hummed the McDonald advert provoking laughter among the group – the image was obviously not that of McDonald’s! (Choirlab Session 8)

Films were also referenced in relation to children’s musical experience.

I was curious to know how many of the children had come across sol-fa names before. Only three of the now eighteen had never come across them ... Of those who had, four credited the film ‘The Sound of the Music’ with their introduction. (Choirlab Session 5)

4.5.2 Implications for the next phase of the research

An issue to explore with expert choral conductors relating to the ‘funds of knowledge’ recognised in language reading was whether they believe that drawing upon children’s experiences of music in their everyday lives could be useful to music reading in terms of aural foundations for imaging sounds during music reading and in terms of motivation and engagement.

4.6 Strategies and Approaches to Developing the Ability to Image Sounds

Theories of audition, imaging sounds from notation, are particularly important in relation to the music thinking involved in reading from notation (Gordon, 2003, 2007; Brodsky et al., 2003). This research draws upon both theory and practice in that it includes insights from classic pedagogical approaches to music such as those of Zoltán Kodály (1882-1967), Émile Jaques-Dalcroze (1865-1950), and more recent innovative approaches to developing the musical imagination (Adolphe, 2013; Karpinski, 2000, 2000a, 2007, 2007a).

The ability to aurally image musical sounds is regarded as a fundamental musical skill. Both Kodály (Choksy, 1988) and Dalcroze (Jaques-Dalcroze, 1912, 1921, 1930; Juntunen, 2006; Juntunen &

Hyvonen, 2004) highlight its importance, emphasising the need for students to have developed an aural foundation or store of musical experiences in their minds upon which to draw when later connecting these to reading and writing music. In Kodály pedagogy this store is developed through song singing, initially through singing carefully selected and sequenced folksongs and later art music. Dalcroze approaches to imaging sounds include singing but also highlight listening experiences involving rhythmical bodily movement as essential for developing aural imagery. More recently, Karpinski (2000), who approaches the development of aural imagery skills by integrating the development of ear training with sight singing, identifies aural imaging as one of the fundamental sight-reading skills best learned before the introduction of notation. Contemporary American composer Bruce Adolphe describes this ability within his conception of ‘the musical imagination’ drawing upon cross-disciplinary experimentation to enhance creative musical thinking and emotional engagement with music. These thinkers were useful to me in investigating how children in choirs develop the ability to image sound from notation.

Activities which I used with the children in Choirlab sessions to investigate aural imaging included children imaging sounds in the context of; song singing, listening to music, improvising, and music reading. In addition, I used two activities from a selection of exercises designed to develop the musical imagination of performers, composers, and listeners in Adolphe’s (2013) *The Mind’s Ear*. Imaging sound was often linked to representation activities. The rationale for the inclusion of aural imaging activities in a range of contexts was to investigate possible ways of developing this skill and to explore connections between imaging and other music reading subskills. A strong connection between children’s experience of music in their lives and their aural imaging was evident in some of the activities.

4.6.1 *Imaging sound in the context of song-singing*

In the context of singing, one strategy through which the idea of internalising sounds or deliberately hearing sounds in their minds can be introduced to children is through the use of word elimination game songs. Word elimination songs are songs which lend themselves to the playing of a game where particular words or phrases are sung internally, rather than performed aloud, often substituting the words with actions to support this. Two activities involving word elimination songs were included in the Choirlab sessions. The first song was a round named *First you Make your Fingers Click*. For this activity children performed the action named in the song (‘click’) whilst singing or hearing the sung word internally. The words of the song go through a range of body percussion, not always on the last beat of the phrase. The second song selected for use was a two-person clapping game song *Ding Dong*. In this activity children were required to cumulatively substitute body percussion rhythms for words of

the song (clapping and patting for ‘Ding dong’ and stamping for ‘Hot Dog’) and to internalise phrases (‘I’ve got a rhythm in my head’) without substituting actions to a point where the whole song was sung internally, that is aurally imagined, with an accompanying rhythm. Whilst the children could, with some practise, comfortably substitute body percussion actions for ‘*First you make your fingers click*’ they experienced difficulty maintaining the tempo of *Ding Dong* when singing it internally and, simultaneously, performing the rhythmic patterns in pairs. This difficulty could have been related to the number of skill dimensions involved in the activity rather than directly related to children’s aural imaging skills (Fischer, 1980; Fischer & Bidell, 2006).

4.6.2 Imaging sounds in the context of listening and gestural representation

As a result of the difficulty that children experienced in aurally imaging in the context of the song *Ding Dong* I decided to reduce the skill-load required and explore whether the children would experience more success in imaging sounds in the context of listening to music without the additional performance requirement. The piece selected was *Royal March of the Lion* from Saint Saens’ *Carnival of the Animals*. Drawing on Dalcroze, this piece was selected because of the possibilities it held for initially internalising and representing two particular musical ideas through gesture and subsequently, aurally imaging these musical ideas in response to a gestural prompt. During the session the children listened to the music and gestured for the lion’s roar and the piano chords which followed. Later they gestured and tried to hear the music internally whilst I muted the volume. Although not perfectly in sync, the children appeared to fare better at matching their internalised phrases to the tempo of the music than they had in the song singing activity. They were asked to answer a question on whether or not they could internally hear the music for which they gestured individually in their notebooks. Twenty-four of the twenty-six children present indicated that they heard the music. The detail added by some children would suggest that they had considered their answers carefully. One child, for example, wrote “I could hear it all of it”. Another indicated that he could hear the music representing the lions roar for which a gesture had been substituted but not the piano chords that followed in his comment “Hands up, I could [hear, but the], piano [chords] I couldn’t”. Another shared that he was singing along internally “Yes, I was saying it quietly by myself and I could hear it!” “I heard some [i.e., the] lions roar. I was saying bum bum bum, bum, BUM, BUM but I could hear the two high notes”. Listening to music could be considered as a context within which children could focus on developing the skill of aural imaging without having to negotiate other skill dimensions, building then to integrating other dimensions.

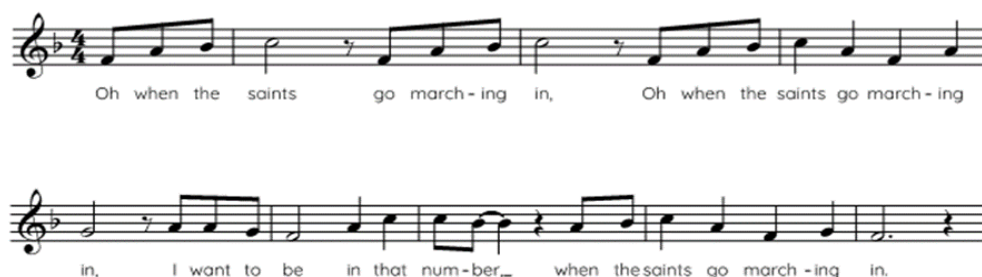
Investigating whether children could develop their aural imaging skills through gestural representations also occurred in the context of song singing, overlapping with investigating children’s

music representational thinking. Following Bruner's enactive stage of representation, in advance of asking children to represent a phrase with objects or on paper, they were frequently asked to represent phrases from songs using gesture. Examples are described in the section on representation.

4.6.3 *Imaging sound in the context of improvising*

Comprehension in language reading includes expectations of the text drawing on prior personal experience and knowledge. This could be related to a music reader having expectations of the music. Mishra (2014) observed that improvisation skills, which involve drawing upon a reader's musical knowledge to think ahead in the music and produce stylistically appropriate material, appear to transfer to sightreading. One activity that children explored was the invention of a new final phrase to the song *When the Saints go Marching in* (Figure 4.10), writing this into their notebooks to fix their versions in one way was helpful.

Figure 4.10: *When the Saints go Marching in*



The following is from the researcher's reflective journal.

The room was filled with children singing the tune through individually/groups (they appeared to need to lead themselves into the new ending). Worrying that the task was perhaps too difficult and that I should have chosen an easier tune, I asked if anyone had a new ending... I sang the tune to prompt the new last line...

The first volunteer's improvised ending (Figure 4.11) uses the final note of the prompt phrase as an anchor and creates a conventional descent to the tonic.

Figure 4.11: *Vincent's Improvised Ending*



The next volunteer's attempt was not as successful. Initially he used a continuous falling line but was not as sure of the pitch collection so had difficulty in executing it (Figure 4.12).

Figure 4.12: Daire's Improvised Ending

As he attempted to sing his ending he stopped saying “I lost it!” “It’s there” his friend said pointing to his notation. He tried again pointing to his notation but without success. When I went back to him the tune had changed [Figure 4.13].

Although Daire had invented an ending, he was unable to hold it in memory long enough to share with the group. The next child, Liam, attempted humour in his response (Figure 4.14) whilst Tony delivered a dramatic rendition.

Tony sang an augmented rhythm version ending with a downward slide clearly linking this ending to the final notes of the cueing phrase (Figure 4.15).

Figure 4.15: Tony's Improvised Ending



(Choirlab Session 8)

These examples suggest that these children were drawing upon stylistic knowledge and experience to invent new endings for the song. This included Liam's apparent attempt at joking in sound. The challenge of remembering musical ideas was highlighted in Daire's difficulty in producing the idea vocally. In language reading, prediction is a valued comprehension skill.

4.6.4 *Imaging sounds in the context of reading notations*

Several activities tried out in the Choirlab, related to music reading, required children to image sound from notation. For example, reading musical patterns in isolation or in longer extracts; guess the tune activities and sequencing sets of cards with notated phrases to represent a song. For example, sequencing a set of cards with notated phrases of the song *Once a Man Fell in a Well*, being able to place them in the correct order to complete the 'jigsaw puzzle' for the song and being able to create a new version of the song by varying the sequence of the phrases and singing accurately from this. These relate to accuracy and automaticity, recognising rather than decoding and having a flexible store of sounds in memory that can be manipulated and changed by the reader. This flexibility was emphasised by Adolphe (2013).

4.6.5 *Imaging sounds in the context of Adolphe's (2013) exercises*

One strand of investigation that provided some insight into how children perceived their own ability to imagine sound and contrast this with their ability to image visually was the completion of two exercises from Adolphe's (2013), *The Mind's Ear*. Often, children's difficulties in comprehension are compounded by difficulties in word recognition or decoding skills. Difficulties in these areas result in a lack of fluency which impacts on their comprehension of a text. Whilst continuing to develop their word recognition and decoding skills, it is also possible to isolate and target the development of comprehension skills separately. Many mainstream class teachers use a 'teacher read aloud' strategy where the teacher reads from an illustrated book and poses questions targeting a particular comprehension strategy (e.g., visualising, predicting, making connections, questioning, clarifying, determining importance, inferring, and synthesising.). *Building Bridges of Understanding* is one Irish resource that promotes this way of working. This strategy affords children opportunities to focus on

understanding and thinking about the text without having to read it for themselves. I was reminded of this strategy of isolating a particular skill for development, in this case comprehension, in order to improve children's overall reading skills when reviewing Adolphe's (2013) exercises for improving the musical imagination of performers, composers, and listeners in his book *The Mind's Ear*. I used two of the exercises with the boys in the Choirlab.

Exercise 1. Adolphe (2013) observes that, for most people, imagining visual images is easier than imagining sound. The first exercise I introduced was described as an exclusively visual imagination warm-up and required the children to imagine an image. As the prompts for the image unfold, the image becomes increasingly distant from a real-life scenario, a fact the children would not have anticipated at the start. Adolphe emphasises that no matter what the suggestions may be, the images seen come from each individual's imagination. Follow up questions prompted the children to remember and describe the detail of the scene they imagined. I was interested in gaining a window on children's experience of imagining in relation to these tasks. During the Choirlab session, I read the instructions aloud and asked the children to close their eyes and follow them. To discover how the children had engaged with the task and to gather their reflections upon the experience individually, I asked them to answer the questions in written form. The instructions or suggestions for the first exercise are presented in the table below.

Figure 4.16: Instruction for Warm-up Exercise No. 1: Imagining an Image (Adolphe, 2013)

Warm-up No. 1: Imagining an Image
● Close your eyes. ● Imagine a street, any street. ● In the middle of the street is a chair. ● On the chair is a car. ● On top of the car is a person. ● On the person's head is a musical instrument. ● Balanced on top of the instrument, is a piece of fruit. ● Take a good look at this vision. ● Zoom in. Zoom out. ● Try to see if from different angles. ● Open your eyes.

The children's answers revealed that they drew heavily upon their own experience and interests when imagining the scene, even though the scene was not a 'real life' scenario. For example, when asked to imagine a street, most of the boys (fourteen out of eighteen present) imagined a street with which they were familiar. Six provided extra detail: four boys named local roads in the neighbourhood whilst

O'Connell St. and Grafton St., two city streets familiar to the children, were cited separately by two other boys.

As part of the scene the boys were asked to imagine a chair, a car, a person, a musical instrument and a piece of fruit. In answering the questions posed, only seven boys said that the chair was familiar, most boys (fourteen of eighteen) described the chair they visualised as being ordinary – “an ordinary kitchen chair from my house”, “a school chair”, “a hospital chair”, “a normal wooden chair” - whilst four described it as a strange chair. Five of the boys indicated that they designed a new chair in their minds. Three of the five questions relating to the chair had no answers from five or six of the children. By comparison, the highest number of non-answers in relation to questions posed about the boys imagining of the car was three. Most children imagined a full-size car whilst five had imagined a toy car. When asked what colour or make of car it was, twelve children described both the colour and make, whilst seventeen had given the colour of the car. Colour appears to be an attribute easily imagined. The car makes cited appeared to reflect both the boys' interests and personal experience, ranging from sports cars such as Ferrari, Lamborghini and Hot Wheels to domestic models (Renault, Toyota, Volkswagen, Ford, Jeep) and one taxi. One child responded that he didn't know what colour or make the car was as he had imagined a cartoon/drawn version. All the children responded that the car that they had imagined remained as they had imagined, it didn't change.

Instruments imagined included traditional Irish instruments, (fiddle, accordion, bagpipe), orchestral instruments (violin, cello, harp, trumpet, saxophone), guitar and piano. Seven boys cited familiarity with the instrument as the reason that they thought the particular instrument was chosen. Six of them played the instrument they imagined whilst one had heard it a lot of times. Instruments played included guitar, fiddle, piano and saxophone. Five boys didn't know why they had imagined the instrument they did, whilst four explained that it was “the first thing I imagined”, “it just popped into my head”.

The questions asked about children's levels of awareness of their imagining provided some interesting insights on the extent to which children felt they could control their imagination. Twelve of the eighteen boys felt as though they were watching a film or an image that they did not control when imagining the scene giving comments such as “It felt like I was looking at a photo”, “I felt we were watching a movie”, “It felt like I could not control it”. Eight boys felt that the images changed by themselves (e.g., “they just popped up”, “they just came”, “it just appeared”) while six said that they felt themselves making decisions (e.g., “I was making the decisions”, “I chose”). It could be valuable to discover whether extended practice would alter children's ability to control an imagined scene or sound. The children's answers to the questions revealed that they were experienced at imaging visually

and that they drew upon their own experiences when doing so. If this was true in relation to their visual imaging, it seemed likely that this would also hold true in relation to their aural imaging.

Exercise 2. The second imaging activity required the children to imagine aurally. The prompts for this activity are shown in Figure 4.17.

Figure 4.17: Instructions for Warm-up Exercise 2: Imagining Sounds (Adolphe, 2013)

Warm-up No. 2: Imagining Sounds

- Close your eyes.
- During the following exercise, listen to the sounds mentioned.
- Whether or not you see the images does not matter.
- Imagine the sounds of a busy street.
- Hear the sound of a horse and carriage coming down the street.
- Inside the carriage, a woman is singing a song
- She is holding a dog, which is barking.
- The horse starts to neigh.
- A motorcycle speeds onto the scene with a blaring radio strapped to the back.
- A man opens a window above the street and screams something.
- Listen to all of this at once.
- Try to focus first on one sound, then another, but keep them all happening.
- Try to hear it from different places on the street.
- Try to hear what the man who opened the window heard inside his apartment.

The first reflection question for this exercise required the children to compare their experience of the two activities. As some boys were not present for the first activity there were thirteen answers. Ten of the thirteen boys who had completed both activities found imagining sounds more difficult than visual imaging. The remaining three boys thought that the difficulty level was about the same. When asked why they thought that the imagining sound version was more difficult, answers varied. Some boys referred to the fact that they were trying to imagine or as they put it ‘listen’ to more than one sound at a time. Comments included, for example “because it’s hard to listen to all the noises, hard to listen all at once” and “because there was more sounds at the same time”. One referred to the need to remember the detail of the sounds when imagining them, “you had to remember what they said”. Another found the scene unusual, which could perhaps also have impacted on his ability to remember detail, “It’s loud and disturbing not supernatural”. One referred to the effort required to imagine sounds, “it was harder because you had to concentrate hard to make the sounds”. Two referred to visual vs. aural imaging in their explanations, “because I find it harder to imagine hearing stuff than seeing” and “harder to picture this week than last”.

The third question asked whether it was easier to see images in your mind without sound than it is to hear sounds in your mind without images? The meaning of the wording of this question had to be teased out with the boys in advance of their answering to ensure that they understood what was being asked. An interesting, if not unexpected finding for this research was that no-one found it easier to hear sounds without images. Fifteen of the seventeen boys present wrote that it was easier to see the images without hearing the sounds. One child wrote that he found it easier to do both simultaneously, “I actually think it is easier to imagine both than them separate”, whilst another answered that it “depends on when I do it”. When asked whether they had seen the scene in addition to hearing it, sixteen of the boys answered that they had. One child who was absent for the first exercise wrote that he didn’t see it. Of the sixteen who visualised the scene in addition to hearing it, ten felt that the visual aspects of the scene were more vivid than the sounds, two found the visual less vivid than the sounds whilst four boys thought that the visual and sound aspects of the scene were even or “about the same”.

One of the questions relating to what the boys had imagined referred to what the woman in the scene was singing. I noticed that four of the responses drew on songs that were part of activities that we had completed in Choirlab. They included a warm up exercise, a mmrrd pattern from a song, the song ‘Circle Left’ and a reference to ‘Twinkle twinkle little star’ an imaging activity we had completed. One of the responses referenced a TV children’s programme, ‘The Simpsons’ theme song. One mentioned ‘Happy Birthday’, another a lullaby, ‘Rock-a-bye-baby’. Three of the boys thought that she was singing opera with one explaining the this was “because she was in a horse and carriage”. Three other answers appeared to have made similar connections. They described her singing “just very high notes”, “La la la la la” and “She was singing a do do do”. Five children appeared to have had difficulty imagining or ‘hearing’ what the lady sang. Three boys suggested that she was singing a ‘random song’, one ‘an indistinct folksong’ and one child wasn’t sure what she sang. When asked whether they had recognised the song the group was evenly split. Nine recognised it, nine had never heard it before. One boy volunteered that he had “made it up”. A prompt question that asked whether the song that the lady sang had lyrics pointed to how children perceive song words. Eight answered that there were words. This included the syllable of a Choirlab warm-up ‘Ve and oh’. “Kind of” was used to describe the use of sol-fa syllables in the mmrrd pattern. The child who had responded that she sang ‘an indistinct folk’ expected that this song would have words but he “couldn’t make them out”.

In addition to the question on the piece she sang, the children were asked what kind of voice they imagined the lady as having. The children’s answers referred to pitch, timbre, genre and accent.

When describing the man’s voice the children again included references to accent (“Manchester voice”, “English”, “rough city”) timbre (“hoarse”, “loud and kind of raspy like he was losing his

voice”), pitch (“low pitch”, “a deep voice”) but, this time, responses included more specific reference to the emotive quality of voice often linked with dynamics (e.g. “loud and rough”, “loud and grumpy”, “a loud angry voice”, “angry and not sorry”, “He had a strong, determined voice”, “a very loud and excited voice”).

Whether or not the children’s aurally imagined scenes had initially contained the detailed aspects of dynamics, timbre, and pitch referenced in the questions, reflecting upon their images with these questions in mind encouraged them to think about these aspects of sounds. The combination of using visual cues to prompt children’s imaging of sounds together with providing opportunities to draw attention to and reflect upon aspects of these aural images could be a useful strategy for supporting children’s ability to imagine sounds and feed into the development of their ability to imagine sound from music notation.

Other than the one boy who was absent for exercise one and “didn’t see them”, the descriptions of the people imagined in response to the prompts in the second exercise were, in general, more detailed than the person imagined in the first. This suggests that practice at imaging whether visual or aural could improve this ability.

A final observation on children’s responses relates to a question that asked, ‘What was on the radio?’. Eleven children imagined music playing, four imagined non-music related programmes (a football game, a talk show, a radio show and a Garda radio). One child wrote that he didn’t know what was on the radio whilst another answered that nothing was playing. Three children listed ‘music’ without specify the genre, five children named pop songs, one listed a classical piece and one a popular YouTube clip. These responses highlight the link between children’s imagined sounds and the sounds that they hear in their everyday lives.

4.6.6 Implications for the next phase of the research

Developing children’s aural imaging skills could be an area for exploration in co-constructing understanding of audiation with choral directors. Adolphe’s imagining exercises highlight the importance of having a store of aural musical vocabulary in memory that can be used and drawn upon flexibly in musical activity, including music reading.

In language reading, mental representations (images) of text are created and adjusted as a reader reads through a text. Visualising is one comprehension strategy that supports a reader’s understanding and meaning-making from language text. In music reading, children are required to image sound or ‘audiate’ (Gordon, 2003) from notation. In addition, it appears that children find it easier and appear to have more experience of imagining visually than aurally. Should learning to read music notation

include a focus on targeting and developing children's ability to image sound to support their notational audiation?

4.7 Investigating Children's Representations of Music

This section reports on children's engagement in representing music. Within the sessions children participated in activities designed to investigate their sense-making in relation to music notations. Activities included drawing, writing, singing, and moving in relation to music. The design of activities for the ChoirLab was influenced by other researchers' use of children's external representations of music to investigate musical thinking (Bamberger, 1982, 1991, 2005; Barrett, 1997, 2000, 2001, 2005; Davidson & Scripp, 1988, 1989; Davidson et al., 1988; Gromko, 1994; Pramling, 2009; Reybrouck et al., 2009; Upitis, 1992). A summary table (Table N.3) of the representation activities included is inserted at Appendix N.

Several considerations had arisen from the literature in relation to planning for representational activities for the ChoirLab. In line with Bruner's (1966) theory of representation, conceptions of children's musical development in relation to their notational strategies favour the idea that, rather than following a linear form of development where children abandon earlier strategies for more sophisticated approaches, development is characterised by children drawing upon an increasingly sophisticated range of strategies for their notations. Representation strategies are often selected in response to the nature of the task. Language can impact on children's invented notations, whether in terms of their having learned to read/write (Barrett 1997), or in relation to whether or not the music represented uses lyrics. I was aware that I needed to gather children's verbal descriptions and explanations of their invented notations to avoid the danger of misinterpretation so that invented notations could be a means of revealing what children know and how they think musically (Reybrouck et al, 2009; Barrett 1997). Barrett suggests that rather than facilitating a window on children's musical thinking, their invented notations could more accurately be described as reflections upon their thinking, a way of revealing understanding (Barrett, 2000).

I was interested in discovering how children would go about making sense of music in their notations, the musical dimensions of a phrase or song that they would perceive and represent, and the types of symbols they would use to do this. These children were all competent users of the written representation of language and were experienced in representing their ideas in single sequences of words written with letters. Music notation, particularly WSN, represents, not only individual sounds, it also represents pitch and rhythmic relationships between notes and groups of notes. Sloboda (2005) speaks of music notation as embodying aspects of the structure or meaning of the music. I was curious

to discover whether the children's invented notations would reveal that they perceive these types of relationships between sounds and, if so, what strategies they would use to illustrate them. Could one approach to enhancing and developing children's musical understanding be to afford them opportunities to explore the representation of music? Could representing music be an explorative approach to developing an understanding of the underpinning operational principles of music notation and encourage the seeking out of implicit meaning in WSN? These were questions that I wanted to explore for myself in a real-life context before gathering the opinions and reflections of experienced choral directors. Odam (1995) describes children's invented notations as being ontological in nature. I was interested in whether the children's invented notations would reflect strategies used in music representation systems that I had reviewed in the literature.

Many of the researchers who had used children's invented notations to investigate musical thinking in varying contexts had, in their typologies of invented notations, drawn attention to a type of notation that reflected gestural representation. Bamberger (1982) included 'Rhythmic Scribbles' and 'Played Drawings' in her typology. Davidson and Scripp (1998) drawing on Bruner (1966) included 'Enactive' representations or scribbles, Hargreaves (1996) refers to 'Action Equivalents' whilst Barrett's (1997) contained 'Representation of Gesture'. Bruner's (1966) representation theory took account of three main types of representational strategies in general use: enactive (or physical), iconic (pictorial) and symbolic (e.g., language). He later emphasised that development does not imply moving from one to the next in a linear progression but, rather, having the ability to draw from a range of representation strategies. In planning for children's use of representation strategies, I ensured that I included activities that required them to use gesture on the one hand and, I was alert to the possibility of their use of gestural representation during the sessions on the other.

Most representation activities were completed in the context of children's song singing. Children were invited to represent short phrases and complete songs both individually and in groups using gestural representation; objects such as coloured card, counters, symbol systems, numerals, sol-fa, and counters on a 5-line stave; and paper and pencil invented notations. Bent et al. (2001) identify two overarching purposes of notation. On the one hand it functions as an aid to memory and, on the other it enables the communication of music to others. The purpose of the activities in the ChoirLab was explained to the children as being either to help them to remember the music themselves or to communicate it to someone else, that is, 'to show how the music goes'. Influenced by Barret's observation on the 'contaminating influence of language' I included some representation activities of music that did not include lyrics. Separately, following Reybrouck et al., (2009) to avoid the risk of misinterpretation, I ensured that there were opportunities to gather children's descriptions and explanations of how their

invented notations operated. Some representational activities occurred in the context of activities which were designed for children to image sound or to read music notation or link with their experiences of music in everyday life and are described separately. The next section reports on findings from a selection of the representation activities.

4.7.1 *Representing two vocal exercises*

Music notations are described as functioning in two principal ways: to provide a visual analogue of musical sounds on the one hand or to give instructions on how to produce sounds on the other (Bent et al., 2001). Western Standard Notation is considered a hybrid of the two. This research argues that notation is more than instructions for performance but a means of thinking, communicating meaning and understanding. In representing the two vocal exercises, the children, with the exception of one child, chose to represent the sounds (visual analogues). In order to do so the children drew upon symbols and representation systems that were familiar to them. Symbols used included dots, dashes, lines, arrows, numerals, shapes, alphabet letters, syllables, and/or words (drawn from both Irish and English languages), punctuation marks, and rhythmic stick notation. These were sometimes accompanied by explanatory comments. One child included an enactive drawing in his representation. The first exercise the Choirlab carried out was based on a vocal warmup with which they were familiar (Figure 4.18).

Figure 4.18: *Vocal Exercise 1 Ve-Oh (N=23)*

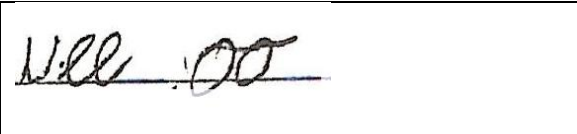
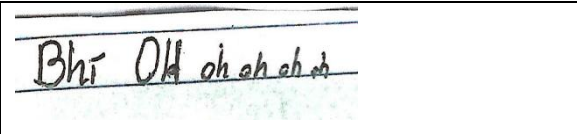
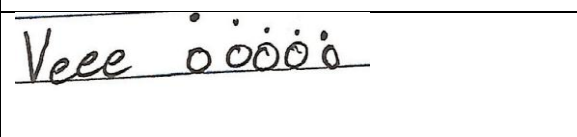
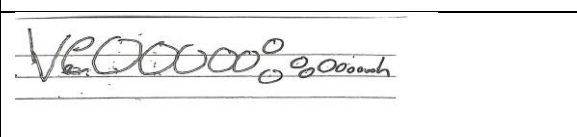
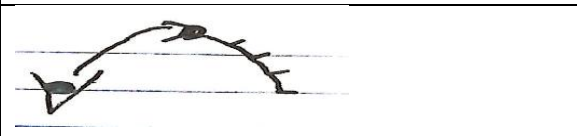
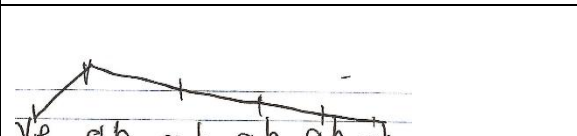
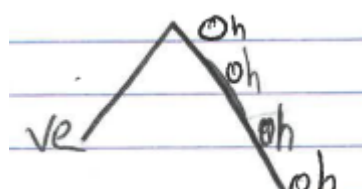
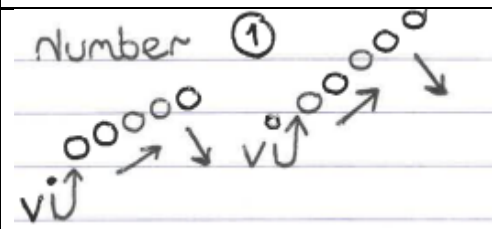
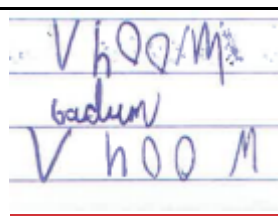
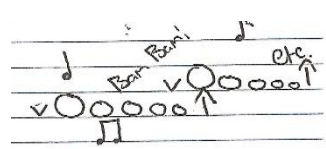


Children represented the sounds in this short vocal exercise in different ways suggesting that they perceived it differently, resonating with Bamberger's idea of 'different hearings'. Five children wrote comments to describe the vocal exercise verbally appearing to reflect upon it from a distance but the majority (eighteen) represented the sounds in the exercise using familiar letters or syllables. Of the children who described the exercise verbally, three referred to the pitch, one (Dan) advised on producing the sound ('open mouth big, ye-ho') whilst the other wrote 'Eiffel Tower', a personal association and perhaps an analogy referring the pitch contour of the exercise. Of the remaining eighteen children, nine represented sounds as grouped together into two main ideas, eight of whom used alphabet letters or syllables to represent the syllables (ve-oh) on which the sounds of the exercise

were sung. This grouping of sounds together echoes what Bamberger (1982), in relation to rhythm patterns, called figural representations.

Nine children represented the individual or discrete sounds in the exercise. Three children appeared to hear the pattern as both individual sounds unfolding in time and as sounds grouped together. They incorporated representing individual sounds into their figural groupings. Separately, two children represented the exercise in one global representation using letters to show the unfolding nature of the phrase rather than grouping or tracking individual sounds. Figure 4.19 provides samples of children's representations from each of the four categories found: figural groupings (Darren), discrete sounds (Kenneth), combined figural and discrete representations (Declan) and global representations (Luke).

Figure 4.19: Samples of Choirlab Representations of Ve-Oh Vocal Warmup

		
Darren – Figural grouping	Kenneth - Discrete sounds	
		
Declan - Combined figural & discrete	Luke - Global	
		
Dean – melodic contour & discrete sounds	Daire – melodic contour & discrete sounds	
 <u>octave</u> <u>higher</u> <u>next time</u>		
Harry – melodic contour & discrete sounds with verbal instruction		
	 	
Keith – discrete sounds, contour indicated	Ronan – enactive drawing	Brian – Discrete sounds

In his combined figural and discrete representation of the vocal exercise Declan uses dots over letters in neume-like fashion to indicate the pitch direction and relative pitch of the sounds on the 'o' vowels. In a similar way Brian uses the relative height or size of the letters with which he represents individual sounds to indicate the descending pitch of the sounds. Daire, who tracked each discrete sound in two ways – use of syllables and vertical lines – also represents pitch in two ways. His spatial positioning of

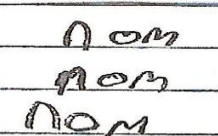
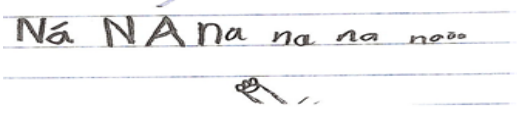
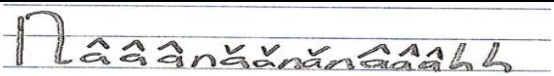
the short vertical lines on the page indicates the relative pitch of individual sounds whilst a line drawing connecting these pitches appears to reflect the overall melodic contour of the phrase. Harry appears to think similarly, but places syllables rather than vertical lines on the line drawing showing the melodic contour. Dean uses a curve to represent the overall melodic contour marking discrete descending sounds with dashes. Arrows are used to indicate pitch direction of the rising diagonal line of ‘o’s in Keith’s representation showing the discrete sounds. The children’s invented notations echo Karpinski’s (2007) description of two distinct dimensions of development in pitch awareness, melodic contour and relative pitch. Something of the ‘feel’ of the upward perfect fifth leap appears to be reflected in these representations. Also visible in Keith and Brian’s representations and in Harry’s (‘ocative higher next time’) and Enda’s (‘it gets higher and higher in pitch’) verbal comments is these children’s understanding or perception of the phrase as part of a repeated sequence. Ronan, the only child to include an enactive drawing included in his representation a reference to the researcher’s modulating two-note sequence ‘badum’. Brian replicates this with ‘Bam Bam’ and, drawing on familiar language systems adds ‘etc.’ to indicate the sequence continuing. Like Ronan and Keith, Brian positions two representations of the complete exercise phrase in relation to each other to indicate its sequential repetition at a higher pitch.

The second exercise also came from a vocal warmup (Figure 4.20). This was selected on the basis that it contained an upward octave leap and descending triad.

Figure 4.20: Vocal Exercise 2 – Na Na (N=17)

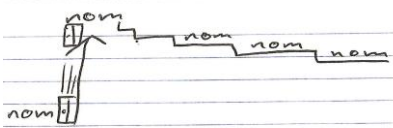
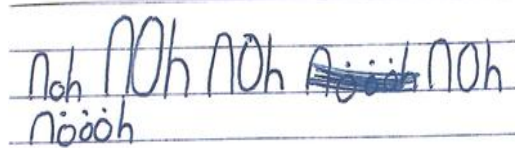
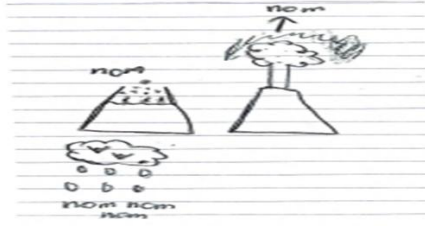
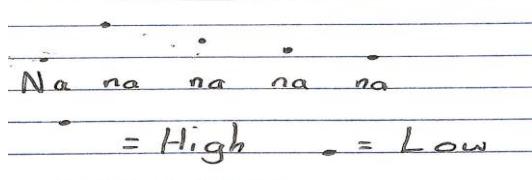
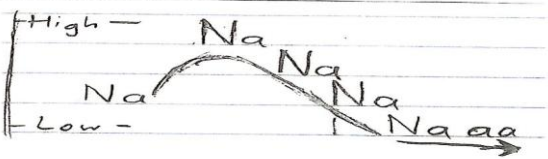


Perhaps influenced by the fact that the second vocal exercise used only one syllable, all the children represented the sounds within the vocal phrase (Figure 4.21). Fifteen of the seventeen invented notations were ‘discrete sounds’ representations tracking the individual sound events; one was a global representation (Luke) and one, a figural (Ronan). Two invented notations within the discrete sounds category did not match the number of sound events accurately. Kenneth who used syllables that incorporated an Irish language spelling (i.e., a ‘fada’ vowel accent on A) included an extra syllable whilst Vincent, who produced a pictorial representation, referenced rather than tracked accurately the number of events. Enda used a verbal description to indicate that the syllable positioned lowest on the page for the first sound of the exercise was to be used twice. Luke combined his syllables into one long letter string global representation whilst, Ronan, grouped his sounds in three groups in a figural representation.

 Vincent pictorial representation referencing discrete sounds (or 'lyrics')	 Enda 'Gets higher in the first three, then goes lower'
 Kenneth – discrete sounds representation incorporating manipulation of syllable height and representation of gesture	 Ronan – Figural representation
 Luke – global representation incorporating neume-like system for pitch	

Pitch was represented in similar ways to those used in representing vocal exercise 1. Five children represented relative pitch through spatial placement of individual syllables on line drawings which indicated the contour (e.g. Sean) illustrated in Figure 4.22. Dean, who used a pictorial representation also drew upon spatial positioning of syllables and symbols. Two children manipulated the letter height or size of syllables written in a linear sequence (see Gary, Figure 4.22).

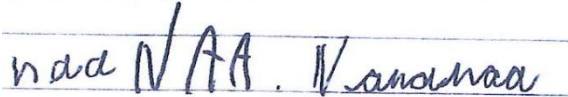
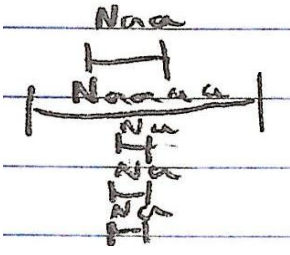
Figure 4.22: Children's Representations of Pitch in Vocal Exercise 2

	
Brian – line drawing and spatial placement of syllables	Sean – pictorial incorporating line drawing and spatial placement of syllables
	
Gary – manipulation of syllable height	Dean – pictorial incorporating pitch
	
Declan- use of external referencing system	Kieran – use of external referencing system

Two drew upon neume-like use of signs drawn over the letters or syllables. Luke (Figure 4.21) uses a v-shape and an inverted v-shape which appears to indicate lower and higher pitches whilst Declan (Figure 4.22) repeated his use of dots over letters. A new strategy that appeared in two of the representations for this vocal exercise (Figure 4.22) was the use of a key or legend as an external referencing system for pitch. Declan, explained his use of spatial placement of dots between two horizontal lines of the notebook above the letters with a legend indicating the vertical spatial relation between high and low sounds. Kieran used a vertical line to the left of his melodic contour line drawing to indicate relative pitch.

The musical dimensions of duration and dynamics or accent were also included by some children. The longer last note of the exercise was represented by five children. The device used to represent it was assigning a greater number of vowels to the n of the final syllable. See, for example Kieran or Gary in Figure 4.22. Separately, the second note of the exercise appears to have been heard and represented as accented by four children. Three indicated this through letter size (e.g., Kenneth) whilst Michael used vowels and line length (see Figure 4.23).

Figure 4.23: Children's Representations of Accent in Vocal Exercise 2

	
Kenneth	Michael

Four children represented more than one musical dimension but each of them represented pitch as one of the dimensions represented. Two, Dean and Sean, capture something of the expressive character of the exercise using pictorial representation.

4.7.2 Representation in the context of song singing

In separate tasks children were asked to represent phrases from two songs *Little Liza Jane* and *There's Fire Down Below* initially through gestural representation and then using pencil and paper invented notations.

Representing and imaging *Little Liza Jane* motifs using gesture. The children were asked to substitute a gestural representation for the answer/response motif 'Little Liza Jane' which occurs at the end of each phrase of the song. Whilst the words remain the same, two different notes patterns are used, one to end a questioning phrase, the other to end an answering phrase. Individual children were then invited to present their gesture to the group whilst singing internally to prompt the group to aurally image and sing the phrase from the gestural representation. Only nine of the twenty-four boys invented two different gestures, (i.e., one for each of the two different response note patterns). The influence of popular culture, children's previous knowledge and differences in the musical aspects that children choose to represent are evident in the extract from the first Choirlab session below.

Sean (a pianist) used an arm movement gesture (borrowed from *the Macarana* movements) for the first *Isms Liza Jane* response. He gestured and the children sang 'Little Liza Jane' to *Isms* in response. Harry (a pianist) used four separate hand gestures (resembling the pitch handsign for *mi*) moving downwards in sync with the rhythm of the phrase to represent the second answering response (*mmrd*). Whilst Harry gestured, another child, Dean, watched and shook his head (appearing somewhat annoyed). 'Why is he going down? The first two are the same

... When the children substituted gestures for the responses in the song they produced 'action equivalents' for the phrases. Dean, the experienced choral singer, who had disagreed with how Harry represented mmrd recognised that this wasn't the way that he would have represented the phrase. He appeared to have drawn on previous training and focused upon the pitch. Yet, Harry accurately represented what it was that he had heard. Children have different capacities for discrimination (Bamberger's 'different hearings'). Dean's representation of the phrase was informed by his capacity to finely differentiate the melody and rhythm. This links with Davidson & Scripp (1989) when they talked about how people hear notes as being connected in different ways or how people hear music. I noticed one other child's (Dan) gestural representation which appeared to capture the forward momentum of the whole first line. (He started with a circular 'rolaí, polai' movement from 'I' at the beginning of the phrase and pointed to the boy beside him on 'know'. They had been facing each other as they sang (social interaction aspect). Dan's representation was more holistic, capturing the 'feel' of the phrase (again, resonating with Dalcroze). Dan's circular and pointing motion showed that he had a sense of something else in the music, he seemed to be tracking its motivation or forward momentum. In the same way that children's graphic notations can give impressions of the music, rather than tracking or representing atomistic features like individual pitches and rhythms, he sensed the accent, that the music has direction. His gestures seemed to capture two discernible musical events in a macro-representation. In addition, he was in role acting out the confrontation character of the words of the opening line. (Choirlab Session 1)

4.7.3 *Distinguishing between 3 endings in representations, gestural and paper/pencil*

In this activity children were asked to invent a gesture to help them remember the last phrase of the song 'There's fire down below', (Figure 4.24) and to record this ending in their notebooks to help them remember it.

Figure 4.24: Sea Shanty *There's fire Down Below*



Next, I explained that I was going to change the ending and sing a different ending. I asked if they could invent a gesture to help them to remember the second ending and represent it in their notebooks. Finally, I sang a third ending and asked them to represent this gesturally and on paper.

When the boys had sung and created gestural and invented pencil and paper notations for the three different endings I set up a challenge. Individuals were asked to select one of the endings, to sing it internally whilst showing the gesture to the group. The aim of this activity was to discover whether the children would be able to recognise and image an ending from a gestural representation. For each child who shared his gestural representation, I sang the penultimate line and asked the ‘listeners’ or observers to look at the boy’s gesture and indicate whether or not they could hear one of the endings inside their heads. The first volunteer’s gesture indicates the strength of the influence that the lyrics or narrative of the song had on some children’s representations.

Tony cupped his hands around his mouth and mouthed “there’s fire down below”. It was not possible from this to distinguish which ending he had in mind, but this didn’t appear to strike him – he obviously knew which ending he was singing/imagining.’ (ChoirLab Reflective Journal extract, Session 6)

The significance of the lyrics was evident in Tony’s gestural representation. He appeared to be almost ‘in role’ as one of the sailors on board the boat warning the other crew that there was a fire below deck. Tony’s invented notations used icons that reflected his gestural representations, the emotional or expressive character he perceived in each ending and on his experience of “ships in the movies where people put their hands over their mouths to shout” (ChoirLab Debrief on *Fire down below*).

Other children’s gestural representations appeared to focus more on representing the sounds of the phrase. Although focused upon the sounds, Daire also took account of representing each word of the lyrics in this representation of the third phrase.

Daire gestured using a two-handed mirror image except for the word ‘fire’. His left hand stayed in position for the word fire, whilst his right hand gestured the two different sounds/syllables. Keith recognised it instantly saying, “He did two for fire”, the movement pattern had indicated two sounds on the word fire. Donal said that he knew it “because it was going down in steps”. Tony thought the same as both the other boys, citing the “different symbols Daire gave, and getting deeper” I asked Daire why his hands had done different

things at one point he explained that his left hand showed the word fire whilst his right hand “did the sounds going down”. (Choirlab Reflective Journal extract, Session 6)

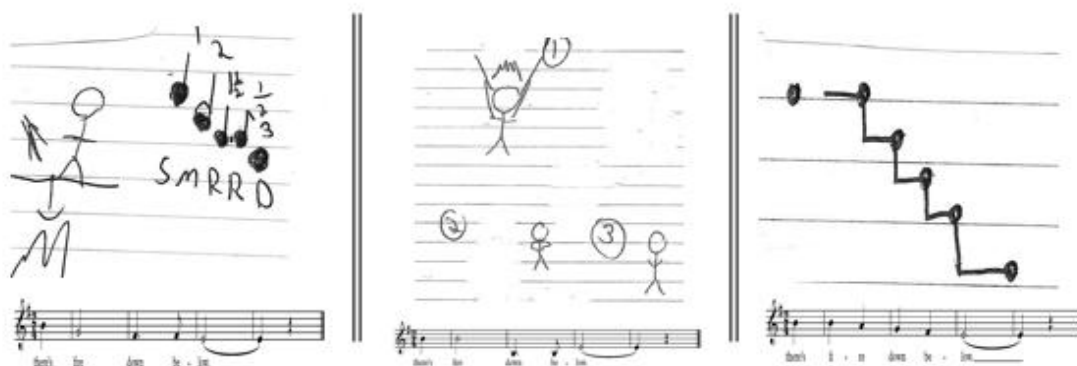
Dean appeared to track the number of sound events (which also matched number of words in the lyrics) together with the pitch of the second ending phrase.

Dean’s gesture was instantly recognisable as the second ending. His was also a two-handed mirror image. ‘There’s fire’ was outspread and gestured high and out above his head ‘down be-’ the two hands met in a closed upside-down V shape at/below waist level ‘-low’ – was at shoulder level. Dean’s gesture reflected the pitch of the melody. The word ‘down’ in this version of the ending happened to be the lowest note of the phrase, approached by a downward octave leap. Dean’s representation reflected this. (Choirlab Reflective Journal extract, Session 6)

Interestingly, when some boys were giving their answer as to which ending they thought had been performed in gesture, they looked at their own drawn representations to help them to distinguish between the endings. “Does looking at your pages help you to remember the sounds?” I asked. The consensus was that it did. (Choirlab Reflective Journal extract, Session 6)

When representing the endings on paper, thirteen of the twenty-five participants used the same representation strategy for each ending. Representations strategies were evenly divided between enactive and iconic representations. Following their representation of the three endings using invented notations, I debriefed the children on how their notations operated. Some valuable insights in relation to children’s musical thinking through the act of notating emerged.

Figure 4.25: Dean’s Invented Notations Fire Down Below Endings: Ending 1; Ending 2; Ending 3



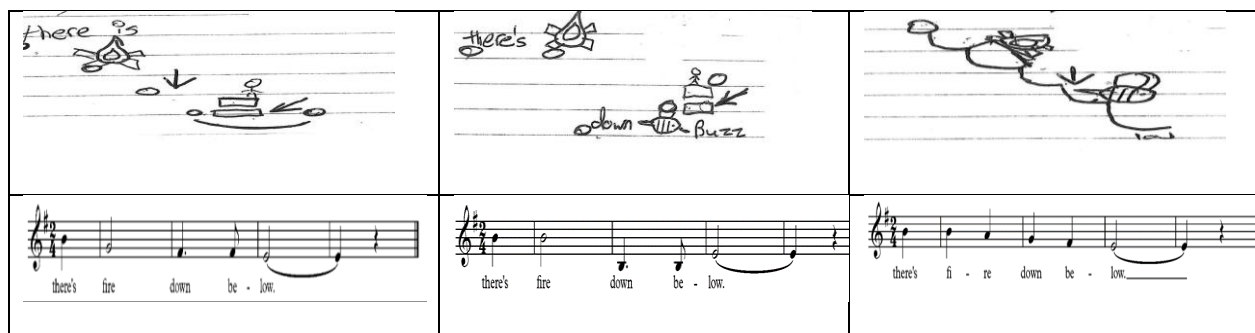
Children's varying levels of musical understanding were evident in their choice of strategy and the number of musical dimensions represented. The role of enactive representation in relation to memory when encoding and retrieving musical information was highlighted. The holistic nature of children's perception was highlighted in relation to the song lyrics. Extracts from debrief conversations with individual children are presented below.

Ending 1: Dean's representation of the first ending incorporated many aspects of the music through the use of different strategies. He used a stick figure drawn standing on a line (i.e., deck) with an arrow below the line pointing to "the fire down below for the words". Next to the picture he drew a descending line of rhythm: crotchet, crotchet changed to a minim, dotted crotchet + quaver, ending with an undefined dot. Any uncertainty about the duration of the notes is laid to rest by his addition of digits above each note indicating its duration (1, 2, 1½, ½, 3). Below the rhythm he has notated the sol-fa names 'smrrd'. Whilst the song is in a minor key and the sol-fa names should properly be 'mdttl', Dean has accurately captured the function and degrees of each note in the phrase in a descending line from the fifth degree of the scale to the tonic.

Ending 2: I recognized Dean's invented notation for the second ending as a two-dimensional pen and paper version (using stick figure illustrations) of the gestural representation he had used to represent this ending during the activity. He used numbers to indicate the order of the movements. The first gesture incorporated a picture of a fire above the stick figure's head. The crossed-out stick figures he explained as 'different ideas' for how to capture/show the movements for movement two, the figure that remained was the correct version of the crossed out figures. Was the only reason that this was so closely tied to the gesture a result of my asking the boys to invent movements to match the endings?

Ending 3: Dean's third ending used a descending stairs pattern with a dot on the corner of each step. The first dot whilst at the same height level as the first note on the stairs, was separate, unconnected to the descending line. Crossed out beside his notation was the beginning of a stick figure, as if he had planned to use the same stick-figure gesture strategy that he had used for the second ending. Above the notation, another attempt to represent the third ending was crossed out. Like the final version, it began with an unconnected dot followed by a continuous, wavy, descending line. (Choirlab debrief of Fire down Below Endings).

Figure 4.26: Harry's Iconic Fire Down Below endings for Endings 1, 2 and 3



Harry's comments highlight the problem-solving nature of his thinking through notation.

Ending 1: Harry commented that "I couldn't realize how I was meant to show whether it was slow or fast and that took me a long time". The 'tie' shaped curve between two circles he explained as "I drew this because it's the same note and the word [below] is stretched". He appears to have perceived the second syllable of below as 'stretched', longer in duration and possibly as fading in dynamic and found a way to represent this.

Ending 2: It was when talking about the notation for the second ending that Harry explained that the empty "circles are the notes". These notes appear to track the pitch contour whilst words (there's, 'down', 'Buzz') and pictures (fire, bee, stick figure above the hold of a boat) augment the notation. When I asked about his use of pictures he said that the pictures were to help him to remember the words.

Ending 3: Harry needed two attempts at notating the third ending before he was happy with his efforts. He explained the crossed-out version by saying "I realized I'd gotten the notes wrong". He appears to have been thinking or problem solving through the act of representing or notating the phrase.

In his final version he pointed out the picture of a fire sitting on the line linking two of the downward curves was to show two sounds across the two. He appeared to have puzzled a lot over how to capture this ending. In his opinion the final version was "a lot more accurate" attributing his success to his use of the 'linking line' "because it was a line that showed me how to do it". He continued his use of pictures (fire and bee) together with the word 'low' on the final curve and an empty circle on the first for 'there's'. (ChoirLab Debrief Fire Down Below Ending)

Sean’s explanation pointed to a holistic hearing of the musical sounds of the phrase combined with the lyrics as one meaningful unit (Figure 4.27). Initially, Sean remembered the second and third endings only but later remembered the first.

Ending 1: “I thought the other endings would be different words so I visualised the words but not the sounds.”

Ending 2: The first arrow stands for ‘there’s’, the downward arrow is for the “lowest point” and “half a beat later” the two fire icons mean ‘below’ sung “a little bit higher”.

Two other children referred to being surprised that the words for each ending were identical.

Figure 4.27: Sean’s Iconic Fire Down Below endings

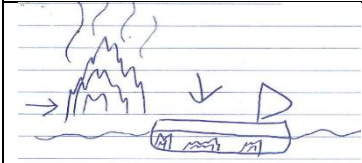
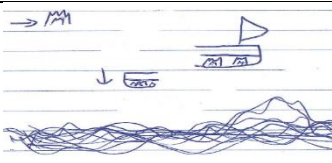
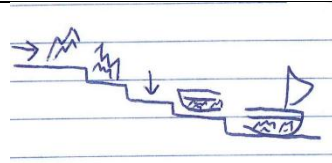
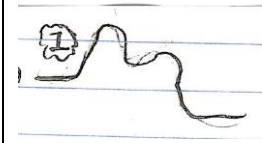
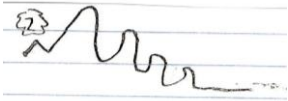
First Ending	Second Ending	Third Ending
		
		

Figure 4.28: Michael’s Enactive Fire Down Below Endings

Michael (Figure 4.28) didn’t remember the tune of the first or second ending but did remember the third.

Ending 3: He sang the third ending phrase accurately whilst following his enactive notation. His rhythmic finger movements as he traced the notation seemed to show the forward momentum of the phrase, including the longer line for the elongated second syllable of 'below'. I asked Michael about his use of wavy lines. "I don't know, it helps me a lot. I don't know why it helps me to do that stuff cause it gives me the tune, I don't really know why."

Ending 2: Michael sang the second ending from his notation less convincingly (following my singing of ending 2).

Ending 1: Singing from the notation for the first ending was not successful even though I had sung it for him. Michael couldn't remember how it went. I commented that a lot of boys had found the first ending the most difficult to remember. Michael agreed saying that "Yeah, the first one's the hardest 'cause if you make up two new ones, it's normally the new ones that you have to try to remember". (ChoirLab Debrief Fire Down Below)

This was not the first time that a link between the physical nature of enactive representation and children's ability to remember how the music went had arisen. The manner in which the phrases are encoded in memory appears to affect their retrieval. It would appear that the first ending was memorised as part of the song whilst the other two were memorised as two separate units. Children's expressed surprise at the lyrics remaining unchanged suggests that, for these children, the song lyrics are considered part of the music. The strong influence of lyrics on representations was most evident in the group representations of advertisements.

4.7.4 *Representing advertisements from radio and television*

In this activity I drew upon common listening repertoire that the children had identified in the House Plan activity, radio and television advertisements. In groups, children were set the task of producing a representation of two given advertisements. I asked that the children did not write the words of the advert but to be as helpful as possible to anyone trying to recognise it from the page. Whilst the children did not write the lyrics, all of the representations used icons that either directly represented the words or represented the word concept in an image as illustrated in Figure 4.29. When the groups had finished I displayed each group's adverts to the others. The boys appeared to recognise each other adverts for the most part.

In the next session I checked whether these representations would prompt children to aurally image the jingle for the advertisements. Would the children 'read' the invented notations? The boys were asked to close their eyes as each notation was presented on the whiteboard, look at the image and write down

their guess before I would count to three and ask them to sing the advert. Nine of the children present had been involved in making the representations the previous week. They were asked to abstain from guessing their own representation and to indicate this on their individual pages. Eight boys had not been present on the day on which the representations were made.

The most accurately recognised advert representation was that for ‘Quote Devil’s always got one hell of a quote’. The children sang the jingle with varying levels of accuracy. Fourteen of the seventeen children identified it correctly on their page, the three who didn’t were in the group that drew this representation. *Senator Windows* was the next most accurately identified on paper, eight children identified it. Those who sang it, sang the correct jingle. The two *Flash* adverts were correctly identified by seven and five children respectively.

This different version of *Flash* [Figure 4.29, Flash 2] caused difficulties ... I asked if any of the boys were hearing it inside their heads? Were they thinking it? The consensus was no. I was interested in finding out whether the pictures were prompting sounds or words which prompted the jingles (Choirlab Session 8)

Interestingly both notations of the Flash advertisement used the same number of symbols/events. Both comprised a lightning flash followed by a person screaming - not as well drawn in the second version - a picture to represent cleaning, an upward pointing arrow for the lyric ‘up’, with the word ‘the’ represented by a horizontal line. Both had an image to represent ‘impossible’, a lock in the first and a chasm impossible to leap, in the second.

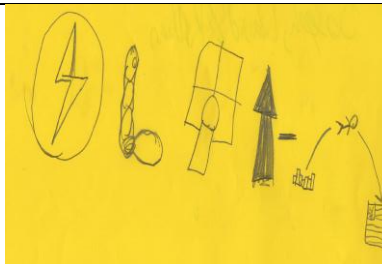
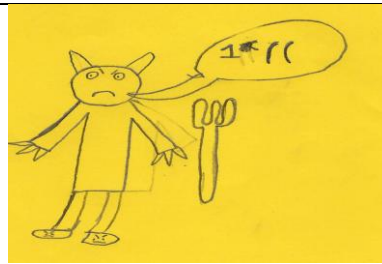
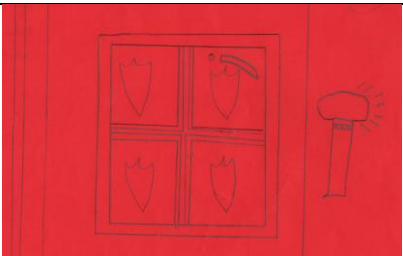
This particular notation symbol [chasm] appears more helpful as a cue for memory for the creators of the notation rather than an aid to a decoder. (Choirlab Session 8)

A similar issue arose in relation to the representation of the Noyeks Newmans advertisement. An icon to illustrate ‘annoying’ was used to represent the ‘noy’ sound.

The encoding used by the sixth-class group didn’t make sense to the others. (Choirlab Session 8)

This mismatch between the inventors’ and readers’ understanding of the representations points to the importance of meaning-making in notating. Illustrations of kitchen utensils and furnishings appeared to prompt aural images for similar types of shops as illustrated below. Three children identified it correctly on paper.

Figure 4.29: Group Representations of Advertisements from Radio/Television

		
Flash 1	Flash 2	Quote Devil
		
Senator Windows	Noyeks Newmans	Energia

The pictures of a kitchen, decking etc. appeared to prompt the two who guessed most accurately. When guessing, one boy sang [incorrect words] ‘*Harvey Norman, kitchens, floors decks and doors*’ to the correct tune of the advert. Only three others attempted to guess – all sang ‘*Go Harvey Go*’, prompted by the pictures of the kitchen etc. Only one child correctly guessed and sang the advert. The kitchen utensils and the deck prompted him.’ (Choirlab Session 8)

The use of a lightning flash in the notation for ‘*Switch to Energia.ie*’ also caused confusion. It appeared that the lightning symbol immediately sparked an aural image of the ‘*Flash*’ advert and that some boys didn’t think further into the notation as a result. The lightning flash prompted another child to make a link with electricity and sing ‘*Prepaid power.ie*’. Another child volunteered that he thought that it was ‘the Energia one’. He couldn’t remember the tune but remembered the words. The child who sang it correctly explained that the ‘switch card’ helped him. The group which had created this representation, referenced children’s popular culture in using an illustration of a ‘switch’ card from an ‘uno’ card game to symbolise the word switch in the lyrics of the *Energia* advert. Only three of the children identified this advert correctly on their pages.

4.7.5 *Implications for the next phase of the research*

Across a number of representation activities, aspects of children's musical thinking were revealed through their gestural and notated representations raising a number of questions in my mind for discussion with expert practitioners.

- Could one approach to enhancing and developing children's musical understanding be to afford them opportunities to explore the representation of music? Could representation be used to highlight the multiple layers of understanding of musical phrases?
- Could representing music develop understanding of the underpinning operational principles of music notation and encourage the seeking out of implicit meaning in WSN?
- Children represented a range of musical aspects and drew on enactive, iconic, and symbolic strategies in producing holistic representations. Do we need to consider presenting notated music to children in holistic units of meaning rather than as atomised musical dimensions?
- Children represented the sounds heard in patterns in different ways. Categories included discrete, figural, combined discrete & figural, and global groupings of sounds. Incorporated into their representations of sounds some children included musical dimensions. The most frequently represented dimension was pitch. Where the phrase had lyrics, children often represented the expressive meaning of the lyrics. Could an emphasis on the expressive aspects of representation feed into a more fluent and expressive reading from notation?
- Does the influence of gestural representation on visual representations and on children's memory of the music suggest that embodied cognition should be considered in any theory of music reading?

4.8 Conclusion and Key Findings

The purpose of the Choirlab was to work intensively and reflexively with a group of children in a choral 'lab' context to investigate the following four areas from the research literature in relation to the research objectives:

1. concepts and ideas from language reading (e.g., 'sight words', decoding, 'fluency') to enhance music reading;
2. the relevance of children's experiences of music in their everyday lives to their learning to read notations;
3. strategies and approaches to developing children's ability to image sounds; and
4. children's representations of music in relation to revealing and developing their musical understanding.

Key findings from each of these strands of investigation are presented below.

1. An important finding from investigating the language reading concept of 'automatic word recognition' for music was that memory is key to the operation of pattern recognition in music reading. Children recognised patterns or note groupings analogous to musical 'sight words' that were taught in Choirlab when reading known songs from notation, some with more accuracy than others. However, being able to translate this ability to recognising these patterns in unknown

songs proved more challenging. Recognition of sight words in language reading is facilitated by automatic decoding skill developed through an intense focus in early language reading on memorising relationships between sounds and alphabet letters during phonics instruction. Whilst the concept of orthographic mapping for music is more complex, developing children's decoding skills (and through this pattern recognition) has possibilities for music reading. The timeframe available to the ChoirLab, ten one-hour sessions, was not sufficient to develop musical decoding skills (for mrd patterns) to automaticity. However, there is potential for children to associate musical sounds with melodic (and rhythmic) solmization to automaticity if the same intensity of focus given to letter/sound relationships was applied to musical 'phonemic awareness' over an extended time period of one or two years as is the case for language reading.

2. Children have a store of aural music vocabulary, and its source can be surprising. Deliberate connections need to be made between children's store of aural music vocabulary from life experience to decoding notation. A strong aural/oral language foundation is critical to learning to read words. Whilst decoding skill facilitates retrieval of the sound of a word, if the word is part of a child's vocabulary, its sound and meaning stored in memory can be activated by sight of the word in print. Similarly, the type of musical vocabulary that contemporary children have stored in memory from media and popular culture provides a potential store of aural musical vocabulary to facilitate extended practice at solmisation (using Sol-fa) within and outside rehearsal. If deliberately connected, this can make a contribution to development of an aural foundation of patterns that can be recognised in notation.
3. Key findings from investigating ways of developing the ability to hear sounds internally were that
 - a) it is more challenging for children to imagine sounds than visual images, possibly because they have less opportunity to imagine aurally in daily life.
 - b) children drew heavily on their personal experiences and memories when imagining sounds, highlighting the importance of children's sound worlds for audiating and of having an aural foundation of musical vocabulary in memory for audiation.
 - c) children call upon their stylistic musical knowledge and memory when audiating during improvising.
4. Opportunities for multimodal representation of musical sounds can both reveal and develop nuanced perception and understandings of music in addition to supporting children's

understanding of the operating principles of Western Standard Notation. In early language literacy, children's 'invented spellings' reveal their development in learning to map the sounds of a language to the spelling patterns that represent them. Similarly, children's invented notations reveal the aspects of music that children are attending to. Key findings from representing music were that children's representations of musical phrases demonstrated differences between individuals in how sounds were perceived and understood. Musical dimensions represented through enactive, iconic, and symbolic strategies showed the influence of lyrics, previous musical knowledge (e.g., Sol-fa, rhythm) and of the expressive character of musical phrases on representations. Writing is understood to support reading in language reading. Individual children represented different musical dimensions of a phrase when encouraged to use different representational modes. Enactive or physical representations influenced children's invented notations and the ease with which they retrieved patterns from memory. Careful consideration needs to be given to the role of lyrics in representation as they can be both an enabling and interrupting mechanism when reading from WSN. In an unfamiliar task children tend to veer towards processes with which they are already familiar and can easily operate, such as lyrics. However, lyrics, especially if they have a structural role in the song, can be an aid to recall.

The ChoirLab aspect of the research was important in allowing me to think about concepts from the literature in relation to music in advance of interviews with choral conductors. In addition, it allowed me to gather artifacts of children's thinking to use to illustrate questions. Questions that arose for me in relation to each of the four streams of investigation fed into the areas explored with choral conductors. The next chapter outlines findings from data gathering with expert practitioner choral conductors and analysis.

5 Phase Two: Findings from Interviews with Choral Conductors

5.1 Introduction

This research seeks to develop new ways of thinking about children's development of music reading fluency. It investigates, with expert practitioner choral conductors, the usefulness of theory from language reading fluency in expanding thinking on music reading and explores expert choral conductors' implicit theories of children's music reading. This chapter presents findings from analysis of a set of three semi-structured interviews conducted with each of the 16 choral conductor research participants in which implications of considering music reading in light of the concept of fluency in language reading were investigated.

Data was analysed from three perspectives summarised in Table 5.1: conductors' thinking on (i) aural fluency for music reading (ii) decoding and automatic word recognition, (iii) the concept of fluency from language reading theory to include a 'real world' music reading context illustrated in Table 5.1.

Table 5.1: Data Analysis Framework

	Aural Fluency for Music Reading	Decoding and Automatic Word Recognition	Fluency from Language Reading Theory
Analysis of Conductors'	consideration of..	reflections and discussion of...	responses and observations
Interview 1	- Personal experiences of auditioning - Singers' auditioning abilities or experiences - Approaches to developing singers' tonal understanding	- Conductors' routine choral practices - Reflection on personal learning of music reading together with teaching of music reading in primary, secondary or third level, as appropriate	- Markers for a fluent music reader - Conductors' routine choral practice
Interview 2	Strategies for developing phonemic awareness through responses to photos depicting language reading	- Early language literacy activities for developing decoding skills through responses to photo prompts - Discussion of the concept of a sight word from language reading literature	- Comparison with a sample oral language reading fluency rating scale* 'Assisted Reading' strategies** used to develop reading fluency in language reading
Interview 3	Adolphe's Imagining Exercises	Children's artefacts from Choirlab	Knowledge sources for Comprehension
'Real World' Music Reading Context			
Interview 2	Approaches to supporting auditioning in reading Finzi's 'Lullaby, Oh Lullaby'	Consideration of how to support singers' sight reading of Finzi's 'Lullaby, Oh Lullaby'	'Real World' fluency in reading Finzi's 'Lullaby, Oh Lullaby'

* The National Association for Educational Progress (NAEP) Oral Reading Fluency Scale (U.S. Dept. of Education, 2002)

** Assisted Reading Strategies: Teacher-assisted or Paired reading, Choral Reading, Buddy Reading, and Audio-assisted Reading.

Analysis is presented in relation to the three research questions.

Research Question 1: To what extent is sheet music or notation of any kind used in choral practice within selected categories of children's choirs in Ireland?

Research Question 2: Do choral conductors of children's choirs consider reading music as having the potential to develop children's musical thinking?

Research Question 3: Do choral conductors perceive musical understanding as enabling fluent music reading?

The first section below, addresses research question one. In describing the role of sheet music in Irish children's choirs it provides a context for the findings presented under questions two and three. These are presented under the following headings

- Aural fluency (as foundational for music reading)
- Decoding fluency (through multimodal representation),
- Automatic recognition and grouping processes
- Making meaning with use of musical vocabulary
- Reading fluency in choral contexts
- The role of expression
- Relevance of music in everyday life for music reading
- Understanding operating principles of WSN

5.2 Research Question 1: To what extent is sheet music or notation of any kind used in choral practice within selected categories of children's choirs in Ireland?

Sheet music was regularly used in three of the four choral contexts, Cathedral (CT), Conservatoire (CN) and Community (CM) choirs. When and how notation was used differed within and across choir categories.

Singing from WSN or sheet music is standard practice in the Cathedral Choir tradition. Choristers typically each have their own copy of music scores from which they sing during both rehearsal and performance. Two CT conductors articulated the impossibility of operating in a cathedral setting, given the constraints within which they worked without using sheet music.

Conservatoire choir singers use sheet music in the rehearsal learning process only and, usually, perform from memory. Two broad reasons were given for this; the first was logistical, young children's ability to hold sheet music and focus during performance. The second related to singers

having better musical communication with conductor and audience without sheet music and to enhancing singers' focus on listening during performance. Use of the score to internalise music during rehearsal appeared to be an important factor in the learning process. Being able to put the score aside indicated that the music was known. Singers were required to practise privately outside of rehearsal time to facilitate singing from memory in three settings.

Similarly, community choir conductors used sheet music in rehearsal with singers to support learning of repertoire. It was generally not used in performance although two conductors (CM2, CM4) used sheet music at times when singers had a heavy repertoire load or if necessary to support singers' confidence or aural memory. CM3 described a continuum of sheet music use across her choirs from aural learning of repertoire and development of literacy skills initially to use of sheet notation. CM4 noted her that older singers had occasional experience with 20th century graphic scores.

Sheet music was never used in PS choirs during performances. It was not used on a regular basis during rehearsal. Three PS conductors reported singers occasionally using sheet music during rehearsal to support the teaching of part-songs. Lyric sheets were occasionally distributed in rehearsal to support learning of lyrics. A separate way in which one PS conductor (PS3) used notated music with singers was through the projection and display of a single score for all singers to follow as they learned aurally.

In summary, sheet music was consistently used in three categories of choirs (CT, CN, CM). In cathedral contexts it was used in both rehearsal and performance. In conservatoire and community choirs (and on occasions when used in primary school choirs) it was used in rehearsal to support the learning process. Within and across categories practices varied in how singers used notation.

5.2.1 *How notation was used.*

The ways in which notation was used ranged from sight reading to learn, to learning repertoire aurally (with/without use of song lyrics), with some mixing of approaches within settings as Table 5.2 illustrates. Significantly, of the 16 choral contexts, there were only four in which singers routinely sight read to learn repertoire, three cathedral choirs (CT1, CT2, CT3) and one conservatoire choir (CN3).

Conductors in four other settings occasionally encouraged singers to sight read to learn (CN4, CM1, CM3, CM4) depending upon the challenge level of repertoire and the reading skill level of singers. Four conductors taught repertoire aurally whilst singers followed the notes in notation (CT4, CN2, CM2, CM4). The four primary school choirs learned repertoire aurally as, occasionally, did others such as CM3's singers to maintain singers' aural memory skills.

Table 5.2: Overview of the Use of Sheet Music or Other Notation in Learning Repertoire

Sight read to learn repertoire routinely	Sight read to learn occasionally	Sight read simplified notation to learn	Aural learning whilst following notation	Aural learning initially, then read notation	Aural learning of repertoire *(+ lyrics)
CT1	CN4	CN1	CT4	CN1	PS1
CT2	CM1	CN3	CN2	CM1	PS2+
CT3	CM3	CN4	CM2	CN4	PS3+
CN3	CM4	CM1	CM1	CM3	PS4+
		CM2	CM4		CM3
		CM4	(PS3)		

An approach to notation that was unique to the PS conductor category involved a conductor annotating displayed lyrics of a song. Effectively, for the three PS conductors who used this strategy (PS2, PS3, PS4), the lyrics functioned as a score and, as the conductors tended to annotate the lyrics whilst teaching, they operated as a ‘living’ score. This practice appeared instinctive to the three PS conductors who used it, though they didn’t consider it a form of ‘notation’. Annotations included graphic symbols such as lines to indicate pitch direction, elongation of vowels to indicate duration and dynamic markings. PS4 describing using children’s aural familiarity with Sol-fa to annotate lyrics using Sol-fa to support accuracy and intonation. Whilst used in rehearsal to support learning and memorising, annotated lyrics were not used in performance. PS1 did not refer to using song lyrics in this way. Instead, she appeared to use a combination of gestural representational strategies to support her singers, some of which were common to other conductors. PS3 occasionally displayed a published score in WSN for singers to follow as they learned.

Six conductors described occasionally simplifying or adapting a score by extracting vocal lines as a support to singers’ reading and learning of repertoire (CN1, CN3, CN4, CM1, CM2, and CM4). Presenting a score in its most ‘readable’ form could simplify not only navigation of lyric text but support singers’ understanding of how vocal parts were related to each other and represented in notation. This practice was routine in CN1’s setting.

5.2.2 Supports for singers’ use of notation

Pitch relation systems: 11 conductors drew upon pitch-relation systems to support singers’ use of sheet music. Ten conductors (CT2, CN1, CN2, CN3, CN4, CM1, CM3, PS1, PS2, PS4) used Relative Sol-fa solmization though in different ways, whilst one (CT3) used a number-based pitch system.

Conductors' own musical backgrounds impacted significantly on their familiarity with and use of sol-fa with singers. Although sol-fa was not used in relation to sheet music by PS conductors, PS1, PS2 and PS4 use Sol-fa with their choirs to support aural learning and intonation.

Use of Accompaniment: In contexts where singers sight read to learn or follow notation whilst learning, singers were often, but not always, supported by use of accompaniment to provide harmonic context for reading and learning vocal lines. Instrumental supported reading included playing

- the written accompaniment (CT1, CN1, CM2, CM4)
- singers' vocal lines (CT2, CT4)
- surrounding vocal lines (CT2, CT4)
- a chordal/harmonic support (CT3, CT4, CN2, CN3, CM1)
- a tonic or dominant pedal (CN4, CM1)
- occasional anchor notes (CM3)

Use of Gestural Representation: Three conductors (CT2, CM1, CM3) described using movement or gestural representation (e.g., tracing an arc in air) with singers to support shaping of legato phrases when singing from notation.

Annotating scores: Interacting with notation through annotating scores was a routine choral practice, though differences in how singers engaged were evident. Ten conductors (four CT, three CN and three CM) regularly instruct singers to annotate their scores whilst seven also encouraged singers to annotate on their own initiative. In PS contexts, conductors annotated a displayed copy of lyrics.

Annotations functioned as aide mémoires to:

- remind singers of certain musical aspects of pieces to improve performance
- support accuracy either in advance of singing to prevent mistakes or as a reaction to errors (e.g., use of arrows to signal pitch direction or tuning). This could include annotating the text of lyrics with regard to articulation particularly in relation to vowel production.
- support fluency (e.g., use of breath marks to group musical ideas together into phrases)
- orient singers in a piece and understand how their lines fit within the structural context of a piece (CM4).
- contribute to expressive performance of a score (through dynamic markings and colour).

Across choral categories, annotating scores was a learning tool that allowed singers to make their own of the sheet music and use it in CM4's words as a 'tool for empowerment'.

Musicianship Classes: Singers in nine settings attended musicianship or theory classes which support their learning in choral rehearsals (CT2, CT3, CT4, CN1, CN2, CN3, CN4, CM3, CM4). In some settings where this is not the case (or for junior singers), conductors endeavoured to integrate theory or skills into rehearsals to support learning of repertoire from notation. In relation to developing singers' music reading ability, conductors frequently distinguished between their choral practices and musicianship teaching. Choral rehearsal was considered a 'singing space' rather than a vehicle for learning to read music.

5.3 Research Question 2: Do choral conductors of children's choirs consider reading music as having the potential to develop children's musical thinking (audiation)?

All 16 conductors believed that singers gain more than new repertoire if reading notation to learn in choir. Use of notation was viewed as developing singers' musical thinking with and through notation, in integrating many aspects of notation simultaneously (CT3, CM2, PS1). Audiating from notation, was referred to as 'a mental facility', a fulfilling 'thought process' or 'voice inside' (PS1). Musical thinking with notation involved 'inner imagination', 'inner hearing' (CT3), and 'brain fireworks' (CM2). PS1 and PS2 described acquiring this ability through use of sol-fa which caused a 'switch' in how PS2 heard notes from notation and changed PS1's thinking from a 'mathematical' to a musical thinking. CT3 captures the excitement and sense of achievement that this ability can bring.

It's partly the way the brain works. So they're learning a mental facility, that internal visualisation, being able to hear something that they see, inside ... developing the inner ear. You get such a sense of achievement from that and also being able to think about things in a different way, see the world in a different way, hear the world in a different way. That inner ear, that inner imagination that very much plays into that. (CT3, Interview 1)

Audiating from notation allowed singers learn and think with a different type of 'language' (PS1, CT1) and learn another form of literacy (CN1, CT3). Notation afforded singers opportunities to develop a deeper perception (CM3, CN2) and understanding (CT2, PS4) of the music they sing through providing a tangible representation of the structure, interrelationships of parts, and style of the music.

They learn stuff **about the other parts** if they have the sheet music in front of them. They learn even about **style**, about the way that you can tell straightaway if a piece is a Baroque ... you just see on the page what it looks like. And I think they learn a lot about the **expression** ... And of course, they learn about, obviously, **keys ... and the intention of the composer.**' (CT2, Interview 1)

Use of a score contributed to improving music reading ability, although this could be influenced by how music was taught (CN2, CM4). When used judiciously singers gain a new song and develop skills. Whether consciously or unconsciously, use of notation contributed to singers' familiarity with how musical sounds are connected to and represented by symbols in notation (CN3). Reading from notation was the start of a process through which singers internalise and make meaning with or interpret notated music (CM1). It contributed to singers' extra musical learning in relation to the lyric text and cultural context of material (CN4) and to singers' sense of identity and achievement (CT4). The extent to which reading music in choir promotes or develops musical thinking is dependent upon singers' aural fluency. At CT2 attests:

At the very, very beginning, reading notation isn't so important. I think being taught to read it is important, but ... learning the basics through aural association is probably the most important initial thing for quite a few months, so you have a context for what you're doing. And then to transfer that to reading, to make that as seamless as you can so that the aural thing then becomes alive through the notation. (CT2, Interview 1)

5.3.1 *Aural fluency*

A musician's ability to hear internally (Kodály, 1974) or imagine sound from notation, 'notational audiation' (Gordon, 2007), is considered a critical aspect of music reading. For a language reader automaticity of decoding, which is dependent upon phonological and phonemic awareness skills, is essential for high levels of reading achievement (Pikulski & Chard, 2001). In the context of music reading, these relate to the understanding and audiation of inter-relationships of notes within tonal contexts. Whilst conductors recognised the importance of developing singers' fluency in internally hearing and understanding sounds in relation to each other within tonal contexts, in practice the choral rehearsal requires supplementary space such as musicianship class or an extended space through technology to support this development.

5.3.1.1 *Audiation and Notational Audiation Skills*

Imagining sounds from notation was considered an important aspect of music reading by all conductors. In their personal music reading, for some it was an automatic, accepted aspect of the music reading process, for others it was a skill that they had consciously worked on or developed over time. One conductor became consciously aware of audiating during this interview. Conductors' formation as musicians influenced the extent to which they themselves audiated from notation and their focus on developing this skill with singers.

Of the 12 conductors who routinely used notation with singers, three (CT3, CN1, CN4) were confident that their singers audiated from notation during reading. Three (CT1, CN2, CM3) were unsure and felt that it was difficult to judge in a rehearsal context. Five (CT2, CT4, CN3, CM1, CM4) believed that some of their singers did or were starting to and one (CM2), had never consciously considered this aspect of his singers' music reading. Both automaticity and consciously developed strategies contribute to music reading fluency.

Unlike school-based practices for language reading, the space for developing singers' audiation skills often lies outside the choral rehearsal. Though considered integral to music reading only seven choral conductors used deliberate strategies to develop singers' audiation skills. This was usually addressed by conductors whose choral contexts facilitated singers' attendance at musicianship or theory classes rather than in choral rehearsal (CT3, CN1, CN3, CN4, CM1, CM3, CM4). Two categories of audiation strategies shared are presented in Table 5.3: (i) activities to develop the ability to audiate sounds, that is to remember, imagine, or 'hear' musical sounds internally, 'basic' audiation and (ii) activities to develop the ability to 'hear' musical sounds from notation during music reading, 'notational audiation' (Gordon, 2007). 'Basic' strategies were used during aural learning in advance of working with notation, notational audiation strategies were used during notation use. Practice in echo singing and improvising was believed to develop singers' implicit awareness of tonality, tone set and feeling for phrase (CN4).

Table 5. 3: Strategies used to Develop Singers' 'Basic' and Notational Audiation Skills

'Basic' Audiation Strategies	- singing a song where certain phrases are sung aloud and others internalised on a given cue (e.g., colour cards) (CN1, CN3) - keeping a beat, clapping a rhythm or, in early stages, miming the words whilst 'inner-hearing' a song melody (CN1, CM3) - echo songs where singers echo and improvise answers to phrases presented aurally to develop awareness of tonality, tone set and feeling for phrase length (CN4) - practise at listening, imagining and discussion activities where singers listen to and memorise a melodic fragment presented aurally (on instrument or voice) in order to imagine the sounds internally focusing on remembering every detail (colour, dynamic level) and to self-assess achievement on a scale of 1-10 (CN2)
Notational Audiation Strategies	- silent reading from notation using hand signs to support internal hearing (CN3) - providing opportunities to practise notational audiation from earliest experiences of learning to read music appropriate to singers' reading level (CN4) - singers alternating between imagining selected bars or phrases in notation and singing others aloud (CN4) - dividing up a score so that alternate bars are sung by different groups of singers (CN4)

Sight singing skills were believed to both influence and indicate notational audiation ability (CT3, CN4). Benefits of developing this 'mental facility' to a music reader included a sense of achievement (CT3) and an enhanced ability 'to interpret and create something from a piece' (CT2).

In contrast to imagining visually, children less frequently encounter being asked to imagine sounds in their everyday lives, limiting their opportunities to develop 'basic' audiation, though CT2 believed that some children may naturally hear sounds internally. Having considered the ChoirLab children's responses to Adolphe's (2013) imagining exercises, conductors saw potential in the idea of drawing upon children's everyday sound worlds. Ten conductors saw a benefit in imagining familiar environmental sounds as a means of developing initial 'basic' audiation (CT2, CT3, CT4, CN2, CN3, CN4, CM1, PS1, PS3, PS4).

Starting with something that isn't necessarily hard, like the street sounds for instance, is a really good idea ... I can see that there's a link there that could lead on then to imagining simple tunes. (CT3, Interview 3)

It brings in their imagination. It opens the doors and the windows of the rehearsal room and brings in the world. It's another way of helping them to use their inner hearing. (CN3, Interview 3)

Whilst strategies for basic audiation development are an initial step, a gap to be bridged exists between imagining environmental or musical sounds and hearing notated music internally. As CT1 observes, being able to transfer practical aural experience of sounds in memory into audiating from notation requires an ability to (i) group sounds and identify them as related aurally and (ii) recognise them in notation.

If we go back to the **"bing, bing, bing"** [school bell] **that's a triad**. If I'm seeing that on the page ... I have to understand that that's what I'm seeing before I can then begin to remember what that sounds like. I have to interpret it after I've seen the notes or gone, "Well, they make up a scale or a triad." Or whatever it is, then I'm remembering what that sounds like. (CT1, Interview 3)

In essence he feels that a singer needs to understand the concept of a triad and recognise its presentation in WSN. Notational audiation requires a foundation of aural experience, musical conceptual knowledge and familiarity with the operation of WSN.

5.3.1.2 Understanding of Tonal Context

Hearing notes in relation to each other rather than as individual unrelated sounds was considered key for musical understanding and tonal thinking. Two conductors (CT3, CM4) used interval training, aural recognition and singing of intervals, to develop singers' skills. Others, familiar with Kodály approaches, used sol-fa to develop singers' aural understanding of tonal context or shared ideas for developing understanding. One strategy was interval training. CT3 outlined his approach.

I'd play [a note] and I would say, 'Sing a fourth above it,' or I'd play two notes and then I'd say, 'Sing both those notes,' or I'd play two notes and I'd say, 'What is this?' So they've been doing that all along. (CT3, Interview 1)

Table 5.4: Interval Training and Sol-fa Strategies used by Conductors for Understanding of Tonal Context

Interval training strategies included:	
(i)	aural drills or ‘tests’ where singers take turns at aurally identifying and singing intervals (CT3)
(ii)	game-based approach to aural drills using playing cards to prompt singing of intervals (given the tonic singers sing intervals such as a fourth above it prompted by display of a four-of-hearts card) (CM4),
(iii)	strategy-related practice at identifying intervals presented aurally by ‘counting’ or ‘singing up’ from the lower note (CM4)
(iv)	use of scale degree numbers (with hand signals, CT3) to relate intervals within tonal contexts
(v)	game-based approach using playing cards to introduce scales and modes and practise the intervals they contain (CN4 shared a guest conductor’s strategy)
(vi)	associating <u>particular intervals</u> with intervals from familiar songs, such as the major sixth interval at the start of the folksong My Bonnie Lies Over the Ocean (CM4, CT4, <u>and also</u> by conductors who used sol-fa, CM1)
Sol-fa strategies included	
(i)	aural teaching of repertoire of increasing range and tone set to younger singers in sol-fa (CM3, CN4, PS2)
(ii)	facilitating home practice by sharing recordings of repertoire sung in sol-fa (CM3, CN4) and in absolute pitch ‘letter’ names (CN4) with singers
(iii)	use of scale-degree numbers to reinforce tonal thinking (CN4)
(iv)	teaching of Kodály hand signs to support sol-fa solmization (CT2, CN3, CN4, CM1, CM3, PS4)

Hand sign use was believed to facilitate deeper understanding of tonal function and assist singers in recalling sounds at later stages when audiating from notation (CN3, PS2, CM1). CN2 articulated the benefits of fluency in use of hand signs to singer’s understanding and for self-monitoring of accuracy during music reading.

They show us the characteristics of the note. The doh is very strong. Re is unstable, it feels like it wants to move down, or perhaps up. Mi is stable, but not as strong as doh. Fa is pointing down, so that’s unstable showing us the semitone, and so on. (CM2, Interview 3)

In order to be able to hear from notation, aural fluency in understanding and internally hearing notes in relation to each other in tonal contexts is a prerequisite. Lack of automaticity in audiating limits a singers' decoding ability and subsequently comprehension. Achieving aural accuracy and automaticity requires systematic and incremental development over time. Whilst some singers achieve high levels of aural fluency, this is predominantly in settings where choral rehearsals are supported through musicianship classes on an ongoing basis. Two conductors (CN4, CM3) sought supplementary ways of affording singers' practice outside rehearsal to develop fluency through use of recordings. CN4 describes her practice.

I upload a **recording of me singing the song**. And they'll have it [sung] **with the words**, with the **Sol-fa**, ... singing the **rhythm names** and the **letter names**. The four different angles that they're coming at it from (CN4, Interview 2).

The time constraints and performance focus of choral rehearsals can limit conductors' opportunities to develop this foundational skill across choral contexts.

5.3.2 Decoding fluency

Decoding is a critical skill for language reading which draws upon a reader's orthographic knowledge (spelling patterns of a language's written representation system) and phonological knowledge (facility with the sounds and sound structures of a language) (Perfetti & Stafura, 2014). Once a reader has learned to map the sounds of a language to its graphemes (letters of the alphabet in an alphabetic orthography) he or she is enabled to 'break the code' and use these memorised relationships to translate printed text into spoken words. While there is a relationship to music reading in mapping sounds, breaking codes, and memorised relationships, unlike text, music notation captures and presents multi-dimensional information and relationships between notes. As an example, music notation often simultaneously represents rhythm, pitch, melody, direction among other multiple dimensions (Sloboda, 2005). Visual representation in language reading is stable whereas in music reading, ideas can change from context to context.

Both language reading and music reading critically build upon foundations in aural/oral language. Children's everyday life experiences can support their developing decoding skills through, for example, exposure to print in their environments, experience of being read to by parents and observation of adults routinely reading and writing in social contexts for a variety of purposes (Neaum, 2017). Comparable emergent and social practices in music reading were recognised as an ideal scenario however, limitations in practice were strongly emphasised.

5.3.2.1 *Representing Pitch - Orthographic Mapping in Choral contexts*

In contrast to the stability of language reading where children learn letter sound correspondences to decode printed language from text, music notation encodes multiple musical dimensions. One aspect of this is the representation of pitch by means of stave position of notes. A melody, or material as small as an interval, can look very different when presented on a stave depending on the key in which it is notated. Music is read ‘relatively’ and this is one reason why sol-fa is often used to connect singers’ aural understandings of pitch relationships with WSN for music reading. However, there are various views on how this might be accomplished.

Of the ten conductors who incorporated sol-fa into their practice, three conductors (CT2, CN2, CN3) used Sol-fa in combination with WSN by writing in the sol-fa (letters) under notes on the stave to reinforce pitch relationships. CT2 used this strategy during singers’ initial year only, CN2 encouraged teenage singers to use it for difficult passages, CN3, however, routinely “would have the Sol-fa written in, note for note, under every piece of music I give them” (CN3, Interview 1). As her singers also attended musicianship classes, they would have experience in using sol-fa and would understand that “they’re not just reading a letter underneath that has no relation to what’s on the stave above it” (CN3, Interview 1). Others (CN1, CN4) disagreed with this practice on the grounds that it obstructed rather than supported learning to read notation. Critically, they suggested that the ‘meaning’ or understanding of pitch relationships that sol-fa offers was absent.

I think sol-fa is really an aural language. And I think it's a bit like learning [to read] Irish by writing the [English] phonetics all the time over the words. What you're actually reading finally is the phonetics, not the words. (CN1, Interview 1)

I feel quite strongly about that ... because I've taught a lot of children who were taught that way and they **use it as a crutch**. It's **almost like a language they write under the notes**, but it **doesn't mean anything to them**. (CN4, Interview 1)

Unless singers connect and apply their aural understanding of sol-fa to notated music, this scaffold can hinder rather than support decoding. Sol-fa as contributing to an understanding of tonal context was highlighted by CT2. Whilst, in her opinion, stronger readers may not need this support, most singers, and particularly those who struggle, benefit from use of sol-fa.

Using the sol-fa syllables, does give the context very well ... people that are struggling, it's invaluable because it tells them exactly where they are. ‘Oh, we're at **doh** here, that's our **home note** and these **intervals spiral out from that**. (CT2, Interview 2)

Further, she linked aural fluency in sol-fa with developing an ability to recognise pitch inter-relationships in notation and audiate sounds accurately in the context of tonality if a reader understands the operation of key signatures in notation.

When you showed, for example, that C to F³ you had to know that the **key signature** ... meant it wasn't d-f, you have to know that it was s-d ... I think that's very useful to teach ... Some ... people do [interval] training like thirds, fourths. I actually do it with the sol-fa. Because I think it gives you the **context of where you are in the key**. I have come to realise that it's very beneficial ... And I think **you can train that very well with children**. (CT2, Interview 2)

Practice at applying a singers' understanding of pitch inter-relationships within tonal contexts through sol-fa was one way used to connect singers' aural understandings of pitch relationships with written music notated in WSN. Another, used by CT3, involved associating scale degrees with stave positions within a key, by superimposing an imaginary grid over the stave.

We would ask them ... in their minds, to see it as a grid. So they look at a piece of music and they understand it tonally, so they know which note is '1', which is '3' and '4' and '5' ... we would look at a piece of music and we would say, 'Okay which notes are the '1's'? Point to all the '1's.' And now look at the top. Point to all the thirds. Point to all the sixths. (CT3, Interview 1)

Most conductors believed that, although decoding skills continue to be developed through music reading, they depend upon singers having achieved a level of aural facility in relating musical sounds to each other within tonal and metric contexts. Three conductors (CT1, CT4, CM2), to varying degrees, appeared to believe that singers could develop the ability to connect heard and notated sounds by 'osmosis' through learning repertoire whilst following notation immersed within a choral context. One (CN2) believed that singers can come to understand some aspects of notation through osmosis before learning through more formal attention to decoding from WSN. For some, but not all singers, a gradual assimilation of knowledge from instrumental, theory, or musicianship classes together with exposure to notation whilst learning large volumes of repertoire appears to achieve a level of decoding



Sample musical unit discussed during Interview 2

skill. However, whilst this resonates with the concept of developing ‘print awareness’ rather than decoding skill in language reading, to achieve accuracy and automaticity in decoding, singers require further support in connecting their aural understanding and facility with sounds to their representations in WSN for music reading.

The idea that you **pick up music [reading] in a choir by osmosis is true and false**. I think somebody who's naturally good or naturally has an affinity to that, gets really good at it, without even hardly being aware of it. And somebody who isn't, simply remains like that. So they develop other skills ... **very good second timers**, which is a very good skill as well. And I think that they learn to pick things up differently ... **you can pick up by just being immersed in it really well, but not always**. (CT2, Interview 2)

Achieving mental dexterity in switching between sol-fa ‘name’, scale degree, and absolute pitch letter name when thinking about inter-relationships between pitches appears to be valuable in facilitating strong connections between singers’ aural fluency and skill in reading WSN. However, knowledge of the operating principles of WSN and conceptual knowledge of key signatures is also required.

The extent to which conductors worked on developing their singers’ decoding or mapping skills depended upon the degree to which singers engaged with sheet music when learning repertoire and whether rehearsals were supported by musicianship, training or theory classes. Conductors spoke about different levels of decoding when working with notation. At a macro level, those who used sheet music with singers described highlighting structural features of the score to singers, such as repeated sections or phrases, drawing attention to phrase beginnings and endings to help singers navigate a score geographically, particularly during part-work. This was also helpful to singers whose decoding skills were at a developing stage. Contextual symbols such as key and time signatures were highlighted by some conductors to support decoding. At a micro level, conductors reflected upon the multidimensional nature of musical information represented in notation to be decoded. In addressing this, conductors outlined strategies that they used to support singers in connecting aural fluency with WSN. These were multi-modal in nature.

5.3.2.2 Multimodal Representation to Connect Aural and Decoding Fluency

Multimodal representation of music appears to be a necessary bridge between singers’ aural fluency and fluency in decoding WSN. Conductors addressed helping singers to connect their aural understanding of music with an understanding of the operational principles of WSN through using and encouraging use of multimodal representations of music.

Physical gestures appeared instinctive to conductors when discussing pitch and pitch contour. Separately, ‘Kodály’ hand signs were used to represent individual sol-fa syllable scale degrees visually and kinesthetically in vertical space. CT3 used hand signals together with scale degree numbers rather than sol-fa. Some conductors described use of a hand stave to illustrate note positions on or between their five fingers in preparation for reading from a 5-line stave (CT2, CN4). CN4 illustrated this while singing a children’s folksong, Apple Tree, using hand signs initially to introduce a new note and then a hand stave to support singers in connecting to the stave presentation.

That's really important at the early stages. The physicality of it, the geography, the spacing of Apple Tree (sung) but then 'down here for the do' (sung) and this is the new note. So they're learning that with their ears, and then you want them to learn it with their eyes as well, to get used to that. That the do is lower, and you're going through the lines and spaces, the three spaces, the three lines, and using the fingers [hand stave], like this is d-m-s (sung) for example or using the spaces. (CN4, Interview 2)

Three conductors connected stave position with how it feels to physically produce a note, muscle memory for pitch and stave position (CT1, CT3, CN1).

I might say, ‘Well, **look at the first note, where do you think it is in your voice?**’ ... if it starts on a particularly low note then I might say, ‘Try and **imagine what your lowest note is**. And if it's not that it will be close to that ... Then you can see that there's a big leap. So you can see that you've got to do a big leap ... That’s almost trying to develop some sort of perfect pitch. Not that that's not the aim ... The low notes will feel like this. The high notes will feel like that. (CT1, Interview 2)

CN1 encouraged singers to map sounds onto parts of the face. To avoid overloading singers with conceptual knowledge about key signatures, she described using a 3-line stave displaying a melodic motif as a type of ‘stencil’ that could be moved higher or lower on a displayed stave for singers to notice the difference in physically singing the note pattern at higher and lower positions. Physical metaphors and iconic imagery such as staircases or ladders referencing physical movement were also used in relation to connect note pitches to stave position (CM1, CM4, PS3).

5.3.2.3 Visualising and Writing to Represent and Connect Sounds and WSN

Two cathedral conductors used visualising to connect aural understanding with stave position of notes. CT3 described helping singers to associate scale degrees with stave positions by superimposing an

imaginary grid over the stave. CT1 used visualising as a type of pre-writing dictation exercise to connect aural and visual thinking in a way that links with singing for young singers.

One of the things I do currently is ... **listening to help the reading**. So if we're doing a warm up la la la..., [minor ascending and descending stepwise pattern from first to fifth degree] I might say, 'Well, **how would you write that down?** ... Or lead them on to try to notice that those notes are all next to each other. In a way that **they might be trying to do it the opposite way around, they're seeing those [notes] next to each other and trying to sing them next to each other**. ... So I'm **trying to connect the two up**.

When they're youngish actually writing a note on a stave is still quite abstract. And I think it's harder to link that with their actual singing and practical music making than it is ... to get them to almost write down what they've just sung if they haven't seen it. (CT1, Interview 2)

CN2 encouraged students to visualise notation whilst internally translating from sol-fa to absolute letter names to complete a dictation task where he sings or plays a motif and students play it back on an instrument.

We try to bring them through a series of steps that helps them get to actually see the notation in their head before they play it ... we would bring them through a series of levels where they analyse the shape and then maybe hear the Sol-fa and from the Sol-fa then they have a pitch series in mind and then they can go to the piano and play that ... it's a really good form of dictation. (CN2, Interview 1)

Use of manipulatives to represent melodic and rhythmic patterns drawn on Kodály strategies, were viewed as beneficial to introduce literacy 'away from a piece of paper' (CM3) and build familiarity with how sounds look and 'sound' on a page (CN4). This can be built up incrementally.

You start with very small steps. You start with like if it's lollipop sticks, or matchsticks on their desks, something very physical, and something that's almost a toy. And getting used to each one of those symbols, one of those represents the pulse, and they're used to the pulse. If they start young, they're used to the pulse, it's not an issue. And then they start to find out there are two sounds in one pulse, so they join them together, or a sound that lasts for two pulses is the circle, etc. So there are all those little stepping stones that they start with. (CN4, Interview 3)

As PS2 observed in relation to a rhythmic representation used by a Choirlab child, “shorthand helps you, it's a scaffold to bring you from the sound into the symbol” (Interview 3). Writing in the context of dictation progressing from use of manipulatives to using abbreviated Sol-fa syllables (letters) for melody, stick notation for rhythm, and both in combination, was a stepping stone to using WSN.

Practice at writing using WSN was considered a means of supporting accuracy and clarifying understanding. At a basic level, CT1 observed that practising placing a note on a staff is beneficial.

You've got to learn how to colour a note in and draw a stem on it If you draw your note on the five lines, and it goes over the line, then it's actually just becomes another note. (CT1, Interview 2)

CT2 described asking singers in musicianship classes to copy simple songs learned onto manuscript.

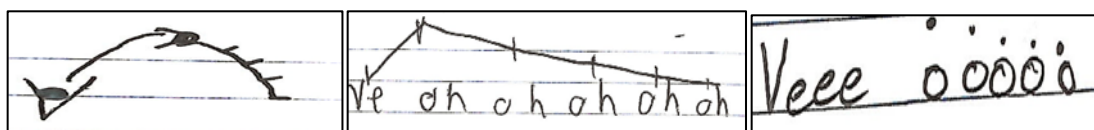
That gives them an extra depth to what they're doing, and it irons out little things they mightn't have fully understood or that they haven't really taken on board. (CT2, Interview 2)

Writing songs with small tone-sets in three different keys and therefore stave positions supports recognition of patterns or units in different keys.

5.3.2.4 *Children's Invented Notations*

Conductors' consideration of Choirlab children's representations of music through their invented notations in Interview 3 highlighted the potential of invented notations for enabling children to explore a range of musical dimensions (including expressive dimensions) and reveal their understanding of musical dimensions and their interrelationships. None of the conductors asked singers to represent music sung or heard using invented notation in choral rehearsal or musicianship settings, though CT3 described occasionally drawing attention to the score by asking singers to draw in response to what they see. Conductors' observations in relation to sample notations in Figure 5.1 indicate that they recognise a range of musical aspects that children represented in notations.

Figure 5.1: Children's Invented Notation Samples



I see that leap, but I see the intention, the moving on and also the notes of du, du, du, du [final four notes sung] ... the first one shows that, just the beautiful roundedness of the phrase. (CM3, Interview 3)

Comparing the two samples, CM4 noted the absence of the ‘roundedness of the phrase’ in the second.

I mean, the shape is still there. The leap is still there. The sense of coming down by step, is still there. It hasn't got the phrasing, the smoothness. (CM4, Interview 3)

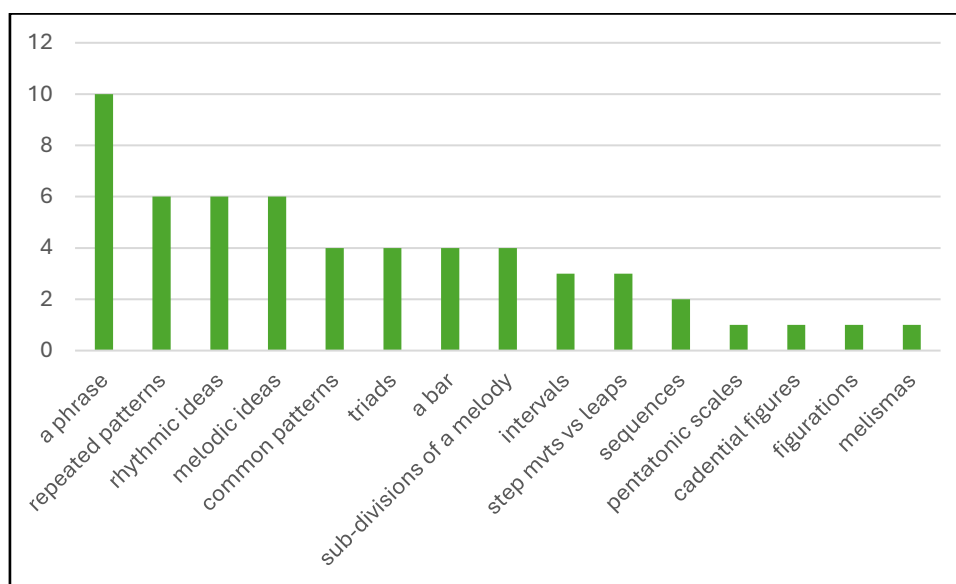
CT2 noted a similarity in notational strategy with plainchant in the third sample, where ‘little squiggles’ rather than ‘on the line notation’ was used. Choirlab children’s artefacts prompted conductors to consider the potential of invented notations for developing understanding of the operating principles of WSN and for promoting their awareness of a range of musical dimensions.

Maybe we shouldn't be always trying, as we teach music, ... to use the standard notation. Maybe we should be devising grids and things like that to **allow people to explore the multidimensional side of music** in terms of length and pitch. And possibly expression as well. Because obviously in your examples there, people were showing stress and emphasis ... as well. So maybe there **should be those steppingstones** to bring people to understand the standard notation, to get them there. And yeah, **it would help them to understand the standard notation** ... But **it would help them understand music** as well. (CN2, Interview 3)

5.3.3 Automatic recognition and grouping processes

Ehri's (2005) concept of ‘sight words’ was useful to the research in that two processes were highlighted for music reading: grouping processes and automatic recognition (prompting audiation) of groups of notes as meaningful ‘units’ or patterns. Unlike printed text where white spaces form a visible boundary between words which are static entities, a reader must actively perceive groups of notes as related or belonging together. Musical ‘units’ suggested in response to the concept of ‘sight words’ shown in Table 5.5 indicated that conductors perceived multiple (and overlapping) ways in which notes can be related in notation.

Table 5.5: Conductors' Suggested Musical 'Sight Words'



Notes could be in relation melodically and harmonically, rhythmically and metrically, linguistically (by lyric text) and structurally within musical contexts. Additionally musical units could be perceived at varying grain sizes. CT3's suggestion of two possibilities illustrates this where he describes musical units of contrasting size.

The obvious correlation is **phrases** or **figurations**. So, a figuration would be a **small, decorative group of notes that might be spread over one syllable or one word**. So you would tend to see them as a sort of **unit**. And then, of course, a phrase, and we encourage musicians, I think, don't we, to see **a whole phrase as an idea ... made up of constituent parts and many words and lots of different notes, but it is an idea or a gesture. As well as seeing all the individual bits of it, you need to be able to think of it as one thing that gives it a sense of direction and purpose.** (CT3, Interview 2)

It was in relation to Finzi's Lullaby (Figure 5.2) that simultaneous perception of patterns at different grain sizes was highlighted as occurring during reading.

Figure 5.2: *Lullaby Oh Lullaby* by Gerald Finzi

Lul - la - by, oh lul - la - by! Flowers are closed and lambs are sleep - ing;

Lul - la - by, oh lul - la - by! Stars are up, the moon is peep - ing;

Lul - la - by, oh lul - la - by! While the birds are si - lence keep - ing,

(Lul - la - by, oh lul - la - by!) Sleep my bab - by, fall a - sleep - ing,

Lul - la - by, oh lul - la - by!

The opening eight-bar phrase of the vocal line of Finzi's piece was perceived as one 'unit' but within this the first four-bars was identified as a pattern repeated through the piece. The F#-B Perfect Fourth interval was a 'unit' that would facilitate accurate reading of melody as would the second inversion of the B minor triad. The minim-crotchet rhythm pattern repeated through the piece was identified as a rhythmic musical unit. The influence of lyrics on perception of musical units was apparent in perception of the minimum-crotchet-minim pattern attached to the word 'Lullaby' as a unit. Whilst notes can be perceived as a group because they are 'visually bound together' or 'visually conjunct' (CN1) through 'step movement' or 'rhythmic spelling' (CN1), a reader's musical knowledge and understanding of the musical context is more critical to grouping and recognition processes. CT1's description of his reading of notation captures the understanding of melodic and harmonic context that underpins visual grouping of notes in skilled music reading.

I would see **notes as either moving in step or in leaps** ... And I'm **relating everything to the key** that we're in ... if they're **moving by leap** ... I'm saying, 'Well, actually are they part of a chord?' And they might be part of any chord. It might be the **tonic chord**, equally it might be the **dominant chord** ... if I need to jump to it [a note] from somewhere, I'm **either thinking of it as the second degree of the scale**, so it's the one above the tonic, or I'm thinking of it as ... 'I've just been around chord five. So it's **the top of a triad of chord five**'. (CT1, Interview 2)

5.3.3.1 *Developing Musical Vocabulary for Automatic Recognition*

Whilst not all conductors agreed with the concept of a ‘musical sight word’, there was consensus that ‘reading ahead’ (CT1), ‘reading a line’ (CT2) or ‘looking forward’ (CT4) in music reading is achieved through perceiving notes in notation in groups rather than reading every note individually. A language reader’s bank of sight words stored in memory facilitate fluent reading in that words’ pronunciations, meanings and syntactical roles are activated automatically on sight of a word in print (Ehri, 2005, 2020). It would appear to be helpful for singers to have a bank of common musical patterns stored in memory that could be automatically recognised in notation. This appears to be the case in practice particularly in settings where singers attend musicianship classes. Patterns taught ranged from rhythmic elements and intervals to common rhythmic and melodic patterns often from children’s folksongs. In musicianship classes these were taught aurally before being introduced in notation.

In order to address the additional challenge of decoding WSN, conductors familiar with Kodály approaches presented patterns or ‘units’ in simplified form using Sol-fa letters or stick notation, initially presenting pitch and rhythm separately before using them to present patterns in combination.

Strategies used to introduce musical units echoed those used in early language literacy for teaching sight words. CN4 described a rhythm bingo game strategy (cited by five conductors) to practise reading, identifying and using rhythm patterns to invent longer patterns.

There are 10 different patterns, sight words in rhythm, maybe ... one is ‘ta ti-ti ta ta’ ... you clap through them, and then I ask them **to make up their own combinations of them**. And then we make a rhythm and **memorise that**, but then I would **clap one and ask them, "Which one is that?"** So they get used to that **as a unit**. (CN4, Interview 2)

CN2 also described working with rhythmic and melodic patterns to develop singers’ musical vocabularies within musicianship training, a practice endorsed by PS2.

You're building up their **musical vocabulary**, little by little, and yes, they would definitely understand the visual cues and the **visual nature of those different patterns** or those different kinds of shapes. They would understand those as units in themselves. (CN2, Interview 2)

It would **be useful to have certain things learned off** so that if they came up, we would have them without too much [thought], you know, that **they'd be automatic**. (PS2, Interview 2)

Much of the aural musical vocabulary singers have stored in memory is garnered from their everyday sound worlds. Conductors' awareness of, and use of this musical vocabulary has potential to further develop automatic grouping and recognition skills in music reading if singers learn to consciously relate these patterns or units to sol-fa.

5.3.4 *Making meaning with use of musical vocabulary*

In language reading, a reader's oral language skills are recognised as foundational for reading. They encompass listening comprehension, verbal expression, and vocabulary development, both receptive vocabulary (words children understand) and expressive vocabulary, language children can use (Strickland & Riley-Ayers, 2007). Children's understanding and use of vocabulary contributes to their knowledge of how language works and to their facility with written language in reading and writing. This facility develops from their earliest attempts at communicating ideas (Strickland & Riley-Ayers, 2007). In choral contexts, children's expressive use of musical language is usually in the context of singing the compositions of others rather than using musical sounds to communicate their own ideas and construct their own meaning. This points to a need to reconsider the role that providing children with opportunities to construct musical meaning through using their own musical vocabularies, may have for developing fluent music reading.

Some conductors appeared to relate 'speaking' in language with 'hearing' or 'singing' rather than using musical language through improvising or composing activities (CN4, CN2). When reflecting on children's proficiency in decoding written language and their relative lack of facility in decoding notated music, CN4 observed that children experiment with and use language early in life and have this experience to bring to reading text.

They are **speaking language from a very, very young age**. They're speaking words and ... syllables ... from two years old ... Playing with it [words], but also understanding, putting them together aurally, and understanding meaning ... "No" understand what 'no' means, and revelling in that, and using it ... until they get to seven years old, they've been doing that, pretty much since they were babies, hearing the sound all round them. (CN4, Interview 3)

When applying the same thinking to music however, it was in terms of 'hearing' music rather than using or 'speaking' it.

They're **not necessarily hearing music all around them, or songs being sung all around them**. Some of them are, some of them aren't. So that it's a much more challenging path to go from sound to symbol in music. (CN4, Interview 3)

CN2 noted that children's early attempts at communication through language use are accepted as not usually fully accurate and related this to the importance of singing, listening and everyday rhythmic activities for music reading. Neither CN2 nor CN4 related 'speaking' with improvising.

When we learn language, we listen to it, of course. We listen to our parents growing up, but **then we actually do it. And sometimes it doesn't go right, but we do it.** So they need to sing and they need to listen and they need to be active in those ways and possibly active in other ways as well rhythmically ... and it's pretty natural as a kid. So I think the more that is there, the more that they'll be able to comprehend the literacy side of things and the musicianship or the aural side of things as well. (CN2, Interview 3)

Two conductors (CM3, CM4) referred to composing/song writing classes outside choir in their settings. CM3 noted a relationship between composing and experiencing music.

If they want to be able to compose music, they have to be able to notate down their ideas. But then in order to know what their ideas are, they have to also experience music ... **it's all complementing each other.** It's just it's hard to do everything in the one 30 minutes slot. (CM3, Interview 1)

CM4 observed that composing or 'writing' music develops musical understanding for reading.

It's not just [to] highlight how you go about writing music, but through writing music develop a greater understanding of the music you're meeting. So, I suppose it's **literacy in a roundabout way.** (CM4, Interview 3)

However, she noted that singers expect a choral singing experience during rehearsal rather than composing or improvising activities and that changing this could disrupt their choral experience.

Kids come with a very clear perception of what it is they think we're going to ask them to do. And we have found at times when we try and deviate from that, kids don't necessarily respond ... The difference between asking children to reproduce to then move to invent and compose or whatever is quite a significant jump. (CM4, Interview 3)

In a musicianship context however, games designed to familiarise singers with reading rhythmic patterns provide singers with opportunities to 'use' musical vocabulary whilst developing aural and reading skills.

It's doing more than just clapping individual rhythms. And it gets them used to putting it together themselves. Creating, improvising, composing. And memorising and writing down. (CN4, Interview 2)

CM4 described a similar game highlighting the knowledge of syntax that singers acquire through using 4-beat rhythmic (or melodic) patterns notated on paper plates to create longer musical phrases.

Kids will start to figure out that you could start with the long notes, you can end with the long notes, but it kind of disrupts the flow if we put them in the wrong place ... They'll very quickly start to figure out that, "I can do that if I've got more music coming after it," but if it's only a four-bar phrase, it makes no sense to do that. (CM4, Interview 2)

Although not considered as such, these types of activities provide children with opportunities to use aspects of musical language and learn how it works. Singers' impulse to create their own music was reflected in CT4's description of some singers' natural inclination to use musical vocabulary gained in choir in their own musical inventions outside choir.

A number of our kids are very keen and **like basic songwriting** and stuff like that. ... one ... keeps on writing little tunes and little songs ... and can play them on the piano. And then he's **picking up music from what he's learning** anyway, and **rhythmic ideas**, and then being able to **incorporate them into what he's doing**. (CT4, Interview 2)

An increased emphasis on singers having opportunities to learn how musical expression and meaning works through use of their own musical language appears valuable for developing music reading fluency. The question of the 'space' in which this should occur remains.

5.3.5 Reading fluency in choral contexts

5.3.5.1 Developing Music Reading Fluency in the Choral Rehearsal

Choral rehearsals provide excellent opportunities for singers to develop music reading fluency. One reason that all singers do not achieve fluency is, that for many, the prerequisite decoding skills underpinning fluency have not been sufficiently developed to enable them to avail of these opportunities. During discussion of assisted reading strategies in Interview 2, CT1 commented that a significant difference between language reading and music reading in a choral context is the group reading context. Where 'choral reading' is routine in choirs, 'solo' is language reading's usual practice (CT1). However, in the choral context, as CT2 observed, reading as part of a group is not necessarily beneficial for every singer's reading development. Some who are not 'switched-on' get 'left behind' (CT2). CM3 voiced similar concerns.

I do wonder how much fluency it builds in the not so strong [readers] or the ones who haven't had experience outside of the choir. Because I wonder are they coasting? And I see this with older people ... people I've sung in choirs with, who've been in choirs for years and years ... and they still can't read ... either they believe they can't read, or they really just can't read.

(CM3, Interview 2)

CN2 had previously described less able readers routinely leaning on stronger readers for support during rehearsals.

In sight singing, the people that might be not so quick ... are absolutely **on their** [good readers'] **coat tails**. And it's **a chorister's trick** ... where you're uncertain and you just **wait that millisecond to hear** an inflection of a pitch. (CN2, Interview 1)

Developing coherency in singing from notation, rather than improving sight reading, was CT3's observation on the contribution that 'assisted reading' strategies make to an individual's skill in music reading.

I wouldn't say good sight reading, but a lot of singers develop an **ability to be able to sing a piece more coherently** than they might otherwise by having someone good next to them. That there's **that sense of working with the person next to you**, if that person is **a strong reader**. (CT3, Interview 2)

This points to a need for explicit teaching of decoding skills for music reading, as is the case for language reading, and for singers to develop these to the point of automaticity if they are to benefit fully from reading fluency development opportunities during choral rehearsals. Given rehearsal time constraints, differences in singers' reading skill levels and the discrepancy between singers' reading skills and the challenge levels of performance repertoire, it would be unrealistic to suggest that these skills can be learned within choral rehearsals. It appears that separate musicianship classes are required to support children's music reading skills for choral practice. This is already the case in some of the cathedral, conservatoire and community research participants' choral settings. A benefit of conductors also teaching singers to sight read in musicianship classes is that links can be made and learning from musicianship classes reinforced and applied in choral rehearsals.

5.3.5.2 Reading Purpose in Choral Contexts

There is an acceptance that the purpose of music reading in choral practice is to refine a piece for performance. Notation is read repeatedly more akin to preparing a poem for recitation or a drama script than to reading prose or text. Performance repertoire is often at a reading challenge level far

beyond that which a young child can read. Therefore, singers are not expected to achieve fluency on a 'first reading'. Often accuracy is the initial concern towards achieving fluency. Early language reading learners practise both decoding skills and fluent reading by reading materials specifically created in a graduated manner for different reading challenge levels. The multidimensional nature of information in a musical score point to a need for similar materials for music reading.

Sight reading is a different skill ... to reading from sight ... I think, when it's a developing skill, people have so much to do to find the rhythm and to find the pitch at the right time and in time ... I think there's too much going on. (CN1, Interview 1)

If it was like a sight singing test, there might be some basic expressive elements, but **you wouldn't expect them to be giving a fully expressive performance in that context**. But what you're looking for is the musical literacy, their musical accuracy you need. (CT3, Interview 1)

Someone who could take a piece of moderately difficult music and be able to sing it **within maybe two or three renditions** of it. I think that would be a fluent sight reader. They're few and far between. (CN2, Interview 1)

Two conductors observed that practice at reading outside rehearsal would be helpful for singers to achieve decoding accuracy and fluency.

It would be a good thing to have a book of a hundred melodies that would be sung in Sol-fa or used rhythm syllables. And that the student is expected to first listen ... and absorb, and then maybe to actively do it ... that could be a very, very good tool, if the students would use it. Because I'd be looking at that as something that you could probably do outside of the classroom, because that's happening inside of the classroom anyway, because the teacher is doing that kind of process. (CN2, Interview 2)

Some of the unison ones [songs] are in the musicianship book that I've created for them. And they're good for just practising what they already [know]. It's not sight singing, but it's connecting the sound to what they read. (CM3, Interview 1)

It would be helpful to have a wider contemporary set of music materials at a variety of challenge levels for young singers to practise reading to fluency at their level. Some for use in choir, some for musicianship and, possibly, technological support.

5.3.5.3 *Accuracy in Choral Context*

In the context of rehearsing repertoire for performance, conductors were more concerned with singers achieving an expressive performance than focusing on developing singers' accurate reading skills. Whilst all conductors counted accuracy as important to fluent reading, it was not deemed to be the top marker for fluency by all. Further, in learning choral repertoire, accurate singing from notation can be achieved through repetition, learning by rote and through the support of other singers rather than a sole focus on reading notation accurately. Conductors found it difficult to judge individual singers' reading accuracy in a choral context as reading accuracy levels vary among choir members and stronger readers often lead or carry others. Accuracy was believed to be easier to monitor in a musicianship/music class context. Further, whilst accuracy was valued, it was not sufficient to ensure fluency in performance. CN3 observed that 'you can sing wrong notes and be very musical and a good sight reader' (Interview 1). CT4 concurred noting that 'you could have somebody who is very accurate, but not musical' (Interview 1).

5.3.5.4 *Accuracy in reading Rhythm vs Pitch*

Whilst conductors found it difficult to gauge whether singers were more accurate melodically or rhythmically when reading notation, some conductors (CM1, CM2) believed that singers' sight reading would be significantly improved if more emphasis was placed on developing rhythmic accuracy when singers are taught to read. This echoed conductors' concern that singers' reading should be anchored to the pulse. CT2 suggested that rhythm difficulties were more obvious than pitch.

If somebody has a sort of weakness in rhythm, it becomes really obvious. I think a lot of children in a choir like that can sort of tag on, be really good at almost seamlessly tagging along with someone, so that they mightn't read pitch ... But in choir, you hardly notice it, because they're so good at doing it. (CT2, Interview 1)

CM2, on the other hand, suggested that lack of fluency in pitch causes inaccuracies in reading rhythm.

In sight reading, pitch takes over from rhythm ... I think **pitch is the biggest fear in sight singing**. So if I go for this next note, is it going to be right pitch wise? So that will **hold you back from getting the rhythm right** because your **rhythm won't be right if you're always worrying ...** if the accuracy of the pitch is going to be correct ... I would encourage them to, no matter what, if the pitch is going up and down in the right direction, **make sure you get your rhythm right**. So **stick with the rhythm**. (CM2 Interview 1)

Reasons suggested for pitch being more accurate were: the choral practice of learning aurally (CT4), children as more (melodically) aurally aware than rhythm oriented (CN1), and lack of practice at reading complicated rhythms as children's repertoire is not generally rhythmically complicated (CN1). Accuracy and fluency in reading holistically is supported by attention to both rhythmic and melodic aspects in a score.

A separate point highlighted by conductors was that opportunities to read individually support accuracy and fluency. Though not practical within choral rehearsals, CT2 highlighted how beneficial for developing music reading skills it can be for individuals to read alone. She described using a scaffolded approach to individual reading in a musicianship context similar to language reading in classroom contexts.

To have each child up to do a little bit of reading themselves is really beneficial. What I often will do though is, if I have a junior class ... I don't bother getting bogged down in they have to sing the whole piece ... I'll keep dotting in and out and I'll say, 'Now, listen, X, start there, Y, go on'. And so they have to keep following, but then the onus isn't on them [to sing the whole piece alone]. you can kind of almost choose the phrases you ask them to do. So they're not super-exposed. (CT2, Interview 2)

CN2, describing activities for reading skill development in musicianship, observed that individual contributions to a group activity can improve focus.

A bit of pressure ... But it's forcing them to really focus and not switch off because they have a specific role to play in the whole ensemble. (CN2, Interview 2)

Within choral rehearsals, other conductors provided singers with opportunities to sing as part of smaller groups or in pairs by dividing up a score between singers. In classroom teaching for language reading, children routinely have opportunities to read individually. Whilst choral reading supports fluency development, attention may need to be paid to singers' individual reading development. Additionally, given that choirs have children of different ages and musical experience, they also vary in their reading ability. This makes it challenging for conductors to support individual reading skill. In some choir contexts this can be addressed through a graded or differentiated approach within musicianship classes. Consideration of ways in which singers can be supported individually would be beneficial for music reading.

5.4 Research Question 3: Do choral conductors perceive musical understanding as enabling fluent music reading?

5.4.1 *The role of expression*

Language reading literature uses the term ‘prosody’ to describe expressive reading communicating meaning, as an aspect of ‘fluency’. Whilst helpful in providing starting points for discussion, conductors understood these terms slightly differently in a music context. They described singers as reading ‘fluently’ when they meant that singers weren’t halting or working out the notes as they read. ‘Expressive interpretation’ was the term more aligned with ‘prosody’ in language reading literature.

5.4.1.1 *Expressive Interpretation*

Expressive interpretation was linked with readers’ understanding of a piece which is communicated in their singing from notation and was considered to be more indicative of fluent reading than technical accuracy as CN1’s success criteria for sight reading in a musicianship context suggests.

There's a sense of performance about it . . . that would be the thing to me. I wouldn't be that concerned about very good accuracy. I think that's actually secondary. (CN1, Interview 1)

For CT2, singers’ understanding of a piece included emotional engagement and could be perceived by listening to how fluently they sing from notation.

The sense of line they would give when they were singing, whether it connects to an emotion. I think that gives a real tell-tale sign. And the kind of weighting they give to their syllables . . . shows they grasp the innate movement in the piece or the underlying rhythms and so on. (CT2, Interview 1)

Conductors differed in when they considered it appropriate to introduce an emphasis on expressive music reading in reader’s fluency development. Some conductors (CT1, CT2, CT3, CN2, CN4, PS4) considered that attention to expressive reading should occur after a level of reading accuracy is achieved. Expressive reading was not expected in an initial sight reading of a piece.

If it was like a sight singing test, there might be **some basic expressive elements**, but you wouldn't expect them to be giving a fully expressive performance in that context. But **what you're looking for is the musical literacy, their musical accuracy you need.** (CT3, Interview 1)

Whilst CT3 referenced individual reading in a musicianship context, CT1 reflected on how reading in a choral context can compensate for decoding difficulties.

Getting the notes right is one level of fluency which is hard to reach. And then doing that with the expressive interpretation, is even harder. In a choir situation you're allowed to miss a note out cause somebody else is singing it. It's different. ... because it's choral not solo. (CT1, Interview 2)

Some conductors (CN2, CN3) suggested that expression was an aspect of children's general musical development that emerges naturally and should be included earlier in music reading. Responding to the Oral Reading Fluency (ORF) scale, CN2 pointed to expression as instinctive for music.

If a time signature were in 4/4 . . . they could quite instinctively lean on beat one and maybe beat three as well, because that's a part of music making. They've just learned that somehow through listening, and listening to music just generally . . . it might be completely separate from any tuition . . . So yes, there can be expressive elements within non fluent readers. But I would say they would be limited. (CN2, Interview 2)

However, he continued by reflecting concerns articulated in language reading literature on the impact a lack decoding automaticity has on reading fluency.

In general, any kind of music making becomes **more expressive once the notes are less of a concern** to the students. If their **mind is clogged up** with how they're going to get the patterns of the melody or the Sol-fa syllables or what Sol-fa syllables I have to use here, they **won't sing it or play it in a musical or a beautiful way**. (CN2, Interview 2)

One conductor, CM3, was emphatic in her belief that expression in music reading should be targeted from the start. She outlined that she would rather singers learn to engender and express meaning in reading and performing a simple four-beat rhythm pattern of crotchets and quavers than read more difficult material without expression or understanding. In doing so, she reinforced the need for music reading materials at various skill levels.

Without **expression** without **meaning** . . . **it's not music**. I may as well be teaching them anything. It's **just a mechanical thing** . . . I would rather us stick on ta and ti-ti until they can read it fluently. And until they're telling me a story and it's not just 'ta ti-ti-ti-ti ta'. **Beat four has a very different feeling** because beat four is **telling us that we're about to come into a new bar, beat one tells us we're there**. And beat three feels like beat one, but it's not quite . . . **it all has meaning**. (CM3, Interview 2)

5.4.1.2 *Reading of Expressive Markings*

Reading expressively needs to be modelled for singers to help them to connect their experience of ‘sounded’ music with reading printed music in notation, as for young language readers. Distinct from rhythmic or melodic decoding, singers need to be taught to recognise and follow interpretative markings or directions in notation. When responding to whether singers sight sing expressively when learning repertoire most conductors replied that they did not. CT2 described having to prompt singers to include expression.

You have to ask them to . . . They might have a feeling for if the piece is in a minor, more doleful sense. In that way, they would. But whether they **follow the dynamics and the expressive** notation, **I don't think they do**, necessarily, straight up. (CT2, Interview 1)

Similarly, CT4 was baffled by how singers tend to ignore expressive indications in notation.

It's the **constant battle** . . . they have the amazing ability to **ignore everything that isn't a dot**. Lyrics and notes, fine. Any other sort of expressions or dynamics or anything. Apparently, there's like, ‘**dynamic blindness**’. (CT4, Interview 1)

Reflecting on the place of expression on the ORF scale, CT1 observed that it was difficult to assess where expression would fit in a fluency scale for music because expression is generally prompted by a conductor or modelled for singers.

They only do the expressive bit when I've told them what it is that they need to do to be expressive. They're not necessarily doing that themselves. (CT1, Interview 1)

Explicit teaching of the meaning of expressive markings in notation and connecting these with aural experiences of music would benefit singers’ music reading fluency.

5.4.1.3 *Encoding Fluency*

Expressive music reading was viewed as dependent on aural and embodied musical experiences. A rich variety of strategies are used by conductors across categories to support singers’ fluent delivery of repertoire in performance. As with decoding fluency, multiple representation approaches are valuable in helping singers towards a deeper understanding of expressive and structural aspects of pieces. It would be beneficial for singers to experience a breadth of fluency-focused strategies when learning prior to learning to read from notation and for conductors to assist singers in using this experience to recognise expressive and structural cues in notation. A stronger emphasis on connecting these

strategies to notation for reading would benefit singers' fluency in recognising musical gestures in notation.

5.4.1.4 Use of Gesture and Movement with Imagery

Whilst gesture and movement were commonly used to represent pitch and rhythmic relations to support decoding skill, two conductors (CM1, CM3) shared movement strategies focused upon reading fluency development. In relation to Finzi's Lullaby, CM3 described how a representation strategy her singers practised during their initial years of aural learning assists them in recognising and understanding the purpose of phrase marks in notation for fluent delivery. Experienced singers can be asked to 'physicalise' a phrase if they are not singing with intention or meaning as a reminder.

My students, once they see that [phrase mark] would almost **automatically pick up their** [imaginary] **phrase string** and start to show me the phrase ... if we take a breath, the string is going to fall to the floor, so we can't. But we also have to keep it going so **there's a sense of energy through that phrase**. We've **practised that in lots of contexts** so they will **know how to shape that phrase**. They will know that it's **all connected**, that they're going from the start to the end, that **there's intention all the way through**. (CM3, Interview 2)

This practice of drawing a phrase in the air was also used by other conductors particularly for long phrases (CN4, CT2).

A separate use of gesture and imagery was to assist singers in recognising articulation and timbral indicators in notation (CM1, CM3).

They would read with paintbrushes to get the **legato**, or they'd be dabbing if they knew it was a **staccato** part. If it was a **high pitch, they'd be opening up the space**. They will be doing all of that. (CM3 Interview 1)

If I want a very lush, connected sound, they're going to take out their paint brushes, they're going to paint it ... by moving their paintbrush back and forth. Or say, I want a **lighter sound**, they might pretend they're cleaning ... they'll be **polishing the desk back and forth** ...

Everything we do is a physical gesture ... just **keep it musical and connected and physical and on the body**. (CM3, Interview 2)

Weighting of syllables in lyric text could also be illustrated through painting gestures (CM1, CM3). Movement was used to highlight structural features of pieces. CM1 described developing singers' awareness of their part within the choral texture by having singers standing in a circle, physically

representing vocal entries in a piece by stepping forward on their vocal entry and backwards on the next. Stepping forward was also a way of emphasising a musical ‘point’ or ‘statement’ (CM1).

They're all only moving from one place to the next place. But the visual thing of that happening around the room in a circle, gave every one of them **a better understanding of all of the parts together, rather than their own individual part** [solely]. (CM1, Interview 2)

Movement and imagery were helpful for singers to recognise cadences aurally in advance of learning to recognise them at a later stage in notation.

We do the 'bowing test'. And if you can bow and it wouldn't be silly, we know we've got a final cadence, so, we're finished. And if you bow and then I say, ‘Okay, can you bow?’ ‘Oh gosh, that's so strange. That's not finished.’ ... I think they can do it aurally, but I don't think they would be able to harmonically analyse a score at sight. Yeah, at those ages, I don't think so. (CM3 Interview 1)

Embodying aspects of repertoire through movement was believed to help singers towards a deeper understanding of the music on the page and, through developing this aurally initially, lead to increased fluency in music reading.

5.4.1.5 *Use of Lyric Text*

Unlike instrumental sheet music, choral music notation includes lyric text as an integral aspect that, for young singers, can be beneficial for expressive interpretation. Whilst two conductors (CT1, CN1) noted that the syllables of lyric text can sometimes function solely as a rhythmic element in the musical texture (CN1) or as a vehicle for carrying the musical sounds (CT1), lyric text was considered an important contributor to developing fluency. CT3 described using lyric text to encourage singers to think expressively early in the learning process as it is “the text that often delivers the impulse for the response” (Interview 1) as singers ‘zone in’ on the words (CM2). As CN1, and later CM4, noted,

With the small ones, it's **always about the text** ... no matter what language it's in, they're **telling a story**. So I would always give them the sense, the context, what is this about? ... (CN1, Interview 2)

Lyric text was also considered important for older singers. When focusing on fluency for Finzi’s Lullaby, CT2 reflected that she would ask singers not to be concerned with accuracy of rhythms or notes and instead “to sing it with great feeling and really care about the words” (Interview 2).

Lyric text can be useful as a vehicle for discussing with singers how to shape a phrase. Where CM1 and CM3 had used gesture to shape the end of each line in Finzi's Lullaby, CT3 suggested telling singers that they were "going to the second to last syllable every time" to help singers feel where the stress lay.

Conductors distinguished between musical meaning and meaning derived from the lyric text, noting tension between negotiating and communicating meaning of the musical and lyric 'text' occasionally. A separate challenge was that singers often sang repertoire containing text beyond their language reading level. To reduce the skill load of accurately integrating music and text, conductors often removed text initially (CT3, CN1, CN4, CM4, PS3). CT3's rationale was to preserve singers' expressive interaction with lyrics.

I leave out the text so that when we come to the text we can **straightaway understand it, expressively**. Otherwise ... they could **get used to the words without engaging with what's going on in terms of meaning**, which I think is a bad habit to get into. I think **when we're singing words, straightaway we're thinking about what they mean**. (CT3, Interview 1)

When considering grouping of notes in response to the concept of sight words, CM4 underlined the importance of lyric text to fluency.

For the song to be beautiful music by the time we've finished it, the kids **have to have some connection to the words** and they have to **deliver that with meaning and conviction and fluency** (CM4, Interview 2)

CN1 articulated the integrated nature of lyric and musical 'text' in choral music repertoire.

Ultimately with singing, I think you're **providing an atmospheric backdrop to text**, you're **conveying something**. So if they understand a concept, no matter how small it is in terms of a phrase or a sentence or whatever, **the music is knitted into that. It's not separate from it**. So I do teach the text, you know, it is the song. (CN1, Interview 2)

This points to the significance of lyric text as an important aspect of music notation which can be helpful in constructing and communicating meaning with young singers for expressive reading and performance of choral repertoire.

5.4.2 Comprehension and fluency

Fluency is understood to be a factor that can limit or support comprehension in language reading (Kuhn et al., 2010). A child's level of reading fluency can be perceived when he or she reads aloud.

Conductors' observations on their singers' reading fluency and on fluent music reading more generally included markers for fluency based on listening to music readers sing from notation.

5.4.3 *Sense of flow or continuity*

A fluent music reader reads with a sense of continuity (CN4), journey (CT3), or flow (CM4). Fluent readers 'don't stop' when there's a mistake or difficulty, they are able to 'catch up' or 'find their way back in' (CT1). They 'keep going' rather than repeating to correct errors (CN1, CN3) and they 'don't give up' (CM3). A fluent reader isn't 'stopping and starting' (PS3) or stalling whilst 'working out what's next' (PS4). A listener 'hears a fluid line' (PS4). This sense of flow or intention is dependent upon readers having a strong connection to or understanding of the underlying pulse (CN1, CN4, CM3).

No matter how well you can read pitches, you **won't sight read accurately if the pulse isn't there**. No matter how well you can recognise all those rhythms, that's **not music if the pulse isn't there**. Everything comes back to the sense of pulse.

Underpinning everything, is pulse. If you don't have pulse, even if you have the right rhythm, it will be in the wrong place and therefore, it's not the right rhythm. Maybe you have the right notes, but they're in the wrong place, then it's not the right notes. But, if you have the wrong notes, in the right place with the right rhythm, you've got a lot. You can't have anything if we don't have that sense of pulse. And we also can't stay together. And we can't keep it going.
(CM3, Interview 1)

Even in the context of early skill-building in relation to rhythm patterns, CM2 emphasised the importance of pulse as underpinning fluency.

If you were teaching someone how to clap out a rhythm, there's **no fluency** in that **unless they can feel the musical pulse**. So there **has to be a connection** to that. So their actual **reading becomes connected to pulse**. (CM2, Interview 2)

Responding to the ORF scale, CM4 described a common sight-reading error where singers disrupt the flow by misjudging the timing of notes of varying durations as a result of not understanding the context.

They have been singing crotchets and now they've moved into quavers. So they know it's supposed to go faster. What they tend to do is, not hang on to **the framework of the beat**. So it goes faster, but it doesn't go **faster in the context of what came before . . .** they've doubled

the speed . . . And then they'll see minims and then they'll all of a sudden put the brakes on . . . The rhythm tends to be read correctly. It's **the understanding of how you contextualise it to the overall beat**. (CM4, Interview 2)

She highlighted that, for her, understanding the metric context of a piece affects a reader's perception of its overall form and can impact upon melodic in addition to rhythmic accuracy.

They do need to know where **the strong pulse** is, where **the weak pulse** is. That will help them overall with **their rhythmic interpretation**, but it would also help with that whole **understanding of architecture and form**. And if you don't understand pulse with that, then the melody doesn't make sense either . . . sometimes when people are making a consistent mistake in melody and singing it, it's actually from **an underlying fault in their understanding of what's going on with the beat and the pulse** and less to do with the melody. (CM4, Interview 2)

The importance to fluency of singers' awareness of pulse at different 'grain' levels emerged in relation to discussing Finzi's Lullaby Oh Lullaby. CM1, for example, described engaging singers in 'feeling', even unconsciously, the effect of feeling the pulse at bar or metric level.

I'd say, "Let's sing and I'm going to conduct it like this, 'Lullaby oh, lullaby' (**conducted in three beats per bar**). And then I might say it to them, "Let's try this," 'Lullaby oh lullaby' (**conducted in a large four-beat conducting gesture**). They would straightaway pick the second one . . . **a four pattern over four bars in a macro four beat** . . . And in that macro four beat, **it's the sweep of that third beat that allows them to open the body and unknowingly maybe go for this themselves**. (CM1, Interview 2)

CN4 echoed the impact of feeling the metric context of the beat together with consideration of the lyric text on shaping of phrases for fluent performance.

I'd try to help them to feel 'yaa, da, daa da' (first four notes sung). To **feel the triple** and to **sway with their bodies to try to feel that**. So that it's not (first three notes sung with emphasis on down beat), but it's 123 12, 3 12 (sung). **So going towards**, the bar going towards the word 'lull' for lullaby. And **shaping it**, I suppose, as well. (CN4, Interview 2)

Physical representation was considered key to singers' ability to feel connected to and understand the context of the beat. CN4 described occasionally encouraging singers to waltz to feel the three-beat metre but taking care to also encourage awareness of pulse at phrase level through gesture.

Something with the body. That transforms how kids feel music. And then once they've got that they can 'Ya, da, da, da, da, da, dam' (Lullaby first phrase sung smoothly on neutral syllables), new phrase (sung), and **show you it with an arc** [tracing arc in air] **after they already feel the triple . . . micro macro.** (CN4, Interview 2)

Conscious and even unconscious understanding of the metric context of a piece at a micro and more global macro level contributes to a sense of flow or continuity in fluent music reading. Developing singers' ability to recognise and feel the beat at various levels in advance of and in addition to reading with a sense of connection to the underpinning metric context is an important consideration for choral practice. Understanding of metric context is linked to 'feeling' the beat or pulse, implying an embodied aspect to any theory of music reading.

5.4.4 Relevance of music in children's everyday lives for music reading

The types of knowledge children draw upon and bring to written language from their lived experience has been well-researched for language reading (Castles et al., 2018; Perfetti & Stafura 2014). Reading of printed texts is understood to be a secondary language process, underpinned by a reader's facility with language (Perfetti, 1999). Whilst research in music reading literature is not as extensive, Mishra (2014a) highlights connections between fluent sight-reading from notation and musical understanding. When considering Perfetti & Stafura's (2014) knowledge sources for language reading, all conductors related linguistic knowledge to a music reader's understanding of music and how it works, even if this is a subconscious understanding. This cultural understanding (CT1, CT3) was thought to be acquired by 'osmosis and assimilation' (CN2).

From the earliest days we understand that a major chord makes you feel happy, and a minor chord makes you feel sad. That's because that's embedded in our culture. There are other cultures where it doesn't work like that. Those chords don't say the same thing. So, that experience is important as well, but that's an aural thing, responding to what you hear. (CT3, Interview 3)

Music in singers' homes (CM4, PS1, PS3, PS4), schools (CT2, CT4) together with music heard on radio or television provided further exposure and opportunities to develop an 'instinct' (CM4, CT1), 'anticipation' (PS1), or 'expectation' (CM3) of music, though CN1 and CN4 questioned how aware singers might be of music played in the background. As CN2 observed this understanding is tacit rather than 'conscious'.

It's not necessarily that ... it's absorbed in a really coherent or comprehensive way. It's just in there to be decoded in some fashion. And I think the more somebody is exposed to music, the [more] likely it is that their ability to be able to decode that will be easier [i.e. understand elements of pitch, rhythm, harmony, tempo] (CN2, Interview 3)

Understanding how music works could be further developed through more formal means such as learning an instrument (CT2, CT4, CN1, CN3, CN4, PS1) or immersion in a choral context.

5.4.4.1 *Aural Foundations for Music Reading*

In language reading, having a rich vocabulary enables fluent reading and contributes to a reader's comprehension of text (Ehri, 2005a, Perfetti & Stafura, 2014)). Conductors were agreed that an aural foundation of musical sounds in memory is critical to developing aural fluency for music reading and that singers bring their individual banks of sounds to reading from notation in choir.

You're bringing your experience already, of what you have heard. And we all have a sort of **reservoir within us of sounds that we have heard**, even if we don't know what to call them. (CT3, Interview 3)

The types of 'sounds in their heads' that conductors believed singers had absorbed included melodic (and rhythmic) patterns from sources listed in Table 5. 5

Table 5.6: Aural Vocabulary Sources Suggested by Conductors

Aural Vocabulary Sources	Conductors
Nursery Rhymes, Playground Tunes Folksongs	CT2, CT4, CM4, PS1 PS1
Parents' Singing Listening Repertoire	PS4, CM4 PS1
Popular Music from TV/Radio/Disney Films	CT2, CT4, CN1, CN3, CN4, PS1
Music Sung in Choir	CT2, CT4, CN1, CN3, CN4, PS1
Ballet, Musical Theatre, Song and Dance Classes	PS1
Instrumental Classes	CT2, CT4, CN1, CN3, CN4,
Environmental Sounds	CT1, CM1

Discussion of the summary table (Appendix N.2) illustrating the types of musical repertoire that Choirlab children listed whilst completing the House Plan activity prompted two conductors to comment that they were not familiar with this repertoire (CT1, CT3). Others shared examples from their choral practice of using repertoire with which children were familiar for aural interval training or to help singers sing difficult intervals in notation. CT4 used the first three notes of The Simpsons cartoon theme tune to assist singers with a tritone entry in a Bruckner piece, PS2 had earmarked a George Ezra song (Shotgun) for introducing a pentatonic scale and used the phrase 'I'm lovin' it' from a McDonalds' advertisement to teach the mrd pattern. CM3 referred to a song by the band One Direction that she had used for the same pattern. CM1 drew on familiar phrases in warm-ups in a question-answer format.

I would go, "**Can you finish this for me?**" ... "d ssls (sung to 'du')" And they'd all go, "ti- d' (sung to 'du')" Right? And I would go, "'du, du, du, du, du' (beginning of Senator Windows)" And they all would go, 'du, du, du, du, du' ('mldrtd' ending of Senator Windows sung on 'du')". ... I have a notebook somewhere that I've listed stuff like that, that I can use as a question-answer thing. (CM1, Interview 3)

Some conductors believed that use of this contemporary repertoire in performance connected to singers' lives (PS1, PS2, PS3) and that of their audiences (PS2) but that whilst connecting with young people's lives was beneficial, suitable choral arrangements of popular songs can be difficult to source (CN4).

A reservation expressed in relation to this repertoire for developing music reading skills was the, often, syncopated rhythmic content which can be more easily assimilated aurally (CT3) and can be 'off-putting visually' for children (CN1). Additionally, there is often a discrepancy between notated versions and that sung by performers, in a genre that was more oral in tradition and not designed to be written down. CN2 also observed a tension between the 'straight simple rhythms' taught in musicianship and the rhythmic content of music children hear in the world.

The bank of familiar sounds that singers have in memory could be beneficial for developing singers' aural fluency and notational audiation through recognition of familiar musical units in notation. Whilst rhythmic content of popular music could be challenging, 13 conductors saw possibilities for using children's aural repertoire for developing aural fluency, particularly in relation to melody. Although, as CM3 observed, a monolithic aural experience cannot be assumed, most children in their everyday lives hear advertisement jingles and contemporary tunes. If singers were taught to recognise these as melodic units using, for example, sol-fa, it would provide opportunities for practice at hearing and

recognising sounds as particular melodic patterns outside rehearsal. Follow-up work on presenting these patterns in notation could assist singers in recognising and audiating these patterns from notation.

5.4.5 Understanding operating principles of WSN

Conductors related knowledge of the writing system for a language to a music reader's understanding of WSN. As CT3 observed, if singers are to read music they need an understanding of notation, it goes 'hand in hand'. As with language, the operating principles of WSN need to be explicitly taught. Multimodal representation practices have potential for developing children's understanding of how WSN works. However, unlike a language reader's exposure to environmental print, developing an awareness of notation from their everyday environments does not appear to be as available to young singers (CT1, CT4, CN1, CN2, CM4, PS3). Conductors noted that unless a child attends instrumental lessons, they are unlikely to have seen notated music before experiencing it in choir. CT1 pointed out that music readers were at a disadvantage in this regard compared to language readers.

They're not necessarily ever going to have seen that [notated music] before. That's not on a road sign .. not on an advert for something, or a shop sign ... they might never have seen it, ... So that has to be potentially taught from the absolute basics. (CT1, Interview 3)

In his view, this disadvantage impacts on music reading in choir. Additionally, a music reader cannot reinforce learning or practise in the same way that a language reader can. As he points out, opportunities to read notation are not available to singers outside of rehearsal.

Unless you're taking away some homework, you're not going to have music in front of you, and you're not going to be asked to read it at any other time than in choir practice. (CT1, Interview 3)

CN2 had a different view observing that exposure to notation may not be a necessity as individuals do learn to read notation in formal learning contexts without having experienced it informally. However, in his choral practice, he valued singers having exposure to WSN and addressed this by distributing sheet music to singers in the youngest choirs whose word reading ability was still developing.

They are given the music, even though they don't know at all what it means. And we don't tell them what it means. We don't say that this is a crotchet and these are high notes and these are low notes and this is a treble clef. We don't say any of that. (CN2, Interview 1)

As singers progress through choirs more emphasis is placed upon deciphering aspects of notation, supported by their learning in musicianship. Exposure to notation is the goal in the early stages with the expectation that 'through osmosis' singers will begin to develop some understanding of its logic.

Whilst singers may experience WSN in choral settings, unless they or their family or friends play instruments there is a dearth of opportunities for experiencing the reading of notation as a social practice in children's everyday lives. PS3 reflected that he should use every opportunity in his context to expose children to WSN.

5.5 Conclusion

This chapter outlined the research findings in relation to the research questions. In addressing the first research question surprising differences were revealed in how sheet music is used in Irish children's choral practice within and across four different categories of choirs.

Consideration of research questions two and three in light of theory from language reading fluency revealed new insight on aspects of music reading fluency on the role of:

- Aural Fluency as foundational for music reading
- Decoding fluency (through multimodal representation)
- Automatic recognition and grouping processes
- Making meaning with musical vocabulary and
- The relevance of music in children's everyday lives for music reading

These are discussed in the next chapter.

6 Discussion

6.1 Introduction

This chapter discusses key findings from analysis of interviews with choral conductors in light of research literature underpinning the theoretical framework and investigations of concepts from the Choirlab phase one study.

The findings highlight five key insights as follows:

- Aural Fluency as foundational for music reading
- Decoding fluency through multimodal representation
- Automatic recognition and grouping processes
- Making meaning with musical vocabulary and
- The relevance of music in children's everyday lives for music reading

The next section elaborates on each of these key insights

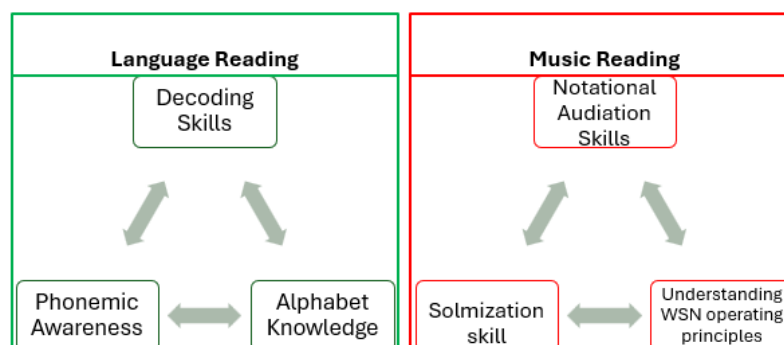
6.2 Aural Fluency as Foundational for Music Reading

Aural fluency in imagining musical sounds and understanding them within a tonal system is well-recognised in music reading research (Gordon, 2007; Brodsky et al., 2003) and in pedagogical approaches to music (Choksy, 1988; Jaques-Dalcroze, 1930; Karpinski, 2007; Adolphe, 2013) as foundational for music reading. This research suggests that developing singers' skills in 'basic audiation' (an ability to recall and imagine everyday sounds internally) could act as a bridge to singers developing skill in audiation (imagining and understanding musical sounds in tonal contexts) for notational audiation (audiating or 'hearing' music from notation).

Investigation of audiation in the Choirlab revealed that children find imagining sounds more difficult than imagining images. Discussion of this with conductors, particularly PS choir conductors indicated that children are often encouraged to visualise but seldom, or less frequently, asked to imagine or remember sounds in everyday school life. Review of children's responses to Adolphe's (2013) imagining exercises using 'real world' aural contexts in this research, highlighted the potential of sound material from children's everyday lives as a means of developing children's ability to vividly remember or audiate sounds. Providing practice at imagining everyday sounds has potential as a stepping stone to developing the ability to imagine musical sounds from notation, notational audiation.

During interviews, comparison of the foundational knowledge and skills required for decoding printed text and notated music highlighted important differences between the two processes. Figure 6.1 contrasts the types of knowledge that underpin decoding skill in language reading and music reading.

Figure 6.1: Developing Decoding Skills for Language Reading and Music Reading



Language reading research recognises a reciprocal association between children’s phonemic awareness (metalinguistic ability to manipulate sounds in spoken words) knowledge of the writing system (the alphabet) and decoding skill (Castles et al., 2018). Knowledge and skill in matching sounds to alphabet letters means that when words are encountered in text, this matching process occurs automatically and rapidly without a reader’s awareness. Letter-sound connections act as a powerful mnemonic system for language reading. Words rather than letters are read as single entities and their pronunciations and meanings, stored in memory, are activated on sight in print (Ehri, 2005). Once learners have grasped the alphabetic principle and have a sufficient level of phonemic awareness, they have the skills to decode printed text independently at their level and progress. Achieving automaticity in decoding is critical to this.

Conductors viewed decoding in music as a more complex process reflecting differences between language and music as distinct symbol systems. Unlike alphabet letters, the note symbols in notation represent more than single ‘sounds’, they also represent the function or role of the note within its tonal (and metric) context. As such, (noted by conductors) a single note, like an individual letter, is not meaningful. Skilled readers read and understand notes in relation to each other within tonal (and metric) contexts. Solmization (associating vocal syllables with pitches as a mnemonic device to indicate pitch relationships or melodic intervals (Hughes & Gerson-Kiwi, 2001) is acknowledged as one approach to relating notes in tonal contexts. Review of conductors’ choral practices in this study indicates that an individual’s formation as a musician impacts how audiation for music reading is developed with singers, if indeed it is addressed. One CT conductor (CT3) used interval training to develop singers’ audiation skills. In combining this work with encouraging choristers to visualise a tonal grid superimposed on the staff when learning repertoire, he avoids Karpinski’s (2000) criticism of ‘atomistic’ training of acontextual musical elements. Tonic or ‘relative’ sol-fa solmization related to

Kodály approaches rather than fixed-doh sol-fa predominates in the Irish context, reflecting conductors' own musical formation and provision for continuous professional development. However, of the ten conductors who used sol-fa with singers, only five (CT2, CN2, CN3, CN4, CM3) consistently applied singers' sol-fa skills to music reading and, in each case, singers' learning was supported in musicianship classes. This suggests that to achieve fluency in solmization for notational audiation, singers' skill development requires an extra space outside of the choral rehearsal space. There is potential for supporting singers' individual practice of sol-fa through use of technology, as used by CN4 and CM3). However, this need prompts a larger question around the context in which children learn foundational music reading skills. Strategies to develop decoding skills for language reading are systematically taught to all children in Irish primary schools, appropriate to their level. As CT3 observed, it is important that children are literate in many different ways.

Musical literacy is just **as important as other sorts of literacy**, whether it be reading a book or mathematical or any number of things. It just **opens up such a world of music making to them . . .** To be able to look at music on a page and **imagine how it sounds . . .** is such a wonderful thing for a child to be able to do. (CT3, Interview 1)

Given the current educational emphasis on developing language reading literacy, issues of equity in access and opportunity to acquire music reading skill exist for Irish children. Curriculum developers should consider the importance of developing children's solmization skills in rhythm and pitch to enable music reading. These skills have been included in Irish curriculum documents since 1971. There is still a strong rationale for teachers, particularly at primary level, to provide support to children in learning basic rhythm and sol-fa to enable them to learn to read music notation independently and to have these skills to bring to music reading in choral contexts. Not to equip children with these skills is akin to using solely a 'whole-language' approach to the teaching of reading text, leaving children without the decoding skills critical for learning to read (Scanlon & Anderson, 2020). As CT3 observes, all children have the capacity to learn to read music.

Any child can do it, you know, it's something that we should be making available to all children . . . we're short-changing children when they don't have that option to learn in the classroom at school. Because not every child is going to be able to have private lessons outside of the school environment . . . **It has to be part of every child's experience** (CT3, Interview 1).

This points to a need for provision of support for teachers' pedagogical knowledge in this area.

6.3 Decoding Fluency through Multimodal Representation

This research suggests a role for multimodal representations of music in gesture, writing, drawing, movement and construction activities in serving as a bridge between aural fluency and fluency in reading WSN. Additionally, it points to the role of representation in deepening singers' understanding of music.

Theories of musical development based on children's representation of music emphasise the role of representation in deepening children's understanding of music and grasp of the operating principles of WSN. Most research studies of music reading in the English-speaking research literature are technique or strategy driven where focus is often on achieving or improving accuracy in reading pitch and rhythm (Hodges & Nolker, 2011; Mishra, 2014). The pedagogies that inform this research, however, (Kodály, Dalcroze, Karpinski, Adolphe) in addition to achieve accuracy, value expressive interpretation and are rich in suggestions for ways to support children in achieving expressive music reading.

An exciting finding in Choirlab investigations was that children's representations of musical sounds revealed rich and varied ways in which they heard and understood musical sounds. Children's representations in activities drawing on Bruner's (1996) enactive, iconic and symbolic modes echoed Bamberger's notion of 'multiple hearings'. Nuances evident in children's representations of the same musical material using different representation modes revealing their different ways of perceiving patterns support Bamberger's conception of development as an accumulation of skill and both Bruner (1996) and Bambergers's (2005, 2011) concept of development as flexible interchangeability between levels or modes of representation rather than a linear progression. Representations also revealed differences in levels of understanding of materials. Whilst singers did not represent the music they sang in invented written notations in rehearsals, conductors' descriptions of their teaching approaches in choral rehearsal included use of movement and gestural representation to varying degrees and of writing and use of manipulatives in musicianship contexts. Group movement techniques used to embody structure by two conductors (CM1, CM3) echo Dalcroze's *Plastique Animée*. When reviewing children's written invented notation artefacts from Choirlab, conductors recognised the musical dimensions children represented in their notations including those representing expressive qualities they perceived.

This research suggests that providing children with opportunities to represent a wide range of musical dimensions through invented notations heightens their awareness of these dimensions but also, aligning with O'Brien (1974), Gudmundottir (2010), and Barrett, (1997; 2004) allows children to

practise thinking in sound to solve problems of representation underpinning the operating principles of WSN.

6.4 Automatic Recognition and Grouping Processes

Ehri's concept of 'sight words' was valuable to this research in suggesting a way of thinking about two processes that appear to be at work in music reading: automatic recognition of patterns and grouping of notes into meaningful musical units. Two important aspects of automatic recognition in language reading are (i) that a reader has a foundation of aural vocabulary in memory and (ii) that a reader has the letter-sound matching skills to rapidly and spontaneously process the letter sound relationships within words so that words are read as units. Conductors' responses to proposed musical 'sight words', together with their consideration of musical units of meaning they would expect singers to recognise in notation, indicated that knowledge of the tonal and metric relationships between notes together with an understanding of the operating principles of WSN is required to support automatic recognition. In music, this aligns with Karpinski's (2000) view that 'as readers theoretical knowledge and speed of comprehension grow, so, too can their abilities to parse meaningful chunks within this advance field of vision' (Karpinski, 2000, p. 174). Sloboda (1985) similarly recognises understanding as underpinning expert performers automatic grouping and recognition of notes in notation. Karpinski's description of two processes involved in accurately performing rhythmic patterns in music echoes sight word recognition and decoding processes in language reading. One process involves a reader matching a pattern against a mental inventory of previously learned patterns, the second involves working out an unfamiliar pattern in real time. Automatic recognition and grouping processes appear to contribute to fluency in music reading in that they facilitate 'reading ahead',

Some conductors with experience of cathedral choir settings believed that being immersed in a choral context enabled singers to learn to read notation by 'osmosis'. This thinking coheres with Share's (1995) 'self-teaching hypothesis' in language reading, the proposal that readers can independently and rapidly expand their sight vocabularies through decoding unfamiliar words during reading. Echoing Goodman's theory of language reading as a 'psycholinguistic guessing game', CT1 observed that his choristers 'quite often just guess. And some are more successful at guessing than others' (CT1, Interview 1). Share's self-teaching hypothesis, however, is dependent upon readers having achieved a certain level of decoding skill for reading to operate as a self-teaching mechanism (Share, 1995; Castles et al., 2018). This appears to explain the variance in singers' success. Whilst the 'assisted' nature of music reading within choral contexts supports singers, decoding skills for music reading require explicit teaching, pointing to the need for fluency in solmization for music reading.

It is unfortunate that most children joining choirs in Ireland have not acquired the necessary level of fluency in decoding and automatic recognition to benefit fully from the opportunities provided to extend their musical vocabularies independently and, resonating with Pikulski and Chard (2005), progress from attending to decoding to having the capacity to give attention to constructing meaning from notation.

6.5 Making Meaning with Musical Vocabulary

Children's fluency in music reading with understanding can be enhanced through inclusion of opportunities for children to practise making their own meanings using their musical language, as they do with words. Speaking and writing are understood to be the complementary literacy skills to listening and reading for interacting with and developing language. In music, improvising and composing would be the comparable literacy skills. However, some conductors initially viewed singing compositions of others as a child's musical equivalent of 'speaking' language. This research highlights the potential that recognising the importance that this key aspect of language reading development has for music reading development.

Primary school conductors, with practical experience and expertise in the teaching of reading were familiar with the importance of expressive language skills. When sharing writing samples illustrating children's progression in language writing together with artefacts of children's representations of a song with conductors, PS4 reacted to the dichotomy in task type.

What you're asking them to do here is a dictation ... Whereas **in the actual writing** [language writing samples], **it's absolutely their own**. There is a difference there. Because they are confined by this tune, it's this tune that they have to notate. (PS4, Interview 3)

She contrasted this with the opportunities children have for using their own language for making and communicating meaning in the writing of daily news at infant level.

The first two lines of 'The News' is usually the same, and formulaic ... there's a certain amount of practising, 'Today is Monday'. But then it's free. So maybe freedom is something that we should be thinking about for music as well. (PS4, Interview 3)

Similarly, CM4 echoing Hultberg's (2002) reproductive and explorative approaches to reading notation reflected:

Maybe that's where we split from the literacy analogy in that the teacher in the classroom from an earlier age is giving scope to creative writing, in terms of when developing their reading

skills. Whereas we tend to focus on the reproduction for much, much, much, much longer.

(CM4, Interview 3)

The inclusion of improvising and composing activities in Kodály, Dalcroze, and Karpinski's pedagogical approaches suggests that the role of meaning making with musical vocabulary is recognised as developing understanding of how music works in the way that speaking and writing are recognised in language literacy. Perfetti and Stafura (2014) highlight linguistic knowledge as supporting comprehension during reading. Mishra's (2014) meta-analysis listed 'creative activities' as one of the most effective interventions to improve sight reading. Two much cited theories of musical development are grounded in creative expression (Swanwick & Tillman, 1986; Webster, 2002). In the Irish context, the curriculum for music at primary level has included composing as one of three strands of musical engagement since 1999. During interviews, conductors in two community settings referred to composing in their contexts. CM1 described inviting a composer to work with her singers to invent a new piece of repertoire. CM3's setting offers a composing class separate to choir or musicianship. CM3 recognised that choral singers who attended this class had opportunities to develop their writing and thinking skills based on their musical experience but could not build on this in choral rehearsal.

If they want to be able to compose music, they have to be able to notate down their ideas. But then in order to know what their ideas are, they have to also experience music. It's ..all complementing each other. It's just it's hard to do everything in the one 30 minutes slot. (CM3, Interview 1)

This research suggests that the role that singers' construction of meaning through expressive use of musical vocabulary plays in developing their knowledge of musical language is not fully understood for music reading as it is in language reading. Awareness of this key role for music reading has implications for practice in recognising the importance of providing singers with opportunities to construct their own musical meaning through improvising or composing activities for developing music reading fluency.

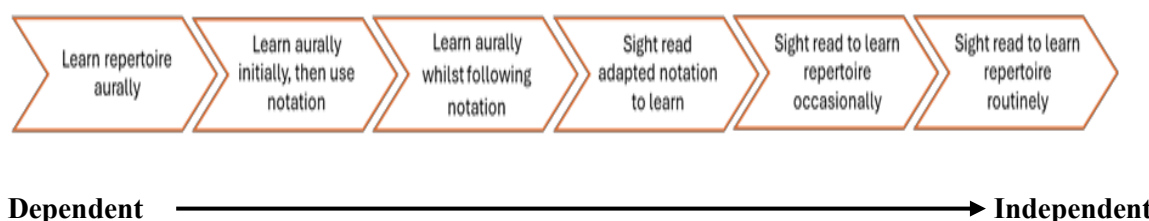
This also points to a need for a broader discussion of the implications of understanding connections between music reading and language reading fluency. This would support choral practitioners on the one hand and highlight the role of creative activities for music reading in educational settings. Whilst composing has been included in curriculum documents for music, the importance of the activities within this strand for supporting music reading is not highlighted. There is potential for the establishment of communities of practice that support choral practice in developing singers' music reading within choral rehearsal (and/or associated musicianship classes) through dissemination and

review of existing research and leading new practitioner-led research on Irish choral practice. In educational settings, there is potential for practice-based research on teachers' perceptions of connections between language reading fluency and music reading fluency.

6.6 Relevance of Music in Children's Everyday Lives

Research question one examined the use of sheet music or notation of any kind within a selection of choirs from four categories of Irish children's choirs. It revealed a diversity of practices within and across categories, shown in Figure 6.2 as a continuum of learning, progressing from singers being dependent upon a conductor or teacher to learn, to becoming increasingly more independent as learners through music reading⁴. The range from aural learning of repertoire supported by lyrics to reading of sheet music to learn, echoes aspects of the development of WSN over time from earliest books of Western European chant containing words only (Kelly, 2015) to the complex, hybrid, partly tablature-like, partly representational system that is WSN (Bent et al., 2001). Notations, however, like writing systems for language, evolve in distinct social and cultural contexts that influence their development, purpose and norms of use (Bent et al., 2001). This research has highlighted the relevance of children's social and cultural contexts to enabling development of music reading fluency.

Figure 6.2: Continuum of Learning Overview



Findings suggest that music in children's everyday lives can support singers' music reading fluency in two ways; (1) in developing audiating skills and (2) in supporting automatic recognition and grouping processes during notational audiation.

Choirlab children's aural store of musical vocabulary, illustrated in the Houseplan Activity and discussed with conductors, highlighted the influence of family, popular culture and media on

⁴ It should be noted that conductors' use of notation with singers differed within and across categories (See 5.1.1). Table 6.2 reflects an overview.

children's sound worlds. This aligns with language reading research which recognises informal experiences gained through children's interactions with parents, family and environments as foundational for reading (Papen, 2005; Neaum, 2017) and with research that acknowledges the influence of popular culture on language literacy (Hagood, 2003; Marsh, 2006). In addition to developing understandings of how music works, children develop aural/oral musical vocabulary through enculturation by being similarly immersed in the musical worlds of their families and environments (Sloboda, 2005). This research suggests that awareness of children's musical vocabularies can support development of audiation skill.

The idea of using children's aural store of musical vocabulary for music reading is not new. Kodály pedagogy recommends drawing melodic and rhythmic patterns from a country's folksong (nursery rhyme and song game) repertoire for music reading. However, whilst nursery rhymes and playground song games were listed by five conductors as sources of musical vocabulary, others (PS4, CM4) noted that many contemporary children are not familiar with this repertoire. CM3 articulated a tension between ideas drawn from previous centuries and contemporary choral contexts.

Using 50-year-old plus pedagogies in a strict way let's say, isn't always conducive to music teaching in our contemporary context. (CM3, Interview 3)

As Irish society becomes more culturally diverse, use of musical vocabulary from popular culture has potential to be more inclusive and relevant to contemporary children, acknowledging their lived experience of music. Indeed, four conductors shared examples from their own practice of using modern idiom to develop singers' aural fluency. Echoing Adolphe's (2013) use of 'real world' sounds from everyday life, CT1 and CM1 also proposed the use of environmental sound patterns (e.g., school bell) from singers' sound worlds for developing audiating skills.

As this research has highlighted, achieving automaticity in solmization for notational audiation requires more time and focus than conductors can devote in choral rehearsals. Use of sound patterns from popular culture and from singers' environments offers opportunities for singers to practise solmization skills outside rehearsal in everyday life if the association between sol-fa syllables and the sounds are made. Additionally, use of technology (through Apps or online resources) could provide 'extended' spaces for individual practice of sol-fa aurally and at recognising patterns in notation. At a macro-level, it also echoes the question of where in the Irish educational system the development of music reading skills is best placed.

6.7 Conclusion

In this chapter key insights from the study findings were discussed. The research findings

- suggest that developing singers' skills in 'basic audiation' can act as a bridge to singers developing skill in audiation for developing notational audiation.
- indicate that multimodal representations of music have a role in connecting music readers' aural fluency and fluency in reading WSN. Additionally, it indicates multimodal representations have potential to deepen singers' understanding of music and of the operating principles of WSN.
- propose further investigation of the operation of automatic recognition and grouping processes in music reading drawn from language reading theory on automatic recognition of sight words.
- suggest that children's fluency in music reading with understanding can be enhanced through inclusion of opportunities for children to practise making their own meanings using their musical language.
- point to the relevance of music in singers' everyday lives for supporting audiation and automatic recognition skills.

The concluding chapter summarises these key insights from the study before outlining limitations and offering suggestions for future research.

7 Conclusions and Recommendations

This chapter summarises and presents the overall research findings in relation to the research aims and questions. Implications of the findings for scholarship and practice are also considered. Limitations of the research are outlined, and suggestions are made for future research building upon the findings. The three overarching aims of the research were:

1. To develop new ways of thinking about and understanding children's development of music reading fluency.
2. To investigate if theory in developing language reading fluency would be useful for developing music reading fluency in the context of children's choirs and
3. To reveal implicit theories of children's music reading held by experienced choral directors of children's choirs.

7.1 Research Aim 1: To Develop New Ways of Thinking About and Understanding Children's Development of Music Reading Fluency

Under this research aim five areas emerged that have potential to extend thinking, which developed directly out of language reading theory. These therefore also address aim 2 of the research, investigating the usefulness of theories and concepts from language reading theory in theorising music reading. Many of the extended ways of thinking about music reading can be encompassed by the term 'fluency', an important concept in language reading theory. This is the ultimate outcome of reading with understanding for both music reading and language reading. Using such a term and its constituent parts can extend thinking through revealing and making visible choral conductors existing practice in this area but also gaps in this practice. Fluency in language reading includes accuracy, automaticity and prosody or expression enabling comprehension. It is characterised by ease of word recognition, appropriate pacing, phrasing and intonation (Kuhn et al., 2010). These concepts map onto developing fluency in music reading and provide a set of terms that can be useful to articulate choral conductors' implicit theories of music reading, thus also addressing research aim 3. One further area emerged as important in practice that could be seen to draw on embodied knowing and multimodal learning, combining aspects of established music pedagogies with more general learning theories and the 'common sense' theories that arise within a conductor's personal practice. As the findings are interlinked, I first address the concepts and theory from language reading fluency, before returning to

this sixth area, considering it within other implicit theories evident in choral directors' discussion of practice addressed under research aim 3.

7.2 Research Aim 2: To Investigate if Theory in Developing Language Reading Fluency would be Useful for Developing Music Reading Fluency in the Context of Children's Choirs

7.2.1 *Aural fluency*

Fluency in internally hearing and understanding (through naming) sounds in relation to each other within a tonal context appears to be a step in developing music reading fluency that lacks sufficient focused attention, is missed out or is considered as being addressed in another context. Developing fluency in reading music is dependent on this step. To read fluently, a reader must first be able to hear sounds internally 'in the mind', sometimes called audiation. To be clear about this, we need to distinguish between basic audiation, remembering and imagining sounds, and notational audiation, calling these sounds to mind in response to written music notation.

Music research literature tells us that notational audiation is well established as a critical aspect music reading. Mishra (2014), drawing upon cognitive and neurological research, highlighted the role of auditory perception in music reading. Sloboda (1984) described sight-reading as a form of musical perception but additionally of musical understanding. Understanding was encompassed in Gordon's (2007) term 'audiation' to describe the process of 'hearing and comprehending in one's mind the sound of music that is not, or may never have been, physically present' (2007, p. 399). An ability to image sound from notation was considered a critical aspect of music reading in each of the pedagogies reviewed, described as 'internal hearing' (Kodály) 'aural facilities' (Dalcroze), 'auralizing' (Karpinski), and 'imagining music vividly in the mind's ear' (Adolphe). However, to 'hear' music from notation, a music reader first needs to develop the ability to aurally image or hear sounds internally, a skill Karpinski (2001) identified as a fundamental sightreading skill that should be targeted in advance of introducing singers to notation. Both imagining and remembering are important here. This ability to image sound is dependent upon an individual having developed an aural bank of musical vocabulary stored in memory to call upon. This internal hearing is 'basic' audiation.

During the Choirlab phase of the research, investigation of children's ability to internally hear or imagine sounds revealed that children could not image sounds as easily as they could imagine pictures or scenes. The implications of this finding are twofold. First a) children need practise at remembering and imagining sounds internally to develop fluency in audiating as a preparatory step for notational audiation in music reading, and b) conductors need to be aware of this and include opportunities for developing audiating skills as an aspect of deliberate choral practice. (Linked to this is understanding

the sounds children already have in their head from daily living which is considered later in this chapter). The ability to remember or imagine musical sounds internally is, however, only the first step towards developing understanding of how musical sounds relate to each other in tonally functional thinking. Research in music and music cognition and pedagogical practice suggest solmization as a means of developing this tonal understanding.

Analysis of interviews with choral conductors revealed that conductors recognised the key role notational audiation plays in fluent music reading but had not considered extensive work needed on developing basic audiation skill. Individuals' formation as musicians and subsequent musical experiences influenced the degree of facility with which they themselves imagined sound from notation. For some it was an accepted, automatic, aspect of their reading, for others it was a skill that they had consciously worked at developing or were continuing to develop. Conductors' formation also influenced their familiarity with ways of developing singers' audiation skills and the emphasis they gave to this.

Conductors with experience of the Kodály approach described developing singers audiation skills through singing and improvising activities. Through these activities, singers were believed to be developing implicit awareness of tonality, tone set and feeling for phrase length, resonating with the sensitivity to the sounds and structures of language developed in phonological awareness activities for language reading.

To support development of conscious tonal understanding, Kodály and Dalcroze approaches use moveable-do, and fixed-do solmization respectively, whilst Karpinski draws upon both in combination with scale degree numbers to emphasise scale degree thinking. The idea of 'aural fluency' in solmization as opposed to 'decoding fluency' is a useful distinction for the better development of music reading. Ten of the 16 conductors described use of sol-fa to differing degrees with singers to support their accuracy in decoding during music reading whilst one used scale-degree thinking.

However, although operating differently, the concept in language of phonemic awareness (associating sounds with letters) relates to the importance of aural fluency in use of a solmization system for understanding sounds. Whatever system is in use for music, a singer needs to be aurally fluent in it, to achieve accuracy and support comprehension when applying this skill in music reading. Fluency can be built up in stages over time as is the case in the Kodály approach where intervals and tone sets are introduced aurally and 'unconsciously' through song material, made conscious using sol-fa and practised through aural activities together with reading and writing activities matched to the reading level.

7.2.2 *Decoding fluency*

However, this can often remain at the level of decoding fluency - where sense is not yet being made of the string of sounds, each being decoded individually. Multimodal representation of music in gesture, writing, drawing, movement and construction activities among other ways appears to be a bridge between aural fluency and fluency in decoding WSN and ultimately reading fluency.

Research literature in language reading highlights an ‘intimate and reciprocal association’ between children’s letter knowledge, phonemic awareness and fluency in decoding (Castels et al., 2018). Young children’s ‘invented spellings; or early spelling attempts are recognised as both revealing and contributing to their developing understanding of how sounds in words map onto the letters of the writing system. Ouellette and Sénéchan (2017) describe children’s invented spellings as ‘a manifestation of children’s ability to represent in print what they hear in speech’ (p.77).

In music, symbols in printed notation represent more than sounds of ‘sounded music’, they also represent inherent relationships between sounds. WSN reflects these multiple dimensions of music in relation to each other, including representation of pitch on a vertical axis, graphic and phonic signs for tempo, expression and articulation and contextual tonal and metric information (Bent et al., 2001), making it a challenging system for learners. Music development research literature values children’s invented notations for music as ‘intuitive and idiosyncratic’ representations of their musical thinking (Barrett, 1997) but also more broadly as a means of investigating children’s developing understanding of music (e.g., Davidson & Scripp, 1988; Bamberger, 1991). Representation of music through writing features strongly in Kodály and Dalcroze approaches. Children are brought gradually and systematically to fluency in decoding WSN in the Kodály approach progressing from representing simple dictated musical patterns using manipulatives such as counters, small sticks and simplified staves to writing more complex patterns on a 5-line stave. Eurhythmic exercises in the Dalcroze approach encourage internalising of rhythm through representing rhythm using the body. Through eurhythmic exercises students do not have to rely on complexity of thought alone to understand rhythm (Anderson, 2012). The mind does not have to compute rhythm patterns if they are known and recognised in the body. These approaches help students towards achieving automaticity and accuracy in decoding WSN.

In the ChoirLab, children had many opportunities to represent music drawing upon enactive (gestural), iconic, and symbolic strategies (Bruner, 1966). Their varying levels of musical understanding were evident in their strategy use and the number of musical dimensions represented. Interestingly use of different strategies and materials to represent the same musical idea could result in a child exploring a wider range of musical aspects.

During interviews with choral conductors, samples of children's representations were reviewed. Conductors recognised children's representations of musical dimensions including expressive aspects of music in the drawings. Although CT3 occasionally in the context of theory/musicianship asked singers to draw in response to what they saw in a score, none of the conductors asked children to represent music they sang or heard using invented notations as part of choral practice. Whilst the question of the most appropriate context and the limited time available for this type of work remained, conductors saw merit in affording children these opportunities.

Representing a wide range of musical dimensions through invented notations not only promotes children's awareness of these dimensions, it also affords them practise at thinking in sound to solve the same types of representational problems addressed in WSN. In addition, it appears to increase children's agency and motivation in meaning-making through notation.

The implications of this are that conductors, or others working with children in music reading, need to be aware of a) the potential of music representation strategies for developing children's understanding of the operating principles of WSN and b) the potential that opportunities to represent music have for preparing fluent expressive music reading, reflecting the understanding gained through meaning-making during representation activities.

Representing music has potential to contribute to children's fluency in 'breaking the code' of the music writing system and building connections between aural fluency in solmization, fluency in decoding music represented in notation and reading notation with musical expectation and understanding.

7.2.3 Automatic recognition and grouping processes

The concept of a 'sight word' in language reading is useful for thinking about developing fluency in music reading. In language reading, automatic word recognition is critical to a reader developing fluency. If a reader's attention is 'drained by decoding words, little or no capacity is available for the attention demanding process of comprehending' (Pikulski and Chard, 2005, p. 551).

Ehri (2005) explains that both automaticity and 'unitisation' (decoding groups of letters within word automatically) are important features of reading words 'at sight' (i.e., from memory at sight of the word in print). Skilled readers have a bank of sight words stored in memory that they recognise automatically in print and so, rarely need to consciously decode words when reading. Automatic recognition facilitates fluent reading through a text, and simultaneous construction of meaning. Sight of a known word 'unit' in print activates its pronunciation and meaning and syntactic role in memory. In music reading 'reading ahead' in music was one area targeted for intervention to improve sight

reading through controlling the pace at which music was presented to a reader. Interventions that targeted musical understanding, rather than reading pace however, were found to be more effective.

Words are recognisable units of language. A language user hears words as individual units and sees them as units on a page distinguished by white space on either side. In music reading this white space does not exist to support grouping of notes that belong together musically so a reader must actively construct musical units as they read. In addition, musical ‘units’ are not ‘static’ or stable. Musical sounds can be heard as belonging together in different groupings or ‘units’ depending upon the context in which they occur.

The idea of musical ‘sight words’ was discussed with conductors in the second interview. Whilst initially some conductors did not relate to this idea, it emerged from discussion that there were particular musical ‘units’ that they would expect their singers to recognise in notation. These included intervals, triads, rhythmic and scale patterns. It could also be the recognition of a repeated motif or the grouping from a sequence. The size of musical groupings could be influenced by the nature of the musical material, by a singer’s breath capacity, the lyric text, and the musical knowledge of a reader. Conductors with a Kodály background related them to typical melodic and rhythmic patterns used to facilitate children’s aural recognition of patterns in learning to read notation. During discussion of sample sight words with conductors they instinctively ‘parsed’ the sample units presented. Sight of three sample musical units prompted recognition and memory of their sounds, their ‘meaning’ in terms of how notes related to each other and to an underpinning tonal and metric context, and whether they would be useful as opening or cadential patterns, thus including aspects of musical meaning. The sample written in Tonic Sol-fa, however, did not activate sound and meaning for most conductors. Those who had a background in sol-fa could read the melodic but not the rhythmic elements of the notation. This points to the importance of having a) an aural foundation of musical vocabulary in memory, b) aural fluency in solmization (for melody and possibly rhythm) and c) familiarity with the music representation system, WSN, to enable fluency in decoding and recognition of familiar musical units.

When Choirlab children represented sample musical sight words taken from songs, they included representations of aspects such as pitch, contour, rhythm, expressive aspects (dynamics, feeling of momentum) and in some cases the meaning of lyric text. Previous musical experience appeared to influence representations.

The concept of a ‘sight word’ in language literacy proposes a way of thinking about music reading that has potential to reveal grouping and recognition processes in music reading that need further attention.

7.2.4 *Relevance of music in children's everyday lives*

Both audiation and musical 'sight word' recognition can be supported by children's everyday experiences with music. Language reading theory recognises literacy experiences that children gain through interactions with parents, family and their environments as foundational for formal learning in reading (Papen, 2005; Neaum, 2017). These include developing a rich aural vocabulary. Linguistic knowledge is further recognised as one of three key knowledge sources that facilitate a reader's comprehension of text (Perfetti & Stafura, 2014). Hagood (2003) and Marsh (2006) note the influence of popular culture and media in language literacy. Similarly with music, Campbell and Lum (2007) observe that children are immersed in the musical worlds of their families and environments. Children's unconscious or informal learning of musical vocabulary is recognised as developing through enculturation. Awareness of the types of 'sounds in their heads' that children already have stored in memory can support development of audiation skill.

Findings from the House Plan Activity in the Choirlab revealed that the strongest influence on children's aural musical vocabularies was popular culture. Choirlab children's 'sounds in their heads' included vocabulary from 'classic' and contemporary popular music, music from films and musicals, advertisements from television and radio. When this finding was shared with choral conductors, some conductors shared similar experiences of drawing upon aural snippets from pop songs or advertisements for melodic audiation. Some, realising their lack of awareness of children's aural vocabulary, commented on the melodic potential of popular songs. For others it had potential in addressing the challenge of teaching music reading in a way that is relevant to contemporary children. Two conductors did in fact include environmental sound patterns absorbed during everyday life.

An expanded way of thinking about music reading fluency includes conductors being aware of the sounds already stored in children's aural memories that they can use to support audiation and sight word recognition. Achieving automaticity in solmization requires more time and practise than can be accomplished in a weekly rehearsal. Drawing upon children's aural store of popular culture and environmental vocabulary potentially affords children opportunities to practise this skill outside rehearsal if these are related to Sol-fa within rehearsal. This parallels ways that children might also recognise words in the environment in language reading. In fact, a further aspect identified by the conductors in this study was the lack of opportunities to develop 'print awareness' of notation in the way that children are routinely exposed to printed language in environmental print.

The analysis carried out in the Choirlab study of advertising jingles well known to these children is a very small beginning to identifying the type of material that might be useful in connecting children's environment with their developing fluent music reading skills. The implications of this research is that

it would be useful to develop a resource for choral conductors to draw on to connect with fluent reading development but that they should also become aware of the sounds in their singers' lives that can support their fluent music reading. Given that time is an issue, a digital resource could be developed and also be made available to children that uses contemporary musical vocabulary, and represents musical 'sight words' in different ways, including WSN which can be used outside the rehearsal.

7.2.5 *Making meaning with use of musical vocabulary*

Just as words are used with meaning, musical sounds are used to communicate such things as endings and developments, for example in sequences or variations. Children's fluency in music reading with understanding can be enhanced through inclusion of opportunities for children to practise making their own meanings using their musical language.

Facility with vocabulary in language reading and writing is understood to be influenced by a reader's oral language skills. Oral language skills include both listening comprehension and verbal expression. Vocabulary development for language reading also includes expressive vocabulary, the language that a child can use to make meaning and go on to read with understanding (Strickland and Riley-Ayers, 2007). In Mishra's (2014) meta-analysis, 'creative activities' were included in the list of most effective interventions for improving sight reading. Training in improvisation and composing deepened musical understanding of structure, facilitating prediction of structure and the ability to develop stylistically appropriate melodic expectations (Mishra, 2014). Children making their own musical meaning in these activities supports sight reading fluently with understanding. This idea from language reading supports the pedagogical practice of improvisation being included in the improvisation activities included in Kodály, Dalcroze, and Karpinski's approaches. Adolphe also develops musical thinking skills through improvising and composing activities.

One of the ChoirLab activities that children enjoyed but found challenging was to invent a new ending for the song *When the Saints go Marching in*. It was evident that the children who successfully improvised a new ending drew upon their aural experiences of music to make a satisfying musical ending.

Many conductors initially viewed singing as the equivalent of children using spoken vocabulary. However, when children speak, they use their own words. Whilst singing facilitates musical expression, when performing choral repertoire, unlike language, children are singing a composer's invention rather than their own. Through using language to communicate meaning children learn how

language works to make meaning. CN2 observed that a young child using language to communicate will often use it incorrectly or incompletely but that this is an accepted stage of development.

Understanding of the role that children constructing their own musical meaning has in developing fluent music reading, has the potential to extend practitioners' thinking on music reading fluency. The implications for this are that there should be an increased emphasis on children having opportunities to learn how musical expression and meaning works through using their own musical language, for example in improvising or composing and supporting games and activities.

7.3 Research Aim 3: To Reveal Implicit Theories of Children's Music Reading held by Experienced Choral Directors of Children's Choirs.

Together with the implicit theories discussed under research aim 2, the strongest theory to emerge from conductors' implicit thinking-in-practice stems from their use of techniques to embody musical fluency. The purpose of learning in choral rehearsal is to prepare pieces for fluent expressive performance. Time constraints restrict conductors' ability to focus on developing children's music reading skills for fluent reading within rehearsal. Some conductors drew upon embodied ways of helping singers toward fluent delivery of repertoire. Some were revealed when conductors considered how they might approach teaching Finzi's Lullaby. For example, CM3 described singers using imaginary paint brushes during learning to embody articulation, dabbing for staccato and long strokes for legato passages. Imaginary phrase strings were drawn in an arc in the air to show fluid movement and length of phrases. She also described asking singers to work out whether it 'felt right' to bow at a phrase end, to embody an open or closed phrase. PS1 asked singers to 'dance' tricky rhythmic aspects of the music and described using shoulder movement to represent semitone movement. Other conductors used physical metaphors to assist with accuracy in articulation, physically pretending to throw a ball into a hoop, imagining landing on a soft pillow. Two conductors (CM1, CM3) described singers physically representing the entry of vocal lines in a score by moving forward or back in a circle or in relation to another part as their line entered, resonating with Dalcroze's *plastique animee* group listening technique.

Whilst this all could be seen as part of a theory of embodiment it also fits into a theory of multimodal learning. Any extended way of thinking about music reading that draws on language reading theory should also encompass this embodied and multimodal learning. Within the Choirlab, children's musical thinking and understanding was evident in the multiple ways in which they interacted with music. Through engaging in enactive, iconic and symbolic representation during audiating, singing, reading, listening and improvising tasks they explored and revealed musical dimensions.

7.4 Limitation of the Research

Whilst the study includes four different contexts of choral practice through purposive sampling, these were included to ensure a diversity of individual practice in choral conductors' interviews and were not a study of these contexts in themselves. It was not possible in this research to comment on trends or patterns in choral conducting nor was this the intention of the research. The research is limited to music reading in Irish children's choral contexts and the research cannot be generalised to music reading in instrumental contexts, likewise the findings do not necessarily pertain to adult singers. Whilst the researcher's background as a choral conductor and music educator could be perceived as a limitation in having an 'insider' perspective, it was in fact an advantage to the aims of the research in terms of co-construction of meaning with conductors. To facilitate this a relatively small number of conductor participants were selected. Finally, the purpose of the children's Choirlab phase was exploratory, to inform the researcher, to tease out and analyse ideas from the literature, and to develop material for the interview phase for discussion rather than to test or confirm particular approaches or to assess or develop children's music reading skills.

7.5 Implications of the Research for Scholarship and Practice

The research makes a contribution to choral practice both theoretically and practically. Theoretically it proposes use of concepts and vocabulary from theory in language reading fluency for extending thinking in music reading and highlights important gaps in practice for developing music reading fluency.

Whilst questions remain in relation to the place of music reading development, implications of findings for choral conductors include a) awareness of the focused attention and time required to support the development of fluency between audiation, solmization, decoding fluency and full reading fluency for music reading b) the potential of representation strategies as a bridge between aural and decoding fluency and for deepening understanding for music reading in rehearsal and c) the relevance of music in children's lives as a resource to support music reading. Programmes for the training of choral leaders should include development of student conductors' awareness of these aspects.

Whilst focused on children's music reading in choral practice, findings may also be useful to music educators more widely. Development of fluency requires focused attention over time. This should be of interest to Irish policy makers in relation to a) considering the time required for developing fluency in music reading in formal educational contexts, b) for curriculum development and c) for informing thinking and practice in teacher education in music.

For music researchers, the model of the Choirlab as a preparatory exploratory phase in research or a research methodology in its own right, could provide a useful methodological model. Separately, researchers' use of creative research methods, employed to investigate children's musical thinking within the Choirlab, could contribute to developing understanding of children's approaches to learning and creating music.

In terms of extending into practice the findings of the potential of fluent language reading theory for capturing and revealing important aspects of developing fluent music reading, a number of initiatives would have potential

- (1) further collaborative work with these conductors to continue to develop these ideas into resources that would be usefully integrated into national choral practice and form the basis of professional development modules.
- (2) The development of a database of real-world examples of music from popular culture that children are aware of and an analysis of the types of sounds they have 'in their heads' so that choral conductors can use this to build on and develop audiation fluency to decoding fluency to full reading fluency.
- (3) To use this collection to develop a digital tool as the basis for a digital means of children reinforcing and relating these sounds to their music reading outside of the rehearsal time. In this way somewhat overcoming the time limitations and supporting practise of skills for fluency in music reading outside rehearsal.

7.6 Recommendations

As this thesis attests there is enormous potential for drawing upon theory on language reading fluency to inform music reading fluency in choral contexts and more broadly in education. Findings raise the question of the context in which children should learn foundational music reading skills. Issues of equity in access and opportunity to acquire music reading skill exist for Irish children impacting on their opportunities for learning in choral contexts.

This research recommends the establishment of communities of practice that support choral conductors in developing singers' music reading within choral rehearsal and/or associated musicianship classes through dissemination and review of existing research and leading new practitioner-led research on Irish choral practice.

This research highlights a need for authentic choral repertoire suited to singers at varying levels of reading skill. It recommends that composers of children's choral repertoire consider the need for young singers to have material at their level to achieve music reading fluency.

The research has highlighted the potential of theory and concepts from research on language reading fluency for developing music reading fluency. Consideration by music theorists of the breadth of research in language reading has potential for expanding thinking in music cognition.

Currently, most singers joining children's choirs have not acquired the necessary aural fluency skill in advance to support their music reading in choral contexts. Primary education is the ideal setting for addressing this. Teachers should be supported in fostering children's music reading skills within a broader music curriculum.

New ways of thinking about music reading drawn on language reading fluency should be integrated within teacher education at preservice, induction and continuing professional development stages as well as into other agencies of the State, charged with the teacher education in its broadest sense.

In preservice, student teachers should learn about connections between processes in language reading fluency and music reading fluency and bring this way of thinking for music reading into their work with children in the induction phase of their careers.

In educational settings, there is potential for practice-based research on teachers' perceptions of connections between language reading fluency and music reading fluency

Policy makers such as curriculum developers should look for similar theoretical connections across subject areas to inform thinking on children's development levels and expectations of teachers.

Professional Development provision should take account of the needs of teachers to be supported in implementing music reading as part of a broad music curriculum.

Researcher bodies (e.g, Government funders) should incentivise funding to build on the possibilities for further exploration of connections between language reading fluency and music reading fluency.

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9 Appendices

Appendix A: Letter to Schools

Chairperson

Board of Management

Dear Chairperson,

As you and the Board are aware, I am currently on leave from ____ school in order to pursue studies towards a PhD degree in music education. I write to seek the Board's permission to invite a group of children from the school to participate in the research and in addition, for permission to use a classroom space outside of school hours for an hour each week for ten weeks between April and June.

The purpose of the research (Thinking in Sound: Developing a conceptual framework for a communicative, meaning-making approach to children's music reading in choral contexts) is to investigate children's musical thinking as they engage in reading music notation in choral contexts. Over a number of years I have worked with a group of children from 4th to 6th class in the school who form a choir known as the 'Harmony Boys'. These children would be an ideal group to work with in terms of their age and their experience of learning together in a choral context.

The main part of this research will be completed with a group of expert choral conductors. However, as a means of investigating how children make sense of music notation in practical terms, I would like to invite these pupils to be part of a Choirlab, a small group of children with whom I will investigate music reading strategies and approaches. These will involve children in writing, drawing, moving and singing activities. As a primary school teacher, I am particularly interested in finding out whether theories of how children learn to read language can be useful in understanding children's thinking and development in music reading. As researcher, I plan to take notes on the Choirlab activities and will share observations and reflections with the choral conductor participants during interviews. With parental consent and the children's permission, I hope to use samples of children's work (written and audio-recordings) to illustrate my observations and promote discussion.

The research will be carried out in line with Dublin City University's ethics protocols. Ethical approval is currently being sought. On receipt of ethical approval I will forward, for the Board's information, a copy of the Plain Language Statement and Informed Consent Form for parents together with a copy of the Plain Language Statement and Assent Form for children.

I appreciate the support that the Board has already afforded to me in pursuing this research.

Thank you for considering this request.

Le dea-ghuí,

Yvonne Higgins

Appendix B: Invitation Letter

April 8, 2019

Dear Parents,

As you may already know, I am currently on leave from St. Patrick's B.N.S. in order to complete research as part of the requirements for a PhD degree. The research investigates children's musical thinking and learning in choral settings. The purpose of this letter is to invite your child to participate in the research project.

I have enclosed two *Plain Language Statements* with this letter, one for parents and one for children, outlining the detail of what is involved in taking part in the study. Also enclosed is an *Informed Consent Form* for parents and an *Assent Form* for children.

If your child would like to participate in the research, and, having read the enclosed information you are happy to give your consent, then please sign and return the attached *Informed Consent Form* (for Parents) to Sharon at the office. There is no onus on any child to participate. As soon as I have received the forms, in line with best research practice with children, I will arrange to meet with the children to read through the the *Plain Language Statement* (children's version) again before asking them to sign the *Assent Form*. The *Assent Form* is enclosed with this letter for your information.

Ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee. I am very grateful to the Board of Management of the school for facilitating my making contact with you in relation to this research. My contact details are below if you would like to ask any questions about the project. Contact details for the research supervisor and the Research Ethics Committee are included in the Plain Language Statement.

Thank you for taking the time to read this letter and the enclosed information.

Kind regards,

Yvonne Higgins

Telephone: 01-8842081 email: yvonne.higgins@dcu.ie

Appendix C: Plain Language Statement (Choral Conductors)

The purpose of this research ‘Thinking in Sound: Developing a conceptual framework for a communicative, meaning-making approach to children’s music reading in choral contexts’ is to investigate children’s musical thinking as they engage in reading music notation in choral contexts and to contribute to theory and practice in this area. Ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

It will be conducted by Yvonne Higgins, a doctoral candidate at the School of Theology, Philosophy, & Music in Dublin City University (DCU), who is completing this research as a requirement for a PhD degree. Her research will be supervised by Dr. Patricia Flynn at the School of Theology, Philosophy and Music, DCU. It is supported by a scholarship from Music Generation in partnership with DCU. The researcher is particularly interested in investigating whether aspects of theory from language reading research on how children learn to read language, could be used to explain or develop theory on how children learn to read music notation.

The research will be completed with a group of expert choral conductors of children’s choirs working in a range of choral settings, allowing the research to draw upon collective experience and insight. Each conductor will be asked to participate in three one-to-one interviews of not more than an hour’s duration each, between August 2020 and January 2021. The interviews will be conducted in the format with which the participant is most comfortable, online or in-person, with all relevant precautions taken. With each conductor’s permission, the interviews will be audio-recorded and later transcribed for analysis, to identify emerging themes. Each conductor will receive a copy of his or her own transcript following each interview in order to check for accuracy or clarification. In relation to confidentiality, only the researcher and the research supervisor will view interview transcripts. Should the services of a transcriber be required, a confidentiality agreement will be put in place.

As a separate, but related strand of the research, and as a means of investigating how children make sense of music notation in practical terms, the researcher set up a Choirlab and worked with a group of children to investigate strategies and approaches. The researcher has taken notes on the Choirlab activities and will share observations, reflections and children’s work samples with choral conductor participants during interviews.

Research findings will be published in a final thesis and disseminated through lectures, conference presentations, and in papers submitted for consideration for publication in academic journals. To illustrate and strengthen the final report of the findings, the researcher will need to quote extracts from

interviews. In any reporting of the research findings pseudonyms rather than participants' names, will be used and data relating to conductors and their settings will be anonymised. Whilst every attempt will be made to keep each conductor's identity confidential, given the relatively small number of conductors involved in choral practice with children in particular contexts in Ireland, anonymity cannot be fully guaranteed.

Audio recordings of interviews will be destroyed on completion of the research. Transcriptions of the interviews will be held on a password protected drive accessible only to the researcher and research supervisor. Interview transcripts will be destroyed five years following the completion of the research. In line with DCU policy, confidentiality of information provided during interviews is subject to legal limitations.

Participation in the research is completely voluntary and participants may withdraw from the research study at any point. No reimbursement is offered for participation. However, participation in the research does offer an opportunity, indirectly, to contribute to Irish choral practice in terms of developing children's musical thinking in relation to reading from notation. In addition, a summary of the research findings will be made available to conductors who participated in the study following completion.

Should you have any questions in relation to the research or to your participation in the study, contact details for the researcher and supervisor are:

Yvonne Higgins: email: yvonne.higgins@dcu.ie; telephone: 01-7009102.

Patricia Flynn: email: patricia.flynn@dcu.ie; telephone: 01-7007056.

If participants have concerns about this study and wish to contact an independent person, please contact:

The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000

Appendix D: Informed Consent Form (Choral Conductors)

Research Title: ‘Thinking in Sound: Developing a conceptual framework for a communicative, meaning-making approach to children’s music reading in choral contexts’

Researcher: Yvonne Higgins, Doctoral Candidate

Research Supervisor: Dr Patricia Flynn, Senior Lecturer in Music and Researcher Convener, School of Theology, Philosophy, and Music at Dublin City University.

Research Purpose: to investigate children’s musical thinking in relation to music reading in choral contexts; to examine whether aspects of theory in language reading research could be used to explain or develop theory in children’s music reading; and, to contribute to knowledge and practice in the field of Performance Music Education.

Please complete the following (Delete Yes or No as appropriate for each question)

I have read the Plain Language Statement	Yes/No
I understand the information provided	Yes/No
I have had an opportunity to ask questions and discuss this study	Yes/No
I have received satisfactory answers to all my questions	Yes/No
I agree to participate in three one-to-one interviews of approximately an hour’s duration with the researcher between August 2020 and January 2021	Yes/No
I am aware that, subject to HSE guidelines, I can elect to be interviewed in a face-to-face or online format	Yes/No
If using the Zoom application, the researcher has alerted me to its limitations	Yes/No
I am aware that the interview will be audio-recorded and transcribed for analysis by the researcher	Yes/No
I understand that data gathered will be analysed by the researcher and used in the reporting of the research findings in a thesis submitted to DCU,	

and in conference presentations, lectures, and academic publications	Yes/No
I am aware that unattributed excerpts from interviews may be used to illustrate findings in the reporting of the research findings outlined above	Yes/No
I am aware that arrangements are in place to protect confidentiality of data and that confidentiality of information provided is subject to legal limitations	Yes/No
I understand that whilst data will be anonymised, participant anonymity cannot be fully guaranteed	Yes/No

I have read and understood the information in this form. My questions and concerns have been answered by the researcher, and I have a copy of this consent form. Therefore, I consent to take part in this research project.

If it is not possible for this form to be signed in person, consent may be provided by email

Participants Signature: _____

Name in Block Capitals: _____

Witness: _____

Date: _____

Appendix E: Plain Language Statement (Parents)

The purpose of this research ‘Thinking in Sound: Developing a conceptual framework for a communicative, meaning-making approach to children’s music reading in choral contexts’ is to investigate children’s musical thinking as they engage in reading music notation in choral contexts.

It will be conducted by Yvonne Higgins, a doctoral candidate at the School of Theology, Philosophy, & Music in Dublin City University (DCU), who is completing this research as a requirement for a PhD degree. Her research will be supervised by Dr. Patricia Flynn at the School of Theology, Philosophy and Music, DCU. It is supported by a scholarship from Music Generation in partnership with DCU. Given the researcher’s background in primary teaching, she is particularly interested in investigating whether aspects of theory from language reading research on how children learn to read language, could be used to explain or develop theory on how children learn to read music notation.

The main part of this research will be completed with a group of expert choral conductors. However, as a means of investigating how children make sense of music notation in practical terms, the researcher will set up a Choirlab, to work with a small group of children to investigate strategies and approaches. These will involve children in writing, drawing, moving and singing activities. The researcher will take notes on the Choirlab activities and will share observations and reflections with choral conductor participants during interviews. Samples of children’s work (written or audio-recorded singing samples) will be used to illustrate observations and promote discussion. The researcher’s observations and children’s work samples may also be reviewed by the research supervisor.

If your child would like to take part in the study, he will be invited to participate in a ‘choir lab’ or workshop of an hour’s duration after school once a week for ten weeks between April and June of this school year (2019). He will be asked to agree to participate in the research separately, by the researcher (Child Plain Language and Assent forms enclosed for your information). Participation in this study is completely voluntary and your son may withdraw from the research study at any point. There is no payment for participation, nor is there any penalty if your child does not wish to take part. To facilitate researcher observation it may be necessary to restrict places.

When the research is completed findings will be reported in a thesis, which will be submitted to Dublin City University for examination. Research findings will also be presented at conferences, at lectures and as papers for consideration for publication in academic journals. Samples of children's work and extracts of children's singing may be used in the reporting but no child will be identified by name. An opportunity will be provided, should you wish, to hear feedback on research findings.

In relation to confidentiality, information relating to the children will be anonymised; children will be referred to by pseudonyms. Your child's name will not be used in any reporting of the research. Photographs will only be taken of children's work and not of children themselves. Photographs or audio-recordings of the children's work will be stored securely on an encrypted computer at the university. When the research is completed the data will be destroyed in line with university policy. To ensure child protection, the research will be carried out in accordance with *Children First: National Guidance for the Protection and Welfare of Children (DCYA, 2017)*. Ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

Should you have any questions in relation to the research or to your child's participation in the study, the contact details for the researcher and supervisor are below:

Yvonne Higgins: email: yvonne.higgins@dcu.ie; telephone: 01-7002081.

Patricia Flynn: email: patricia.flynn@dcu.ie; telephone: 01-7007056.

If participants have concerns about this study and wish to contact an independent person, please contact:

The Secretary, Dublin City University Research Ethics Committee, c/o Research and Innovation Support, Dublin City University, Dublin 9. Tel 01-7008000

Appendix F: Plain Language Statement (Children)

As you know, Ms. Higgins is not in school this year. Instead, she is a student in Dublin City University (DCU) working on a research project. The purpose of this research is to investigate how children in choirs think when they are reading and singing from written music. She is interested to know what helps them to figure out how the music should sound. She wonders whether the ways in which children think, when they read and understand words and sentences in books, could be useful to children when they read music. She would like your help to find out.

Over the last few years she has read many books and articles by people who have researched how children learn to read different languages (including English) and how they learn to read music. She would like to try out some of the ideas that she has found with Irish children to see how they work. To do this she is going to set up a Choirlab, a special type of choir that will try out and use these ideas to learn songs. Some of the ideas involve using imagination, drawing, writing, gestures, moving and singing to learn how songs should sound. The Choirlab will meet for one hour after school each week for ten weeks between April and June. Ms. Higgins will take notes to help her remember and think about how the ideas work.

As well as this work with children, Ms. Higgins plans to talk to some conductors of other children's choirs to ask them about the strategies that they use to teach their choirs. She will tell them about the ideas she found in the research and about how they worked with Irish children in her Choirlab and ask for their help. She will need to share some of the drawings, writing or perhaps recordings of singing that children create in the Choirlab to help her to explain to the other conductors how the activities worked but she will not share any child's name. To make sure that she is following the rules of research, a lecturer in the University who is an expert in research will need to check Ms. Higgins' work, including the Choirlab work. She will do this by reading Ms. Higgins' notes and looking at, or listening to, samples of children's work.

When the research project is completed, Ms. Higgins will write about what she found out (called the research findings) in a book called a thesis that will be submitted to the University. She will also present the findings at conferences and, perhaps, in books or journals for other researchers and teachers to read. Some of the children's work might be displayed or be published in books or articles. Even if your work is used, your real name will not be given. Instead, Ms. Higgins will change the

names and explain to people that she has done this to protect the children's identity. If you would like, she will speak to the Choirlab singers about the research findings also.

If you are interested in being part of this research and in joining the Choirlab please talk to your parents about it first. If it suits, and if they and you agree, then Ms. Higgins will ask you to meet her in school to sign an agreement form. You do not have to join and even if you do join, you or your parents can decide that you will leave at any time. If you have any questions you can ask Ms. Higgins when she comes to school to arrange a meeting with the pupils who are interested in joining or you can ask your parents to contact her.

Thank you for reading this information

Appendix G: Informed Consent Form (Parent)

Research Study Title: ‘Thinking in Sound: Developing a conceptual framework for a communicative, meaning-making approach to children’s music reading in choral contexts’

Researcher: Yvonne Higgins, Doctoral Candidate, School of Theology, Philosophy, and Music, Dublin City University.

Research Supervisor: Dr Patricia Flynn, Senior Lecturer in Music and Researcher Convenor, School of Theology, Philosophy, and Music at Dublin City University.

Research Purpose: to investigate children’s musical thinking in relation to music reading in choral contexts; to examine whether aspects of theory in language reading research could be used to explain or develop theory in children’s music reading; and to contribute to knowledge and practice in the field of Performance Music Education.

Please complete the following (Circle Yes or No for each question)

I have read the Plain Language Statement	Yes/No
I understand the information provided	Yes/No
I have had an opportunity to ask questions and discuss this study	Yes/No
I have received satisfactory answers to all my questions	Yes/No
I agree to my child attending weekly ‘Choirlab’ workshops of one hour’s duration outside school hours for ten weeks between April and June of 2019 in order to participate in the research.	Yes/No
I am aware that my child’s work (written and audio-recorded singing samples) may be shared with others for research and educational purposes	Yes/No
I understand that I may withdraw my child from the research study at any point	Yes/No
I understand that data gathered will be analysed by the researcher and used in the reporting of the research findings in a thesis submitted to DCU,	

and in conference presentations, and academics publications Yes/No

I am aware that arrangements are in place to protect confidentiality of data and

that confidentiality of information provided is subject to legal limitations Yes/No

I have read and understood the information in this form. My questions and concerns have been answered by the researcher, and I have a copy of this consent form. Therefore, I consent to my child taking part in this research project.

Participants Signature: _____

Name in Block Capitals: _____

Witness: _____

Date: _____

Appendix H: Assent Form (Children)

Please complete the following (Circle Yes or No for each question)

I have read the Plain Language Statement (or it has been read to me) and I understand the information in it Yes/No

I had a chance to ask the researcher any questions I had about the research and I was happy with the answers to my questions Yes/No

I understand that I can take part in the research by attending Choirlab after school for ten sessions between April and June, 2019 Yes/No

I understand that my work (writing, drawing, recorded singing samples) may be shared with other conductors and researchers Yes/No

I know that my name will never be used in reports about the research Yes/No

I understand that the researcher will write about the Choirlab in a thesis for DCU, and that she will share the research findings with other researchers at conferences and in books or journals
Yes/No

I know, that if I wish, I can leave the Choirlab and research study at any time Yes/No

I agree to take part in this research project.

Participants Signature: _____

Name in Block Capitals: _____

Witness: _____

Date: _____

Appendix I: DCU Research Ethics Committee Letter of Approval

Ollscoil Chathair Bhaile Átha Cliath
Dublin City University



Ms Yvonne Higgins Murphy
School of Theology, Philosophy and Music

4th April 2019

REC Reference: DCUREC/2019/042

Proposal Title: Thinking in sound: Developing a conceptual framework for a communicative, meaning-making approach to children's music reading in choral contexts.

Applicant(s) Ms Yvonne Higgins Murphy, Dr Patricia Flynn

Dear Colleagues,

Further to expedited review, the DCU Research Ethics Committee approves this research proposal.

Materials used to recruit participants should note that ethical approval for this project has been obtained from the Dublin City University Research Ethics Committee.

Should substantial modifications to the research protocol be required at a later stage, a further amendment submission should be made to the REC.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Mark Philbin'.

Dr Mark Philbin
Interim Chairperson
DCU Research Ethics Committee



Taighde & Nuálaíocht Tacalocht
Ollscoil Chathair Bhaile Átha Cliath,
Baile Átha Cliath, Éire

Research & Innovation Support
Dublin City University,
Dublin 9, Ireland

T +353 1 700 8000
F +353 1 700 8003
E research@dcu.ie
www.dcu.ie

Appendix J: COVID-19 Protocol

Researcher & Research Participant Safeguarding Confirmation Information

I confirm that, during the last fourteen days I have not:

- been recovering from Covid-19;
- been in close contact with any confirmed case of Covid-19;
- travelled outside of Ireland;
- experienced symptoms of Covid-19 (e.g. cold or flu-like symptoms, loss or change to sense of smell or taste).

I agree to the safeguards put in place to keep the research participant and researcher safe:

- Physical distancing of 2 metres
- Use of visor or masks
- Use of an alcohol-based sanitiser for good hand hygiene and good cough and sneeze etiquette.

Signature Research Participant _____

Date _____

Appendix K: Interview 1 Schedule

Interview Schedule – Interview 1

(Focus: Conductors' Musical backgrounds; Choral Contexts & Current Practice in relation to Children's Musical Thinking in Music Reading)

Introduction of researcher's purpose

I'd like to start by thanking you for agreeing to participate in this research. As you know, the purpose of the research is to contribute to improving theory and practice in children's choral contexts through investigating the development of children's musical thinking or meaning making from music notation.

The research methodology that I am using involves generating theory from 'real-world' on the ground contexts. I'm hoping to draw on the collective experiences of expert choral conductors of different types of children's choirs in order to gain insights from a range of perspectives into choral conductors' theories of music literacy and the approaches that they use to develop children's music reading in choral contexts.

With your agreement, in this first interview, I'm going to focus on three main areas: the context within which you work with your choir(s), your own musical background or training and your reflection and observations on your experiences of developing children's music thinking and reading skills in your choral context. Through conducting these interviews I'm hoping to build up a detailed picture of current practice in choral practice in a variety of settings.

1. Children's Choir Context

Question 1.

The context in which a conductor works often influences the types of practices that are possible. I'd like to start by asking you to tell me a little about the choir or choirs that you work with.

Could you tell me a little about your children's choir?

Follow-up prompts:

- Its context or the purpose for which it was formed (a community / church/ school/ other type of choir)?

- The children's choir members (age group, gender, socio-economic background, whether they also learn instruments)?
- How often they rehearse?
- The type of repertoire that they sing?
- How often they perform?

2. Conductor's musical background in relation to musical thinking and music reading

Sometimes our own teaching and how we think about it is influenced by how we ourselves learned.

Question 1.

- Can I ask you about **your musical background**?
 - o For example, your own memories of when you learned to read music? Do you actually remember learning?

Follow-up prompts

- Were you a child or an adult at the time?
- Is it something that you developed over time, returned to at different stages?
- In what context did you learn?
 - o Individually/with others?
 - o In the context of learning an instrument? In a choir setting?
 - o At school? In college?
 - o As an adult? Self-taught? Online course?

Question 2.

- Do you remember **how you were taught**? Could you tell me what you remember about it?
 - o any materials or strategies that were used?
 - o Were rhythm and pitch tackled separately or together?
 - o Did you ever use gesture, Sol-fa, handsigns, numbers, letter names for pitch?
 - o Do you remember ever using rhythm names, counting, simplified rhythm notations?
 - o Did you move beat, clap rhythms?
 - o Were you ever asked to notate music (e.g. dictations? Invented notations)
 - o What about expressive aspects of the music, do you remember working on learning to read expressively?

- Do you enjoy it as an activity? Was it difficult or easy? Do you remember having a sense of achievement?
- Have you any memories of the experience of others around you learning to read music?

Question 3. Purpose in conductor's learning to read

Was music reading used as a means of learning new material or as a separate activity or skill (part of requirements for an exam perhaps?) purpose of learning to read

Question 4. (Conductor's valuing of teaching/learning to read music?)

Do you think that it is important for 21st century children to be able to read music notation? Why/Why not?

Follow-up prompts

- Is music reading useful or valuable in this technological age?

Theories of Audiation /Thinking in sound

Question 1

Some music theorists suggest that as a singer reads through a piece of music notation, he/she creates aural images prompted by the music notation. S/he 'hears the music' internally in the mind's ear.

- Does this idea of imaging or imagining sounds in response to music notation as part of the process of music reading resonate with your experience of reading music or of teaching children to read notation?

Question 2

Do you ever incorporate ways of developing this ability in your singers?

What types of activities would you use?

Conductors' use of music notation with singers in choir context

Question 1

Do you use music notation with your singers? Yes/No?

- Do you use notation (or invented notation or gesture) in your teaching? (e.g. pointing out music or representations of music to singers from IWB/board)
- Do the singers sing from notation during performances or during rehearsals?
- Do they ever invent their own notation or annotate the music?

Question 2

What would you say your purpose is for using notation? (or What influenced you in deciding not to use notation with your singers?)

- Is it a means of teaching and learning the music, to speed up the teaching/learning process?
- to lessen the load on or visually support aural memory?
- to help children to remember the words of song texts?
- to follow their part in the context of others, to know when to 'come in'
- to facilitate deeper study of a piece (e.g. in terms of structural relationships)?

Question 3

Do you include teaching music reading skills in your choir rehearsals? (or do they learn this separately?)
How do you go about teaching music reading? (or, if they learn music reading skills separately how do you support their reading during rehearsal)

3.1 If you teach your singers to read music, do you have a particular way of working with them?

Follow-up prompt

- Do you follow a particular method or have you created your own over time that draws on particular strategies (e.g. Kodály, Dalcroze, Orff, particular Choir Level Books)?
- Is it something that you target or is it developed over time through immersion?
- Do children in your choir learn from those around them (immersion) in addition to learning to read independently? (individual vs pair/group-work) (collaborative learning)

3.2 Are there particular strategies that you use to develop children's accuracy and fluency in reading music?

- use of handsigns, solmization (Sol-fa syllables, rhythm syllables), gesture/movement?
- repeated practice?

- reading similar material within a genre?
- teaching skimming, scanning, chunking visual processes?
- Use of 'writing' or representing (e.g. dictation, invented notations)? By conductor? By singers?
- Use of both visual and aural processes in music reading
- How do you manage the challenge of integrating children's varying notational knowledge if they, for example, play an instrument?

Question 4 Use of music reading in learning repertoire

How do you approach teaching new repertoire? If I ask you to think about the last piece you were working on with the choir.

- Would you ever listen to a piece in advance of learning it or ask the singers to do so? (Why?) (to help them to image sounds from the notation?)
- Do you ask singers to sight-read new repertoire in order to learn it or do you teach new material aurally? Or use a combination of both?
- If you ask them to sight read new material, do you do any preparatory work with them in advance of their reading? (e.g. overview of piece, time signature, key, look for patterns, phrases, repetition) (scaffolding)
- Would you approach sight reading of the music holistically or by addressing aspects separately (e.g. reading the rhythm and pitch aspects separately?)
- Would you play an accompaniment as they sight read? (Why?)
- Do they generally sight read together as a group? Work individually? In pairs? (collaborative approaches)

Question 5 (Accuracy & Fluency)

How accurate would you say your singers are in their reading?

- Have you noticed any differences in children's individual accuracy levels in terms of rhythm and pitch?
- What about the expressive aspects of the music? Do your singers sight sing with expression in the way that a reader of a language text would read expressively for meaning? Would you say that they sight sing fluently?

What would you say the markers for a fluent music reader would be?

Follow-up prompts

- If you were to think of a confident reader in your choir and compare him or her to a less confident reader, what are the differences?
- Accuracy, effortless, stylistic accuracy?

Musical thinking/Understanding

The last area I would like you to consider is whether or not you think that it is possible to gauge how well the children understand the music they read by listening to their singing from notation?

To what types of factors would you attribute differences in children's ability to make meaning from music notation?

Follow up prompts

- Age, experience, ability levels

End of interview

I would like to thank you once again for agreeing to participate in this research and for allowing me an insight into your practice and your thinking. Our conversation has been really valuable to me in developing a rich description of choral practice in relation to children's musical thinking in reading notation. Thank you for your generosity in giving of your time and expertise.

If there is anything that you would like to add that I haven't asked about please feel free to tell me now or to contact me before we meet again.

Appendix L: Interview 2 Schedule

Interview Schedule - Interview 2 (for use with slides)

(Focus: Conductors' Reflections on Concepts from Language Reading in relation to Music Reading)

(Sight Words; Connecting Sound and Symbol (Decoding); Fluency) and Musical Understanding.

SLIDE 1: Purpose of Interview

Really interested in the ways you think about things and any experiences that you have that you can tell me about.

Stop sharing screen

SIGHT WORDS

I'd like you to think about the last song you have done with your choir?

- What was it called? (do I know it – hum it?)

When we read, we don't read letters, we read groups of letters as words.

Question 1(SW): So I was wondering, what might the equivalent be of words or a group of meaning in music? (for children in your choir?)

Follow-up prompt:

- You might think of the song you were thinking of?
 - What could a word be from that song?
- When I was thinking about a song, the one I thought of was 'Down by the Sally Gardens'.
 - What could be groups of meaning in that?
- What is included in a sight word?
 - Just pitch?
 - Pitch and rhythm?
 - Anything more?

SHARE SCREEN – SLIDE 2 - MUSICAL SIGHT WORD?

- Is this be a sight word?
- **SLIDE 3 – MUSICAL SIGHT WORDS?**
- Could these be sight words? Do you recognise them? Do you know how they sounds?

What's the equivalent of a word in that? A bit that could exist on its own, that your brain could capture (and that you might be able to see remember)

SLIDE 4 – APPROACHES TO TEACHING SIGHT WORDS

Here are some approaches that are used in language reading.

What I'd like you to do is think about is are there any equivalences in music reading?

The first one is writing the word. So in this picture you have the word 'here' and the children are writing it or using it.

The second activity one is spotting the word in books. They're looking for the word 'not' and they're looking for all the 'not's that they can find in the book.

The third one is playing games with the words so that they are practising recognising the look of it and spotting it while they're doing that.

The fourth is collecting words that have something similar about them.

Question 2 (SW): Can you think of any equivalences in music?

(Do any of these activities remind you of things that are done in music?)

Follow-up prompt

- Looking for repeated patterns
- ‘spot the difference’ between patterns in a score?
- Writing music patterns on stave?

SLIDE 5: Sound & Symbol Connections

In language reading a lot of work goes into connecting the look of the symbol with the sound.
There are three things in language that we use to **decode** - syllables, letters and clumps.
(being able to manipulate the sounds of the letters into words is important)

Here are three examples of what we do.

The first is learning the shape of the letter by writing it or /making it with manipulatives.

The second is spotting the letter in books

The third is listening out for the letter in words

Question 3 (S&S): Are there any ways that we could be making those connections for children in music?

Follow up prompt

SLIDE 6: Fluency Graph simplified slide

One of the ways we think about readers is of them **moving to becoming more fluent**.
This graph shows examples of moving from being a non-fluent reader to a fluent reader

When children are reading they show that by:

- how they group words together,
- how they use their voice to express the meaning of the words,
- how they read with flow and without halting, and
- with what they call ‘pacing’ but what they really mean as communicating understanding – so not so fast that they’re only saying words and missing the meaning and not so slow (and laborious) that they don’t get the meaning.

Question 5: Again, what I’d like to think about is, are there any equivalences in music to developing fluency?

- Could you go back to the song you thought about in our first slide.
If someone wasn’t a fluent reader, what would that sound like?
- Like someone decoding a tune but not recognising it

SLIDE 7: Developing Fluency Slide

So here are strategies that we use in language reading to help with fluency.

Question 6: Do you think about whether any of these might be relevant to music reading?

In the top right corner, you have **teacher-assisted** reading which is usually carried out 1-1. The teacher (or a parent) models fluent reading of a passage while the child points out the words and listens. Then they read the

same passage together and finally the child reads while the teacher/parent give guidance and encouragement.
Paired reading is a variation of this often done with parents.

Next is **audio-assisted** reading where a child reads along silently with an audio-taped fluent reader before practising reading a passage aloud with the tape until they can read it fluently independently. They then read it to the teacher.

In **Choral Reading**, the class reads in unison following the teacher's model.

I was really struck in our last conversation by the techniques that you were already using and I was looking at the strategies that we use in language reading

[So these are basically 'repeated reading strategies' where fluency is developed by giving the child opportunities to listen to **good models** of fluent reading, **extensive practise** at reading and re-reading a piece of text and **guidance and feedback**.]

Question 6 (repeated): Do you think any of these relevant to music reading?

Question 7: Can you think of anything else that might be useful in music reading?

Slide 8: FINZI Lullaby – as a prop to bring all of the ideas together

Question 8: So what's a **sight word** here?

o (first 3 notes??) and next 4 notes?

What could exist and make sense on it's own mmm, lmmm (2 words in a phrase) (different levels of meaning)

Question: Are there **activities** you would do with this?

Question 9:

Finzi & Sight Words: Could we go back to this slide and think about the ways that language reading uses to help them to become familiar with sight words.

What ways could somebody get children familiar with what we're talking about as 'sight sounds' within this?

- Take out and work with it
- clap rhythm?
- Jigsaw rhythms, one group sings other answers
- hand signs in the air?
- Any associations with language techniques?

[Not just music ways of doing it but ways coming from language ways of doing it? Give space to make associations]

Finzi & Connecting Sound & Symbol...In language reading people spend a lot of time connecting the look of the symbol with the sound. (e.g. s sound)

Question10: Are there similar ways with this piece of music that you might do that?

Hand signs?

Finzi & Fluency: Finally, thinking about **fluency within this**. So remember that we talked about how fluency is shown when they're able to group words together when they're reading, when they're being expressive in giving the meaning so is it coming to an end or is it moving on to something else and their voice tells you about that, the flow, lack of halting accuracy and smoothness, and the communicating meaning in it.

Question 11: So what are the things we need to do to help children be fluent when they're reading this? Strategies?

- Phrase with accidentals
- Repeated sections

So if you remember the language strategies for developing fluency are there any of these or are there other ways that you would think about that you could work with this song to develop fluency?

- a recording with lines missing? They listen with the notation in front of them and have space to sing the part that's missing. So that when they've heard the first phrase, they related it the 3rd phrase sound.

Oral Language Fluency Rating Scale

Just to finish, I'd like to show you a slide that describes levels of fluency for language reading.

Question 12: Would something like this for music be a help to choir directors to be able to notice when they need to give extra support to their singers to develop fluency? (and to figure what strategies need to be given to improve

- E.g. 'reads word by word' 'does not preserve meaning' So they're trying to decode the notes but they need to work towards fluency so I need to doing
- Reads in 3-word phrases with appropriate phrasing but little or no expression so needs to work on reading with expressive interpretation.

Final

One of the things that's really strong in language reading is the realisation that children come in already as language users. So as a teacher, you can connect language reading to that, to what's in their head already.

A question I asked myself was 'how do we know what sounds are in children's heads already and how can we link that to what we're doing in music reading?'

What would be fabulous is if you could go away and think about that and the next time we meet, I'll show you what I did with my choir as a choir lab.

I would really like to hear how you might approach that and I wanted to give you time outside the interview to think about it in an interview you're always on the spot.

So if you could think about connecting the music in children's lives or in their heads with teaching music reading we can talk about it when we next meet.

Purpose of Interview 2

1. To tap into choral conductor's expertise and ways of thinking
2. Follow up on Interview 1
3. To examine together the usefulness that particular concepts from language reading might have for music making
 - a. Sight words
 - b. Decoding - connecting symbol & sound
 - c. Fluency & Comprehension

1

Writing the word

Reading the word in context of games

Looking for the word in books

Comparing it to known words

4

Developing Fluency

7

2

Writing the letter

Making the letter

Listening for its sound

Sound and Symbol connections

Spotting the letter in books

5

8

Musical sight words?

3

	Non-Fluent 1	Non-Fluent 2	Fluent 3	Fluent 4
How words are grouped together when reading				
Expressive Interpretation				
Accuracy & Smoothness				
Pacing				

6

FLUENCY	
Fluent	Level 4: Reads in longer, meaningful phrase groups. Small inaccuracies do not detract from the overall structure of the story. Preservation of the author's syntax. reads with expressive interpretation.
Non-fluent	Level 3: Reads in 1/4-word phrase groups. Appropriate phrasing. Little or no expressive interpretation. Level 2: Reads in 2/3-word phrases. awkward phrasing unrelated to context of sentence or passage. Level 1: Reads word-by-word. does not preserve meaning.

9

Appendix M: Interview 3 Schedule

Interview Schedule – Interview 3

Focus: Examining Theories of Comprehension from Language Reading in order to reflect on Understanding in Music Reading; Reflecting on Children's Use of Representation Systems for Language and for Music)

SLIDE 1:

What we're about today is seeing the connections between reading and writing words and reading and writing music.

And essentially, what I'm trying to do in the research is to **use** the theory **from** reading and writing words **to create theory for** reading and writing music.

SLIDE 2:

And to put that in a simpler way: Can we use all we know about children reading and writing words to help us to understand and support children reading and writing music?

SLIDE 3: And that's what I need your help with. To co-construct understanding drawing on your expertise....

So what we'll do in this interview is these three things. And here are the things that I'm looking for from you as we go along – your ideas, the connections you make, experiences you've had that you're reminded of your thoughts.

SLIDE 4:

The first aspect of theory from language literacy that we'll work on together today is COMPREHENSION.

A thing that really shocked me from the literature is that researchers found that there isn't enough in a text for us to understand it. It's not enough for us to be able to read the words to understand what the text is about.

What we mightn't realise is that we always bring our expectations and our experience of life to it. I found this really startling, that we do this without even being aware that we do it. It's the interaction between what we bring and what's on the page that helps us to understand.

One writer talked about three main types of knowledge that a reader draws on to understand written text.

The **first** is understanding the **language and how it works**. That includes vocabulary, syntax, grammar – so, familiarity and experience of the spoken language.

The **second** is understanding the writing system of the language – how the language looks written down, the marks or signs that are used to represent the spoken sounds/words and how written language is structured (sentences, paragraphs, headings).

The **third** is **background knowledge**. I've divided this into two sections:

We bring **personal first-hand experience** of the world and we also bring **knowledge of the world**.

Personal experience includes experience to bring to understanding (e.g. Trip to the Zoo/picnic) and experiences of success for confidence and motivation.

Knowledge of the world is knowing about things from being in the world. (e.g. TV, studied in school, understand and remember more of text) It also includes knowing about different types of genres of text, fiction, non-fiction, historical novel, biography.

QUESTION 1: So, my question is, what does this mean for music?

Prompt: What do music readers bring to reading music notation?

- how music works?
- The music writing system?
- First hand experience of music?
- Music in the world?

SLIDE 6: 'Comprehension refers to the ability to **go beyond the words**, to understand the **ideas** and the **relationships between ideas** conveyed in a text.'

QUESTION 2: Does this resonate with you in relation to music reading?

Prompt:

- I was struck by the *relationships between ideas* in music, how things refer forward and back, that you go beyond the notes...

‘Some **readers struggle** to develop sufficient **skills** to comprehend the **underlying, deeper meaning** of the sentences, the paragraphs and the entire text.’

QUESTION 2a: What about this quote? Are there different levels of comprehension in music reading?

Prompt:

- ‘shallow’ vs ‘deep’ comprehension
- being aware of whether or not you’re understanding what you reading – checking for coherence as you read.

SLIDE: Comprehension strategies

QUESTION 2c: Here are some strategies that are taught to aid comprehension in language reading. **Could any of these be useful for music?**

- Predicting
- Inferring
- Visualising
- Making connections (to background knowledge/ other texts)
- Identify main idea, sequencing
- Self-monitoring/ Checking for coherence

SLIDE: Music Anticipation

Question: I wondered whether anticipation linked with the strategies?

SLIDE: Connecting reader with text – significance/emotion

QUESTION 3: How does this work for music? Emotional engagement?

Prompt: - Do your singers give you feedback on repertoire?

- o Do they have favourite pieces that are important to them? (Motivation/Engagemnt)

SLIDE: CHOIRLAB

Now I’m going to show you something from my own investigations in Choirlab on what we bring to music reading.

I was interested in finding out about the sounds that children had in their heads from their everyday lives to bring to music reading. I used a generic house plan and asked them to mark on the plan in colour where, in their own homes, they interacted with music. They wrote on individual post-its what music they were interacting with.

What I found was that they had a broad range of music that they listened to and sang both individually and with others. Some listed artists, some named songs. You can see the categories across the top. They accessed music on spotify playlists, phones, youtube, car radio. One category of sounds that they all seemed to have in common were Radio/TV adverts.

Question: Are there ways that we could be drawing on this aural store of sounds that the children have for music reading?

SLIDE: Adverts

- I was surprised to see the rhythmic sophistication of what they were singing e.g., triplets and use of ties for syncopation. (But, these work because of where we put the stresses on words.)

SLIDE: Happier Pop songs (open and closed phrase Happier idea)

SLIDE: *Supplementary Questions*

Based on that there are a few things that we might need to think about and here's the first.

Question: How could technologies be useful for music reading?

Prompt:

- Have you had any experiences during the last year that would influence how you think about music reading and technology?

REPRESENTATION

Up to now we've been talking about what children bring to music reading in terms of their first-hand personal experiences and their knowledge of the world. Can we move now to thinking about children bringing their Knowledge of the Language and of the Language Writing system?

SLIDE: Children's language writing

You can see from children's attempts at writing how they are progressing in relating the sounds of the language to the letters of the writing system.

1. Random letters show the child understands that written symbols represent a message
2. Focusing on **aural strategies** (semi phonetic) (vowels missing)
3. to phonetic when their awareness of letter-sound correspondence increases.
4. Work more on sound than **visual spelling strategies** and then progress to transitional stage where they draw on visual strategies.

5. Competent stage is where children have **mastered sound/letter relationships** and are very aware of **word structure** or **patterns** of the English spelling system.)

You can see that children are using the symbols of the writing system.

They show their understanding of the writing system and their strategies for operating it.

SLIDE D & Scripp

Something missing in music? In music there seems to me to be a **disconnect** between knowing the musical language and the system and being able to operate it.

In this slide you can see that a 7-year old inventing their own way of showing the song with words does a better job of showing their understanding of the song than the 16 year old music student who is trying to use a system that they can't operate yet.

QUESTION: Any thoughts or experiences with your singers on using the writing system?

SLIDE: CHOIRLAB

Last time we met we spoke about what might be the equivalent of sight words in music. In my Choirlab I was wondering about that too.

SLIDE: Musical sight Words1

So I gave them something that felt like it was a separate entity, a vocal warm-up that you can see here. That seemed to me to be a unit made of things that belonged together so I was interested in how they might represent that, whether they heard it as a unit.

How they represented it (like the 16 and the 7 year old in the previous slide) shows what they understood.

QUESTION: I have certain ideas about this but what I'd like to do is to have a conversation to see if you as an experienced choral director, see similar things within it?

'So I gave them this and,

- in the **first one** you can see he used the v and he's thinking about the leap up and the fall away, he actually has the individual parts here, so if you already knew that you could get it. You have each entity in SN has a representation in the invented notation but he's given more. He's showing us that the first note is longer, and this is longer, but he's also giving the **intention**. It **gives more than you'd decode from the SN, it gives the energy or movement** in the piece as well as the **pitch**. **Would you agree?**

The 2nd one, has less information in it. It gives the number of notes accurately, not much about the length of the notes but something of the pitch.

3rd almost gives how it feels to sing it. He's using the word that he feels he's singing but he's giving **the swell within it and the dying away**. It's **expressive**.

'Bhí' has also given something of the swell in the size of letters, strong, strong, weaker, weaker, weaker, weaker.

5th – Vee much longer at the beginning. He gives some aspect of the pitch and the sense of the way he sees the events. There's a beginning event and the other events.

Bam bam: This is the beginning of something. His use of letter size seems to be to show the **emphasis or accent** on the second note.

SLIDE: NA na na na na I did the same thing with another warm-up.

QUESTION: Is there anything that strikes you here in how language reading and writing relates to this?

Could there be another way of thinking about this?

'As a Choral Director this reveals to me the way they understand that w/up exercise. They understand the musical components in it. And It isn't just pitch and rhythm, it's also swell and energy.' and **prediction** (Keith Bam bam) he's saying, you keep going...

SLIDE: Liza Jane Sight word Slide

Liza Jane, hears the components but also hears it as a phrase.

'it shows me that it isn't actually accurate. It shows me how he hears and understands it and where are the bits that he doesn't get yet. He didn't hear the song that way when he tried to work it out in his head.'

SLIDE: Liza Jane - Harry 'I want you to have a look at this thinking about the example we had earlier with Row Row Row Your Boat and the 7-year old that, using their own system could show what they understood. And when I tried it out in the ChoirLab it seemed to be that this was an example of that. He hasn't got it all right by any means, but I can see what he hasn't heard in the piece of music from the way that he's represented it here. And if I can show you that and if you can see it we look through it. (point out 3 bits)

SLIDE: Harry & Dean Liza

And then if we look at Dean who tried to do the same thing. And you can see here that he first tries SN, he's been taught, he's drawn a lovely treble clef on the G but frustration with a system that he can't yet operate.

He's actually trying to work out the rhythms with a *short hand and finds this easier to do*

QUESTION: What do you think this is telling us? Or What can we learn from this?

(develop understanding through use of easier representations of music? Language representations are easier for children to work with, easier sound/symbol correspondances. Music is more complex – negotiating rhythm, pitch, tonality, metre.

SLIDE: Dean x 3 representations

Representing using 3 different strategies, we can see the experience he's bringing,

'I was looking at these and what really struck me here was that this is one child and he has used three different modes of representing in this. And I was thinking how does this relate to language theory and I was finding it difficult to relate them.'

Is there anything that strikes you from a musician's point of view in terms of knowledge of how language works? Is there anything that strikes you that would help me to think about this.?

How does music work? Does it work differently to how language works?

Is there anything extra that music representation needs?

SLIDE: Sean Fire Down Below & 'do remember me' – Influence of lyrics?

Shows me how children store the song as one = *should we separate things out the way we do?*
(rhythm/pitch)

John Kanaka

Representation develop understanding for music but in the context of language theory and music theory

When trying to see what representation helps to understand what it is they hear and how it shows me

Thank you and Conversation re Follow Up



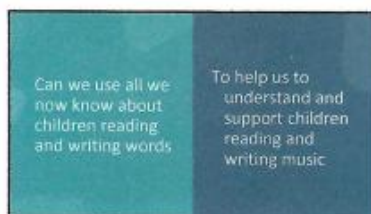
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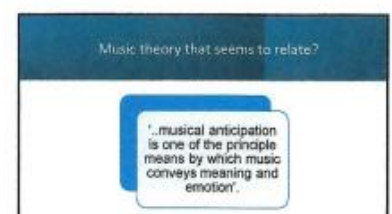
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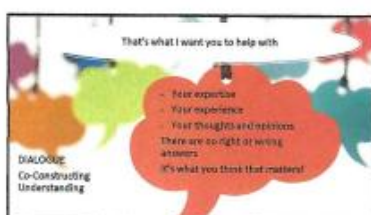
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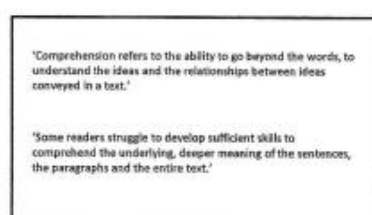
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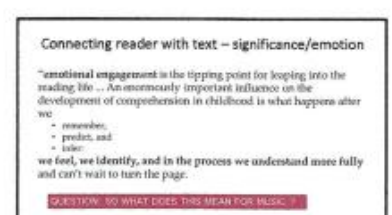
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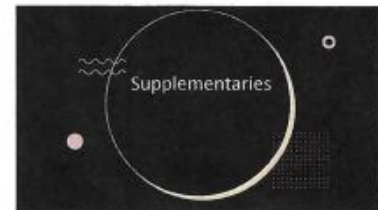
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10

Author	Background knowledge	Language	Understanding the writing system	Strong internalized knowledge of the sound system	Not knowledge of the words
Dr. Seuss	Dr. Seuss	Dr. Seuss	Dr. Seuss	Dr. Seuss	Dr. Seuss
...	...	...	...	...	...

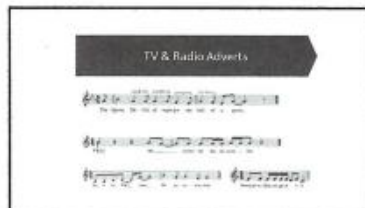
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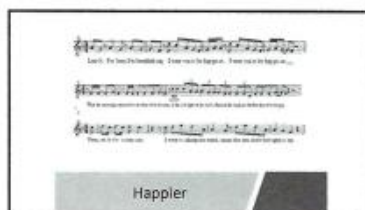
Digital sources for Music → New Literacy - Technology

To become fully literate in today's world, students must become proficient in the new literacies of 21st-century technologies. As a result, literacy educators have a responsibility to effectively integrate these new technologies into the curriculum, preparing students for the literacy future they deserve.

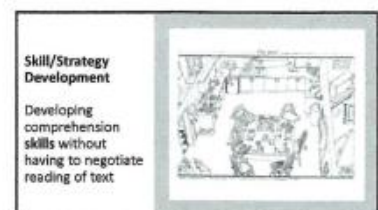
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15



18

Imaging sounds without negotiating a score - using the imagination

Warm-up No. 2: Imaging sounds

1. Observe your surroundings for the following exercise. Listen to the sounds expressed. Observe and imagine the images they not matter.
2. Imagine the sound of a busy street.
3. Hear the sound of a hammer and carriage coming down the street.
4. Hear the sound of a woman's singing.
5. Hear a bell ringing in a church.
6. Hear a bell ringing in a church.
7. Hear a bell ringing in a church.
8. Hear a bell ringing in a church.
9. Hear a bell ringing in a church.
10. Hear a bell ringing in a church.
11. Hear a bell ringing in a church.
12. Hear a bell ringing in a church.

19

"The key to imagining is memory. A refined memory, capable of hearing in the mind a piece that one has heard previously as if it were happening in the present moment, is the complementary skill to imagining unheard music."

(Mozart, 1791)

22

7 year old

26 year old music student

Comparison of musical notation and sound wave for a 7-year-old and a 26-year-old music student.

25

imagining sounds

Personal experience

Memory

Motivation

Skill dimensions

"... I find it harder to imagine hearing stuff than seeing"

"you had to concentrate hard to make the sounds"

"... it's hard to listen to all the noises, hard to listen all at once"

"... I actually think it is easier to imagine both [sounds and visual images] than them separately"

20

Knowledge of Language & Language writing system Representing

23

Bruner argued that conceptual understanding could be enhanced if students are exposed to different representations of a concept. In particular, he identified three main types of representations: enactive, iconic, and symbolic. ...all three modes can be utilized in introducing abstract concepts for students."

26

Exercise - 'One note tells a story'

Imagine a person you know.

See the person clearly. Select a mood and imagine a situation where this mood makes sense. Also see the person in this situation, in this mood.

Now turn that little scene into a one-note piece to be performed only in your mind.

Choose an appropriate musical instrument to play the one note.

Using expressive articulations, dynamics, and phrasing, listen to this piece unfold.

Background

The word is "Hallelujah".

A famous story is about when David and his men were in the desert.

When a great king, the musical equivalent to a series of very fast repeated notes, burst out of the desert, David, in his joy, praised God, and the kingdom was born.

This is followed by three fast notes with which David praised God, each longer and longer, and then a long note.

21

Knowledge of the language and writing system

Four small images showing musical notation and sound wave patterns.

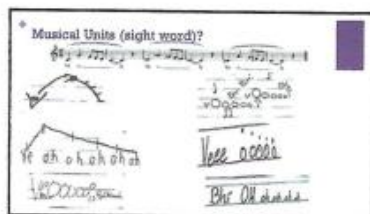
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CHOIR-LAB

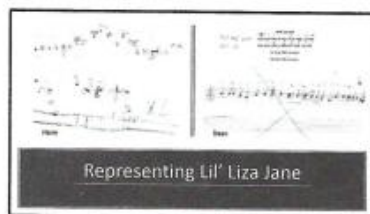
System language (Musical, Symbolic, Grammatical)

Understand the writing system (How it looks, makes me use, structure)

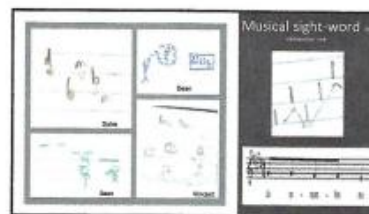
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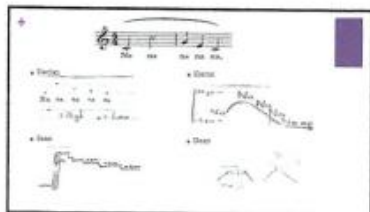
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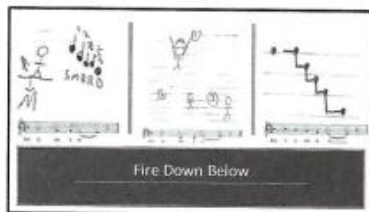
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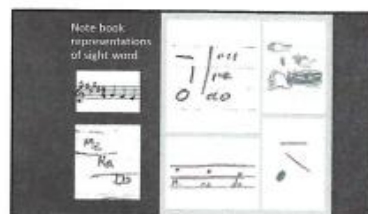
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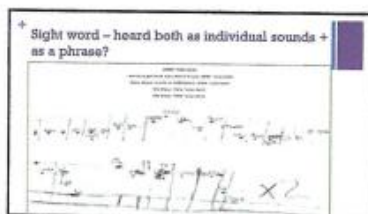
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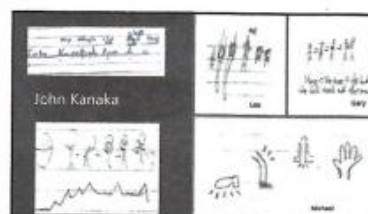
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Appendix N: Choirlab Preparatory Study

Table N.1 Overview of Choirlab Sessions

Session	Activity	Concept(s)
1	Vocal warmup & Song singing: - <i>First You Make Your Fingers Click</i> - <i>Liza Jane</i>	Internalising sounds Gestural representation
2	Vocal warmup & Song singing: - <i>First You Make Your Fingers Click</i> - <i>Liza Jane</i>	Memory/Gestural cueing
	House Plan Activity	Aural (musical) vocabulary, Music in everyday environment
3	Vocal warmup & Song singing	Sight words
	- <i>Ve-oh warmup</i> - <i>Liza Jane</i> - <i>Rocky Mountain</i>	Sight words Representation
4	Vocal warmup & Song singing - <i>Ding Dong</i> - <i>Rocky Mountain</i>	Inner-hearing / Aural imaging & Dimensions of Skill
	Music reading discussion	Musical knowledge Knowledge of music writing system
5	Vocal warm up & Song singing - <i>Na-Na Warmup</i> - <i>Once a man fell in a well</i> Card sequencing activity - <i>Twinkle Twinkle Little Star</i> - <i>John Kanaka</i> - <i>Turn the Glasses Over</i>	Multi-modal Representation Recognition/Reading Imagining vocal timbre Aural musical vocabulary development
	Musical Memory/Signal Game (Dalcroze)	Memory/Aural Recognition
6	Vocal warm up & Song singing - <i>There's Fire Down Below</i> Learning, internalising and representing three separate phrase endings (gestural, on paper)	Memory/ Imaging sounds /Representation strategies
	Listening to <i>Royal March of The Lion</i> from <i>Carnival of the Animals</i> by Saint-Saens. - Internalising phrases - Gestural cueing of phrases	Memory /Imaging sounds/ Dimensions of Skill

	Representing on paper	
10	Warm up & Song singing - <i>Bow, wow, wow</i> - <i>Circle Left</i> - <i>John Kanaka</i> Represent answer- phrase - <i>Hill and Gully</i> - <i>Here Comes a Bluebird</i> Aural reinforcement of mrd patterns including major 3 rd interval (d-m-d)	Aural musical vocabulary/Sight words Music as multi-dimensional/Memory
	Sight singing - <i>Au Clair de la Lune</i> - <i>Merrily we roll along</i> - <i>Au Clair de la Lune</i>	Decoding/Accuracy Paired-reading Reading internally/Self-monitoring
	Guess the Tune Reading Activity	Recognition/Accuracy/Automaticity

Table N.2: Children's Experiences of Music in Everyday Life, Responses from the House Plan Activity

Artists/ Bands	Contemporary Artists/Bands	Films/ Musicals	TV/Radio	Genre/Classical	Genre/ Folk
Queen	George Ezra	Greatest	Yu-gi-oh	Cantique de	Rattlin'
Elvis	Taylor Swift	Showman	theme	Jean Racine -	Bog
Beatles	Jonas Brothers	Soundtrack	Crazy Frog	Fauré	
Bruce	Ariana Grande	Let it go -	Adverts	Allegri's	Genre
Springstein	KSI	Frozen	Flash,	Miserere	Pop
Clearwater	Marshmellow	A Whole	Senator	Saxophone	Sources
Revival		new World -	Windows,	piece	Spotify
Stevie		Aladdin	123.ie	Canon in D	Playlist
Wonder		Endgame –	Quote Devil	Fur Elise	REM
		Marvel	Noyeks	Moonlight	Radio
		Avengers	Newmans	Sonata	
Songs identified by title					
Be Alright		Just got paid French Montana		Riptide by Vance Joy	
Blame it on my Juice by Lizzo		Leave a light on by Tom Walker		Runaway - Kanye West	
Buffalo Soldier		No Mercy by Living Tombstones		Somewhere only we know	
Fireflies		Old Town Road by Lil Nas x		by Keane	
Giant		Perfect Song by Ed. Sheeran		Sucker by Jonas Brothers	
Happier		Power over me – Dermot		Something just like this	
I'm so tired		Kennedy Rain		Shotgun	

Table N.3: Summary of Representation Activities

Activities	Detail	Purpose	Representation Individual (Ind.) or Group Activity		
			Gestural	Other/objects	Paper & Pencil
Song-singing	Vocal exercise 1 (Vee-0)	As an aid to memory	☐ Ind.		☐ Ind.
	Vocal exercise 2	As an aid to memory	☐ Ind.		☐ Ind.
Song singing	<i>Little Liza Jane</i> Response phrase 1 & phrase 2	Imaging Sound	☐ Ind.		
	Little Liza Jane	To communicate the song to someone else			☐ Ind.
Song singing	Rocky Mountain	To show how the song goes		☐ coloured cards Group	
	<i>Rocky Mountain</i> 'Do remember me' final phrase	As an aid to memory	Ind.	☐ Counters Ind./pair	☐ Ind.
Song singing	Once a cat fell in a well	To show how the melody goes	☐ Ind.	☐ Numerals/sol-fa Ind.	
Song-singing	<i>Fire Down Below Song</i> – 3 alternate ending phrases	Aid to memory To recognise and distinguish between endings	☐ Ind.		☐ Ind.
Song-singing	Circle Left – 'shake them simmons down' phrase	To show ' <i>Shake them Simmons down</i> ' as mmrrd on a 5-line stave		☐ Counters on 5-line stave	☐ Ind.
Song-singing	Here Comes a Bluebird last phrase	As an aid to memory			☐ Ind.
Song-singing	<i>John Kanaka</i> response phrase	As an aid to memory			☐ Ind.
Song-singing	<i>Hill and Gully</i> response phrase	As an aid to memory			☐ Ind.

Activities	Detail	Purpose	Representation Individual or Group Activity		
			Gestural	Other/objects	Paper Pencil
Imaging sound activities	TV/Radio Adverts	To help someone to recognise the advert			☐ Group
Reading activities	Introduction of mrd as a 'sight word'	As an aid to memory	☐ Sol-fa handsigns	☐ Counters on 5-line stave	☐ Ind. 5-line stave manuscript
Imaging sound	Responding to Herold's Clog Dance from La Fille Malgardée	To help younger children to follow along with the piece	☐ Group		☐ Ind.

(Note: ☐ symbol indicates the type of representation used for each activity)

Appendix O: Conductors' Choral Contexts

The choral environment within which each of the 16 conductors worked is outlined below to contextualise conductors' thinking and practice.

Cathedral Choir Contexts

Four conductor participants worked with children in the context of a Cathedral Choir tradition, CT1, CT2, CT3 and CT4. In the Western European Cathedral Choir tradition child choristers, historically boys but more recently also girls, form the treble line(s) of SATB Cathedral Choirs. Choristers receive intensive training, often in specialist choir or music schools to achieve remarkably high standards of singing sacred liturgical music from the Western classical canon. They often received a modest stipend to acknowledge their work and commitment.

Each of these conductors worked with children within the age range focused upon in this research as an aspect of their post in a Cathedral Choir setting. Whilst they shared similar contexts, the performance practice requirements of each of the children's choirs and the structures in place to support the choristers in each context varied, impacting upon each conductor's practice and use of notation. As illustrated in Table O.1, liturgical performance requirements ranged from: singing sacred repertoire as one of a children's choir (CT3) to singing treble lines of a broad range of SATB classical repertoire (CT1, CT2, CT4); from singing a liturgy once a month (CT3) to singing at daily liturgies (CT4); from morning and/or evening daily rehearsals in a school supported context (CT4) to rehearsals on one, two or three days a week (CT1, CT2, CT3); and from being encouraged to learn an instrument outside choir (CT2) to being offered individual instrumental or vocal tuition as part of their training (CT4). Choristers audition or are invited to join as probationers from age seven or eight and sing as choristers until they reach between twelve and fourteen for boys and sixteen to eighteen for girls. As part of their training, they receive instruction in music theory. In CT1's setting teaching of music theory was built into choral rehearsals. In CT4's setting the teaching of music theory was more aligned with children's instrumental learning and followed Royal Irish Academy or Associated Board theory grades. For CT2 and CT3 the choristers followed the Royal School of Church Music 'Voice for Life' progression programme with weekly training classes which include music theory. In all settings conductors ensured that children's singing was informed by their developing knowledge of music theory. In comparison to children singing in other categories of choir, choristers are required to learn and perform a vast amount of repertoire on a weekly basis within a learning community steeped in

history and dedicated to serving a liturgy. Unlike other choir categories, perhaps, singing in a cathedral choir involves a sense of service more akin to that of a professional singer than a recreational activity.

9.1.1.1 CT Conductor's Aims or Hopes for the Choir

Conductors operating within the cathedral choir tradition shared a commitment to continuing and safeguarding a liturgical choral heritage in addition to the responsibility of ensuring the provision of varied liturgical music of high standards on a weekly, and in one case daily, basis. This commitment and responsibility were reflected in how the hopes that each of the conductors had for their children's choirs (and on their use of music notation with their choristers) were expressed. CT3, for example, outlined three aspects of his aims for his choir.

First of all that they all become musically literate and are able to sight sing. That's very important. We see that as an essential part of what we do ... they learn to be able to do a range of aural tests which ensure their choral literacy in life. That's the first aim. The second is that vocally we want them to be able to use the voice well, to understand how to use the voice in terms of breathing, how they produce tone, diction, all of the sort of the nuts and bolts of good singing technique that we want to build a strong technical base for them. Thirdly, that they feel part of a very venerable history. (CT3, Interview 1)

Whilst reading music was not explicitly listed as an aim by some conductors, an ability to read notation appeared to be implicit in achieving the aims of the choirs in these settings. Coupled with a need to meet music performance requirements, care for, and belief in the potential of the choristers was evident in responses.

Cathedral choir conductors were also cognisant of the importance of children's engagement with and enjoyment of the music together with an appreciation of the significance of the social aspects, both immediate and long-term, of being a chorister.

Table O.1: Overview of Cathedral Choir Contexts

CT1	CT2	CT3	CT4
1 x Boys Choir and 1 x Girls Choir	1 x Boys Choir and 1 x Girls Choir	1 x Children's Choir (for Boys & Girls)	1 x Boys Choir and 1 x Girls Choir
The Boys Choir form the soprano & alto lines of the SATB Cathedral Choir. On separate occasions, the Girls Choir form the soprano & alto lines of the SATB Cathedral Choir	The Boys Choir form the soprano & alto lines of the Cathedral choir. The Girls Choir sings separately as an upper voice choir. Choirs combine for large scale concerts.	The Children's Choir sings independently as one of a number of choral ensembles.	The Boys choir forms the treble line of the SATB Cathedral choir & sings some liturgies independently. Junior Girls choir sings independently. The choirs operate as separate ensembles.
Boys Choir Age: 7/8yrs - 2/13/14yrs Members: 18 Girls Choir Age: 8/9yrs - 18yrs Members: 18	Boys Choir Age: 7/8yrs - 13/14yrs Members: 30 Girls Choir Age: 8/9yrs - 5/16yrs Members: 32	Children's Choir Age: 7/8yrs to 14yrs Members: 24 to 30	Boys Choir Age: 8yrs -12/13/14yrs Members: 24 Junior Girls Choir Age: 8 – 12yrs Members: 24
Perform – once a week Weekly Liturgy Boys Choir sings each Sunday Girls Choir sings each Sundays.	Perform – once a week Weekly Liturgy Boys Choir sings each Sunday Girls Choir sings each Saturday +frequent concerts	Perform – once a month Monthly Liturgy The Children's Choir sings once a month. + special events, carol services, fund-raising concerts	Perform – 8 times a week (Boys) twice a week (Jnr Girls)
Rehearse – twice a week 1hr + 1 ½ hrs	Rehearse – Boys- 3 days a week (3hrs +4 hrs) Girls - 2 days a week (3hrs + 2hrs)	Rehearse- once a week 2 ½ hrs	Rehearse Boys - Daily Junior Girls – 3 days a week

Training/Theory	Training/Theory	Training/Theory	Training/Theory
Theory learning built into choral rehearsal, some use of RSCM scheme	Probationer Training Year (8 girls, 8 boys x 2 sessions a week) Continuing Training Classes using RSCM Scheme	Probationer Training Year Continuing Training Classes using RSCM Scheme Graded theory class 3 differentiated groups	Theory classes RIAM or Associated Board Theory Exams

Conservatoire Choir Contexts

Four choral conductor participants worked with children's choirs established within conservatoire settings where choral conducting was included as an aspect of conductors' teaching roles (CN1, CN2, CN3, CN4). For the purposes of this research, a conservatoire setting refers to a third-level institution which offers a Music Performance Degree. Within these third level institutions a department often called a Music School or Conservatoire offers specialised individual tuition in instrument and/or solo voice in addition to ensemble work supported by musicianship classes. Individual instrumental tuition is also provided for children, in some cases in a Junior section. Children's instrumental and vocal tuition is supported by musicianship classes. Students are encouraged to join a variety of ensembles which include children's choirs.

Three conservatoires (CN1, CN3 and CN4) organised junior and senior children's choirs to cater for children up to the age of 13/14 in addition to a Youth or Chamber Choir primarily for second level students with some overlap in age with upper primary school age. One conservatoire setting (CN2) offered a Choral Programme where choirs were organised by primary school class levels rather than age. Children's choirs were usually mixed, for both boys and girls. In CN2's setting accommodations were made to retain and support boy singers through the setting up of separate boys' and girls' choirs for the senior primary/early secondary school age groups. Children progress from junior to more senior choir levels across the conservatoires. Some overlap in age ranges between junior, senior and youth choirs allows a degree of flexibility in assigning a child to a particular choir to take account of children's varying vocal maturity and skill levels. Progression involves an increase in the challenge level of repertoire and associated skill levels in singing and reading.

Apart from CN1's setting, most members of children's choirs in the conservatoire category study instruments in addition to being choir members. Some children learn more than one instrument, and many are involved in other performing ensembles. There is a strong commitment in conservatoire teaching to children's learning to read music as part of their development as musicians. Conservatoire

singer students attend theory or musicianship classes, and they bring this bank of experience of notation to their music reading in choral contexts. In CN2's setting, singers who are not students of the conservatoire are required to attend musicianship classes to support their learning in choir. In CN1's setting, not all singers were students of the conservatoire, impacting on singers' literacy levels.

As illustrated in Table O.2, Conservatoire Children's Choirs generally rehearse once a week for between 1¼ and 1½ hours. It is expected in three of the settings that children will complete individual practise during the week, conductors provide materials to support this (e.g., notation, audio tracks).

Unlike the performance requirements of cathedral choirs, conservatoire choirs tend to perform at concerts organised in line with the academic calendar often at the end of academic semesters. Choirs in three of the four settings participated in choral festivals. Children in conservatoire choirs often benefit from invitations or opportunities to collaborate with external performing arts groups. Parental support for children's learning is generally strong in relation to payment of fees, attendance at classes and support for children's individual practise.

In addition to conducting at least one of the children's choirs in the setting, CN conductors led other choirs and taught musicianship classes for children, teenagers and, in the case of two conductors, third level music degree students. Separately, one CN conductor had experience of teaching music at second level. As a result, the CN conductor participants drew upon and at times contrasted their experiences of children's music reading in choral contexts with experiences in musicianship class or school settings. In contrast to the CT choir conductors, all four conservatoire conductors were familiar with and had studied the Kodály Approach to music pedagogy and appeared to draw upon 'Kodály' strategies in their choral practice to varying degrees.

9.1.1.2 CN Conductor's Aims or Hopes for the Choir

Each of the CN conductors spoke about wanting their singers to enjoy a good foundational choral experience. In addition to singers' musical learning and achievement, there was a sense of conductors' commitment to the singers' holistic or extra-musical development and recognition of choral singing as a social practice, perhaps as a counterbalance to the individual focus of instrumental lessons. CN conductors recognised the importance of social aspects of choral learning to fostering children's love of aesthetic music making with others in addition to developing their potential as musicians.

Table O.2: Overview of Conservatoire Choir Contexts

CN1	CN2	CN3	CN4
City-based	City-based	City-based	City-based
Junior Children's Chorus Age: 7-11 years Members: 75-90 (total) Can comprise separate groups that combine to perform as one Jnr Choir	Boys Choir Age: 9-13years Members: c20	2 x Senior Children's Choirs Age: 10-12yrs Members: 24 & 14 Choirs combine with others to perform as one large chorus at Performing Groups Concert	Junior & Senior Children's Choirs Age: c8-10 years Age: 10-14 years Members: c14 & 25
One of three choirs in the setting. Jnr Children's Chorus Age: 7-11yrs Snr Children's Chorus Age: 12-14 yrs Youth Choir Age: 14-18yrs	One of six choirs in the setting. Choir Club: Age: c6/7yrs Children's Choir Age: c7/8yrs Junior Girls Choir Age: c9/10yrs Boys Choir Age: c9-13yrs Girls Choir Age: c10-13yrs Youth Choir Age: c14 -18yrs	One of three choirs in the setting [pre-instrumental class] Junior Children's Choir Age 7 – 9yrs 2 x Senior Children's Choirs Age 10-12/13 yrs Youth Choir Age: 12 – 18yrs	Choirs are the children's choirs in the setting [musicianship 5-6yrs] Junior Children's Choir Age: c8-10yrs Senior Children's Choir Age: c10-14yrs Chamber Choir
Perform 4 times a year on average Christmas Concert Summer Concert Awards Ceremonies	Perform 4 times a year (younger choirs) Autumn Concert Christmas Concert Spring Concert Summer Concert	Perform 3 times a year (as part of performing groups joint concerts) Christmas Concert End of January Summer Concert	Perform 2 big events with other opportunities during the year Christmas Summer Concert
Choral Festival /Competition Participation Yes	Choral Festival / Competition Participation Yes	Choral Festival / Competition Participation No	Choral Festival / Competition Participation Yes

Collaborations/ By Invitation Yes	Collaborations/ By Invitation Yes	Collaborations/By Invitation Not referenced	Collaborations/By Invitation Yes
Rehearse - once a week 1 ¼ hours	Rehearse – once a week 1 ¼ hours (Boys/Girls/Jnr Girls)	Rehearse – once a week 1 ¼ hours	Rehearse – once a week Jnr: 1 hour Snr: 1 ½ hours
Independent practise/homework Supplementary materials for independent home practise, scores, tracks	Independent practise/homework Not referenced	Independent practise/homework Yes Sol-fa written in as a support	Independent practise/homework Yes
Auditions: Yes	Auditions: Yes	Auditions: Yes	Auditions: Yes (sight reading)
Repertoire Mainly Classical (Composers who write for children's voices) Some Disney Repertoire Some arrangements of popular music	Repertoire Mainly Classical esp. contemporary Classical; Composers who write for children's voices Part-songs (9yrs+) Some popular music	Repertoire Some Classical Composers who write for children's voices Musicals repertoire for joint concerts Christmas Repertoire Folksongs & folksong arrangements Canons, Quodlibets	Repertoire Classical Composers who write for children's voices Folksongs Some Gospel/ Musical repertoire Jnr: Acapella Unison material; Canon; Easy 2-part Snr: 2-part; 3-part.
Instrumental Learning Most play instruments. Most are musically literate. Some, not all, are students of the conservatoire. May be taking traditional lessons, involved in Musical Theatre	Instrumental Learning Many play instruments 50/60% From age 10, singers must attend musicianship classes to be choir members	Instrumental Learning Most learn one instrument, some two. All attend musicianship classes. Most are students of the conservatoire. Singers who do not learn instruments must attend musicianship classes. (minority)	Instrumental Learning Almost all singers learn instruments and attend musicianship classes as conservatoire students.
Socioeconomic Background	Socioeconomic Background	Socioeconomic Background	Socioeconomic Background

Mixed. DEIS school & conservatoire students.	Mostly Middle	Middle-high	Mixed
Musicianship Yes	Musicianship Yes	Musicianship Yes	Musicianship Yes

Community Choir Contexts

CM1, CM2, CM3, and CM4 were the four conductor participants who worked with children in Community Choir contexts. Whilst each choir operated as a community choir, differences in their operation stemming from either their geographical location or how and why they came to be established were evident. As illustrated in Table O.3, CM1 and CM2's choirs were set in rural towns and were established in response to requests from their communities; CM1's at the suggestion of a primary school principal, CM2's in response to requests from parents of students attending voice lessons. In contrast, CM3 founded her city-based choirs because she perceived a need for an incremental structure of choral music education for children outside of formal school or religious settings. CM4's choirs operated within a large national music education organisation. They were part of a regional choral singing project offering a choral experience that was different to that available through formal education to singers who came from over a two-county geographical area.

Each conductor had more than one choir in their community context, in some cases choirs evolved to meet the needs of singers of different ages as they arose over time. CM2 worked with two choirs: a primary school age children's choir (6 – 12 years) and a secondary school age youth choir (12+ years). CM1's choirs evolved from a similar two-choir structure into what she described as a progression path programme comprising five choirs: a junior children's choir (4-8yrs) a Boys Choir and a separate Girls Choir (9 – 12yrs) a Youth Group and Chamber Choir (12+yrs). Whilst CM1's structures evolved over time, CM3 envisioned, from the outset, having a series of choirs providing an incremental structure of choral music education. Her junior choral programme comprised a separate choir for children at each primary school class level from second class (7/8yrs), third class (8/9yrs); and fourth class (9/10yrs). A separate choir catered for singers aged between 10 and 14years with opportunities for older singers available in Youth Choir, Chamber Choir or Adult Choir. CM4's choral singing project comprised three separate choirs: the youngest choir (aged 6-8yrs), middle choir (aged 9–11yrs) and secondary school age choir (12 to 16/17yrs). I was struck by how these conductors, operating outside of formal school structures, appeared to think and plan in terms of children's progression through their choral structures. In addition to the choirs described above, two conductors, CM1 and CM3, also worked with community choirs in two different settings. CM1 conducted a city-based choir

(referred to as City-based Choir) which operated within a larger performing structure whilst CM3 worked with a children's choral programme in another city (referred to as City2 Choir). In reflecting upon their practice, each drew upon their experiences of working with singers in each of their community choir settings.

In relation to rehearsals, three conductors, CM1, CM2 and CM3, rehearsed with their choirs on a weekly basis for one hour's duration (in CM2's case one hour and 15 minutes). A unique feature of CM4's choral practice across all choir categories in this research, was that her singers meet once a month for an immersive day-long rehearsal. I was curious to learn how this difference in duration and frequency of rehearsal might impact on how singers engaged with music notation in her choir.

A strong focus on inclusion and on responding to the needs of singers was reflected in how community choir structures had evolved over time. CM1, for example, divided her children's choir into separate boys' and girls' choirs to address the differing needs of young male and female singers whilst CM3 noted efforts made to include all gender expressions in her choirs.

CM Conductor's Aims or Hopes for the Choir

Community choir conductors had a keen sense of their role in serving the needs of their community of singers. Equity of access to choral music education, regardless of socioeconomic status or geographical location was evident in conductors' reflections on their aims for their choirs as was a commitment to achieving high standards of choral singing.

Each of the conductors valued the extra-musical learning that their community choirs provided for singers. CM2, for example, observed that choir allowed children to develop both musically and socially. CM3's vision included developing children's awareness of wider societal problems, such as sustainability, through choral work. Choir was valued as a social practice, a means of holistic personal development and of connecting with others through music. Developing children's love of choral singing and pointing towards future pathways and possibilities for participation were important to these conductors.

The role of repertoire in expanding singers' horizons and in deepening musical engagement was evident. CM1 credited her belief in the innate musical ability of every child and use of diverse repertoire for her choirs' success. Repertoire selection allowed for collaborative projects with interdisciplinary artists. CM2 sought to enrich singing experiences for young singers and expose them to future possibilities by selecting some repertoire suitable for both unison and SATB choir performance with his Chamber choir. Competition set pieces were also included in his and CM1's repertoire to motivate and challenge singers and provided opportunities for singers to travel to perform

and hear other choirs outside their immediate community. CM3's junior choir repertoire selection reflected Kodály-based pedagogies and connected with singers' learning in her choral programme's musicianship classes but also included wider classical repertoire. For older choirs, competition set pieces and commissioned works exposed singers to more challenging and contemporary repertoire. CM4 described repertoire selection as broad and based on skill-development rather than being genre-specific to enable singers' growth as musicians.

All four conductors cited achieving high performance standards, or as CM1 described it 'artistic excellence' in choral singing. Although focused upon to differing degrees, a commitment to developing singers' musicianship skills, including music reading, as a means of deepening singer's musical engagement and agency, was evident.

Table O.3: Overview of Community Choir Contexts

CM1	CM2	CM3	CM4
Set in rural town	Set in rural town	City-based	Regional
Boys Choir Age: 9-12 years Members: c10-20 Girls Choir Age: 9-12 years Members: c30-40	Children's Choir Age: 6/7–12 years Members: 45	Children's Choir Age: 10-14 years Members: 30	Children's Choir Age: 9-12 years Members: c20 [50-60 members across the three choirs]
Two of five choirs Junior Children's Choir Age: 4-8 years Boys Choir Age: 9-12 years Girls Choir Age: 9-12 years Youth Group: Age: 13-18 years Chamber Group: Age: 13-18 years	One of two children's choirs in the setting. Children's Choir Age: 6/7 – 12 years Youth Choir Age: 12+ years [A separate Chamber Choir performs with children on occasion]	One of a set of seven choirs in an incremental Choral Programme Junior Choir Programme (4 choirs) Age: 7; 8; 9; 10 years Children's Choir Age: 10-14 years Youth Choir Age: 14-18years Chamber Choir Age: 16+ Adult Singers Age: 18+	One of three choirs within a regional Choral Singing Project Junior Choir Age: 6-8 years Children's Choir: Age: 9-12 years Senior Choir Age: 13-16/17 years
Perform Culture Night Halloween Christmas	Perform Carol Service Competitions usually two a year	Perform Junior Choirs 4 times a year (2 x family nights)	Perform Work towards a single Gala Concert

Competitions Trips abroad	End of year concert	mid-terms + Winter & Summer Concerts) Other choirs a lot Children's Choir in first year of existence so only one performance [Joint Choir Performances]	+ 3/4 other performance opportunities through the year (e.g., Culture Night)
Rehearse - once a week	Rehearse - once a week 1¼ hours	Rehearse -once a week 1hr	Rehearse - once a month 1 x immersive day each month (10 – 4pm)
Repertoire Diverse, all styles & genres Acapella, accompanied, choreographed	Repertoire Varied, Competition pieces Classical, Anthems Disney songs Musical Theatre Unison, 2-part	Repertoire Junior Choirs: Folk songs & very Kodály influenced Children's Choir: Classical, (inc. sacred out of sacred context) Children's pieces Commissioned pieces Some pop songs (only really clever arrangements) Older choirs: Competition set pieces	Repertoire Skill-based (towards part-singing) rather than genre specific. Repertoire to enable singers' growth as musicians Very broad. Could be pop, traditional Irish, African [classical, musicals, sacred]
Auditions: No	Auditions: No	Auditions: Yes	Auditions: No
Musicianship Through repertoire	Musicianship Through immersion	Musicianship Integrated in Jnr choir Separate in older choirs	Musicianship Included in choral days
Evolved into a Progressional Path Programme	Driven by local schools Sub-group of children's choir sing at a weekly Mass	An incremental structure of Choral Music Education	A monthly Choir open to all interested in doing something extra in singing
Learn an instrument >50% (school recorder programme)	Learn an instrument 50% All learn tin-whistle in school (letter names)	Learn an instrument Majority don't learn instruments in Jnr choirs	Learn an instrument Some, not a prerequisite, not asked
Socio-economic	Socio-economic	Socio-economic	Socio-economic

A Mixture	Quite varied	A mix of backgrounds	Mixed (remove barriers)
Collaborative projects Artists/Composers Choreographers	Collaborations Joint performances with Chamber Choir	Collaborations Musicians	Collaborations Inbuilt
Team of conductors & musicians	1 conductor	Team of conductors & musicians	Team of conductors & Musicians
Established by conductor in response to local principal's request	Established by conductor in response to parents' requests	Established by conductor	Established as a project within a national structure

Primary School Choir Contexts

Four conductor participants worked with children in the context of primary school choirs, PS1, PS2, PS3 and PS4. Each of these conductors were primary school teachers in their respective schools with related teaching responsibilities. Their strong interests in choral singing had led these conductors to establish and conduct choirs within their schools separate from classroom music teaching to afford children opportunities to engage in singing with others in a choral context.

The Irish primary school context resulted in similarities in how the choirs operated but differences in practices were also evident. In Ireland, children can attend primary school from four/five years of age and may attend kindergarten in advance of starting school. Following two years in Infant classes (junior and senior infants), children progress from first to sixth class when they leave primary education (usually at 12 years of age) and begin secondary education. Whilst numbers can vary, in urban areas children are usually placed in classes of up to 30 pupils with one teacher who has responsibility for children's learning across all curricular subjects, including music, for an academic year. Schools make provision for supporting children with special educational needs through special education teachers who work closely with classroom teachers to plan and support children's learning.

As illustrated in Table O.4, each of the choirs of these conductor participants were based in large primary schools in urban settings, three city-suburb schools and one in a town. In each school, pupils in senior classes (8/9 to 12/13-years of age) were invited by the PS choral conductor to join a school choir on a voluntary basis. Each choir's membership reflected the school's pupil population, PS1 conducts a girls' choir, whilst PS2, PS3 and PS4's choirs are open to boys and girls. In comparison to the membership of choirs in other settings, primary school choirs had the largest numbers of choir

members reflecting a strong emphasis on participation and inclusion. Large numbers of singers impacted on PS conductors' choral practices and use of notation.

Two choir conductors, PS2 and PS4 audition children before joining, largely as a means of containing numbers. In PS2's school, children's interest in choral singing caused choral practice in the school to evolve over time to involve a team of teachers who work together to conduct two separate choirs. Choirs differed in the frequency and amount of rehearsal time. Rehearsals were generally held outside of class time. PS2 and PS3's choral practices appear to be closely linked to the ethos and activities of their schools (e.g., Singing for liturgies, Confirmation ceremonies, Seachtain na Gaeilge; The Commemoration of 1916; school assemblies; local community events). PS1 and PS4 are less closely tied to school events and focus more on creating and giving children a separate choral experience.

The voluntary nature of the choir for both children and PS conductors afforded a degree of flexibility in, for example, repertoire selection. As primary teachers, PS conductors have an awareness of and can make links with topical school level celebrations or events. In addition, PS1, PS2 and PS3 refer to incorporating contemporary Popular songs that children express interest in learning and that will appeal to a school audience of children or parents. PS conductors' personal musical interests or expertise can also influence repertoire selection. A further influencing factor in PS conductors' practices was each conductor's musical background or pathway into choral conducting. One conductor, PS2, in addition to conducting a school choir had experience of conducting a community children's choir. In some of her responses she drew upon and contrasted her practice and thinking in each of the settings. In general, PS choirs learn repertoire aurally by rote rather than from notation.

9.1.1.3 PS Conductors Aims or Hopes for the Choir

Perhaps influenced by the primary school emphasis on children's holistic development, PS conductors spoke about their aims and hopes for what they could achieve with their singers in terms of enriching children's current and future lives through developing their love of music on the one hand, and in relation to children's extra-musical learning on the other. Enabling children to connect with others through joyful choral music making was an evident aim, as was a wish to enable children's future musical participation in adult life whether as a hobby or in terms of future study.

Within their primary school settings, the voluntary nature of the choirs sets them apart from general class work. Like their conductors, children opt to join choir. Part of their commitment to choir is attending punctually and regularly. Being on the 'choral team' requires learning a measure of self-discipline.

PS conductors' aims for their choirs focused on developing children's love of music and their orientation to enjoying singing or making music with others throughout their lives. Participation and inclusion of as many children as was possible were important as was developing children's sense of commitment to the choir. One notable absence in relation to this research in these conductors' aims was that their singers would learn to read music.

Across all four choir categories, fostering singers' love of choral singing and of music together with a commitment to working together to achieve high standards was evident. Recognition of extra-musical learning and choir as a social practice was also apparent. In the cathedral, conservatoire, and community settings in this research, developing children's musicianship and music reading as part of this was included in conductors' aims and to varying degrees their practice.

Table O.4: Overview of Primary School Choir Contexts

PS1	PS2	PS3	PS4
City suburb	Rural Town	City Suburb	City Suburb
No audition	Auditioned	No audition	Auditioned
Girls Choir Age: 9-12yrs Members: 70-80 (max 117) (4 th , 5 th & 6 th class)	2 x Boys & Girls Choirs Junior Age: 8-9yrs Junior Members: 45-50 (3 rd & 4 th class) Senior Age: 10-12yrs Senior Members: 45-50 (5 th & 6 th class)	Boys & Girls Choir Age: 8-12yrs Members: 60 (3 rd to 6 th class)	Boys & Girls Choir Age: 10-12yrs Members: 95-100 (5 th & 6 th class)
Perform c10 times a year	Perform Junior – 5 times a year Senior – 6/7 times a year	Perform 3 main events a year	Perform 4 times a year
In-School Events: School Concerts/ Productions	In-School Events: Christmas Carol Service; Seachtain na Gaeilge; Confirmation Ceremony; Summer Concert	In-School Events: Monthly Assembly; Christmas Carol Service; Graduation; Parent's Concert	In-School Events: Christmas Carol Service
Choral Festivals: (Feis Ceoil; Sligo/Cork International Choral Festivals)	Choral Festivals: Feis Ceoil (Senior Choir)	Educational Choral Projects: Current - Peace Proms (Choral education project); Previously - National Children's Choir	Choral Festivals: (Feis Ceoil; Cork International Choral Festival)

		(School based choral experience)	
By invitation Community Events; Charity Events; Launch events/ Television Auditions	Community Outreach: Visit local Nursing Homes to perform carols at Christmas	Community Outreach Annual concert for elderly in locality	By Invitation: With adult choirs in e.g., National Concert Hall/ Mansion House/ Local Theatre
Rehearse - 3 times a week 1½ hrs a week ½ hr x 3 mornings before school	Rehearse – once a week ½ hr a week (more coming up to events)	Rehearse – once a week 1hr a week (½ hr before school + ½ hr during school)	Rehearse – Daily c3hrs a week 2 x ½ hr before school 2 x 25min lunch break 1 x 1hr after school
Repertoire *Diverse repertoire Classical, Musical Theatre, Folk, Irish, Jazz (including competition set pieces e.g., Feis Ceoil)	Repertoire Varied repertoire Liturgical, Christmas, Pop, Folk, Irish focus (e.g., 2016 Commemoration) Competition set pieces (e.g. Feis Ceoil) Conductor preference/expertise, Retirement Requests	Repertoire Varied repertoire Classical, Current Popular Songs, Disney movie Songs Irish songs Varied repertoire from <i>National Children's Choir/Peace Proms</i> Programme (e.g., simple 2-part pieces, Danny boy, Carrickfergus, 'Teeny Bopper', Classic Pop songs for parents)	Repertoire Mostly Classical Liturgical/Church music, Folksongs classically arranged, Irish music Competition set pieces
Instrumental Learning c 5% learn instruments	Instrumental Learning 'A small few' learn instruments, piano/guitar School ukulele programme	Instrumental Learning c33% learn an instrument outside school (piano/violin)	Instrumental Learning Yes, many to Primary Grade /Grade 1
Socioeconomic Background A mixture predominantly middle level.	Socioeconomic Background A broad range c30% new Irish children in school population reflected in choir membership.	Socioeconomic Background Middle V. strong parental support for arts	Socioeconomic Background High V strong support for music and choir.

Appendix P: Repertoire Teaching Approaches

Table P.1 Cathedral Conductor Approaches to Teaching New Repertoire

	CT1	CT2	CT3	CT4
Sight read to learn new repertoire	Yes	Yes	Yes	No occasionally
Teach new repertoire aurally	No	No	No	Yes As singers follow notation
Combination of sight reading & teaching aurally	No	No	No	Yes
Sight read as a group	Yes	Yes	Yes	No
Accompany singers as they sightread	Yes Written accompaniment	Yes Vocal lines, occasionally support lines	Sometimes Sketch in harmony	Yes Vocal lines, support lines, written accompaniment
Preparatory work before reading (e.g., key/time signature)	Yes.	Yes	Yes	Yes
Aural Preparation	No	Yes	Yes	No
Holistic reading approach (vs separating rhythm/pitch)	Yes	Yes depends on piece	Sometimes, depends on piece	Yes depends on piece
Listen in advance of learning/ask singers to listen to recordings	No	Very occasionally	Very occasionally	Yes
Write in sol-fa names of notes in advance?	No	No	No (visualise grid for scale degrees)	No

Table P.2: Conservatoire Conductor Approaches to Teaching New Repertoire

	CN1	CN2	CN3	CN4
Motivating singers to learn piece by presenting it through singing and discussing.	Yes Discuss song, singers' opinion, Story of lyrics, mood. (vocal tone)	Yes (buy-in critical at start) story of lyric text, sing it, enthuse singers through discussion	No Figuring out the piece as more fun	Not referenced
Sight read to learn new repertoire	No	No Depends on piece, older choirs try to read 'off the bat'	Yes If within singers' ability, if not read separate aspects pitch/rhythm	Sometimes Depends on the piece
Teach new repertoire aurally	Yes	Yes Lines taught aurally whilst singers follow score	No	Sometimes aurally first then to score (e.g., Old Abram Brown)
Combination of sight reading & teaching aurally	No taught aurally first, then given score.	Yes (aural learning with score)	Yes but prefer to encourage singers to work it out	Yes a mixture
Sight read as a group	Yes but read as a group having learned the music aurally	Sometimes (accompaniment while singers sight read) Don't do sight reading exercises in choir.	Yes	Yes but might ask stronger singers to read as good model. Stronger singers lead group
Accompany singers as they sightread	Yes a harmony	Yes conductor & rehearsal accompanist, judged according to need, dot in some harmonies	Yes might play a chordal accompaniment to support difficulties	No unless a one-note tonic/dominant support to intonation.
Preparatory work before reading	No [re score prep]	No	Yes	Yes

(e.g., key/time signature)				
Aural Preparation	Yes aural prep of difficult parts as warm-up exercises	No Not referenced	Yes aural sol-fa warmups & prepare tricky aspects	Yes aural prep of tone sets, intervals
Holistic reading approach (vs separating rhythm/pitch)	Yes comparison to reading a book	Yes but organic process, separate on a needs must basis. [earlier ref to compartmentalise, if difficulty strip back to components, break things down, rhythm, sol-fa]	Yes, depends on piece, try together but if difficult separately– read/clap rhythm first then pitch using sol-fa, neutral syllable, add text	A mixture, e.g. address particular aspects first then more holistic
Listen in advance of learning/ask singers to listen to recordings	No never	No (listening not referenced)	No Not initially, prefer to allow singers figure out what's on the page, then perhaps listen	No Generally not when introducing piece. At times asks singers to go online to find favourite performance
Write in sol-fa names of notes in advance?	No (sol-fa an aural language) but used as a support for difficult intervals	No In older choirs, a technique to engage vocal line who are waiting their turn to sing	Yes Sol-fa written in note for note under every piece of music, facilitates independent practise. In musicianship, children work it out. Not practical in choir	No (It becomes a crutch or a separate language that doesn't mean anything to them; used as a support for difficulties, aural prep before writing in)

Table P.3: Community Conductor Approaches to Teaching New Repertoire

	CM1	CM2	CM3	CM4
Sight read to learn new repertoire	Sometimes	No (Singers follow score whilst learning aurally)	Sometimes Depends on the choir and the piece. Older singers yes, younger sometimes	Sometimes Depends on age of singers, give them a go.
Teach new repertoire aurally	Yes (especially rounds and canons)	Yes but whilst singers follow score	Yes doesn't want singers to be 'just' readers, values aural skills	No Sing from score supported aurally by conductor
Combination of sight reading & teaching aurally	Yes	Yes (osmosis) Reading along whilst supported by conductor and accompaniment	Yes	Yes Sing with & accompany singers as they follow notation
Sight read as a group	Yes	Yes	Yes	Yes
Accompany singers as they sightread	Yes 5 th at top of piano in the tonality/chords; have accompanist for city choir	Yes use CD and then sing and play accompaniment as singers read from score	No fosters independence and encourages hard work. (But supports with anchor notes)	Yes but careful re striking a balance, bravery with support.
Preparatory work before reading (e.g. key/time signature)	No Never before, no separation of theory & practice	No do it 'on the fly'	Yes Supplemented by aural & rhythmic preparation	Yes Orientation around the score, time signature (less on key) more patterns, repetitions
Aural Preparation	Yes Warmup of tricky sections & aural rhythmic warmups	Yes but through listening to CD recording before learning	Yes aural prep for harmonic body percussion,	Yes In context of patterns in score & preparing tricky

			conducting for rhythmic aspects	intervals in advance through warmup
Holistic reading approach (vs separating rhythm/pitch)	Yes assisted by conductor	Yes a bit of both	Yes and No if working with accompanist yes, but more often separate if younger unaccompanied	Yes
Listen in advance of learning/ask singers to listen to recordings	Yes	Yes listen to recording as scores are distributed, sing along with recording whilst following score to build an aural picture of piece	Sometimes, depends on choir, depends on the piece and the tradition from which it comes	Yes to give an aural picture of the end product but balancing act. Also listening around to other pieces by composer
Write in sol-fa names in advance	Yes Encouraged to read without sol-fa written in but sol-fa is used to correct or target difficulties	No (Not in choral context)	No but All repertoire is taught using sol-fa (aurally). Sol-fa line tapes for home practise; Encourage singers to sing at sight without sol-fa written in but if modulation write in sol-fa	No (not conductor's primary decoding tool)

Table P.4: Primary School Choir Conductor Approaches to Teaching New Repertoire

	PS1	PS2	PS3	PS4
Motivating singers to learn piece by presenting it through singing with accompaniment and discussion	Yes	Yes	Yes	Yes
Sight read new repertoire to learn it	No	No	No	No
Teach new repertoire aurally	Yes	Yes with lyrics displayed	Yes with lyrics displayed and occasionally notation displayed	Yes with lyrics displayed
Combination of sight reading & teaching aurally	No	No	No	No
Sight read as a group	n/a	n/a	n/a	n/a
Accompany singers as they learn aurally	Yes	Yes	Yes	Not referenced
Aural preparation of tricky intervals/ rhythms	Yes Warmups	Yes Warmups	Not referenced	Yes Sol-fa
Holistic approach to teaching (aurally)	Yes	Yes	Yes	Yes
Listen in advance of learning/ask singers to listen to recordings	Yes	Yes	Yes	Yes (asks singers to listen)
Support aural learning by conductor annotating displayed lyrics	No	Yes	Yes	Yes

Support aural learning of part-songs with notation	Occasionally	Occasionally	Occasionally (use of technology)	No
Support aural learning through gestural representation of pitch/rhythm	Yes	Yes	Yes	Yes
Support aural learning through aural analysis /aural training	Yes Listening for repeated patterns	Yes listening for structure, highest /lowest parts	No	Yes Interval training, scale singing, using Sol-fa
Use of sol-fa	Yes Tricky aspects, accuracy	Yes Tricky aspects	No	Yes Intonation

Appendix Q: Conductors' Accuracy and Fluency Reading Strategies

Table Q.1: CT Conductors' Strategies for Accuracy and Fluency

	CT1	CT2	CT3	CT4
Call attention to /notice the look and sound of frequent intervals	Yes	Yes	Yes	Yes (but learn aurally from notation)
Notice repeated patterns	Yes	Yes	Yes	Yes
Visual processes skimming, scanning, chunking	Yes	Yes But supports through aural	Yes	Yes In relation to aural work
Both visual & aural process in music reading	Yes	Yes Also aural preparation of tonal context, recalling tonic	Yes Visualise grid to connect key/ tonal context visually with stave	Yes
Relate new material to music they already know	Yes	Yes	Yes	Yes
Sol-fa	No	Yes	No Scale-degree number system in use	No
Sol-fa handsigns	No	Yes	No but gestures relating to scale degree	No
Rhythm syllables	No Use of counting	Yes (initial year)	No	No
Gesture/movement	No	Yes	No – but use of movement warmups	No

Use of body for rhythm	No	Yes Tap pulse & teach conducting		
Repeated practise	Yes	Yes	Yes	Yes
Prepare tricky parts in advance	Not referenced but discusses errors	Yes	Yes Addressed separately	No

Table Q.2: CN Conductors Strategies for Accuracy and Fluency

	CN1	CN2	CN3	CN4
Call attention to /notice the look and sound of frequent intervals	Yes	No	Yes	Yes
Notice repeated patterns		Yes		
Visual processes skimming, scanning, chunking	Yes	If appropriate to the piece	Yes from a structural point of view	
Both visual & aural process in music reading		Yes (cf dictation & spot the difference audiation in musicianship classes)	Yes	
Relate new material to music they already know	No		Yes	Yes
Sol-fa	Yes (warm ups + tricky)	Yes	Yes, in warmups & written in on notation	Yes
Sol-fa handsigns	Yes, unconscious use	Yes	Yes	Yes
Rhythm syllables		Yes	Yes	
Gesture/movement			Conductor unconsciously	Yes
Use of body for rhythm		Yes	Yes, singers & rhythm	Yes
Repeated practise			Yes	Yes
Prepare tricky parts in advance			Yes	

Table Q.3: CM Conductors' Strategies for Accuracy and Fluency

	CM1	CM2	CM3	CM4
Call attention to /notice the look and sound of frequent intervals	Yes	Not referenced (aural learning with score)	Yes	Yes (and in warmups)
Notice repeated patterns	Yes	Yes	Yes	Yes
Visual processes skimming, scanning, chunking	Yes With accompanist support	Yes	Yes	Yes And annotating score to show the beat
Both visual & aural process in music reading	Yes	Yes	Yes	Yes
Relate new material to music they already know	Yes	Yes (repertoire within a genre)		Yes But in relation to familiar patterns
Sol-fa	Yes	No	Yes	No (some team exposure)
Sol-fa handsigns	Yes	No	Yes	No
Rhythm syllables	Yes (some use)	No	Yes	No Clap rhythm
Gesture/movement	Yes	Yes	Yes and by singers	Not referenced
Use of body for rhythm	Yes Rhythm warmups	Yes Teaches singers to conduct	Yes	Not referenced
Repeated practise	Yes	Yes	Yes	Yes
Prepare tricky parts in advance	Yes encouraged to 'work out' intervals	Not referenced	Yes	Yes

Appendix R: Solmization Systems Outside Europe

Examples of Solmization syllables used outside Europe include a Japanese system that uses the initial seven syllables of an established conventional order of 48 characters (*i, ro, ha, ni, ho, he, to*). This system functions in the same way that the Western letters A to G function in WSN with repetition for each octave in the same way (Bent et al., 2001, Section II, 3). The scale of C major is represented as *ha-ni-ho-he-to-i-ro-ha* with each syllable represented by a single Japanese character (Bent et al., 2001, S2, 3). This solmization is based on the first line of an ancient Japanese poem, Iroha. Using vocal syllables derived from well-known material (i.e., poems or songs) to represent pitch relations is a teaching and learning device that has been used across cultures.

Other examples of solmization syllable systems include the Chinese syllables for the pentatonic scale *gong-shang-jue-zhi-yu* and the Balinese syllables for the five-note slendro scale *ding-dong-dèng-dung-dang* shown in Figure U.1. The origin of solmization in India is in Vedic texts. In Indian classical music, notes corresponding to the Western solfege system are sa-ri-ga-ma-pa-dha-ni (Morris & Ravikiran, 2006)

Figure 9.1: Balinese Syllables for the Five-Note Balinese Slendro Scale where the Five Vowel Sounds are Represented by Characters rather than Letters:

ding	dong	dèng	dung	dang
ᮊ	ᮊ ᮘ	ᮊ	ᮊ	ᮊ

Source: Bent et al., 2001 Notations, SII, 3

Appendix S: Simplified Standard Notation Practices

An early example of a simplified solmization notation using numerals is that of Pierre Davantes (1560). His system used numerals 1 to 9, letters A and B, dots and dashes. The numerals, augmented by the letters A and B, represented the notes in an ascending sequence beginning on E, C or B. The numbers represented the natural hexachord if written without dots, the ‘hard hexachord’ if followed by a dot and the ‘soft hexachord’ if preceded by a dot. Vertical dashes were used for rhythm signs. (Bent et al., 2001). John Day, in the 1570s, used a simpler solmization notation in psalm book publications where abbreviations of the solmization syllables were added to conventional notes on staves (Krummel, 1975).

Various numerical notational systems as alternatives to or replacements for conventional mensural notation have been proposed since the 17th century. William Braythwaite’s (1638) was one of the earliest and used numerals for notes and various types of commas for rests. These types of systems involved the use of numerals, with or without alphabet letters, to count diatonic intervals from a given note or notes. Some used conventional rhythm signs to show the durations of notes (Bent et al., 2001).

Rousseau (1742) incorporated the placing of numerals 1 to 7 for the diatonic scale of C major on, above, or below lines to distinguish between different octaves into his system of notation for complex pieces. In his system for simple melodies, he used dots over or under numerals to indicate a move to a higher or lower octave rather than placing numerals in relation to lines. Conventional rhythm signs were discarded. Simple integers were used to indicate time signatures instead of the usual fractional signatures; and unequal subdivisions of a bar were indicated by commas and horizontal lines over or under groups of notes - akin to beams in mensural notation. In line with most influential 19th-century solmization and alphabetical notational systems, rhythm signs in the conventional sense were not used. Rousseau’s notational ideas gave rise to the Galin-Paris-Chev  method in 19th century France whose influence spread to many other European countries (Germany, the Netherlands, Denmark and Russia). In the Galin-Paris-Chev  method, the numbers 1-7 represented pitches, with a dot below for lower octave and above for upper. The numbers were only used as visual cues for the spoken (sung) syllables, ut, re, mi, etc.

Appendix T: Sarah Glovers Sol-fa System

Glover's inspiration had been to improve singing in church through her work in Sunday schools and schools for 'charity children' but her vision later, like Kodály's, encompassed the development of singing and literacy skills as part of all children's education, including 'those attending academies for young ladies and gentlemen' (Waterhouse, 2009). Her principles have much in common with the Kodály approach, for example starting music instruction as early as possible and contrary to the practices of the day, beginning with song-singing experiences rather than theory learning.

Over a twenty-year period, Glover experimented with various teaching methodologies, adapting d'Arezzo's hexachord solmization syllable system and extending it to a 'movable – do' or 'relative' sol-fa system which used the whole diatonic scale. She published this as her *Scheme for Rendering Psalmody Congregational* in 1835 (Glover 1835/1982). At a time when European methods favoured numbers to represent degrees of the scale (such as the Galin's (1818) of teaching sight-singing based on Rousseau's (1741) figure-notation) or used a 'fixed-do' sol-fa system, Glover advocated the use of relative sol-fa or 'the practice of sol-fa-ing' as being 'favourable to the production of accuracy in tune' (p.8).

Her 'new notation' was devised to help beginners to learn to read music. In it, sol-fa names, derived from the Latin syllables of the Hymn to St John used by d'Arezzo with 'do' instead of 'ut' and 'te' instead of 'si' to avoid conflict with sol when abbreviated. These sol-fa names were abbreviated to capital initials (D, R, M, F, S, L, T) with the use of a grave accent (̀) to indicate the lower octave and an acute accent (́) to indicate the higher (Waterhouse, 2009). A flat or sharp was indicated by a vowel change, 'oy' for a sharp (e.g., 'fah'/'foy') and 'ow' for a flat (e.g., 'lah'/'low'). The chromatic alteration of the sixth and seventh notes of the minor scale were indicated by syllables 'bah' and 'ne' (Bennet, 1984). Her suggestion that, in addition to aiding learner readers, the practice of 'sol-fa-ing' could be of benefit to individuals who could already read staff notation (Glover, 1835/1982). suggests, perhaps, that she connected sol-fa use with music thinking skills