“Have you brought your singing voice?”

An Investigation into Whether a Small Group Singing Intervention Can Improve Phonological Discrimination in Young Children.

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ABSTRACT

The purpose of this study was to investigate whether a small group singing intervention can improve phonological discrimination, in young children.

The study was carried out in a primary school nursery class. A mixed methods design was used. Firstly, a quasi experimental method, where 18 participants, aged three to four, received singing intervention, for six sessions, in four small groups and 20 participants were randomly allocated to a control group. The participants were assessed in phonological discrimination, before and after the intervention. Secondly, a qualitative research method, where a semi-structured interview gained the views of the class teacher, in relation to any potential benefits of the intervention and the feasibility of small group singing in future practice. Thirdly, a mosaic approach was used to gather the children's views of the intervention, underpinned by the important assumption that children are active co-constructors in the research process.

Statistical analysis, using ANOVA and post hoc tests, revealed a significant gain in phonological discrimination for children in the intervention group, compared to the control group, where there was no gain. Thematic analysis revealed broader benefits of the intervention, in terms of improved communication, motivation, confidence and providing opportunities "to shine". There appeared to be a value to a small singing group, that could add to existing classroom experience, and that was feasible in practice. Themes that were drawn from the mosaic approach highlighted the importance of paying attention to social learning, enjoyment and building on previous experiences when delivering the intervention. The research concluded, therefore, that both the *content of* the intervention, as well as the *nature of* the intervention, are important factors to inform practice.

Alternative possible explanations for the gains were also discussed. Limitations of the study were described, suggestions for improvements made and recommendations for future research outlined.

CONTENTS

Tables

Figures

CHAPTER 1 INTRODUCTION

That music in itself, whose sounds are song,
the poetry of speech.
Lord Byron

Can a small group singing intervention improve phonological discrimination in young children? This question matters because interventions that support the development of phonological awareness may have a critical impact on children acquiring literacy and subsequent success at school and throughout life. There is consistent evidence for the important relationship between phonological awareness, broader language development and acquiring literacy. Snowling and Juel (2005), for example, reviewed what is needed in order to learn to read and concluded that speech and language abilities are the foundations for later literacy skills. Similarly a review by the National Institute for Child Health and Human Development (NICHD) (2005) found that a strong language base is required for reading. It has also been widely recognised that phonological awareness, in particular, is one of the most important skills for learning to read and researchers over the past twenty years have determined that phonemic awareness, that is, the ability to recognise that a spoken word consists of individual sounds or phonemes, is one of the best predictors of how well children learn to read (Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan, 2001; Hulme, Hatcher, Nation, Brown, Adams & Stuart, 2002; Nation & Hulme, 1997). Furthermore, the recent Rose Review of teaching early reading (Rose, 2006) has put phonological deficits at the heart of difficulties in acquiring literacy skills.

In the light of this, practitioners, researchers and policy makers are increasingly interested in establishing what early activities can impact on later phonological awareness. Music and singing have traditionally played an important part in early years settings, but interest is growing in determining more precisely what skills these activities are actually tapping into. Some initial studies have found significant gains in phonological awareness following music

intervention, with children aged between four and six, a time when development of phonological awareness is accelerated (Colwell, 1988, 1994; Standley & Hughes, 1997; Register, 2001; Gromko, 2005; Bolduc, 2009; Galicia, Contreras Gomez & Pena Flores, 2006; Dege & Schwarzer, 2011).

An increasingly consistent view has emerged from the literature, highlighting phonological awareness as one component of a larger phonological processing system used for speaking and listening (Wagner, Torgesen, Laughon, Simmons & Rashotte, 1993) and that it follows a developmental process (Carroll, Snowling & Hulme, 2003). Despite this, it is less clear whether music intervention, carried out with younger children, specifically impacts on the precursors of phonological awareness, such as phonological discrimination, as no studies have been carried out to date, to the knowledge of the author. Yet, this is potentially an important contribution to knowledge in this area, as these early phonological skills provide the foundations for later phonological awareness and acquiring literacy (Carroll, Snowling & Hulme, 2003).

The purpose of this study, therefore, is to establish whether a small group singing intervention with younger children, aged three and four years, can impact on phonological discrimination. The purpose of this introduction is to set out the context and the structure for this thesis. To do this it will, firstly, describe the importance of this topic and the research context and, secondly, outline how the research will achieve its objectives through the literature review, methodology, results, discussion and conclusion.

1.1. Why this is an Important Research Area

In terms of broader outcomes, children's early communication skills have been proposed as the single best predictor of future cognitive skills and school performance, even when socio-economic factors have been taken into account (Rosetti, 1996). Children who have speech, language and communication difficulties are significantly disadvantaged in their ability to access the national curriculum since almost every educational skill presupposes the use of language (Dockrell, Sylva, Huxford & Roberts, 2009). The ability to read and write with

understanding enhances children's interpersonal communication, expands their worlds and leads to independence in learning (Gromko, 2005). These skills are crucial not only in school but throughout life in gaining knowledge, sharing history and culture, pleasure and enjoyment, self-actualisation and growth and making sense of the world. It is not surprising therefore, that literacy is both a national and international concern (Gromko, 2005).

This is particularly pertinent in the current context where an increasing number of children are starting school with limited skills in speech, language and communication. Research into the perceptions of head teachers (National Literacy Trust (NLT) & National Association of Head teachers (NAHT), 2001), teachers (Basic Skills Agency (BSA), 2002) and nursery workers (I CAN, 2004) has highlighted a growing professional concern regarding the deterioration of children's speech, language and communication skills. This is a concern, not only about the subsequent impact on literacy, but more broadly on children's social and emotional competence and behaviour (Dockrell et al., 2009). Research has also highlighted the fundamental role that language serves in interpersonal contexts, relationship formation, regulation of interactions, socialisation of children (Cohen, 2005) and the difficulties that emerge when children are not able to express their needs, participate in social exchange and achieve in education (Silva, Williams & McGee, 1987).

As a large number of children now attend mainstream early years settings, staff need to be sensitive to children's language competencies, skilled at supporting oral language and aware when systematic attempts to support oral language difficulties are not effective (Dockrell et al., 2009). Current evidence, however, suggests that, on the whole, pre-school settings tend to be dominated by adult talk and do not always give children enough opportunities to use and practice language (Dockrell, Stuart & Kind, 2004). Oral language is composed of a number of sub-skills and many of these skills are being developed and consolidated during the pre-school period. It follows, therefore, that these skills should be evident in the ways language is assessed and in the focus of early years' pedagogy. How can children be supported to develop these early skills that are so critical to later development? There is increasing interest in the potential psychological benefits of music (Hallam, 2010). Music and singing have been the cornerstone of many activities with young children over many years and across cultures, but researchers and practitioners are becoming increasingly

interested in why this should be the case and what skills, in particular, music could be harnessing.

The growing evidence base of the potential impact of music, alongside an increasing commitment to, and interest in, the early years sector, is coinciding with the music profession experiencing rapid change, including new opportunities for partnership working with early years settings (Ellison & Creech, 2010). Importantly, longitudinal research suggests that high quality experiences in early years provision are of particular benefit to those children at risk of expressive language delay and subsequent poor reading ability at a later age (Sylva, Melhuish, Sammons, Siraj-Blatchford & Taggart, 2004). Therefore, it could be argued, that music interventions that are evidence based and underpinned by sound theoretical understanding have the potential to make a considerable difference, particularly for those children who have not experienced a language rich home environment. Ellison and Creech (2010) propose that the current climate is suited to a collaborative approach, which has the potential to inform practice, research and policy.

> Arguably in the UK the conditions are thus in place for early years practitioners, music professionals, researchers and policy makers to work collaboratively in order that sustainable and pedagogically sound musical opportunities become embedded within early years provision. (p. 198)

1.2. Research Context

Generally, there has been a growing interest in the potential of music to impact on the intellectual, social and personal development of children and young people (Hallam, 2010). One area of particular interest has been the impact of music on phonological awareness. A small number of studies have been carried out which have shown significant gains in phonological awareness following music instruction, with children aged four to six, a time when the development of phonological awareness is accelerated. Although there were some methodological constraints in terms of sample size and accounting for Hawthorne Effects (Colwell, 1988, 1994; Standley & Hughes, 1997; Register, 2001; Gromko, 2005; Bolduc, 2009; Galicia, Contreras Gomez & Pena Flores, 2006; Dege & Schwarzer, 2011).

What explains this potential transfer of skills? The transfer of learning from one domain to another depends on the similarities between processes involved and is known as ' near transfer', and plausible comparisons have been found between the early development of music and language (McMullen & Saffran, 2004), leading to the proposal of a 'shared sound category learning mechanism hypothesis' (Patel, 2003). These comparisons would also suggest similar abilities in both music and phonological awareness and correlations studies have found some evidence for this, although the number and scale of studies are limited (Bryant, Bradley, Maclean & Crossland, 1989; Lamb & Gregory, 1993; Bolduc & Montesinos-Gelet, 2005; Peynircioglu, Durgunoglu & Oney-Kusefoglu, 2002; Anvari, Trainor, Woodside & Levy, 2002).

Therefore, broadly speaking, the research question is informed by the idea of an intrinsic link between early communication and musicality, supported by evidence for a shared common early development in both music and language. Empirical investigations have provided some initial evidence for a correlation between music abilities and phonological awareness, supporting a 'shared sound category learning mechanism hypothesis'. Studies have also shown a positive impact on phonological awareness following music instruction, supporting the concept of 'near transfer' of skills where similar processes are involved.

To summarise, this study intends to add to empirical findings, informed by sound theoretical understanding, to inform effective practice, with the intention to improve the future outcomes of children's literacy. It has three key aims. Firstly, this study aims to add something new to the initial empirical findings by investigating whether a small singing group with children, aged three to four, can result in gains in phonological discrimination, but also paying attention to some important methodological constraints of previous studies. Secondly, it aims to provide further evidence to support the theoretical concepts of a 'shared sound category learning mechanism hypothesis' and 'near transfer' and further illuminate the wider processes implicated in the development of phonological awareness. Finally, the study intends to inform future practice by establishing any potential benefits of small group singing and considering the feasibility of such an intervention in practice.

1.3. Thesis Structure

The thesis will proceed in five stages. First, a literature review will review the critical points of knowledge in this area, including substantive findings as well as theoretical and methodological contributions to the topic. It will initially take a broad view and outline intrinsic links between early musicality and communication within a social context; review whether there is evidence to suggest an early common development in music and language to support a 'shared sound category learning mechanism hypothesis'; then more specifically establish whether there is sufficient evidence to show a correlation between music abilities and phonological awareness and whether music instruction has the potential to impact on the development of phonological awareness, supporting a 'near transfer' hypothesis. It will then describe in detail increasingly consistent findings on the development of phonological awareness and the importance of understanding this within a larger processing system that is part of broader language development. It proposes that this developmental framework illuminates a plausible connection between music and singing and phonological awareness, and in particular because of the potential for singing to facilitate these early skills through articulation, rhythm and rhyme. Furthermore, these precursors to the development of phonological awareness impact on later skills which are critical for learning to read, such as phonemic awareness. Implications for practice in the current policy context will briefly be considered, in terms of potential collaboration between music specialists and early years settings to promote effective early years pedagogy, within the broader context of increasing concerns over children's language development as they start school. The review will lead to the identification of an area of knowledge that would merit further investigation to add to and support understanding. Specific research questions will be formulated.

Second, a methodology section will begin by giving an overview of the ontological and epistemological position of the research, which are the underlying assumptions that the researcher has about what the world is, how it works and how people can claim to know these things. It will then go on to consider the point of research and the purpose of methodology. It will put the research in the context of the increasingly prevalent view of children as active participants in acquiring knowledge, as co-constructors and contributors,

social actors in a cultural context (Woodhead & Faulkner, 2008). As a precursor to the mixed methods research design it will briefly outline the importance of identifying the method that best suits the question that is being investigated. The section will then outline the quantitative research design, in terms of a quasi-experimental design describing ethical considerations, the rationale and development of the assessment tool and intervention design, and will then describe the rationale for the small group collaborative approach within a socio-cultural model of learning. Finally, the qualitative research design will be outlined including the rationale and design for gaining the class teacher's perceptions and for using a mosaic approach (Clark & Moss, 2011) to gather children's views of their experience of the intervention.

Thirdly, a results section will outline the findings obtained from the research fieldwork. Statistical analyses carried out on the quantitative data will be outlined to establish any intervention effects and to assess the consistency of the assessment tool. A rationale for, and an explanation of, the process of statistical analysis will be given. The qualitative data will be analysed in terms of the key themes and sub themes which emerge following thematic analysis of the class teacher's perceptions, gathered in the semi-structured interview. Illustrations of the class teacher's perceptions of each theme will be illustrated by extracts from the data. Researcher and class teacher observations and the children's views, through group evaluation and drawings, will be documented using a mosaic approach (Clark & Moss, 2011), and the rich picture which emerges from the data will be presented.

Next, the discussion will consider the findings in relation to whether the objectives of the study have been met. This will be in terms of adding to empirical findings, supporting key theoretical concepts in the literature and implications for future practice. Implications in relation to educational psychology will also be outlined. Alternative explanations for the findings will be discussed and limitations of the study will be outlined, including some challenges of researching with young children.

Finally, the conclusion will revisit the broader context for this study, the purpose of the study and describe whether this was achieved. The conclusion will draw together the key

findings from the research and critically evaluate what these findings add to knowledge and practice in this area. Finally, recommendations for future research will be made.

Some definitions of key terms will be outlined below.

1.4. Definitions of Key Terms

Phonological discrimination: discriminating between similarities and differences in the sounds that make up words, rather than auditory discrimination which is discriminating between sounds in general.

Phonological awareness: involves the detection and manipulation of sounds at three levels of sound structure: syllables, onsets and rimes, and phonemes.

Phoneme: the smallest sound unit in a language that is capable of conveying a distinct meaning, such as the s of sing and the r of ring. Adjective: phonemic.

Smaller phonological units: phonemic awareness is the second stage in the development of phonological awareness.

Larger phonological units: syllable and rime and are the first stage in the development of phonological awareness.

Syllable: a unit of organization for a sequence of speech sounds. For example, the word *water* is composed of two syllables: *wa* and *ter*. Syllables are often considered the phonological "building blocks" of words.

Onset: the initial consonant sound (b- in bag, sw- in swim).

Rime: the vowel and the rest of the syllable that follows (-ag in bag, -im in swim).

Phonemic awareness: a subset of phonological awareness in which listeners are able to hear, identify and manipulate phonemes. Separating the spoken word "cat" into three distinct phonemes, /k/, /æ/, and /t/, requires phonemic awareness.

Pitch: the auditory attribute of sound according to which sounds can be ordered on a scale from low to high.

Contour: rising and falling patterns.

Melody: succession of musical tones which is perceived as a single entity, a combination of pitch and rhythm.

Rhythm: the arrangement of sound and silences in time.

Prosody: the rhythm, stress and intonation which conveys information about the meaning of the sound.

Syntax: patterned relations that govern the way the words in a sentence or notes in a tune come together.

Timbre: quality of a musical note or sound or tone that distinguishes different types of sound production, such as voices and musical instruments.

CHAPTER 2 LITERATURE REVIEW

There has been a growing interest in the potential of music to impact on the intellectual, social and personal development of children and young people. One area of particular interest has been the impact of music on phonological awareness and broader speech and language development. This is important because evidence is now fairly unequivocal that phonological awareness is important to developing literacy skills. The recent Rose Review (2006) has put phonological deficits at the heart of difficulties in acquiring these skills. These literacy skills are crucial not only in school but throughout life, in gaining knowledge, sharing history and culture, pleasure and enjoyment, self-actualisation and growth and making sense of the world around us.

The purpose of this literature review is to review the critical points of current knowledge in these areas. It will do this by organising the literature within three key themes, firstly, it will outline the broad view of an intrinsic link between early communication, musicality and language development and propose that they share a common early development, suggesting plausibility for the 'shared sound category learning mechanism hypothesis'. Secondly, it critically reviews empirical studies that specifically focus on the relationship between music and phonological awareness, in children aged four to six, a time when the development of phonological awareness is accelerated. This would also provide evidence for the 'shared sound category learning mechanism hypothesis' as well as a 'near transfer hypothesis'.

Thirdly, it will look in detail at the theoretical framework which explains the development of phonological awareness within a wider phonological processing system. This is important because it establishes some of the processes that music instruction may be tapping into, which can potentially benefit not only phonological awareness but important pre cursors to it.

This literature review will conclude by identifying an aspect of musicality and phonological awareness that would merit further investigation to add to empirical findings, support theoretical understanding and have implications for practice. Specifically, it will identify a

research focus on a small group singing intervention, with three to four year olds, to increase phonological discrimination, using a control group in the same school.

The next section will now outline the broad view that musicality and early communication are intrinsically linked and will illustrate this with descriptions of early and universal interactions between infants and parents or caregivers, defined by both communication and musicality. This is important because it provides a clear foundation for the proposal of a shared common early development in both language and music, which will be explored in some detail. Conclusions will be drawn about the plausibility of a 'shared sound category learning mechanism hypothesis'.

2.1. The Broad Link Between Early Development of Music and Language

Children experience early musicality in communication, particularly within their home and pre-school environments. There appears to be an intrinsic link between early communication and musicality. Evidence shows that, throughout the world, caregivers provide musical input of various types to their pre-lingual children, speaking in melodious tones, singing a great deal and using a special genre of music with common features across cultures, such as simple pitch contours, repetition and narrow pitch range (Trehub & Trainor, 1998). Within the first interactions between adults and infants, adults use infant-directed forms of language and music (Meadows, 2006). In general, the maternal repertoire of songs for infants is limited to a handful of play songs or lullabies that are performed in an expressive and highly ritualized manner (Trehub & Trainor, 1998; Bergeson & Trehub, 2002). From the neonatal period, infants prefer acoustic renditions of a song in the maternal style to non-maternal rendition of the same song by the same singer (Masataka, 1999; Trainor, 1996). Moreover, they are entranced by performances in which they can both see and hear the singer, as reflected in extended periods of focussed attention and reduced body movement in the infant (Trehub & Nakata, 2001/2). Musicality and communication become indistinguishable. Infant speech is often referred to as a type of musical speech because it contains musical characteristics, such as abundant repetition, high pitch, slow tempo (timing), and large slow pitch contour (up/down patterns). Interestingly, musical speech is

used similarly across language and cultures (Fernald, 1991) and caregivers, non-parents and siblings intuitively use it with infants (Dunn & Kendrick, 1982). Koelsch and Siebel (2005) go so far as to propose that the early developing brain processes language as a type of music.

There are four key aspects to inform a broad link between music and language, each of which will be discussed in this section, i.e., early communication and musicality; a 'shared sound category learning mechanism hypothesis'; comparisons of early development of music and language; and evidence from brain studies.

2.1.1. Early communication and musicality. This literature review will now describe findings relating to these earliest of communicative interactions between caregiver and infant, which illustrate the inter-subjectivity and musicality of such interactions, within the context of a holistic approach to speech and language and social and emotional development.

Lev Vygotsky (1978), Jerome Bruner (1983) and John Locke (1993) all emphasise that a child picks up language purposefully and inter-subjectively, by noticing what other people do with it. Trevarthen (2002/1) contends that it involves mutual attention:

> Is it not more reasonable to expect the human being to be born with motivating principles that guide experience to a collaborative awareness and that motivate learning of culturally created meanings? (p. 20)

Communication and language are embedded in the social and cognitive context, and include interactive features such as early joint attention, turn taking , looking at picture story books and naming objects, routine talk and nursery rhymes (Meadows, 2006). Observational studies have revealed a great deal about the early interactions between caregiver and infant, in relation to musicality. Trehub (2003) contends that "an examination of mother-infant interactions provides a glimpse into our social and musical beginnings" (p. 671). This kind of specialised talk that adults engage in with infants is traditionally known as 'motherese', but is becoming more widely known as 'Child Directed Speech' or 'Infant Directed Speech' because it is not just mothers that do it, but also fathers, teachers and older siblings (Meadows, 2006).

Trevarthen (2002/1) has been seminal in his work of analysing these caregiver and child interactions and he has highlighted some distinctive features, grounded in musicality. This section will outline these distinctive features. Firstly, melodic fluctuations, where typical proto-conversation was found to be interesting musically, where there are graceful fluctuations in pitch creating a melody and melodic fluctuations of voicing, characteristic of Infant Directed Speech (Fernald, 1992; Papousek, 1996; Trehub, 1990). Secondly, timing; after analysing several proto-conversations, Malloch (1999) found, in addition to a regulated beat and bar structure, that something close to a 30 second cycle is a consistent feature. Similar cycles of excitement are common in music, and 20 to 30 seconds is the usual length of a verse or stanza in a baby song, the stanza being made up of four phrases each lasting about 5 seconds. Interestingly, this same period, around 30 seconds, is also an autonomic cycle known by physiologists for over a century, a spontaneous change in the brain's regulation of spontaneous processes in the body (Trevarthen, 2002/1). Thirdly, recognising saliency; newborns actively synchronise with salient moments in the adult's message of gesture or utterance with tosses and turns of the head, hand gestures and touches given rhythmic emphasis. The extended vocalisations of Infant Directed Speech, its predictable rhyming and climaxes of affect, dancing limb and whole body movement, predicting what the parent will do, and 'coo' sounds can be matched in pitch and quality (timbre) between them (Malloch, 1999; Papousek & Papousek, 1981; Trevarthen, 1999). Fourthly, engaging attention and affect. Speech to infants in different languages has universal rhythmic and prosodic features, and everywhere rising contours elicit and maintain infant attention more than falling pitch (Papousek, 1996). Infants are more interactive, interested and emotionally positive to Infant Directed Speech, which engages attention, communicates affect, facilitates social interaction, and presumably, helps language acquisition, all consequences of an infant's innate motives for communicating the primary impulses of a conscious agency (Trehub, 1990).

From detailed observation over many years and across many cultures, Trevarthen (1999) contends that music communicates with the very young human being because it engages with a fundamental Intrinsic Motive Pulse (IMP) generated in the human brain. The Intrinsic

Motive Pulse depends on what Malloch (1999) has called communicative musicality. This comprises;

- a rhythmic time sense that detects syllables, the beat, phrases and longer elements;
- sensitivity for temporal variations in intensity, pitch and timbre of voices and in instrumental sounds that mimic the human voice; and
- a perception of the narrative in the emotional development of the melodic line, which supports anticipation of repeated harmonies, phrases and emotional forms in a vocal or musical performance.

Trevarthen and colleagues (2001/2) collected and analysed baby songs in many languages and they found that there is a very characteristic pattern of rhyming vowels at the end of the second and fourth lines. For example in the Scottish song:

Clappa, clappa handies,
Mummy's at the well,
Daddy is away to London,
To buy Leanne a bell.

Rhyme seems to be an important feature and babies become very expert by 4 to 6 months at predicting the timing and rhyming features, for example, during 'Round and round the garden' five month old Leanne vocalised on top of the long vowel of 'bear' and matched the sound of the vowel (Trevarthen, 1999). Trevarthen (2002/1) attempts to explain the significance of nursery rhymes as part of a holistic experience:

> It is highly significant that a nursery song, once attended to with appreciation, is virtually unforgettable as pure music, and that the music makes the words an appealing narrative both richer and more memorable. The link between melody and memory must explain one key function of musicality, or poetics – they make sharable and retrievable dynamic meaning. (p. 173)

This suggests a holistic and interactive view of this early human musicality incorporating social and emotional development as well as broader speech and language development. It is important to be mindful that these early interactions between caregiver and infant will

not be everyone's experience, although, there is much evidence that confirms this early link with musicality and language across cultures.

It may seem likely, therefore, that the earliest of childhood experiences of music and language are inextricably linked and this literature review will now consider whether they in fact share a common basis for development in the early years.

2.1.2. A 'shared sound category learning mechanism hypothesis'. Language and music are specific to humans and share several characteristics, such as the use of the auditory domain as the input path, and the organisation of discrete perceptual elements into structured sequences (Patel, 2003). Music, like language, is based in the auditory modality and the primary mode of music production, singing, uses the same vocal apparatus as speech. Some aspects are universal and some culturally specific, for example, all language consist of phonemes, the smallest unit of sound, and all musical systems consist of notes, although the specifics may vary from culture to culture (McMullen & Saffran, 2004).

This relationship between language sound categories and musical sound categories has led commentators to a 'shared sound category learning mechanism hypothesis' (Fedorenko et al., 2009). Although musical and linguistic sound systems have different organisations of pitch (high and low) and timbre (the characteristic quality of a sound that distinguishes it from other aspects), both sound systems face the challenge of extracting a small number of categories that are meaningful from a flow of acoustically variable signals (Dege & Schwarzer, 2011). These challenges are likely to be solved by a shared mechanism (Patel, 2008).

In order to establish the plausibility of a 'shared sound category learning mechanism hypothesis', the next section will now outline McMullen and Saffran's (2004) review of empirical studies and what they reveal about the comparisons of the early development of music and language.

2.1.3. Comparisons of early development of music and language. McMullen and Saffran's (2004) framework is useful because it organises evidence of comparisons in the following key areas, environmental input, sound structure, prosodic structure, grammatical structure, meaning, memory and learning mechanisms.

2.1.3.1. Environmental input. Knowledge of music and language is gained implicitly from exposure and this process involves inducing structure from environmental input (Hallam, 2010). When human beings listen to music or speech they process an enormous amount of information rapidly without conscious awareness (Blakemore & Frith, 2005). This depends on environmental input, and as Hallam (2010) contends, "the ease with which we do this depends on our prior musical and linguistic experiences" (p. 6). This knowledge is implicitly learned through exposure to particular environments and is automatically applied when we listen to music or speech (Hallam, 2010).

Two important similarities are in the nature of input and normalisation. Firstly, in terms of the nature of input, some music and language will be absorbed through everyday experience and some will need to be taught more explicitly. Secondly, a normalisation process must be in operation in order to achieve perceptual constancy, since, for example, both phonemes in speech and melody in music retain their identity despite changes in duration and loudness etc. (Anvari, Trainor, Woodside & Levy, 2002).

2.1.3.2. Sound structure. Both music and language are generated from a finite set of sounds and these are organised into discrete categories, facilitating representation and memory (McMullen & Saffran, 2004). Infants must learn the specific features of the systems in their environment; for example, by six months, infants' speech perceptions are attuned to the vowels in their native language (Kuhl, Williams, Lacerda, Stevens & Lindblom, 1992). Similarly, infant's consonant perception is attuned to the native language by ten to twelve months of age (Werker & Lalonde, 1988). In both cases infants shift from categorising all speech sounds, regardless of status in their native language, to discriminating contrasts between native and non-native sounds (McMullen & Saffran, 2004). Although the precise learning mechanisms underpinning the non-native to native shift are unknown, it appears that the statistical distributions of speech sounds, or how often they are heard, may play a

critical role (McMullen & Saffran, 2004). Some similar shifts have been found in the domain of music on the level of scale structures (a series of notes differing in pitch) (Trainor & Trehub, 1992; Trehub, Cohen, Thorpe & Morrongiello, 1986; Trehub & Schellenberg, 1999), although not as well tested as in the linguistic case. Statistical induction, or making conclusions about what is heard, is identified as a plausible mechanism for this kind of learning in music, as is the case with phonemes (McMullen & Saffran, 2004)

2.1.3.3. Prosodic structure. The prosodic structure of language and music, that is, the patterns of rhythm, stress and intonation to give information about the meaning of a sound, most likely drive much of the early processing in both domains (McMullen & Saffran, 2004). Infant directed music, which shares features cross culturally, includes simple repeated pitch contours (rising and falling patterns) (Trehub & Trainor, 1998) and contour is one of the first aspects of music to be discriminated by infants (Trehub, 2003). As with infant directed speech, these songs are preferred by infants from early in life (Masataka, 1999; Trainor, 1996). In both domains the affective properties appear to be central (McMullen & Saffran, 2004) and in both domains prosodic contours are the primary means of transmitting emotional information before other forms of communication are available (Trehub, 2003). Prosodic cues may also play a role in making sense of the structural information that infants must learn to process music and language. For example, studies have shown that infants preferred to listen to infant directed speech when pauses were at clause boundaries (the end of clauses in speech are marked by syllable lengthening and a drop in pitch) (Hirsh-Pasek, Kemler Nelson, Jusczyk & Cassidy, 1987). Similar results emerge from studies using musical materials where pauses are placed at the end rather than the middle of phrases (Jusczyk & Krumhansl, 1993). However, it remains unclear whether infants are using the same mechanism or whether they have learned these similar prosodic properties independently (McMullen & Saffran, 2004).

2.1.3.4. Grammatical structure. The real power of musical and linguistic systems comes from their infinitely combinational nature (McMullen & Saffran, 2004). Both systems contain a wealth of culturally specific nuanced rules that must be learned before adult comprehension can occur (Chomsky, 1957; Lerdahl & Jackendoff, 1983). By seven months, infants are capable of pattern induction from linguistic output (Marcus, Vijayan, Bandi Rao

& Vishton, 1999). Slightly older infants have demonstrated similarly impressive abilities with complex strings of individually uttered words generated by a finite state grammar (Gomez & Gerken, 1999). Knowledge about how infants learn the grammar of their native musical system is more limited, but available data indicates that development of this knowledge is slower, emerging somewhat later, possibly due to being exposed to fewer examples of musical phrasing (McMullen & Saffran, 2004). Neuroscience responses were also quite similar for speech and music stimuli of comparable difficulty (Patel, Gibson, Ratner, Besson & Holcomb, 1998). Further similarities were found in early neural processing of linguistic and musical syntax, using syntactically incongruent words (not following the rules of how words fit together) and out of key chords, which both tended to elicit an early negative component stronger on the left for speech and right for musical (Hahne & Friederici, 1999).

2.1.3.5. Meaning. At the lexical level, no good correlate exists between language and music, as this would be problematic to assess (McMullen & Saffran, 2004). However, speech carries meaning not only lexically but also para-linguistically, through the use of intonation, and it is here that useful comparisons can be made (McMullen & Saffran, 2004). A good deal of research exists around the exaggerated prosodic contours characteristic of infant directed speech, outlined earlier in the text (McMullen & Saffron, 2004). In addition to cognitive and attentive benefits, some have suggested that a major function of infant directed speech is emotional communication and bonding (Trehub, 2003). Recent neuro-imaging indicates that responses to non-linguistic human vocal sounds are strongest in the right superior temporal area (Belin, Zatorre & Ahad, 2002), near areas that have been implicated in processing of musical pitch in other studies (Zatorre, 2003). It is unclear whether there is a meaningful overlap (McMullen & Saffran, 2004), but further research in this area could prove fruitful.

2.1.3.6. Memory. Infants are remarkably adept at representing their auditory experiences in long-term memory, as highlighted in a study by Jusczyk and Hohne (1997), which found that seven month old infants preferred to listen to a list of words taken from stories they had already heard, suggesting that they remembered words last heard several weeks ago. An analogous study using musical material suggests similar abilities exist in infant musical memory (Saffran, Loman & Robertson, 2000), suggesting that an infant's musical memory

may be as nuanced as their linguistic memory (McMullen & Saffran, 2004). Infants also appear to process linguistic auditory events at multiple levels of detail simultaneously (Kuhl, 1979, 1983) and where auditory representations are quite detailed (Ilari, Polka & Costa-Giomi, 2002). More insight into the development of auditory memory is being provided by work using electroencephalograms (EEG), which measures brain activity, indicating that newborn auditory memory is sufficient to permit the learning of phonetic contrasts without any possibility of conscious attention (Cheour, Ceponiene, Leppanen, Alho, Kujala, Renlund et al., 2002). No comparable research, to the knowledge of the author, has been done involving musical stimuli, a fertile field for investigation (McMullen & Saffran, 2004).

2.1.3.7. Learning mechanisms. Once learners have received sufficient exposure to musical and linguistic systems, they must somehow derive structure across the specific experiences represented in memory (McMullen & Saffran, 2004). Various types of learning mechanisms have been implicated in this process; rules and statistics (McMullen & Saffron, 2004). Rules require learners to abstract away from the specific items in their experience to discover underlying structure (Chomsky, 1959); statistical learning is detecting patterns of sounds, words, or other units in the environment that cue underlying structure (Saffran, 2003). These processes have been found across word boundaries in fluent speech (Aslin, Saffran & Newport, 1992; Saffran, Johnson, Aslin & Newport, 1999) and in sequences of musical tones (Saffran et al., 1999). This suggests that that some aspects of music and language may be acquired via the same learning mechanism (McMullen & Saffran, 2004).

However, it is important to note that there is evidence for cortical separation of these functions in adults (Peretz & Coltheart, 2003; Zatorre & Belin 2001). One proposal to clarify this apparent contradiction is put forward by Patel (2003), who suggests that a distinction be made between the processing resources and the *content* that the processing creates. So general auditory processing mechanisms responsible for pattern analysis are involved in the perception of both speech and music and knowledge would be stored separately (Patel, 2003). In addition, other commentators have also put forward the view that, although this distinction may exist in adults, it remains unclear whether humans begin life with this neural specialisation or whether it emerges as a function of experience (McMullen & Saffran, 2004). Further research is required, although it seems plausible that young children may

indeed bring some of the same skills to bear on learning in each domain. As McMullen and Saffran (2004) contend:

> From the perspective of the youngest listeners, who must learn about each system before discovering its communicative intent, the similarities between music and language may be heightened. (p. 290)

Overall the literature suggests that there may be some overlap in the processes involved in the early development of music and language which would add some weight to the 'shared sound system learning mechanisms hypothesis', in terms of environmental input, structure, meaning, memory and learning mechanisms (McMullen & Saffron, 2004). This would appear consistent with the inextricable links between early musicality and language and communication outlined previously. Furthermore, if this is the case, it could be predicted that there would be comparable individual differences in language and musical abilities, which will be explored later in this literature review. It would also be expected that some shared processes would be detectable in brain activity which will now be outlined.

2.1.4. Evidence from brain studies. There is evidence that speech and music share some cortical areas and mechanisms (Patel, Peretz, Tramo & Labrecque, 1998). Several studies have reported associations between musical ability and accuracy at perceiving phonetic or prosodic contrasts, in a native or foreign language (Anvari et al., 2002; Thompson, Schellenberg & Husain, 2004; Magne, Schon & Besson et al., 2006; Slevc & Miyake, 2006; Wong & Perrachione, 2007). However, the brain mechanisms mediating these benefits have not been well understood (Patel & Iverson, 2007).

Patel (2003) puts forward the hypothesis that linguistic and musical syntax share certain syntactic processes in overlapping frontal brain areas and contends that this is a growing area of research which has some potential to clarify the nature of shared mechanisms. As Patel (2003) contends, "it is important to note that research on language-music relations is growing rapidly in both depth and breadth" (p. 679). Studies include comparative studies of development (Trehub, Unyk & Trainor, 1993), neural plasticity (Zatorre, Evans, Meyer & Giedde, 1992), pitch perception (Patel, Gibson, Ratner, Besson & Holcomb, 1998; Zatorre et

al., 1992; Schon, Mage & Besson, 2001) the cortical representation of speech versus musical sounds (Zatorre et al., 1992) and text and tune processing in songs (Besson, Faita, Peretz, Bonnel & Requin, 1998).

Of particular interest has been the influence of the experience or training in one domain on another and advances in the study of the brain have helped to enhance understanding of how active engagement with music influences other areas of development (Hallam, 2010). Studies have shown that extensive active engagement with music induces cortical re-organisation producing functional changes in how the brain processes information (Hallam, 2010). If this occurs early in development, the alterations may become hard wired and produce permanent changes in the way information is processed (Schlaug, Jancke, Huang & Steinmetz, 1995).

The transfer of learning from one domain to another depends on the similarities between the processes involved and is known as 'Near Transfer'. Transfer between tasks is a function of the degree to which the tasks share cognitive processes (Hallam, 2010). Transfer can be near or far and is stronger and more likely to occur if it is near. Salomon and Perkins (1989) refer to low road and high road transfer. Low road transfer depends on automated skills and is relatively spontaneous and automatic, for example, the processing of music and language, using the same skills to read music or text. High road transfer requires reflection and conscious processing. Some musical skills are more likely to transfer than others (Hallam, 2010). The musical skills more likely to transfer are those concerned with perceptual processing of sound, fine motor skills, emotional sensitivity, conceptions of relationships between written materials and sounds and memorisation of extended information (Schellenberg, 2003; Norton, Wimer, Cronin, Overy, Lee & Schlaug, 2005).

A recent study by Wong, Skoe, Russo, Dees and Kraus (2007) suggests that musical experience tunes basic auditory sensory processing circuitry in the brain, which has consequences for language development (Patel & Iverson, 2007). Musical training sharpens the brain's early encoding of sound leading to enhanced performance (Tallal & Gaab, 2006; Patel & Iverson, 2007), improving the ability to distinguish between rapidly changing sounds (Gaab, Tallal, Kim, Lakshminarayanan, Archie, Glover et al., 2005), and enhancing auditory

discrimination (Schlaug, Norton, Overy & Winner, 2005). This has an impact on the cortical processing of linguistic pitch patterns (Schon et al., 2004; Magne, Schon & Besson, 2006). Effects of music training emerge quickly (Hallam, 2010). Eight year old children with just eight weeks of musical training differed from controls in their cortical event related potentials (Moreno & Besson, 2006); and Flohr, Miller and DeBeus (2000) provided music training for 25 minutes for seven weeks for children aged four to six and found that those children who had received musical training produced EEG frequencies associated with increased cognitive processing compared to the control group (Hallam, 2010). Hallam contends that the earlier the exposure, the greater the impact:

> Overall the evidence suggests that engagement with music plays a major role in developing perceptual processing systems which facilitate the encoding and identification of speech sounds and patterns, the earlier the exposure to active music participation and the greater the length of the participation the greater the impact. Transfer of these skills is automatic and contributes not only to language development but to literacy. (p. 8)

To conclude, language and music are important to humans and share several characteristics, such as the use of the auditory domain as the input path and the organisation of discrete perceptual elements into structured sequences (Patel, 2003). Music, like language, is based in the auditory modality and the primary mode of music production, singing, uses the same vocal apparatus as speech. There appears to be an intrinsic link between early communication and musicality, illustrated by observations of interactions between caregivers and infants, which occur cross culturally. Furthermore, comparisons of early development in music and language have revealed some important overlap in areas such as environmental input, sound structure, prosodic structure, grammatical structure, meaning, memory and learning mechanisms (McMullen & Saffran, 2004). Brain studies have also revealed that there is evidence that speech and music share some cortical areas and mechanisms (Patel & Peretz, 1997; Patel, Peretz, Tramo & Labrecque, 1998). It seems plausible, therefore, that young children may indeed bring some of the same skills to bear on learning in each domain and there is some evidence for a ‘shared sound category learning mechanism hypothesis’.

2.2. Empirical Studies to Investigate the Specific Relationship Between Music and Phonological Awareness in Children Aged Four to Six

The literature review will now look more specifically at the proposed relationship between music and phonological awareness. It will do this by critically reviewing empirical studies that have been carried out with children aged four to six, a time when the development of phonological awareness is accelerated. Firstly, correlation studies will be reviewed because these can provide evidence that abilities in music and phonological awareness are related. This would add weight to the 'shared sound category learning mechanism hypothesis'. Secondly, quasi experimental studies of children aged four to six will be reviewed to establish whether significant gains in phonological awareness were made following music-based intervention. This is important because it would support a 'near transfer hypothesis', which is valuable because it would provide evidence that training in one domain could potentially benefit the other.

2.2.1. Correlation studies. Common early development in music and language would suggest that there would be some correlation between abilities in both. There has been a particular interest in the correlation between musical abilities and phonological awareness in children aged four to six, a period when phonological awareness will be developing rapidly (Bryant, Bradley, Maclean & Crossland, 1989) and initial findings have proved fruitful in establishing some correlation between musical abilities and phonological awareness. The studies will now be outlined.

Bryant, Bradley, Maclean and Crossland (1989) looked at relationships between knowledge of nursery rhymes, in particular, and later phonological awareness and reading ability. They carried out a seminal longitudinal study of children aged between three and six, when most of them had begun to learn to read. Strong relationships were found between early knowledge of nursery rhymes and success in reading and spelling over the next year, even after differences in social background, IQ and the children's phonological skills at the start of the project were taken into account. The analysis supported a rhyme detection leading to

phoneme detection leading to reading route, rather than a direct route between rhyme detection and reading.

Lamb and Gregory (1993) were among the first researchers to examine the possible link between music abilities and phonological awareness and revealed a relationship between pitch discrimination and phonemic awareness in eighteen English speaking children aged four to five. In terms of the limitations of the study, the authors did acknowledge a small sample size, which could affect how robustly they could generalise from their results. The authors concluded that children who had better results in melodic perception were more able to manipulate and to decode various linguistic units (rhymes, syllables, and phonemes) than children who performed less well in melodic perception. The ability to perceive slight differences in phonemes seemed to depend on the ability to extract information about the frequencies of speech sounds (Hallam, 2010).

Following the Lamb and Gregory (1993) research, Bolduc and Montesinos-Gelet (2005) examined the correlation between phonological awareness, melodic perception, and rhythmic perception abilities with thirteen French Canadian children with an average age of five years six months. Melodic perceptive abilities correlated with syllabic and rhythmic identification tasks, although the sample size of thirteen children was small and this makes it problematic to generalise from these findings.

Two studies carried out by Peynircioglu, Durgunoglu and Oney-Kusefoglu (2002) support the above research outcomes. In their first study they examined the correlation between musical aptitudes (perceptive melodic and rhythmic abilities), phonological awareness and pseudo-word recognition abilities with thirty two Turkish children, and results suggested that participants with superior musical abilities obtained better results in the phonological awareness and pseudo word recognition tasks than participants with below average musical aptitudes.

In their second study, with forty pre-school children from the USA, similar to the first study, children in the high musical aptitude group did much better on all tasks than those in the low musical aptitude group. There is some evidence to support the view that success in

manipulating linguistic sounds was related to an awareness of distinct musical sounds. These results need to be interpreted with caution, however, because no precise information was provided by the authors about the children's general cognitive abilities or their socioeconomic backgrounds (Bolduc, 2008) and the sample sizes were relatively small. The researchers did observe that participants from the USA were able to distinguish consonants in the beginning of words more easily than their Turkish counterparts, although it is unclear whether this is a language difference or a difference in schooling. It may be fruitful to explore differences in these phonemic or alliteration skills in relation to monolingual and bilingual speakers.

An extensive analysis was carried out in 2002 by Anvari, Trainor, Woodside and Levy, who explored whether musical abilities were correlated with phonological awareness and pre-reading abilities, with a larger sample of one hundred English speaking Canadian children aged four to five years old, using control measures . The researchers developed a phonological awareness test and a musical aptitudes test. Spatial-temporal and mathematical control tasks were used as assessment measures. Music skills were found to correlate significantly with both phonological awareness and reading development. Regression analyses indicated that music perception skills contributed unique variance in predicting reading ability, even when variance due to phonological awareness and other cognitive abilities had been accounted for. A relationship between musical rhythm and reading was less clear. Interestingly, the study found inconsistent results for rhythmic tasks; in four year olds both the rhythm production and discrimination tasks correlated with the musical pitch tasks and with reading whereas, in contrast, for the five year olds, the rhythm tasks did not correlate with musical pitch tasks or reading. It remains unclear as to why musical pitch appears to relate more consistently to phonemic awareness and reading (Anvari et al., 2002). Musical pitch and musical rhythm tasks may be tapping into different skills.

Recent studies have confirmed that having musical skills predicts the ability to perceive and produce subtle phonetic contrasts in a second language (Slevc & Miyake, 2006) and the reading abilities of children in their first language (Anvari et al., 2002). It also enhances the ability to interpret affective speech rhythms (Thompson et al., 2004). Bolduc (2008) notes

that both Sloboda and Ribiere-Raverlat have argued that music education may contribute to the development of phonological memory.

In conclusion, findings from these studies are broadly consistent in showing a relationship between phonological awareness and music abilities, with children aged between four and six years old. However, some of the studies had small sample sizes and could not account for other variables, such as cognitive ability and socio economic status. The Anvari et al. (2002) study was more robust as it had a larger sample size and regression analyses accounted for other variables. Other studies which build on these findings would be fruitful to confirm these initial findings, but they should take account of the methodological constraints . The current findings tentatively suggest some correlation between music abilities and phonological awareness. In order to establish whether building skills in one domain can impact on skills on another according to the 'near transfer hypothesis' it will be necessary to investigate whether instruction in one domain can impact on the other, or to pose the question, 'Can musical instruction improve phonological awareness?' This is the focus of the next section.

2.2. 2. Quasi-experimental studies to investigate the impact of music instruction on phonological awareness. There have been a number of international studies, which provide some insight into the effects of music programmes on the development of emergent literacy in children aged four to six years (Colwell, 1994; Standley & Hughes, 1997; Register, 2001), but this literature review will only focus on those studies which looked at the impact of musical instruction on phonological awareness, because the focus of this study is phonological awareness and the pre cursors to it, rather than later emerging skills.

A study by Colwell (1988) showed that a music therapy programme improved phonological awareness for twenty three participants from the USA aged four to six. Two groups of children participated in the experimental programme, which included a daily fifteen minute music lesson, that focussed on learning songs and on identifying phonological units through listening activities, over four weeks. Two other groups of children participated in a control programme that provided phonological awareness training without musical instruction. The groups were then switched over so that each experienced the experimental and control

conditions for another four weeks. Colwell's variance analysis revealed that, although both the control programme and the music therapy programme had a significant impact on phonological awareness, statistically, the music therapy programme proved to be more effective. The author claimed that music facilitates the development of pre reading skills even before systematic teaching of reading begins in primary school, even over a short daily time period. The conclusion needs to be regarded with some caution, as Colwell used only one phonological awareness test, which she developed herself.

Bolduc (2009) carried out a much larger study with one hundred and four kindergarten children in Quebec, where the experimental group followed a culturally specific amended version of Standley's and Hughes' (1997) music programme, that focused on both pre writing and pre reading abilities, compared with a control group which followed a regular music programme. According to Bolduc, the interdisciplinary activities in the experimental music programme contributed to improving three components that play an essential part in the development of musical and linguistic abilities, i.e., auditory perception, phonological memory and meta-cognitive knowledge (Bolduc, 2008).

Gromko (2005) investigated the effects of musical training on phonological awareness . Forty three kindergarten children in the USA were taught music during a weekly thirty minute session over four months. The control group of sixty children attended a nearby school and received no intervention. Participants underwent a number of early literacy tests. No music instruction was generally provided in schools in the district. Both groups received approximately the same amount of reading instruction. The music programme was based on Jerome Bruner's concept of education as learning through active experience and included learning a new folk song, accompanied singing with movement or body percussion, using instruments and touching a graphic chart, whilst singing, that consisted of symbols to represent beat, word rhythms and melodic contour. Gromko (2005) contended that beginning readers match sounds to graphemes or letters and beginners in music also match rhythm and pitch to graphic shapes.

Children who received the instruction showed significant gains in the development of their phoneme segmentation fluency, when compared to the control group. According to Gromko

(2005) the results support a near-transfer hypothesis that active music making and the association of sound with developmentally appropriate symbols may develop cognitive processes similar to those needed for segmentation of a spoken word into its phonemes. Gromko (2005) did recognise the possibility of a Hawthorne effect, in that improvement in the experimental group could be as a result of extra attention and therefore it is problematic to conclude robustly that gains are due to the music programme. Of particular note, neither performance in letter naming fluency nor nonsense word fluency was significantly different between control and intervention groups. Whereas in the phoneme segmentation task, significant gains were made. This could be accounted for by the fact that the task is distinctly aural in nature, compared to the letter and nonsense word fluency which requires grapheme recognition. Gromko (2005) suggested that phonemic awareness, defined as the ability to recognise that a spoken word consists of individual sounds or phonemes, may be the mechanism that explains the relationship of music instruction to reading skill (Gromko, 2005). Although an interesting finding, it is important to note methodological constraints, in that the control group was in a different school and therefore it is not possible to take account of confounding variables such as teaching emphasis and style, in explaining the results.

Dege and Schwarzer (2011) contended that the studies conducted to date have some limitations and attempted to account for Hawthorne effects in their experimental design by having a music group, phonological skills group and a control group that received sports training. They also attempted to ensure that groups were well matched for gender, age, intelligence and phonological awareness. Forty one participants in German schools, aged five to six years old, took part and were trained for ten minutes on a daily basis for twenty weeks in groups of five to seven children. A music programme was created by the researchers and based on a well established programme for early years music and contained joint singing, drumming, rhythmic exercises, meter execution, training of rudimentary notation skills, dancing and playful familiarisation with intervals. There was a significant improvement in all groups in smaller phonological unit skills, synthesis of phonemes into words and phoneme recognition in words. There was a significant gain for the music and phonological programmes groups in phonological awareness for larger phonological units but not for the sports group.

The authors contended that the enhancement of phonological awareness was driven by positive effects of the music programme and phonological skills programme on phonological awareness for larger phonological units. The data suggests that phonological awareness can be trained with either a phonological skills programme or a music programme. The authors concluded that this provides evidence of a 'shared sound category learning mechanism' for language and music. What is interesting about this study is the difference between the phonological activities group and music group, both making significant gains in awareness of larger phonological units, compared to the sports group which did not. This is in comparison to all groups making significant gains in awareness of smaller phonological units. However, it is important to note that the groups were taken from three different kindergartens and therefore the children may have experienced different teaching experiences and environments.

In conclusion, although the findings from the quasi-experimental studies are broadly consistent in showing a positive effect of music instruction on phonological awareness, in children aged four to six years, there are several limitations with the studies carried out to date, particularly in terms of sample size, Hawthorne Effects and drawing control groups from different schools. Further research projects avoiding some of these limitations would be fruitful to add weight to the initial findings. Furthermore, the impact of music instruction on the pre-cursors of phonological awareness have not been investigated. This is a particularly fruitful area because developing early phonological skills impacts positively on later phonological awareness and later literacy. This is because phonological awareness arises through a developmental process and is part of a much wider phonological processing system. In the next section, the development of phonological awareness will be described in the context of a wider processing system and broader language development.

2.3. Theoretical Framework to Explain the Development of Phonological Awareness

This literature review has examined empirical evidence for the relationship between music and phonological awareness. Therefore, it is necessary to examine phonological awareness in detail, in order to better understand the mechanisms underlying this relationship. This section will outline a theoretical framework which illustrates the development of phonological awareness. It will provide a brief overview of why understanding phonological awareness is important, what it is, how it is demonstrated and when it develops. It will describe two key aspects of an increasingly consistent view about phonological awareness. Firstly, that it is one part of a larger phonological processing system and research is beginning to reveal the relationships between sub-skills including those related to language development, early phonological skills, later phonological awareness and acquiring literacy. Secondly, that this wider processing system is developmental, so that developing skills in earlier phonological skills impacts on later phonological awareness and literacy.

Interest in the development of phonological awareness is important as there is strong evidence that it is one of the most important predictors of reading in normally developing children (Rack et al., 1994; Wagner & Torgesen, 1987). In addition children with dyslexia often show phonological processing difficulties and explicit training in phonological awareness can improve the efficacy of reading instruction (Hatcher, Hulme & Ellis, 1994; Lundberg, Frost & Peterson, 1988; Rose Review, 2006; Torgesen, 2004).

2.3.1. Definition of phonological awareness. Phonological awareness specifically involves the detection and manipulation of sounds made up of syllable, onset and rime and phoneme. Awareness of these sounds is demonstrated through a variety of tasks such as;

- listening skills, the ability to attend to and distinguish environmental and speech sounds from one another, discrimination, recognise same and different sounds;
- syllable structure awareness tasks such as syllable segmentation, for example, distinguishing how many syllables there are in the word elephant;

- onset-rime awareness tasks such as spoken rhyme detection, for example, identifying which word doesn't rhyme with bell, fell, shell, bun; and
- phonemic awareness tasks such as alliteration or phoneme detection, for example, identifying the word which has a different first sound ball, bat, bounce and sun.

Although the tasks vary, they share the same basic requirement that some basic operation be performed on the sounds, such as identifying, comparing, separating, combining or generating.

2.3.2. When and how phonological awareness develops. Although some two year olds show some phonological awareness, for most children phonological awareness appears in the third year, with accelerated development in the fourth and fifth (Bryant et al., 1990). Phonological awareness skills develop in a predictable pattern, similar across languages, progressing from larger to smaller unit of sounds. Tasks that require mastery of phonological awareness have their own developmental sequence, for example, tasks involving the detection of dissimilar or similar sounds are mastered before tasks requiring the manipulation of sounds (Anthony, Lonigan, Driscoll, Phillips & Burgess, 2003). Phonological awareness is different from other phonological abilities in that it is a meta-linguistic skill requiring conscious awareness and reflection on the structure of language, whereas other phonological abilities such as attending to speech, discriminating between sounds and holding sounds in memory, can be performed without conscious reflection (Gillon, 2004). However, these other phonological abilities are prerequisite to the development of phonological awareness. Therefore, general speaking and listening skills are often among those included in phonological awareness instruction because the level of analysis required for awareness at the phoneme level is thought to originate with auditory discrimination of similarities and differences in sounds (Gromko, 2005). Arguably, singing and music could play a part in developing these skills.

2.3.3. Phonological awareness within a larger processing system. This literature review will now draw on the developmental framework for phonological awareness outlined in Carroll, Snowling, Stevenson and Hulme's (2003) longitudinal study. The study is particularly helpful because it sought to establish knowledge about individual sub-skills and their

interrelationships throughout the developmental process. The authors looked at both the precursors to, and phonological awareness, as part of a larger phonological processing system used for speaking and listening (Wagner, Torgesen, Laughon, Simmons and Rashotte, 1993). According to Carroll, Snowling, Stevenson and Hulme (2003), the precursors of phonological awareness as individual sub-skills are a relatively under researched, yet important, area. This literature review has already established an early commonality between language development and music and, therefore, a theoretical framework which pays attention to the context of broader language development has the potential to be particularly informative.

2.3.4. Importance of wider language development. In their longitudinal study (Carroll, Snowling, Stevenson & Hulme, 2003), three and four year old children were tested three times over a course of a year, on a range of phonological awareness tasks. Findings indicated that correlations between receptive language (vocabulary knowledge and phonological discrimination) and large segment awareness (syllable and rime) were particularly high. The authors also found that both articulation and large segment phonological awareness have significant independent longitudinal influences on the development of phoneme awareness. This finding is in keeping with previous findings, that children with reading difficulties and, hence, phonemic awareness difficulties, tend to show impairments in expressive (output) but not receptive (input) phonology (Hulme & Snowling, 1992).

Of particular note is the authors' conclusion that the precursors of phonological awareness grow out of normal linguistic development. As the authors contend:

> Implicit large segment sensitivity is a skill that grows out of normal language development and because it seems to interact closely with receptive lexical knowledge it might therefore be better considered as part of normal linguistic rather than meta linguistic development. (Carroll, Snowling, Stevenson & Hulme, 2003, p.922)

This fits well with a growing consensus that phonological awareness is closely tied to overall speech and language development, supported by research that has found that pre-school language abilities correlate with later phonological awareness (Chaney, 1998; Olofsson &

Neidersoe, 1999) and early language development is related to later reading development (Bishop and Adams, 1990; Bryant, Maclean and Bradley, 1990). Interestingly, studies of children experiencing difficulties with reading have highlighted difficulties in rhythmic performance (Atterbury, 1985; Overy, 2000) and verbal memory (Ho, Cheung & Chang, 2003), which may be broadly more language related. Although studies like that of Carroll, Snowling and Hulme, (2003) that link individual sub-skills of language to phonological awareness are relatively uncommon, one recent study carried out by Silven, Niemi and Voeten, (2002) found that receptive and expressive vocabulary at two years of age predicted onset-rime sensitivity at four years of age. "Despite this relationship, the origins of phonological awareness in pre-school children have received little attention" (Carroll, Snowling, Stevenson & Hulme, 2003, p. 913).

Understanding phonological awareness within a broader language context is also illustrated by some of the conclusions drawn from investigations into the impact of music instruction on phonological awareness. According to Bolduc (2008), the interdisciplinary activities in the experimental music programme used in the research contributed to raising three components that play an essential part in the development of musical and linguistic abilities, i.e., auditory perception, phonological memory and meta-cognitive knowledge (Bolduc, 2008). Following music instruction with Mexican kindergarten children (Galicia et al., 2006), results showed a significant increase in the receptive language skills of the music intervention group compared with the control and comparison groups and they concluded that based on the evidence of the significant correlations of phonological awareness with melody and timbre discrimination and with receptive vocabulary (Anvari et al., 2002), it can be inferred that melody and timbre discrimination activities help to stimulate receptive vocabulary development (Galicia et al., 2006). Therefore, music activities are likely to benefit broader language development and have the potential to impact on phonological awareness, as there appears to be a strong relationship between phonological awareness, early phonological skills and language development:

> The later development of the explicit awareness of phonemes appears to build on the foundation of earlier large segmentation awareness and to depend, in

addition, on the accuracy of a child's articulation skills. (Carroll, Snowling, Stevenson & Hulme, 2003, p.922)

2.3.5. Development from awareness of large to small units. A further important conclusion about phonological awareness is the characterising of development as a progression from awareness of large units (syllables and rimes) to awareness of small units (phonemes)(Carroll, Snowling, Stevenson & Hulme, 2003). This conclusion is in line with a number of previous studies, which provide evidence that rime awareness and phoneme awareness are separable skills (Hoien, Lundberg, Stanovich & Bjaalid, 1995; Muter, Hulme, Snowling & Taylor, 1998). Foy and Mann (2001) also found that these skills correlate differently within a range of language and reading measures. Within their study, rime awareness correlated with speech perception and short term memory measures, whereas phoneme awareness correlated with reading and letter knowledge. This is part of a growing body of evidence that suggests that rime and phoneme tasks tap fundamentally different processes (Carroll, Snowling, Stevenson & Hulme, 2003).

This is important, because it may then follow that music abilities and different forms of music instruction may also be tapping into different processes. For example, singing nursery rhymes may be tapping into the skills that correlate with speech perception and short term memory measures, similar to rime awareness skills (large units), whereas matching symbol to musical note more likely tap into skills related to reading and letter knowledge, more akin to skills associated with phoneme awareness (small units). This distinction is supported by findings from investigations into the impact of music instruction on phonological awareness, for example, Dege and Schwarzer (2011) found a difference between the phonological activities group and music group in making significant gains in awareness of larger phonological units compared to the sports group, whereas all groups made significant gains in awareness of smaller phonological units. Whereas, Gromko (2005) found a distinction between four and five year olds, where correlation between rhythm production, discrimination tasks and musical pitch tasks, and with reading was found with four year olds, in contrast, for the five year olds, the rhythm tasks did not correlate with musical pitch tasks or reading.

To summarise, in relation to phonological awareness, the literature review has highlighted important developments in knowledge. Firstly, that individual sub-skills are related within a broader context of language development and a phonological processing system. Secondly, that there is a particularly strong relationship between early large segmentation awareness (syllable and rime), articulation and receptive language. Thirdly, early phonological skills, such as large scale awareness (syllable and rime), tap into different skills to later phonological awareness, but developing these precursors to phonological awareness will impact on later phonological awareness. These findings can begin to illuminate the potential for music intervention to improve phonological awareness by informing two key assumptions. Firstly, links between music and language, as outlined earlier in this chapter, make it plausible that music activities may facilitate the development of broader language skills; and secondly, encouraging activities involving related sub-skills such as the development of rhyme, rhythm and articulation will also benefit later phonological awareness. The next section will illustrate how music intervention, such as singing nursery rhymes, that simultaneously facilitates singing rhyme and rhythm, articulation and receptive language, has the potential to develop these important sub-skills. This is informed by the theoretical framework cited, which would also suggest that the development of these early phonological skills can impact on later phonological awareness and literacy.

2.3.6. The potential benefits of singing nursery rhymes. Bryant, Bradley, Maclean and Crossland (1989) argue that singing nursery rhymes specifically enhance phonological skills by teaching children about rhyme within traditional routines. They contend that this frequently builds on children's early experiences of communication and musicality, which pertains to the discussion earlier in this literature review. If knowledge of nursery rhymes affects children's sensitivity to rhyme and alliteration, it will likely play a part when children learn to read, because of the wider process that has been outlined in terms of the development of phonological awareness. Bryant, Bradley, Maclean and Crossland's (1989) longitudinal study into the relationship between nursery rhymes, phonological skills and reading showed a "powerful and lasting connection between the children's early knowledge of nursery rhymes and aspects of their linguistic development later on" (p.426). Their findings confirm the developmental process of phonological awareness, as their study suggested a nursery rhyme – rhyme detection – phoneme detection – reading route rather

than a direct route from nursery rhyme to phoneme detection. Bryant and colleagues (1989) carried out correlation studies but they suggest that intervention studies are also needed:

> We need evidence as well from intervention studies. If our hypothesis is right then extra experience with nursery rhymes should make children more successful in phonological tasks and it should also help them to read and spell. (Bryant, Maclean , Maclean & Crossland, 1989, p.426)

This section has given a brief overview of why phonological awareness is important, what it is and when it typically develops. It has maintained the importance of understanding phonological awareness within a larger phonological processing system and in particular in relation to the precursors of phonological awareness. It has outlined the relationships between important individual sub-skills that make up the wider processing system. This is important because evidence shows that paying attention to the precursors will benefit later phonological awareness and subsequently later reading. Evidence has been highlighted that supports the view that phonological awareness sits within a broader language context and how large (syllable and rime) and small scale (phonemic) phonological awareness are distinct and separable skills. Understanding the processes that tap into these different sub-skills has the potential to inform why singing and music instruction may be beneficial, as well as the form that they should take. Singing nursery rhymes with children may draw on early experiences of musicality and communication and would appear to contribute to developing these important skills such as rhythm, rhyme and articulation as well as receptive language.

2.3. Formulating a Research Topic

Having examined the literature on the key themes of broader shared common early development of music and language, the specific relationship between music and phonological awareness, in terms of correlation between abilities and impact of instruction in one domain on another, and on an explanation of the development of phonological awareness, the next stage is to identify a specific topic for research that can add to

knowledge in this area. This is the purpose of this final section. Specifically, it points to a research focus into the potential of small group singing interventions, with three to four year olds, to improve phonological discrimination, using a control group in the same school. Informed by the literature review, this section will now highlight some key features to be taken into consideration when formulating the research question.

In general terms the research focus follows from the intrinsic link suggested in the literature between early musicality and communication and the plausible evidence for a shared common early development in both music and language and a ' shared sound category learning mechanisms hypothesis'. Developing phonological awareness is important for acquiring literacy, and there is some initial empirical evidence, to suggest a relationship between music abilities and phonological awareness, which supports, and can be explained by, this idea of a common early development.

Crucially, this extends to the proposal that instruction in one domain can increase skills in another, according to a 'near transfer hypothesis', so that music instruction has the potential to increase phonological awareness. Although initial findings have shown promising gains, with children aged four to six, there have been a relatively small number of studies, with methodological constraints. Of particular note, control groups were not in the same school as intervention groups and therefore it was problematic to account for confounding variables. In other words, there could be an alternative explanation for the gains made.

Therefore, the proposed research can add value to these initial findings, by taking account of some of the methodological constraints. Specifically, ensuring that the control group and the intervention group are in the same classes in the same school, as this will enable more robust conclusions about any intervention effect, as confounding variables will be minimised.

The theoretical framework in relation to the development of phonological awareness provides a critical insight into phonological awareness as part of a wider processing system,

within broader language development. This is informative because it highlights the importance of the precursors to the development of phonological awareness.

However, empirical studies in this area have tended to focus on the impact of music instruction on phonological awareness, that is large scale (syllable and rime) and small scale (phonemic) awareness. Therefore, studies have been carried out with children, aged four to six, a time when the development of phonological awareness is accelerated. Despite the importance of developing the pre cursors of phonological awareness, there are no intervention studies, to the author's knowledge, that specifically look at the effects of music intervention on earlier phonological skills with younger children. These are important foundations to the later development of phonological awareness and literacy, as well as broader language development.

Therefore, the proposed topic of research will add something new by investigating the impact of music instruction on early phonological skills, with younger children, aged three to four. A skill such as phonological discrimination would be useful to assess because it distinguishes between differences and similarities in words, rather than just in sounds, as in auditory discrimination. Therefore, it is a skill that can be seen as a progression from auditory discrimination, but also as a precursor to phonological awareness.

A music intervention that focuses on singing can give children the opportunity to develop large scale phonological awareness (syllable and rime), articulation and receptive language skills, outlined in the literature review as important precursors in the development of phonological awareness. This is because singing enables children to discriminate between hearing sounds and articulating sounds, and experience rhythm and rhyme. It is particularly important that the intervention enables the children to use their voices (articulate), in the light of the concerns over children's expressive language and the lack of opportunities for using oral language in early years settings. Furthermore, it may be of particular benefit to children at risk of expressive language delay and those who have not experienced a language rich home environment.

Therefore, it is also important that this intervention enables children to participate and use their voices. In order to ensure this, a small group will be a necessary feature. A regular

small group programme will give children greater benefits than whole class singing, since their engagement can be more easily monitored and appropriate scaffolding provided by adults and peers within a social learning model.

Finally, it will be necessary to establish implications for practice in terms of the feasibility of carrying out small group singing sessions in early years settings by exploring any benefits perceived by teachers and what factors could facilitate future small group singing interventions, in relation to resources, training and confidence of staff.

2.4. Summary

The literature review has reviewed the critical points of current knowledge in this area. Firstly, it proposed a broad view of the link between music and language and outlined the social and holistic nature of early infant musicality, interaction and communication, for which there is much cross-cultural empirical evidence. It then described the evidence which broadly supports the contention that there may be some commonality in the early development of music and language, which gives plausibility to a 'shared sound category learning mechanism hypothesis'. Secondly, it considered more specifically the relationship between music and phonological awareness by examining empirical studies. It examined studies which showed a correlation between music abilities and phonological awareness and concluded that although there is some evidence to support this view, it is limited by scale and methodological constraints in the research studies. It then went on to examine the impact of musical instruction on phonological awareness, in children aged four to six. It concluded that, although studies indicated positive gains following intervention, these studies were small in scale and several methodological constraints raised questions over the robustness of the intervention effect, particularly with regards to confounding variables where control groups were located in different settings to intervention groups. Thirdly, it described an increasingly consistent view, of the development of, and precursors to, phonological awareness within a larger processing system where processes are part of broader language development. This is an important theoretical framework because it helps to explain some of the underlying mechanisms pertinent to this area. It establishes some of

the specific skills that music instruction may be tapping in to which can potentially benefit not only phonological awareness but important pre cursors to it.

The chapter concluded by identifying a research topic, using a small group singing intervention, with three to four year olds, to improve phonological discrimination, with a control group in the same school. Features were outlined which highlighted this as a fruitful area of further research. In relation to the research questions, the next chapter will establish the methodology for researching this topic, how these research questions will be addressed and the principles underlying the research process.

Primary research question

1. Can a small singing group intervention with young children improve phonological discrimination?

Secondary research questions

2. What are the class teacher's perceptions of the singing intervention in terms of impacts on speaking and listening and other broader areas, small group singing in general and implications for practice?

3. What are the children's views about their experience of the singing intervention?

CHAPTER 3 METHODOLOGY

Methodology is important because it shows how the researcher justifies the research process, shows how research questions were articulated and subsequently how the research was designed in terms of meeting its purpose (Cohen, Manion & Morrison, 2000). Critical thinking throughout the process is essential to maintain transparency and justify how significant the study is in achieving its aims. As Miles and Huberman contend (1994), "without such methodological frankness, we run the risk of reporting knowledge that ain't so" (p. 294).

The following are examples of questions, formulated by the author during the research process, in an attempt to ensure justification for the actions chosen.

- What specific questions am I asking and how did they come about?
- How did these lead to the particular method design?
- Are the methods used fit for the purpose?
- Does the analytical approach fit the analysis required?
- What else could account for the findings?
- Am I paying close attention to ethical considerations?
- What would I do differently?
- How does the method reflect a view of children as participants and co-constructors of the process?
- What might another researcher learn from my experience?
- What are the implications for future practice?

The primary purpose of the research is to inform practice in an important area which has the potential to make a real difference. So there is an implicit focus on transformative practices within the wider policy context. This draws on Clough and Nutbrown's (2007) 'Four P's' in relation to social research, in that; it is *p*ersuasive because it intends to persuade others of its value; *p*urposive because it intends to achieve something as a result; *p*ositional

because it expresses a distinct perspective; and *p*olitical because it is hoped that it facilitates some kind of change, even if that is just a change in the researcher.

The previous chapter concluded by identifying a research topic based on a small group singing intervention, with three to four year olds, to increase phonological discrimination, using a control group in the same school. Features were outlined which highlighted this as a fruitful area for further research. This chapter will establish the methodology for researching this topic, including the specific research questions, how these research questions will be addressed and the principles underlying the research process.

Informed by the literature review, the following research questions were formulated, to add to knowledge in this area, in terms of empirical findings, theoretical framework and implication for practice.

Primary research question

1. Can a small singing group intervention with young children improve phonological discrimination?

Secondary research questions

2. What are the class teacher's perceptions of the singing intervention in terms of impacts on speaking and listening and other broader areas, small group singing in general and implications for practice?

3. What are the children's views about their experience of the singing intervention?

This chapter will begin by giving an overview of the ontological and epistemological position of the research. A social constructionist view of knowledge is outlined, including its critique

of, and differences from traditional psychology. It will then put the research in the context of the increasingly emerging view of children as participants, co-constructors, contributors and social actors, in a cultural context. As a precursor to the mixed methods research design, the chapter will briefly contend that the choice between qualitative and quantitative methods is informed by the method that best suits the question that is being investigated.

The quantitative research design will then be outlined. This will include identifying a school; gatekeeper permission; participant selection and exclusion; random allocation to groups; matching other variables; and obtaining informed consent, particularly in relation to young children. Other ethical considerations with regards to the research will also be outlined, such as safeguarding, treatment of children who have not had access to the intervention, awareness of limited school staff time, appreciation of staff input, clear complaints procedure, and contact details, anonymity and storage of data. Details will then be given about the rationale and development of the assessment tool and intervention design, outlining the importance of the small group collaborative approach within a socio- cultural model of learning.

Finally the qualitative research design will be outlined, including the rationale and design of questions to gain the class teacher's perceptions and for a mosaic approach to gather children's views of their experiences of the intervention. First, the methodological assumptions of the research will now be outlined.

3.1.Ontology and Epistemology

Underpinning any research are a great many assumptions about what the world is, how it works and how people claim to know these things. This research is underpinned by a social constructionist view of the world. Social constructionism is a way of understanding the world as a radical and critical alternative to traditional psychology and social psychology. It draws its influence from a number of disciplines including sociology, linguistics and philosophy and is therefore multi-disciplinary in nature, although, as Burr (2003) contends, "social constructionism is a term used almost exclusively by psychologists" (p. 2).

The key assumptions underlying social constructionism will now be outlined. Firstly, it takes a critical stance towards taken for granted knowledge, based on objective, unbiased observation of the world. Secondly, it takes account of historical and cultural specificity, and in particular the social construction of childhood, taking the view that all ways of understanding are culturally and historically relative. Thirdly, it proposes that knowledge is sustained by social processes, so when posing the question 'Where does knowledge come from?' the answer is that people construct it between them. Fourthly, it contends that what is regarded as truth may be thought of as current accepted ways of understanding the world. Knowledge is not the product of objective observation of the world but of the social processes and interactions that people are constantly engaging in with each other. Fifthly, it assumes that knowledge and social action go together so that each social construction also brings with it, or invites, a different kind of action from human beings. Descriptions or constructions of the world therefore sustain some patterns of social action and exclude others and are therefore bound up with power relations (Burr, 2003).

This is a different approach to traditional psychology in that, firstly, the focus is on interaction and social practices rather than measurable and observable data and that secondly, the focus is on process, in terms of the dynamics of social interaction, rather than viewing the researcher and participants as purely objective or neutral in the process. This is particularly pertinent when researching with young children, and the next section will consider this in some more detail.

3.1.1. Children as social actors in cultural contexts. This section will outline some important assumptions with regards to research with young children. It is particularly important to address these assumptions, in order to avoid some of the criticisms of previous psychological research. This section will begin by providing a brief overview of some of the criticisms of psychological research with children and will then propose an alternative paradigm that views children as active participants in the research process, informed by a socio-cultural model and within a broader context that requires participation with children and young people.

Some criticisms of psychological research with children have included children being treated as objects, unequal power relations between adult researchers and children participants, a focus on the narrow interests of the researcher and other issues arising from participants dismissed as 'unimportant' (Woodhead & Faulkner, 2008). A particular critique of some areas of developmental psychology is the 'under developed' status of the child when compared to the 'complete' status of the thinking and reasoning of an adult. Since the 1970s an alternative theoretical paradigm has begun to compete with the Piagetian view of the child as 'lone actor' or 'miniature scientist' (Woodhead & Faulkner, 2008). Psychologists have begun to articulate the extent to which children are social communicators and meaning-makers from the beginning of life, trying to make sense of their social world, in the various cultural contexts they inhabit (Bruner & Haste, 1987).

This socio-cultural paradigm was shaped by the insights of Vygotsky. Many of Vygotsky's investigations were carried out in applied educational contexts, as he was a former teacher (Woodhead & Faulkner, 2008). This led him to propose that knowledge is socially constructed between people and that children develop sophisticated cognitive competencies through interactions with adults who are available as teachers or models to guide the child and help them make sense of their experience (Woodhead & Faulkner, 2008). This marked a break from conventional cognitive theories of development, as Jerome Bruner (1990) explained, "the child does not enter the life of his or her group as a private and autistic sport of primary processes, but rather as a participant in a larger public process in which public meanings are negotiated" (p. 13).

This socio-cultural paradigm inspired by Vygotsky's writing has been embraced by leading developmental psychologists such as Bruner (1990), Cole (1996), Dunn, (1988), and Rogoff (2003) who have spearheaded major research programmes comparing the contribution of family and peer relationships and schooling to children's development. This pioneering work has included studies into active members of family worlds, guided participants, collaborative learners, peer support and consulting with children (Woodhead & Faulkner, 2008).

Alongside a shift in paradigm, there has also been a broader move towards consultation with, and participation of, children and young people, across a range of areas, in order that they actively contribute to policies, recruitment and service provision and school councils and youth parliaments. This has partly been due to the United Nations Convention of the Rights of the Child (UNCRC,1989). In psychological research there has been an increasing shift from subject or object, to participant, although not exclusively. According to Woodhead and Faulkner (2008):

> We noted that the British Psychological Ethical Code clearly marked the shift from 'subjects' to participants in the 1991 edition, but this was not consistently applied within the house-style of the British Journal of Developmental Psychology until 1996. Even at the end of 1998, one issue of the International Journal of Behavioural Development included some articles referring to children as 'subjects', alongside others that talked about 'participants'. (p. 35)

3.2. Research Methods

This section will briefly outline the research methods used, in order to address the research questions and the rationale for the methods used.

A mixed method research design was used in the study. The rationale for choosing a mixed methods research design was to use the most appropriate method for each research question. It was not the case of a simple choice between a paradigm of qualitative and quantitative methods but in the interests of developing a research design that served the investigation of the questions posed. As Clough and Nutbrown (2007) contend, "research studies often move between these broad approaches selecting the most appropriate for each part of the study" (p. 20).

3.2.1. Research methods for research question 1.

1. **Can a small singing group intervention with young children improve phonological discrimination?**

This section will outline the process followed in order to address the primary research question and will include research design and rationale; identifying the school and gaining gatekeeper permission; participants; informed consent; other ethical considerations; assessment of phonological discrimination; intervention design; and collation and analysis of findings.

3.2.1.1. Research design and rationale. In order to answer this question, it was necessary to assess whether a group of children, who took part in a small group singing intervention, were found to have a significant improvement in their phonological discrimination skills, compared to a group of children who did not receive the intervention. If a significant increase was an effect of the intervention and not due to chance or maturation, it would be expected that there would be a significant increase in the phonological discrimination scores of the intervention group and not the control group. This necessitated a quasi-experimental design where children were randomly assigned to either an intervention group or a control group, matched for other confounding variables such as singing experiences in the classroom, age, gender and socio-economic status.

Participants underwent a pre and post intervention assessment of phonological skills (a phonological discrimination task), with the intervention group then receiving the small group singing intervention for six sessions. The scores in the phonological discrimination task for the control and intervention groups pre and post intervention were statistically analysed to establish whether there was a significant intervention effect. A null hypothesis or no intervention effect would result in no significant difference in the mean scores for the phonological discrimination task for either condition - control or intervention, at either time – pre or post test.

3.2.1.2. Identifying school and gaining gatekeeper permission. The school was selected on the basis of two key factors. Firstly, very large morning and afternoon nursery classes allowed for adequate sized intervention and control cohorts of children and, secondly, location in a Flying Start area minimised the confounding variable of socio economic status. Flying Start areas are those identified by the Welsh Assembly Government as the most

deprived areas in Wales, where targeted resources are put in place to support families and children from birth to three years (Welsh Government 2012). Therefore variations in socio economic factors could be minimised across control and intervention groups.

Key features of the school as described by the school website and ESTYN inspection report (unreferenced to protect anonymity) were as follows.

- The school was situated less than two miles from a city centre.
- The area was a designated regeneration area.
- It had mainly rented accommodation.
- In the latest index for multi-disciplinary levels of deprivation the ward ranks as one of the most deprived in Wales.
- Pupil mobility into and out of the community can amount to 10% each year.
- The school considers its intake of pupils to have many who are less able and a few more able.
- 30% of pupils are in receipt of additional support for their learning.
- Close to 60% of the pupils are entitled to free school meals.
- The home language of 96% of the pupils is English.
- Since Spring 2003 families seeking asylum and refugee status have moved into the area and now amount to just less than 5% of the school population.

Permission to carry out the research project was gained from the Foundation Phase Advisor for the Local Authority. A meeting was set up with the Head teacher who was given a gatekeeper letter with information about the research project, including projected timescale, information about consent, confidentiality and anonymity (See appendix A). A meeting was arranged with the nursery teacher and staff to discuss the nature of the project, dates and timescale, to explore the setting, and to distribute consent letters for parents (Appendix B) and a consent letter for the class teacher (Appendix C).

3.2.1.3. Participants. Consent letters were distributed to parents and carers of seventy six children in the morning and afternoon nursery classes (Appendix B). Four were returned with consent declined. Thirty eight children were included in the pre intervention assessments from the morning nursery and thirty two children were included in the pre intervention assessments in the afternoon nursery. One child declined to take part in the assessments and one child was absent. Forty five children completed the assessment, twenty four children from the morning nursery and twenty one from the afternoon, and were therefore assigned as participants of the study. From these children, participants were randomly selected by drawing from two piles of names, one for the morning and one for the afternoon, and these where then allocated to either the control group or one of two small singing groups. This resulted in a total of twenty three children in the control group, nine females, fourteen males, and a total of twenty two children in the four singing groups, made up of thirteen females and nine males. The small singing groups consisted of two groups of six in the morning session and two groups of five in the afternoon. All participants were from the same nursery class and therefore had the same activities in school in terms of whole-class daily singing and speaking and listening activities.

Discussions took place with the class teacher to confirm that the children in the control and intervention groups were broadly well matched in terms of ability, special educational needs (SEN) and English as an additional language (EAL).

3.2.1.4. Informed consent. Letters were distributed to parents and carers (Appendix B) outlining the purpose of the project, the timescale, details about the researcher, with the intention to reassure parents and carers about the suitability of the researcher to work alongside their children. The letter also outlined details about the process – what would be involved in the assessment and how long it would take, how groups would be randomly allocated and how long the singing sessions would be. Information was given about how children's consent to participate in each session would be gained and what they would do if they didn't wish to join the session. An additional session was offered at the end of the project to enable all children to join in a singing session. Details were given about anonymity, a future debrief letter and contact details for any further information. Parents and carers were asked to return an attached slip by a specified date if they did not wish

their child to participate, the specific text being in bold for additional clarity. The School of Psychology Ethics Committee and school staff endorsed this approach for this particular research project.

In terms of gaining informed consent from the children as participants, the researcher used the following script before the assessment activity – "I've brought a listening game – would you like to have a go? Is that OK?" The researcher only proceeded if it was clear that the child agreed to join in. This was particularly important because the activity took place in a classroom environment where children were expected to carry out the activities that were asked of them. The researcher was mindful to ask the children if they would like to join in the activity, rather than just direct them to it. In terms of the intervention, it was important to give the children a meaningful way to express their informed consent before each session so that they could withdraw at any point during the process. To ensure the means of consent would be grounded in their experience, a train system was used, where children who were in the singing group would be asked whether they would like to join the 'super singing train' today and if so they would come and join the train. If they didn't wish to join in they would stay with the whole class. The responses from the children would be accepted and the researcher did not attempt to influence the children in any way as the researcher was mindful of the power relationships that exist between adults and children, especially in a school setting.

3.2.1.5. Other ethical considerations.

Safeguarding The researcher read and complied with the Cardiff University Child Protection Procedures and established the Child Protection contact person for the school. In case of any disclosure the researcher would follow the decision chart (Appendix E). The researcher would record details in writing as soon as practically possible.

Control group and other children The researcher carried out a story session for the whole class at the end of the project. Timescales did not allow for the researcher to repeat the singing intervention with the control group.

School time and appreciation of support It was intended not to put additional pressures on already busy school staff by making sure all documentation was photocopied and clearly marked and that the researcher was responsible for organising space and seating arrangements for assessments and singing sessions. It was important to acknowledge the support of the school in enabling the research to take place and the contribution of the children. Gifts for staff and children were given at the end of the project.

Complaints and contact details In all documentation to the school and parents and carers, contact details for the researcher, supervisor and complaints procedure were outlined (Appendices A, B,C).

Anonymity Children's names were recorded for the purposes of matching up the pre and post intervention assessments and were only known to the researcher. On completion of the post intervention assessment, the test results were completely anonymised by putting a coding system in place. No reference was made to the school in the thesis and the researcher has ensured that the school, class, teacher and children cannot be identified in the research report.

Storage of information All data collected were stored by the researcher in a locked filing cabinet at the researcher's home.

Evaluation of intervention by children The children were viewed as co-constructors of, and interactive in, the singing sessions and their views of the sessions were gathered using a mosaic approach (Clark & Moss, 2011), validating their experience in the research process.

Debrief A debrief letter was given to parents and carers and the class teacher at the end of the project (Appendix D).

3.2.1.6. Assessment of phonological discrimination. Participants' phonological discrimination skills were assessed using a phonological discrimination task (Appendix F) which did not require any verbal responses and consisted of a simple choice between minimal pairs of words. Minimal pairs differ by one phonological element. The task was

informed by the importance of examining the quality of a child's phonological representations without requiring a verbal response from the child (Carroll, Snowling, Stevenson & Hulme, 2003), or drawing on other cognitive and language skills. Walley (1988) used a listening-for-mispronunciations task to assess the detail included in children's representations at different ages. Children had to detect whether a word was correctly pronounced or misarticulated by a single phoneme. This technique is widely used in published psychological assessment tools. For example, the Wepman Auditory Discrimination Test, Second Edition (WADT2)(Wepman, 1973) assesses phonological discrimination using a very simple procedure, which assesses the child's ability to recognize the fine differences between phonemes used in English speech. The examiner reads aloud forty pairs of words, and the child indicates, verbally or gesturally, whether the words in each pair are the same or different. The Dyslexia Early Screening Test (DEST) (Nicolson & Fawcett, 1996) also includes a similar phonological discrimination test of minimal pairs, made up of nine pairs. These repeated contrasts have been found to be an accurate assessment of phonological discrimination in young children (Kamil & Rudegeair, 1972).

In light of the younger age of the participants, in this study, two sets of twelve words were used, where nine pairs in each list differed by an initial, medial or final phoneme and three pairs were the same, for example, pet, pat; fan, van; cup, cut; fat, fat; which would take around five minutes, to hold the children's attention. (Appendix F). Three practice items were used, where the researcher could model a correct response using gestures; for the same, thumbs up and nodding or for not the same, shaking head and thumbs down. Each pair could be repeated once. The children were given a sticker and thanked for playing the listening game. All children in the control and intervention groups undertook the phonological discrimination task pre and post intervention.

3.2.1.7. Intervention design. Four small group singing programmes were carried out over six sessions each, with each session lasting approximately twenty minutes; two in the morning, each with six participants and two in the afternoon, each with five participants.

The intervention was designed as a small collaborative group where children could interact with the researcher and peers. This approach was shaped by a socio-cultural model of learning influenced by the following.

- The thinking of Lev Vygotsky with the premise that new understanding does not come about by the single consciousness of an individual but in the interaction between individuals (Macready, 2009). Vygotsky asserted that cognitive development involves the internalisation, transformation and use of routines, ideas and skills that are learned socially, from more competent partners (Meadows, 2006).
- Social Learning Theory (Bandura, 1986) also contends that learning occurs within a social context where human beings learn from their environment. Social Learning Theory proposes that growth and development occur through a process called experiential learning.
- Factors related to the capacity to learn are related to the capacity for relationship. In order to improve access to learning, one has to pay particular attention to processes of relationship. The way adults engage in affective processes has an impact on the child's capacity for learning (Greenhalgh, 1994).

Much of the structure and content of the intervention was informed by Melody Monkey's Marvellous Music Box (National Centre for early Music, 2012) , designed by early years music specialists and which the researcher had used previously. It informed a varied structure to the session, ensured a suitable range of pitch for young children's voices, focussed on using singing voice without accompanying music or instruments, ensured the sessions were enjoyable and engaging, and utilised different voice sounds. It was also important that the session be interactive and responsive to children's suggestions. Key aspects of the intervention involved rhyme and exaggerated and varied use of language. A typical session had the following structure.

- An initial hello song was sung to each member of the group.
- Have you brought your talking, whispering, lion's, mouse's singing voice?

- Favourite songs/nursery rhymes were drawn from the children's own experiences – each child chose a song bowl that had been made after the first session which gathered everybody's favourite songs, for example, Incey Wincey Spider, Twinkle Twinkle Little Star.
- Engaging activities were used such as, puppets and movement, different voices and prediction and anticipation, for example, Five Little Monkeys sitting in a Tree or Five Little Monkeys Jumping on the Bed.
- The calming song, I Wiggle my Fingers, was used to create a calm atmosphere.
- There were opportunities to respond to group suggestions.
- Super singers stickers were distributed to group at the end of the sessions.

3.2.1.8. Collation and analysis of findings. The scores for the pre and post intervention phonological discrimination task were collated (Appendix H) and analysed as follows.

- Any potential outliers in the data were identified.
- Descriptive statistics were outlined.
- A statistical test of correlation was carried out to establish consistency of the phonological discrimination task.
- Analysis of Variance (ANOVA) was carried out to establish whether there was a significant variation between the means of the scores of both groups, control and intervention, at both times, pre and post intervention. Post hoc tests were carried out to establish whether there was a significant intervention effect.

3.2.2. Research methods for research question 2.

2. **What were the class teacher's perceptions of the singing intervention in terms of impacts on speaking and listening and other broader areas, small group singing in general and implications for practice?**

This section will outline the process followed in order to address the secondary research question and will include rationale; ethical considerations; carrying out the interview; the interview schedule; and collation and analysis of findings.

3.2.2.1. Rationale. In order to answer this question it was necessary to gain qualitative data by carrying out a semi-structured interview with the class teacher (Appendix J). The semi- structured interview enabled the researcher to draw out key themes to inform the field research, whilst not being limited to those questions if other areas emerged during the interview (Lindlof & Taylor, 2002). In order to draw out key themes, focussed questions were scripted so that the class teacher's perspectives of the three key areas could be explored, i.e., any impacts of the singing intervention, views on small group singing and implications for practice.

3.2.2.2. Ethical considerations. A consent letter was given to the teacher which outlined information similar to that in the consent letter to parents and carers (Appendix C). The letter included information on how long the interview would take and the purpose of the interview. The class teacher was also given additional clarification about anonymity, since this individual was the only participant being interviewed.

It was problematic to guarantee anonymity for the interviewee because only one class teacher was interviewed. The interviewee was notified of this and gave informed consent. Their name or any other details were not recorded on any documentation.

3.2.2.3. Carrying out the interview. The participant was thanked for their time and asked if they consented for the interview to be recorded on a dictaphone and told that the interview could be stopped at any time. They were given an overview of the research project by the researcher. The researcher stated that she was interested in the views of the participant and asked the participant to try and be as honest as possible. Information was given about anonymity as outlined in the consent letter (Appendix C).

3.2.2.4. Interview schedule. The interview schedule is outlined below.

Observations on the intervention

Generally speaking, what were your observations of the small group singing project?

Do you think the children enjoyed the sessions? What did you notice?
Do you think the children did not enjoy the sessions? What did you notice?
Did you notice any impact on children's skills in the following areas?

- Singing
- Speaking and listening
- Phonological skills

Do you think the children benefitted in other ways? For example, turn taking? How do you know this?
Do you think the sessions presented challenges or difficulties for any of the children?
Would you recommend this kind of project to others? Why?
What was difficult or challenging for you about the project?
If something similar was carried out in the future, what would help to improve it?

Broader views of small group singing and implications for practice
Do you think there is a value generally in small group singing? In your opinion does it have the potential to impact on speaking and listening, phonological skills? Other possible benefits?
Do you think that there are the differences between whole class and small group singing?
Do you have opportunities for small group singing? Would you like to have more opportunities for small group singing? What makes it difficult and what would help?
Has the Foundation Phase provided you with more or less opportunities for singing?
How confident do you feel about singing with the children?
What training have you received? Would you like to receive more training? If so, in what areas?
What resources do you have access to?
What support do you have within school or outside school? What support would you like?

3.2.2.5. Collation and analysis of findings. The audio recording from the semi-structured interview with the class teacher was transcribed and the transcript was analysed using thematic analysis (Appendix I) which is flexible and enables a systematic search for patterns

in the data which the researcher actively interprets and analyses (Braun & Clarke, 2006). Using guidance from Braun and Clarke (2006) the transcript was read thoroughly and all text was coded and recoded for meaning. The codes were then grouped into themes which were clustered into master themes and subthemes by the researcher.

3.2.3. Research design for research question 3.

3. What were the children's views about their experience of the singing intervention?

This section will outline the process used to address the final research question, which intended to gain the children's views about the intervention. This will include a description of the mosaic approach and collation and analysis of findings.

In order to answer this question, a mosaic approach (Clark & Moss, 2011) was used. The mosaic approach is an approach that has been developed to gain the views of young children, particularly in early years settings. It aims to gain children's views in a holistic and meaningful way by using a multi modal approach, i.e., a variety of forms to gain views including verbal and non-verbal approaches, for example, drawing, visual aids and observations.

A rich picture of the children's views was collected and collated using the following:

Researcher and class teacher observations

The researcher took observational notes after each session (Appendix K) and the class teacher was asked specific questions during the semi-structured interview (Appendix L):

Do you think the children enjoyed the sessions? What did you notice?
Do you think the children did not enjoy the sessions? What did you notice?

Large visual aid with whole group to gain children's evaluation of sessions

A floor size evaluation prompt with smiley face, half smile and not smiling face was made by the researcher. The children were asked to stand on the face that showed how much each child enjoyed or did not enjoy the sessions. The researcher asked each child why and recorded the responses. The researcher then put pictures of the activities covered over the sessions as visual prompts on the floor and gave the children a stone to place on each child's favourite; Hello song; Have you brought your – voice? nursery rhyme bowls; Five little monkeys sitting in a tree; Five little monkeys jumping on the bed. The researcher asked each child why they liked that activity the best and noted individual answers and responses.

A visual questionnaire was used with individual children to evaluate the programme of sessions as a whole, and individual activities, using pictures and stones for choices as outlined in the group activity above (Appendix G)

Children's drawings of activities (appendix M)

Children were asked if they wanted to come and draw a picture of their favourite activity using paper and coloured pencils.

3.3. Summary

This section has outlined the importance of methodology, described Clough and Nutbrown's (2007) 'Four P's' approach to research and highlighted the underlying assumptions underpinning the research, in terms of social constructionism. This included the increasingly emerging view of children as participants and co constructors of their knowledge and experience. A rationale was given for a mixed method design, in terms of the method that would most appropriately address each research question.

The chapter went on to outline the quantitative research design including ethical considerations and the rationale and development of the assessment tool and intervention. The importance of the intervention being based on a small collaborative group, within the socio-cultural model of learning, was highlighted.

Finally, the section detailed the qualitative research design as being an effective method to gain the perceptions of the class teacher with regards to the intervention as well as the class teacher's broader views about small groups, singing and implications for practice. A mosaic approach was adopted as a meaningful way to gather children's views about their experience of the intervention and validated their experiences as active participants in the research process.

Collation and treatment of findings were outlined within the quantitative and qualitative research design and the analyses of findings will now be detailed in the next section.

CHAPTER 4 RESULTS

The research topic for this thesis was whether a small group singing intervention, with three to four year olds, could increase phonological discrimination, using a control group in the same school. The research was conducted in an urban primary school in 2011. The purpose of this chapter is to present the results from that research. It will do this in respect of the three research questions established in the methodology. These were:

1. Can a small singing group intervention with young children improve phonological discrimination?

2. What are the class teacher's perceptions of the singing intervention in terms of impacts on speaking and listening and other broader areas, small group singing in general and implications for practice?

3. What are the children's views about their experience of the singing intervention?

4.1. Results for Research Question 1

1. **Can a small group singing intervention with young children increase phonological discrimination?**

This section will now outline the following descriptive statistics of the phonological discrimination task scores for control and intervention groups, pre and post intervention; correlation analysis to establish the consistency of the assessment tool; a rationale and explanation of the process of statistical analysis; statistical analysis to establish whether there was a significant variation in the phonological discrimination scores, for each group, pre and post intervention, using ANOVA; and analysis of the source of variation using post hoc tests.

4.1.1. Participant numbers. At the end of the intervention period, the number of participants had reduced from 23 to 18, in the control group, and from 22 to 20, in the intervention group. These changes were due to children leaving school, non-attendance and two outliers (observations which were numerically distant from the rest of the data) which raised concerns over the participants' understanding of the assessment.

4.1.2. Descriptive statistics. Table 1: Descriptive statistics for phonological discrimination test scores for control and intervention group pre and post intervention (see appendix H for raw data)

	Condition	**Mean score (Possible range of scores 0-24)**	**Standard deviation**	**Total number of - N**
Pre intervention scores (time 1)	Control	19.44	1.53	18
	Intervention	18.25	1.89	20
Post intervention scores (time 2)	Control	19.06	1.93	18
	Intervention	20.35	1.81	20

4.1.3. Consistency of assessment tool. In order to ensure consistency in the phonological discrimination task, statistical analysis was carried out to assess whether the test scores, for each set of twelve pairs of words, significantly correlated.

A Pearson's product moment correlation coefficient was carried out as a statistical test of correlation. Results showed that the scores for the two sets of paired words used during the pre intervention assessment, significantly correlated at the 0.01 level (2-tailed), $r(38) = .69$,

$p < .01$. and the scores for the two sets of paired words used during the post intervention assessment significantly correlated at the 0.01 level (2-tailed), $r(38) = .63$, $p < .01$.

Due to the consistency between the two test scores, it was possible to use both scores as a single construct of test score. Therefore, the two test scores were combined, resulting in a possible range of test score for each participant of between 0 and 24.

4.1.4. Statistical analysis to establish manipulation effects. The null hypothesis suggests that there will be no variation in the mean scores for the phonological discrimination task for all groups, if there was no intervention effect. Therefore the means of the scores for each group, control and intervention, pre and post intervention, would be expected to be the same or broadly similar. Independent variables are:

- Condition – control or intervention group
- Time – pre or post intervention – time 1 or 2

And the dependent variable is:

- test score – phonological discrimination task

ANOVA compares variation in three or more means and tests whether the means are all the same, so it tests the null hypothesis that all group means are equal. ANOVA is an omnibus test which means that it tests for an overall experimental effect. So although, ANOVA can establish whether the experimental manipulation was generally successful, it does not provide specific information about which groups were affected. In order to establish where the differences between groups lie, it is necessary to carry out post hoc tests or simple comparisons between each group.

ANOVA was used to analyse, firstly, whether there were any significant interaction effects, and secondly, whether there were any significant main manipulation effects.

The ANOVA analysed whether there was a significant interaction between time and condition.

There was a significant interaction between time and condition, $F(1, 36) = 8.45$, $p = 0.006$. This result shows that when the interactions between all groups are analysed there is a significant interaction effect, although as mentioned previously, the ANOVA does not inform in which groups the interaction lies. Therefore, post hoc tests were carried out to establish the nature of the interaction. Simple effects analysis of pair wise comparisons were carried out on the control group scores, at times 1 and 2, and the intervention group, at times 1 and 2.

No significant difference was found between the control group at time 1 and 2 (M (time 1) = 19.44, M(time 2) = 19.06, SE = 0.31), F (1,36) = 0.39, p = 0.54, $\eta_p^2 = 0.26$. Therefore there was no significant difference in the phonological discrimination task scores, for the control group, pre and post intervention.

However, a significant difference was found in the mean scores of the intervention group at time 1 and time 2 (M (time 1) = 18.25, M (time 2) = 20.35, SE = 0.30), F (1,36) = 12.7, p = 0.001, $\eta_p^2 = 0.26$; at the 0.05 level of significance. This suggests a significant manipulation effect, between time 1 and time 2, for the intervention group because there was a significant difference in the mean scores for the phonological discrimination task for the intervention group, pre and post intervention.

Therefore, there was a significant increase in the phonological discrimination scores for the intervention group, following intervention. This was in comparison to the control group, which didn't receive the intervention, where there was no significant increase in their phonological discrimination scores, at time 2.

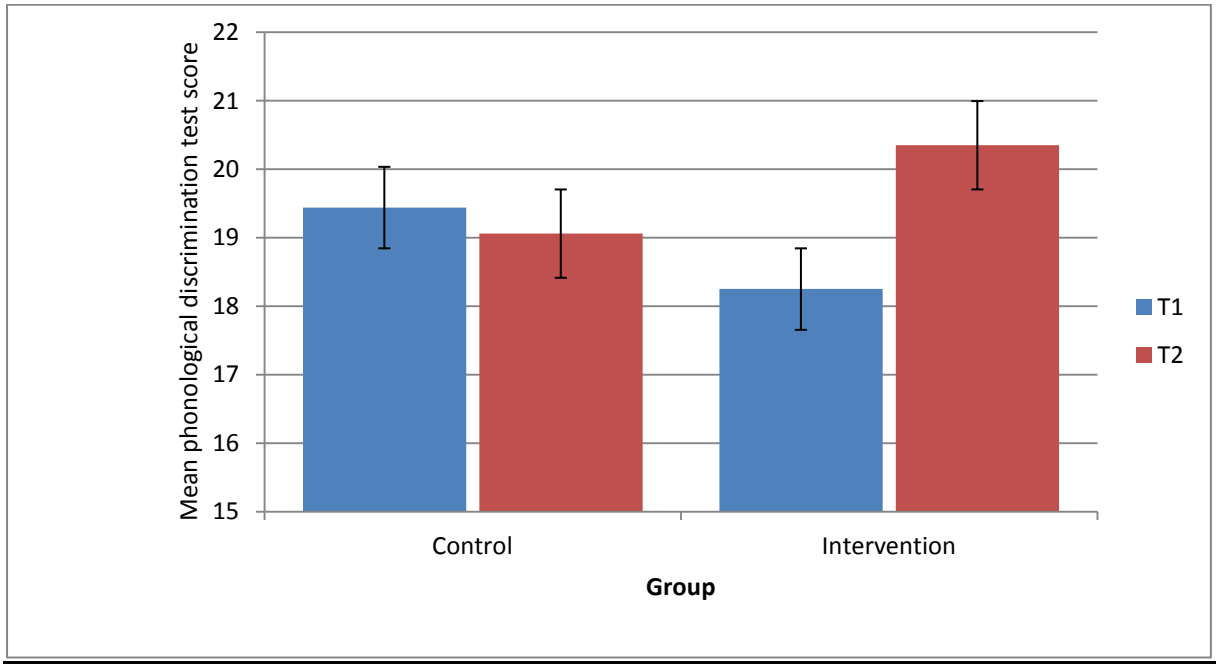
The ANOVA analysed both the within subjects variable of time and the between subjects variable of condition and compared variation in means. Time is a within subjects variable since each participant performs at both pre and post intervention. Condition is a between subject variable as each participant is either one or the other.

No significant main effect was found for time, (M = 9.64, SD =1.80), F(1,36) = 3.99, p = 0.05, η_p^2 = 0.1.

No significant main effect was found for condition, (M = 9.63 , SD = 1.80), F (1,36) = 0.002, p = 0.96, η_p^2 = 0.00.

What these results show in terms of no main effects, is that when one variable is collapsed, for example, condition, then each set of scores is compared simply as time 1 and time 2, and there was no significant variation between both groups being combined. Similarly, when the variable of time is collapsed, so that each group is compared as simply either control or intervention, no significant variation was found in the scores.

Table 2: Error bar chart to compare control and intervention group phonological discrimination test score means pre and post intervention



To summarise, no significant main effects were found in terms of time or condition, which means that in terms of just time (control and intervention group scores combined) or condition (pre and post intervention test scores combined), there was no significant effect.

However, there was a significant interaction between time and condition. There was a significant increase in the phonological discrimination scores for the intervention group, following the intervention, compared to the control group, where there was no improvement in their scores.

4.2. Results for Research Question 2

2. **What are the class teacher's perceptions of the singing intervention in terms of impacts on speaking and listening and other broader areas, small group singing in general and implications for practice?**

This section will outline the key themes and subthemes which emerged following thematic analysis of the class teacher's perceptions, gathered in the semi-structured interview. The class teacher's perceptions of each key theme and subtheme will then be illustrated by extracts from the data.

Teacher perspectives can be presented against two key themes and a number of sub themes. The two key themes are firstly, the specific fieldwork or intervention and secondly, the broader school context. Analysis of the first key theme, of fieldwork or intervention, revealed an overarching theme of positive benefits for children, which divided into sub themes of motivation, confidence, communication skills and opportunities to shine. The second key theme, of broader school context, had two overarching themes, implications for future practice and recognising the potential of small group work and singing; and a more minor theme of existing skills and practice. The key themes and subthemes are illustrated in Diagram 1 below (See appendix I for transcript).

Diagram 1: Diagram to illustrate two key themes and subthemes that emerged from thematic analysis of the data from the class teacher's perceptions

Key themes and subthemes are outlined in the table below with illustrative quotes (See appendix I for raw data).

Table 3: Table with illustrative quotes from qualitative data of class teacher perspectives

FIELDWORK THEME – INTERVENTION
Positive benefits for children
Motivation *You could see that the children really wanted to be a part of it; even though you had your selected group of children you could see that all the children were really interested in it and they all wanted to take part.* *The children seemed to be really attentive to you, and really wanted to come and line up and take part with you, you know, they really did.* **Confidence** *Now he never used to enjoy singing before and now he puts his hand up to take part in singing, whether you've given him the confidence or whether just being in that small group focus has enabled him to come out of his shell a little bit you know. I think it was one day last week, he put his hand up to sing Baa baa black sheep, and then again this week he sung as well, which is shocking for us because we've never seen him ever contribute before and he did this time and you can see it a little improvement there*

you know.

I felt it brought out their confidence a lot more and you gave them a lot of one to one attention and focus you know.

Communication

But I think for the children that have been involved in the project with you – I mean because you've given that one to one situation with them I think yeah it has improved their speaking and listening and also their turn taking as well. They've realised they've got to take turns and wait for the next person to have a go, you know what I mean. So yeah I think it has had an impact.

Absolutely, it's teaching the kids vocabulary as well, singing songs isn't it? And that's what you need before you learn to speak and listen, before you are able to learn and recognise sounds so yeah I think it's very valuable.

Opportunity to shine

You're coming in that time of day when the children are all winding down and you can see the ones who were interested to come out with you and again they had their opportunity to shine whereas they wouldn't have had that before. So yeah I think you did really well with them.

Would you recommend the intervention to others?

Yes, definitely.

I think anything in small groups allows the children to shine. I mean and with the numbers we've got in our nursery as well we don't get a lot of time for the children to shine in small groups.

Challenges for researcher

The only downfall for you is the fact that it was in a class room environment and we haven't got a small classroom where you could have worked.

BROADER SCHOOL CONTEXT THEME
Future practice

I certainly will be taking something from this next year and hopefully taking groups into the hall to do small group singing sessions and maybe with instruments next year as I really do feel that, like you said, it is used sometimes as time filler but I think that it's more important than that, it's almost as important as reading I feel, singing.

But for me I think yeah small group sessions can easily be implemented within our setting with an adult and it's something that I will look into doing next year you've given me an idea.

Coming back to smaller groups, when you try and do a music session and maybe you're introducing some of the instruments to them, when you're doing it in a whole class it's very difficult, they're banging, it's hard then to get them back focussed whereas if you're doing a small group singing lesson accompanied with musical instruments by it would be easier to manage I think in a small group session- you've given me another idea! I could do more music lessons next year!

Implications for working within the Foundation Phase (FP)

Yeah, I do think it lends itself to small group singing sessions definitely , because its creative development and speaking and listening so it fits in with the areas of the Foundation Phase.

Making improvements

The time of day, maybe come in when children first come in to the nursery, after register that can be a good time, and also having that space when it's just you and one to one with the adult.

Training and resources

And to book myself onto some courses really, you know, aid my knowledge of how to teach the best that I can in FP, different songs to cater for the topics that we are doing. It would good to have support to come in and maybe deliver music sessions, initially and then the support staff would be geared up to take over, its basic training I suppose

then.

I'd love to have more resources – a lot more basic resources I think that would help as well.

Recognising positive impact of small group and singing

Improving confidence

I suppose with a small group session they feel a lot more willing to take part especially when you've got a couple of them who are reluctant to take part and when you've got them together then they might encourage each other and that's a growth in confidence.

It lets the children and especially if you're doing it with small groups with everyone, it lets them, they don't feel pressurised to do it on their own, they can join in and build their confidence that way you know and then if they want the opportunity to sing in front of others in a small group then fine, you know, I just think its valuable because it does build confidence.

Utilising Foundation Phase focus task groups

The Foundation Phase, it's all about experiential learning and learning through play. Any nursery and reception setting for children love singing and you could have that as a focus task within the Foundation Phase and help their creative development with musical instruments as well.

I mean focus activities are carried out by adults so I mean it's the way that teachers use those adults.

I feel that smaller group sessions are more valuable than whole group because you've got the focus of the children that you want then you know.

Broader benefits of singing

It's getting everyone to realise how important singing is 'cos I don't think everybody really appreciates how important it is in the early years. Like I say a lot of people use it, like I say, I use it myself as a time filler. Whereas something like this your research

project now, it lets you into, actually it's not, it's really valuable, you know, especially when you start to see changes.

I think it allows you the opportunity to obviously hone in on certain aspects of their learning and seeing how just singing, general things such as singing can help improve them.

'Cos I think a lot of the time with the little ones singing is overseen as just not gonna really help much but really it does, especially with speaking and listening, a prime example, what you're trying to prove improve phonological awareness, I think it really does help and I think that is overseen a lot of the time. Whereas projects like this let you into the importance of it.

But I think with singing, like I've said, you don't value the importance of it, you think, oh no, I'd rather to a focus numeracy or literacy lesson, whereas really singing is a part of literacy so you've got to think actually it could really help them.

Current skills and practice

At the moment I can say that we don't do small group singing sessions but we do do whole-school singing sessions but again the children are lost in there, especially the little ones in nursery, they're too young to go up into the hall.

To be honest children love singing anyway. We do quite a lot of whole class singing sessions.

I love singing. And it's a way for me with the little ones for calming them down and settling them in, calming and relaxing and the children always seem to enjoy it. A lot of the parents use singing as well – they're used to it. It's maybe a thing for them, so they all enjoy singing.

We've got a music coordinator and she does music sessions like singing sessions once a week but nursery aren't involved in that, because of the capacity in the hall, and it's a long way up for little ones anyway, the hall's upstairs and by the time you've got up there and taken them to the toilet and taken them back down, but we do singing sessions every day, whole-class every day, and like I said a lot of it is a time filler, rather using it as a valuable...

4.3. Results for Research Question 3

3. **What are the children's views about their experience of the singing intervention?**

This section will now outline researcher and class teacher observations of the intervention, plus children's views obtained through group evaluation and drawings. A rich picture of their views will be documented using a mosaic approach.

A rich picture of the children's views was collected and collated using the following approaches.

- A researcher diary (appendix K) and class teacher observations (Appendix L) were used.
- A large visual aid was used with the whole group to gain the children's evaluation of the sessions.
- A visual questionnaire was used with individual children to evaluate sessions as a whole, as well as individual activities using pictures and stones to indicate choices as outlined in the group activity above (Appendix G).
- Children's drawings of activities were collected (appendix M).

Key themes that emerged from the data gathered using the mosaic approach were 'enjoyment', 'what didn't go well', 'social learning' and 'building on experience' and these are summarised in the diagram below (see Appendix N for raw data).

Diagram 2: Diagram to illustrate rich picture of children's views of intervention

ENJOYMENT

Observations from researcher and class teacher of childrens' behaviours - motivated, keen to join in, animated, joining in actions and singing, laughing and smiling, excited with puppets, engaging with different voices, making own suggestions

Children's views from group evaluation - enjoyed mostly - 13, favourite activities - Five Little Monkeys sitting in a tree and choosing rhyme bowls, favourite songs - Grand Old Duke of York, Five Little Monkeys - Tree and bed, Incey Wincey, Humpty Dumpty, Hickory Dickory

"Made me happy"

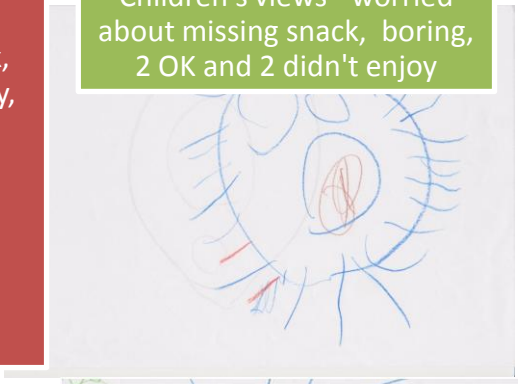
Children's drawings of favourite songs - Incey Wincey, Humpty Dumpty, Five Little Monkeys, Grand Old Duke of York

drawing of researcher

WHAT DIDN'T GO WELL?

Observations from researcher and class teacher - distractions in setting, restlessness, timing - snack time, keeping engaging and focussed

Children's views - worried about missing snack, boring, 2 OK and 2 didn't enjoy



MOSAIC APPROACH TO EVALUATION OF SINGING INTERVENTION

SOCIAL LEARNING

Observations from researcher and classteacher - helping the researcher, working together, making own suggestions, learning from each other's suggestions to make own suggestions,confidence to sing alone, attention by adult and peers, sharing ideas, creative thinking - new verses and scaffolding peers, body as a shape , increasing motivation, confidence, opportunies to shine, communication, turn taking

Children's views - rapport with researcher "You're funny like Mr Taylor", singing together, "Choosing bowl together", "'Cos everyone else liked the monkey song as well"

BUILDING ON EXPERIENCE

Observations from class teacher - children enjoy singing in school and singing with parents, transfering learning and confidence to whole class setting

Views from children - '"Humpty dumpty my mummy makes me laug", "Croc and monkey cos my mummy sings me that one","I saw monkeys in Folly Farm"

4.4. Summary

This chapter has presented the results from the research. It outlined the results found in respect of each of the three research questions. In relation to the first research question statistical analysis revealed that there was a significant intervention effect, in relation to the intervention group. Following the singing intervention, the phonological discrimination scores of the intervention group increased significantly, compared to the control group scores, which did not.

In relation to the second research question, two key themes emerged from the class teacher's perspectives, firstly, a key theme of the specific fieldwork or intervention and secondly, a key theme of the broader school context. Analysis of the first fieldwork or intervention theme, revealed a sub theme of positive benefits for children, which divided into motivation, confidence, communication skills and opportunities to shine. The second theme of broader school context had two sub themes, implications for future practice and recognising the potential of small group work and singing; and a smaller sub theme of existing skills and practice. Illustrative quotes were used to highlight key themes, as well as a visual diagram.

Using a mosaic approach (Moss & Clark, 2001), the children's views of the intervention were gathered using a range of sources and collated as a rich picture to triangulate the children's views in terms of 'enjoyment', 'what didn't work', 'social learning' and 'building on experience'.

The next section will discuss these findings in more detail, by considering the possible reasons for the findings, outlining what may have been added to knowledge in this area and whether the objectives of the research have been achieved.

CHAPTER 5 DISCUSSION

The broad research focus of this thesis was to investigate the potential for a small group singing intervention, to improve phonological discrimination, in young children. The aims of the study were three fold. Firstly, it aimed to add something new to the existing empirical findings. It aimed to do this by investigating whether a small singing group with children, aged three to four, can specifically result in gains in phonological discrimination scores, with a control group. Secondly, it aimed to provide further evidence to support the theoretical concepts of 'shared sound category learning mechanism hypothesis' and 'near transfer' and further illuminate the wider processes implicated in the development of phonological awareness. Thirdly, it aimed to inform future practice by establishing any potential benefits of small group singing and consider the feasibility of such an intervention in practice.

Three specific research questions were formulated and the research proceeded to address these questions.

Firstly, a small group singing intervention was carried out with children, aged three to four, in a nursery class, in an urban primary school. The results revealed that nursery children (N= 20) who received six sessions of small group singing intervention showed significantly greater gains in phonological discrimination, compared to a control group (N=18), in the same nursery class, who received no intervention.

Secondly, the class teacher's perceptions of the intervention were gained, in terms of any specific impact on language skills and other broader areas and implications for future practice. Two key themes emerged from the class teacher's perspectives, the first key theme being in relation to the specific intervention, and the second key theme, the broader school context. Analysis of views relating to the first key theme of intervention revealed positive benefits for children, in terms of motivation, confidence, communication skills and opportunities to shine. The second key theme of broader school context revealed some positive benefits for the class teacher, in terms of recognising the potential of small group singing and implications for future practice.

Thirdly, the children's voice in relation to their experience of the intervention was gathered using a mosaic approach. Findings revealed that the children enjoyed the sessions and identified what they specifically enjoyed as well as identifying what didn't work. Children's views also reflected the context of social learning and building on their own experience.

The rest of the discussion will consider these findings in relation to the three aims of the thesis. It will then go onto consider the limitations of the study, including the challenges of researching with young children and implications for practice, including the practice of educational psychology.

5.1. Extending Empirical Findings

Some initial studies have found significant gains in phonological awareness following music intervention, with children aged between four to six, a time when phonological awareness is accelerated (Colwell, 1988, 1994; Standley & Hughes, 1997; Register, 2001; Gromko, 2005; Bolduc, 2006; Galicia, Contreras Gomez & Pena Flores, 2006; Dege & Schwarzer, 2011). Although the findings from the quasi-experimental studies are broadly consistent in showing a positive effect of music instruction on phonological awareness, in children aged four to six years, there are several limitations with the studies carried out to date, particularly in terms of sample size, Hawthorne Effects and drawing control and experimental groups from different schools. Furthermore, the impact of music instruction on the pre-cursors to phonological awareness have not been investigated.

Therefore, the purpose of this study was to add to these initial empirical findings by taking account of a key methodological constraint, in having a control group in the same school, so that confounding variables could be minimised, Secondly, it proposed to extend the question, "Can music intervention impact on phonological awareness?", in children aged four to six, to "Can music intervention impact on earlier phonological skills, in younger children?" This is a particularly fruitful area because developing early phonological skills benefit later phonological awareness and later literacy. Despite this, studies with younger children to investigate the impact of music intervention on early phonological skills have not been carried out, to the author's knowledge.

This study investigated whether a small singing group intervention, with an emphasis on giving young children small group structured opportunities to use their voice and enjoy rhyming songs, would lead to significant gains in their phonological discrimination. The results revealed that nursery children (N= 20) who received six sessions of small group singing intervention showed significantly greater gains in phonological discrimination compared to a control group (N=18) in the same nursery class who received no intervention.

The study has met its initial aim of adding new empirical findings, by specifically investigating the impact of music instruction on early phonological skills, with younger children, aged three to four; a gap in the existing literature. In particular, it investigated the impact of a small group singing intervention on a specific phonological skill, phonological discrimination. This was useful to add to the initial empirical findings which show the impact of music instruction on phonological awareness, because phonological discrimination is a skill that can be seen as a progression from auditory discrimination, but also as a precursor to phonological awareness. It distinguishes between differences and similarities in words, rather than just in sounds, as in auditory discrimination.

A music intervention that focuses on singing, can give children the opportunity to develop large scale phonological awareness (syllable and rime), articulation and receptive language skills, outlined in the literature review, as important precursors in the development of phonological awareness. This is because singing enables the children to discriminate between hearing sounds and articulating sounds, and experience rhythm and rhyme. It is particularly important that the intervention enables the children to use their voice (articulate), in light of the concerns over children's expressive language and the lack of opportunities for using oral language in early years settings. Furthermore, it may be of particular benefit to children at risk of expressive language delay and those who have not experienced a language rich home environment. Importantly, the intervention enabled children to participate and use their voice. A small group was a necessary feature because children's engagement could be more easily monitored and appropriate scaffolding provided by adults and peers within a social learning model.

The study did pay attention to ensuring that the control group was in the same nursery class, in the same school. Therefore, some confounding variables could be controlled in terms of experiences in school. This was important in order to discount other possible explanations for the gains, such as maturation. Therefore, the gains in the intervention group, compared to the control group, provided some evidence that the gains were not due to maturation, i.e., development that would have occurred over time anyway.

Although the study has provided some promising empirical findings, in terms of gains in phonological discrimination, and paid attention to minimising confounding variables with the use of the control group, it is important to note some methodological constraints of the study. The next section will therefore outline some possible alternative explanations for the gains noted.

5.1.1. Possible alternative explanations for the gains. The intervention group could have started off with less well developed skills in phonological discrimination than the control group. Therefore it would be expected that improvement might be greater. With a larger sample number and repeat of the study it would be possible to evaluate this possibility.

The children in the intervention group gained extra attention and seemed to enjoy the one to one attention of an adult. It is not possible to establish how much of a contributory factor this was without a comparison group.

The researcher carried out both the assessments and the intervention. There may therefore be the possibility of children being biased in their approach towards the post intervention assessment, as they had built up a relationship with the researcher. Therefore they may have engaged better with the assessment and may have wanted do better. How much of an explanation this could provide is difficult to assess without a comparison group.

There may have been some confounding variables that were not taken into account, for example, some children in the intervention group may have been telling family members about the singing at school and family members may have been singing their favourite songs at home. Home environment was an unknown to the researcher and it is not possible to

establish whether children in the intervention group had more input at home compared to the control group.

There may have been differences in cognitive abilities of the children which may have contributed to the gains made. This was not taken into account by the researcher.

Having an assessment on one day only might have reflected how the children performed on that particular day. It is necessary to generally be cautious in terms of static tests and assessment at a different time or day may have produced different results.

To summarise, the study has to some extent, added new knowledge to empirical findings, in terms of showing gains in phonological discrimination, following a small group singing intervention, with children aged three to four. The study has attempted to address some methodological constraints in terms of a control group and can plausibly conclude that the gains were not due to maturation. However, there are some alternative explanations that have been outlined, although the singing intervention may be the most plausible explanation in light of the literature. Some of these key theoretical concepts, which support, and are supported by, the findings will be outlined in the next section. Future research which included a comparison group, can build on these fruitful initial findings and will help to discount some alternative explanations that have been outlined. For example, a comparison group could have carried out an alternative activity such as story reading. Other variables such as the relationship with an adult and adult attention could have then been accounted for and increases in tasks scores could be explained in terms of the particular intervention more easily. If scores only significantly increased in the intervention group and not the comparison group, the experimental effect is probably due to the intervention and not the adult attention, since the comparison group would have shared this variable.

5.2. Support for the Theoretical Concepts

The singing intervention will possibly have built on the children's very early experiences of communication particularly within their home and pre-school environments. There appears

to be an intrinsic link between early communication and musicality. Evidence shows that throughout the world caregivers provide musical input of various types to their pre-lingual children. Trevarthen (1999) has described this interplay as a dance of attunement where communicative interactions are supported by melodic fluctuations, timing, recognising saliency and engaging attention and affect. Musicality and communication become indistinguishable.

This inextricable link in early communication may be further explained by the fact that language and music are specific to humans and share several characteristics, such as the use of the auditory domain as the input path and the organisation of discrete perceptual elements into structured sequences (Patel, 2003). Music, like language, is based in the auditory modality and the primary mode of music production; singing uses the same vocal apparatus as speech. Comparisons of early development have revealed some overlap in environmental input, sound structure, prosodic structure, grammatical structure, meaning, memory and learning mechanisms (McMullen & Saffran, 2004). Furthermore, brain studies have revealed that there is evidence that speech and music share some cortical areas and mechanisms (Patel & Peretz, 1997; Patel, Peretz, Tramo & Labrecque, 1998) and that music instruction effects auditory sensory processing in the brain.

There is therefore some evidence from the literature for a 'shared sound category learning mechanism hypothesis', which adds to the idea of a link between language development and music. it seems plausible that young children may indeed bring some of the same skills to bear on learning in each domain. What this means, in terms of the intervention, is that singing and phonological discrimination probably relied on the many of the same mechanisms.

If there was indeed a common early development in music and language it would be expected that there would be some correlation between abilities in both. There has been a particular interest in the correlation between musical abilities and phonological awareness in children aged four to six, a period when phonological awareness will be developing rapidly (Bryant, Bradley, Maclean & Crossland, 1989) and initial findings have proved fruitful in establishing some correlation (Bryant et al., 1989; Lamb & Gregory,

1993; Bolduc & Montesinos-Gelet, 2005; Peynircioglu, Durgunoglu & Oney-Kusefoglu, 2002; Anvari, Trainor, Woodside & Levy, 2002).

There is a growing interest in the influence of the experience or training in one domain on another (Patel, 2003) and advances in the study of the brain have helped to enhance understanding of how active engagement with music influences other areas of development (Hallam, 2010). Studies have shown that extensive active engagement with music induces cortical re-organisation, producing functional changes in the how the brain processes information. If this occurs early in development the alterations may become hard wired and produce permanent changes in the way information is processed (Schlaug et al., 1995). The transfer of learning from one domain to another depends on the similarities between the processes involved and is known as 'Near Transfer'. Transfer between tasks is a function of the degree to which the tasks share cognitive processes (Hallam, 2010). Transfer can be near or far and is stronger and more likely to occur if it is near.

In light of the scope of the literature, which informs an intrinsic link between early communication and musicality, the proposal of a shared common early development in language and music, and more specifically the relationship between music abilities and phonological awareness, it would seem plausible that both a 'shared sound category learning mechanism hypothesis' and a' near transfer hypothesis' could provide some explanation for the findings in this study. This is because they provide evidence for the view that there is a potential for skills to transfer to similar areas. Singing, involving articulation, rhythm and rhyme as well as broader listening skills was found to impact on phonological discrimination, and the explanations outlined would suggest that these skills may be closely related and relying on similar mechanisms. The next section will build on this theoretical concept by outlining how understanding of the development of phonological awareness would suggest this to be the case, in terms of a larger phonological processing system. This can provide a fruitful explanation for the results found in the study, as the detailed mechanisms involved are illuminated, as well as the relationships between them.

5.2.1. Phonological awareness as part of larger processing system. Because phonological awareness is one component of a larger phonological processing system used for speaking

and listening (Wagner, Torgesen, Laughon, Simmons and Rashotte, 1993), extending knowledge with regards to what can facilitate the early stages of the development of phonological awareness is beneficial. Other phonological abilities such as attending to speech, discriminating between sounds and holding sounds in memory can be performed without conscious reflection (Gillon, 2004). However these other phonological abilities are prerequisite to the development of phonological awareness. Therefore general listening skills are often among those included in phonological awareness instruction. Singing and music are frequently used to develop these skills even if not explicitly articulated in these terms in schools. Why should singing in particular impact on the development of these skills? Consideration of the developmental process with regards to phonological awareness will provide some clarity.

Longitudinal studies have revealed strong correlations between receptive language as measured by vocabulary knowledge and phonological discrimination and large segment phonological awareness (syllable and rime) (Carroll, Snowling, Stevenson & Hulme, 2003). This would suggest that it is plausible that instruction in one domain could impact on gains in the other. In addition, findings revealed that both articulatory skills and syllable and rime awareness predicted later phoneme awareness (Carroll, Snowling & Hulme, 2003). Therefore articulation also plays a key part in the relationship.

The opportunity, for children in the intervention group, to focus specifically on articulation through songs, which predominantly involved rhythm, rhyme and exaggerated and varied use of language, may have increased the children's quantity and quality of articulation as well as provided opportunities to develop the larger units of phonological awareness, i.e., syllable and rime. This assumption would be consistent with the findings of Bryant, Bradley, Maclean and Crossland (1989), who considered what influence nursery rhymes have in children's development. According to Bradley and colleagues (1989), singing nursery rhymes enhances phonological skills, by learning about rhyme within traditional routines, and that knowledge of nursery rhymes affects children's sensitivity to rhyme and alliteration. The potential benefit of singing nursery rhymes also relates to early communication and musicality outlined in the literature review, which suggested that learning rhyme through song starts early and that prosodic cues and rhythms in caregiver's speech to their babies

play an important part (Trevarthen, 1999), as well as a recognition that nursery rhymes are an ingredient of parent-infant dialogues and thus are a part of the inter-subjective routines which may play a significant role in language acquisition.

Furthermore, a number of studies provide some additional evidence that rime awareness and phoneme awareness are separable skills and that these skills correlate differently within a range of language and reading measures skills (Hoien, Lundberg, Stanovich & Bjaalid, 1995; Muter, Hulme, Snowling & Taylor, 1998). Rime awareness has been found to correlate with speech perception and short term memory measures, whereas phoneme awareness correlated with reading and letter knowledge (Foy and Mann, 2001). This is part of a growing body of evidence that suggests that rime and phoneme tasks tap fundamentally different processes. The singing intervention may be tapping into the skills that correlate more specifically with language measures and therefore correlate with speech perception and short term memory measures.

This view of early rime and syllable awareness and later phoneme awareness, as tapping different processes, is supported by findings from investigations into the impact of music instruction on phonological awareness. Distinctions in the impact on these areas have been made, for example, Dege and Schwarzer (2011) found a difference between the phonological activities group and music group in making significant gains in awareness of larger phonological units compared to the sports group which did not, whereas all groups making significant gains in awareness of smaller phonological units. Whereas Gromko (2005) found that children who received instruction showed significant gains in development of their phoneme segmentation fluency when compared to the control group, a reflection of the development of meta linguistic skills. It also remains unclear as to why musical pitch appears to relate more consistently to phonemic awareness and reading (Anvari et al., 2002). Perhaps it is an example of different musical skills also tapping different processes at different stages of development. As mentioned previously, the singing intervention seems more likely to be tapping into skills more broadly associated with broader language development, whereas interventions with older children may be tapping into meta language skills.

Therefore the relationship between the gains in phonological discrimination and the activities carried out in the intervention, in terms of articulation, large segment awareness (rime and syllable) and broader listening skills, can perhaps be best understood in terms of broader language development. The findings therefore support the theoretical framework that views phonological awareness as one component of a larger phonological processing system used for speaking and listening. This view is further confirmed by explorations into the precursors of phonological awareness that are increasingly leading to the conclusion that phonological awareness is closely tied to overall speech and language development; and researchers have found that pre-school language abilities correlate with later phonological awareness (Chaney, 1998; Olofsson & Neidersoe, 1999); and others have found that early language development is related to later reading development (Bishop and Adams, 1990; Bryant, Maclean & Bradley, 1990).

This would also be consistent with some of the conclusions drawn from investigations into the impact of music instruction on phonological awareness. According to Bolduc (2008) the interdisciplinary activities in an experimental music programme contributed to raising three components that play an essential part in the development of musical and linguistic abilities; auditory perception, phonological memory and meta-cognitive knowledge (Bolduc, 2008). Perhaps these are the components that connect the developmental process, as developing these components impacts on broader language development, phonological awareness and later literacy, particularly reading and spelling. Furthermore, music instruction has been found beneficial when it can stimulate broader language development. For example, Galicia and colleagues concluded that, based on the evidence of the significant correlations of phonological awareness with melody and timbre discrimination and with receptive vocabulary (Anvari et al., 2002), it can be inferred that melody and timbre discrimination activities help to stimulate receptive vocabulary development (Galicia et al., 2006).

Interestingly, the class teacher, in this study, perceived that the intervention had a positive impact on communication generally, and in particular, speaking and listening and turn taking. For example, the class teacher stated:

> ...but I think for the children that have been involved in the project with you... I mean because you've given that one to one situation with them. I think yeah it has improved their speaking and listening and also their turn taking as well. They've realised they've got to take turns and wait for the next person to have a go, you know what I mean. So yeah I think it has had an impact.

And in terms of broader language development she stated:

> Absolutely, it's teaching the kids vocabulary as well as singing songs, isn't it? And that's what you need before you learn to speak and listen, before you are able to learn and recognise sounds so yeah I think it's very valuable.

To summarise, the second aim of the research has been met because findings from the study would appear to confirm the theoretical frameworks highlighted in the literature. Firstly, in terms of the relationship between music and language and the 'shared sound category learning mechanism hypothesis' and 'near transfer hypothesis'. Secondly, in terms of the development of phonological awareness as a larger phonological processing system within broader language development. This framework would expect that an intervention which facilitates the use of voice as articulation, broader listening skills, as well as rhythm and rhyme, would result in gains in phonological discrimination. This is because the theoretical framework illustrates the important relationships between these sub-skills, and how they are part of broader language development. The literature also provides evidence for rime awareness correlating specifically with language measures, such as speech perception and short term memory measures. Although this supports the view that early and later phonological awareness are tapping separate skills, it is important to note that developing these early phonological skills directly impacts on later phonological awareness as well as later literacy. The study has provided some evidence of the potential of developing early phonological skills, which fits well into the theoretical concepts of the wider literature.

5.3. To Inform Future Practice

The final aim of the study was to inform future practice by establishing any potential benefits of small group singing and to consider the feasibility of such an intervention in practice. There is increasing interest in the potential of music instruction to improve phonological awareness. Developing phonological awareness, and the precursors to phonological awareness are critical for later literacy. This will impact on children's outcomes at school and throughout life. Music interventions that are evidence based and underpinned by sound theoretical understanding have the potential to make a considerable difference, particularly for those children who have not experienced a language rich home environment. This is particularly important in the current context, where there are concerns over children's language abilities when they are starting school. Therefore, intervention needs to be based on sound empirical and theoretical foundations, but also needs to be seen as practical and valuable by practitioners.

The study intended to meet this aim by gaining the class teacher's perceptions of the intervention, in terms of any specific impact on language skills and other broader areas and implications for future practice. Two key themes emerged from the class teacher's perspectives, the first key theme being in relation to the specific intervention, and the second key theme, the broader school context. Analysis of views around the first key theme of intervention, revealed positive benefits for children, in terms of motivation, confidence, communication skills and opportunities to shine. The second key theme, of broader school context, revealed some positive benefits for the class teacher, in terms of recognising the potential of small group singing and implications for future practice.

This section will now discuss the findings in terms of the benefits of the intervention, possible underlying principles for success, adding value to the classroom experience and the feasibility of such an intervention in practice.

5.3.1. Broader benefits of the intervention. The class teacher viewed the intervention as having positive benefits for the children, in terms of improving speech, language and communication, as outlined in the previous section. She also highlighted some wider

benefits of the intervention for the children in terms of improving motivation and confidence and having an opportunity to shine. All of these emerged, not only from the perceptions of the class teacher, but also from observations by the researcher. These observations are important because they also indicate that the children were engaged with the intervention, which was critical to any potential success.

With regards to motivation the researcher observed,

> J, L and T really focussed and engaged today...All children ready to jump up and join the train.

In terms of confidence the researcher observed,

> M sang her favourite song too. She is much more talkative now and will try out activities that other children are suggesting.

And the class teacher stated,

> Now he never used to enjoy singing before and now he puts his hand up to take part in singing, whether you've given him the confidence or whether just being in that small group focus has enabled him to come out of his shell a little bit you know.

5.3.2. Possible underlying principles for future success. It would be interesting to explore what factors may have enabled the children to engage with the singing intervention, particularly to inform future practice. This is important because if the children did not engage, it would be unlikely that such an intervention would be successful. It is to this question that this discussion will now turn.

These positive impacts can perhaps be best explained in terms of the principles underlying the intervention, where social and emotional aspects of the children's experience were considered as a key component. In terms of social learning, the nature of the group enabled the children to learn, not only from the researcher, but from each other, through a process of scaffolding, modelling, shared attention and emotion, as well as one to one attention and positive regard. This was confirmed by the class teacher:

> I felt it brought out their confidence a lot more and you gave them a lot of one to one attention and focus you know and I felt it really improved their concentration and their confidence as well.

The social learning aspects can be illustrated by the group working together, as observed by the researcher:

> J and T wanted the group to sing hello to both of them together today which we did. J and T chose green together.

The children had the opportunity to make their own suggestions and then other children, learning from their peers, went on to make their own suggestions, as the researcher observed:

> T offered a new idea for the song, 'Five little dolphins' instead of 'Monkeys' and we all sang his idea. K ...suggested 'Five Little dogs' and sang it to me. T suggested some other voices and we tried a leopard voice together.

To summarise, the class teacher viewed that the intervention had positive impacts on the children, in terms of improving speech, language and communication, as well as motivation, confidence and having an opportunity to shine. This was important to inform future practice in two ways, firstly, in terms of other potential benefits, and secondly, in terms of the underlying principles of the group.

5.3.3. Added value of small group singing to class room practice. By reflecting on the potential benefits, the class teacher's views illustrate that small group singing is an activity that could be seen as valuable by practitioners. In particular, the class teacher reflected on whether the small group singing was adding something of value to the existing classroom experience. For example, she had noticed the considerable impact on one child at other times during the day:

> Now he never used to enjoy singing before and now he puts his hand up to take part in singing, whether you've given him the confidence or whether just being in that

> small group focus has enabled him to come out of his shell a little bit you know. I think it was one day last week, he put his hand up to sing 'Baa baa black sheep', and then again this week he sung as well, which is shocking for us because we've never seen him ever contribute before and he did this time.

As well as acknowledging the value of singing per se:

> I think it allows you the opportunity to obviously hone in on certain aspects of their learning and seeing how just singing, general things such as singing can help improve them. Cos I think a lot of the time with the little ones singing is overseen as just not gonna really help much but really it does, especially with speaking and listening.

5.3.4. Feasibility in practice. As well as reflecting on the value of small group singing, the class teacher also articulated the intention to carry out small group singing in the future. She stated:

> I love singing. And it's a way for me with the little ones for calming them down and settling them in, calming and relaxing and the children always seem to enjoy it.
> I certainly will be taking something from this next year and hopefully taking groups into the hall to do small group singing sessions and maybe with instruments next year as I really do feel that, like you said it is used sometimes as time filler but I think that it's more important than that, it's almost as important as reading I feel, singing.

The class teacher also acknowledged the feasibility of singing as a valuable small group focussed task, within the Foundation Phase. As the class teacher proposed:

> Yeah, I do think it lends itself to small group singing sessions definitely, because its creative development and speaking and listening so it fits in with the areas of the Foundation Phase.

The class teacher reflected on her own training and resources, and she could identify what would specifically facilitate this kind of intervention in practice:

> And to book myself onto some courses really, you know, aid my knowledge of how to teach the best that I can in Foundation Phase, different songs to cater for the topics that we are doing. It would good to have support to come in and maybe deliver music sessions, initially and then the support staff would be geared up to take over, its basic training I suppose then.

Suggestions were also made by the class teacher which could improve the singing group intervention, such as timing and space. She reflected:

> The time of day maybe come in when children first come in to the nursery, after register that can be a good time, and also having that space when it's just you and one to one with the adult.

The children's voice informed further improvements for future practice, giving consideration to minimising distractions and restlessness in the setting, avoiding important times for children such as snack-time, keeping the sessions engaging and focussed and avoiding being boring.

To summarise, the findings from the study can inform future practice. Firstly, in terms of the potential of small group singing to result in specific gains in phonological discrimination, an important precursor to phonological awareness and acquiring later literacy. Secondly, other benefits, in terms of improving confidence, motivation and communication and providing opportunities to shine. Thirdly, the added value of a small group singing programme to the classroom experience and fourthly, its feasibility in practice. It appears that both the content of the intervention as well as the nature of the intervention are important factors to inform practice. Engagement was critical and analysis of the qualitative data identified some important factors that contributed to the children's engagement with the activity, namely attention to the social and emotional aspects of the group. Themes that were drawn from the mosaic approach, which triangulated the views of children, class teacher and researcher, further informed this view, and were made up of social learning, enjoyment and building on previous experiences. Therefore the nature of the group as well as the content played an important role, although it is not possible to assess the extent of the influence of each separately, without having a comparison group, which was beyond the scope of this study. In terms of feasibility for future practice, potential benefits were recognised, as well as the added value of a small group singing approach. In fact, the class teacher articulated the intention to try out in her own practice and identified what could facilitate this, in terms of training and resources. Suggestions were outlined, for improvement, informed by the class teacher and the children. The study has provided some fruitful findings to suggest that there

is a value in such an intervention in practice and that it is feasible in practice, although methodological constraints need be taken into account, for example, teacher bias during the interview process and only one class teacher being interviewed.

5.3.5. Implications for educational psychology. The broader research area and the specific findings of this research have a number of implications in relation to educational psychology. Firstly, interventions such as this are very relevant to early intervention and prevention work and it is widely accepted that high quality early intervention work improves later outcomes, particularly for the most disadvantaged children, in terms of socio economic status (Sylva et al., 2004).

Secondly, this kind of intervention is relevant to educational psychologists (EPs) at the individual, group and systems levels of EPs' work. EPs can recommend this intervention when working with individual children where language and literacy are a concern; EPs can facilitate the setting up of small group singing in early years settings, paying attention to the findings of the research in relation to both the content and the nature of such an intervention; EPs can facilitate this kind of intervention at a systems level, for example, working with early years strategy groups and acting as a bridge between early years settings and music specialists and carrying out monitoring and evaluation. EPs are also well placed to work alongside Foundation Phase advisors to assess staff confidence, resources and identify suitable training opportunities. This kind of work may be of particular value where children have not had access to a rich language environment at home.

Thirdly, EPs can be explicit with both families and practitioners about the psychology underlying the development of phonological awareness, and the important relationship to broader language development and later literacy skills.

Fourthly, as part of an increasing agenda to work more with families, EPs have the potential to work in partnership with practitioners to support this kind of intervention. For example, working with children's centres and Flying Start settings, as a means of engaging 'hard to reach' families, through fun, non threatening activities, which are evidence based and can improve future outcomes.

The final section will outline some general limitations of the study.

5.4. Limitations of the Study

Limitations of the study will now be discussed in terms of Hawthorne Effects, other confounding variables, challenges of assessment, interviewee and children's bias. Challenges of the study will be outlined with reference to researching with young children.

5.4.1. Hawthorne Effects. The study showed significant gains in phonological discrimination, following intervention, in the intervention group compared to the control group, which, in comparison to other studies, were located in the same nursery class and therefore subject to similar experiences in school. Due to the sample numbers required in each of the control and intervention groups, it was not possible to have a comparison group in the same setting. Without a comparison group it is not possible to account for Hawthorne Effects, which may impact on the intervention group in terms of their improved performance. It is not possible to state categorically that the improvement was due to the intervention alone because the group may have been responding to attention given by the researcher and been better motivated to carry out the assessment. A comparison group carrying out an activity with the researcher, not related to the singing intervention, would provide evidence as to whether the improvements were due to the intervention alone because it might then be possible to discount Hawthorne Effects.

5.4.2. Other confounding variables. Other variables could have contributed to the gains made by the intervention group that were not accounted for by the researcher, such as home environment. It was not possible to establish the extent of singing, music and communication in the home environment, which could have in some part accounted for some gains in phonological discrimination for some children. Variables such as gender, special educational needs (SEN) and English as an additional language (EAL) were broadly matched in both control and intervention groups through discussion with the class teacher. All of the children in the control and intervention groups carried out the assessments,

compared to those children in the setting that were unable to, and this may provide some evidence of matching in terms of broader abilities. In terms of socio economic status, the school was chosen so that children would broadly be from an area made up of families from similar socio-economic backgrounds, although variations between families could exist.

5.4.3. Challenges of assessment. Identifying a meaningful assessment tool was a challenging process for the researcher as it was critical for the investigation to be certain that the assessment task was measuring phonological discrimination. A minimal pairing task did not substantially rely on other abilities such as language, visual processing and switching between auditory and visual processing. Therefore the assessment was more reliable as a measurement of phonological discrimination, rather than of verbal or other abilities. It did mean, however, that children who communicated either "all same" or "all different" for the assessment were deemed as not understanding or engaging with the assessment. It is problematic to assess how precise a judgement this was, as some children could have been responding correctly to their perception of the task.

The assessment task required a balance of not being too difficult that many children would be unable to carry it out, as well as not having ceiling effects which would make measuring gains impossible. There was also a clear ethical consideration in terms of time taken, engagement and enjoyment of the assessment activity, particularly in light of the age of the children.

It was important for the researcher to recognise the nature of working with young children and be clear about their understanding and engagement with the assessment rather than simply accept their responses and record, without questioning the meaningfulness of the process. This to some degree relied on the professional judgement of the researcher and cannot be said to be replicable.

5.4.4. Interviewee and children's bias. The intervention took place within a nursery setting over several weeks and a relationship developed between the researcher and class teacher. The class teacher was the only person who was interviewed and it is therefore possible that there may have been some interviewee bias as this individual may not have

wanted to say anything too negative to the researcher. In order to avoid some bias the researcher emphasised that the honest view of the class teacher would be beneficial, particularly to inform any future practice and questions were phrased in terms of "What didn't work so well" or "What the challenges were", "How improvements could be made". Of course it is problematic to assess the extent of bias and it is important to recognise that even though steps were taken to avoid bias, it may still have been an influencing factor.

The researcher carried out the both the assessments and the intervention. There may therefore be the possibility that children in the intervention group were biased in their approach towards the post intervention assessment as they have built up a relationship with the researcher and may have engaged better with the assessment and wanted to do well. How much of an explanation this could provide for the outcomes is difficult to assess without a comparison group.

5.4.5. Researching with young children. There were many issues in relation to a research project involving young children, particularly in terms of time scale, engagement, consent and the nursery setting. The assessment process was very time consuming for the researcher because seventy children with consent in the nursery class were assessed. The researcher found this challenging to balance time pressures with engaging and communicating with the children who frequently wanted to have a chat or tell you some news. Ensuring additional time to allow for the unpredictable and curious nature of young children would have been beneficial.

Equally pertinent were issues around informed consent. Children were asked if they wanted to carry out the assessment, play a listening game, and the researcher had to be very clear about their consent. Being within a school environment made this difficult to gauge as children were well used to being called to an activity by the staff and expected to take part in it. It was therefore only possible to ask a clear question and say "Is that OK?" but it was not within the remit of the study to remove children from the classroom environment, nor would this have been desirable, as the children were familiar with the staff and setting. These consent issues needed to be continually addressed by the researcher during the intervention and having a very concrete concept of "Are you coming on the super singing

train?" might have enabled children to make a choice about consent. However, within a school context, children are expected to join in activities when called. It was therefore important to be clear that they did not have to join in and could leave the group at any time. This, of course, could have disrupted the singing sessions but did not materialise as an issue.

One boy became quite distressed when asked to join the train at the second session. The researcher had to be very clear that he did not have to join in. The researcher did not want to ask the boy if he wanted to join in for the next session as she did not want to cause upset and thought he had withdrawn his consent from the intervention. However, on week five he asked if he could come and join the group as he had finished his snack. This highlights the challenges of making assumptions about the child's view as well as ethical considerations and not wanting to cause upset. Reviewing the situation with staff and the child would have been beneficial in providing more information.

Keeping the children engaged was at times challenging and this led to an ethical dilemma for the researcher. Observations were made that two of the children were restless during a session. The researcher assumed that this was an indication that they were not enjoying the session and did not want to join in. She attempted to very clear at the beginning of the next session to state that they didn't have to come, only if they wanted to and they did express that they wanted to join in. The researcher used positive praise to highlight what the children were doing well but ultimately if children were restless or wanted to leave the group the researcher would make observations and have to enable them to leave the group. This felt counter intuitive for the researcher as she wanted to complete the singing sessions and it became important, therefore, to pay particular regard to engaging the interest of the children and accept that at times, this may not be possible.

5.5. Summary

The discussion considered the findings of the research in light of the three key aims of the thesis. Firstly, it proposed that the study has, to some extent, added new knowledge to empirical findings, in terms of showing gains in phonological discrimination, following a

small group singing intervention, with children aged three to four. The study has attempted to address some methodological constraints of previous studies in terms of a control group and can plausibly conclude that the gains were not due to maturation. However, there are some alternative explanations that have been outlined, although the singing intervention may be the most plausible explanation for the outcomes in light of the literature. Future research which included a comparison group, can build on these fruitful initial findings and will help to discount some alternative explanations that have been outlined.

Secondly, it contended that the second aim of the research, has been met, because findings from the study would appear to confirm the theoretical frameworks highlighted in the literature. Firstly, in terms of the relationship between music and language, the 'shared sound category learning mechanism hypothesis' and 'near transfer hypothesis'. Secondly, in terms of the development of phonological awareness as part of a larger phonological processing system within broader language development. The study has provided some clarity in to the potential of developing early phonological skills, in terms of producing empirical findings, which fit into the theoretical concerns of the wider literature.
Thirdly, it outlined how the findings can inform future practice. Firstly, in terms of the potential of small group singing to result in specific gains in phonological discrimination, an important precursor to phonological awareness and acquiring later literacy. Secondly, other benefits, in terms of improving confidence, motivation, communication and opportunities to shine. Thirdly, the added value of a small group singing programme to the classroom experience and fourthly, its feasibility in practice. It appears that both the content of the intervention as well as the nature of the intervention are important factors to inform practice.

Finally the discussion considered: limitations of the study, in terms of Hawthorne Effects; other confounding variables; challenges of assessment; and interviewee and children's bias. Challenges of the study were outlined with reference to research and young children.

The final chapter will give an overview of the overall research project by outlining what it intended to achieve and providing a summary of how it achieved its aims, what the findings

were, how the findings fit with existing knowledge and what this study has added to knowledge in this area. It will make recommendations for future research.

CHAPTER 6 CONCLUSION

The purpose of this conclusion, firstly, is to place the research within the broader context of national concerns over literacy, the increasing awareness of the role of phonological awareness in acquiring literacy and the importance of establishing early intervention which can impact on these skills in young children. Secondly, informed by the wider literature, the conclusion will outline the aims of the research and how it intended to meet these aims by establishing three focussed research questions. Thirdly, there will be a brief overview of the methodological framework for investigating the research questions and the findings will be discussed in relation to the aims of the research. Conclusions will be drawn with regards to how the research findings fit with existing knowledge and what the implications of the findings are in terms of broadening understanding in this area. Fourthly, it will outline some recommendations for future research.

6.1. The Research Context and Why this Research Matters

Can a small group singing intervention improve phonological discrimination in young children? This question matters because interventions that support the development of phonological awareness may have a critical impact on acquiring literacy and subsequent success at school and throughout life. There is consistent evidence for the important relationship between phonological awareness, broader language development and acquiring literacy. Snowling and Juel (2005), for example, reviewed what is needed in order to learn to read and concluded that speech and language abilities are the foundations for later literacy skills. Similarly a review by the National Institute for Child Health and Human Development (NICHD, 2005) found that a strong language base is required for reading. It has also been widely recognised that phonological awareness in particular, is one of the most important skills for learning to read and researchers over the past twenty years have determined that phonemic awareness, that is, the ability to recognise that a spoken word consists of individual sounds or phonemes, is one of the best predictors of how well children learn to read (Ehri, Nunes, Willows, Schuster, Yaghoub-Zadeh & Shanahan, 2001; Hulme,

Hatcher, Nation, Brown, Adams & Stuart, 2002; Nation & Hulme, 1997). Furthermore, the recent Rose Review (Rose, 2006) has put phonological deficits at the heart of difficulties in acquiring literacy skills.

In light of this, practitioners, researchers and policy makers are increasingly interested in establishing what early activities can impact on later phonological awareness. Music and singing have traditionally played an important part in early years settings, but interest is growing in determining more precisely what skills these activities are actually tapping into. Some initial studies have found significant gains in phonological awareness following music intervention, with children aged between four to six, a time when phonological awareness is accelerated (Colwell, 1988, 1994; Standley & Hughes, 1997; Register, 2001; Gromko, 2005; Bolduc, 2009; Galicia, Contreras Gomez & Pena Flores, 2006; Dege & Schwarzer, 2011).

What explains this potential transfer of skills? The transfer of learning from one domain to another depends on the similarities between processes involved and is known as ' near transfer', and plausible comparisons have been found between the early development of music and language (McMullen & Saffran, 2004), leading to the proposal of 'shared sound category learning mechanism hypothesis' (Patel, 2003). These comparisons would also suggest similar abilities in both music and phonological awareness and correlations studies have found some evidence for this, although the number and scale of studies are limited (Bryant et al., 1989; Lamb & Gregory, 1993; Bolduc & Montesinos-Gelet, 2005; Peynircioglu, Durgunoglu & Oney-Kusefoglu, 2002; Anvari et al., 2002).

An increasingly consistent view is also emerging from the literature, highlighting phonological awareness as one component of a larger phonological processing system used for speaking and listening (Wagner, Torgesen, Laughon, Simmons & Rashotte, 1993) and that it follows a developmental process (Carroll, Snowling, Stevenson & Hulme, 2003). Despite this, it is less clear whether music intervention, carried out with younger children, specifically impacts on the precursors of phonological awareness, such as phonological discrimination, as no studies have been carried out to date, to the knowledge of the author. Yet, this is potentially an important contribution to knowledge in this area, as these early

phonological skills provide the foundations for later phonological awareness and acquiring literacy (Carroll, Snowling, Stevenson & Hulme, 2003).

Therefore, broadly speaking, the research question was informed by two key theoretical concepts. Firstly, the idea of an intrinsic link between early communication and musicality, supported by evidence for a shared common early development in both music and language. Empirical investigations have provided some initial evidence for a correlation between music abilities and phonological awareness supporting a 'shared sound category learning mechanism hypothesis'. Studies have also shown a positive impact on phonological awareness following music instruction supporting the concept of 'near transfer' of skills where similar processes are involved. Secondly, an understanding of the development of phonological awareness, as one component of a larger phonological processing system used for speaking and listening.

The purpose of this study, therefore, was to establish whether a small group singing intervention with younger children, aged three and four years, can impact on phonological discrimination.

6.2. The Research Aims Informed by Wider Literature

The literature review reviewed the critical points of current knowledge in this area. Firstly, it proposed a broad view of the link between music and language and outlined the social and holistic nature of early infant musicality, interaction and communication, for which there is much cross-cultural empirical evidence. It then described the evidence which broadly supports the contention that there may be some commonality in the early development of music and language, which gives plausibility to a 'shared sound category learning mechanism hypothesis'. Secondly, it considered more specifically the relationship between music and phonological awareness by examining empirical studies. It examined studies which showed a correlation between music abilities and phonological awareness and concluded that, although there is some evidence to support this view, it is limited by scale and methodological constraints. It then went onto to examine the impact of musical

instruction on phonological awareness, in children aged four to six. It concluded that, although studies indicated positive gains following intervention, these studies were small in scale and several methodological constraints raised questions over the robustness of the intervention effect, particularly with regards to confounding variables where control and intervention groups were located in different school settings. Thirdly, it described an increasingly consistent view of the development of, and precursors to, phonological awareness within a larger processing system, where processes are part of broader language development. This is an important theoretical framework because it helps to explain some of the underlying mechanisms pertinent to this area. It establishes some of the specific skills that music instruction may be tapping into to, as well as the relationships between them.

It was proposed that the topic of the research would add something new, by investigating the impact of a singing intervention on early phonological skills, with younger children, aged three to four. A skill such as phonological discrimination would be useful to assess because it distinguishes between differences and similarities in words, rather than just in sounds, as in auditory discrimination. Therefore, it is a skill that can be seen as a progression from auditory discrimination, but also as a precursor to phonological awareness. A music intervention that focuses on singing can give children the opportunity to develop large scale phonological awareness (syllable and rime), articulation and receptive language skills, outlined in the literature review as important precursors in the development of phonological awareness.

The wider literature, therefore, informed the three key aims of the study. Firstly, the study aimed to add something new to the initial empirical findings by investigating whether a small singing group with children, aged three to four, can specifically result in gains in phonological discrimination, but also paying attention to some important methodological constraints of previous studies. Secondly, it aimed to provide further evidence to support the theoretical concepts of 'shared sound category learning mechanism hypothesis' and 'near transfer' and further illuminate the wider processes implicated in the development of phonological awareness. Finally the study intended to inform future practice by establishing any potential benefits of small group singing and considering the feasibility of such an intervention in practice. This led to the formulation of three research questions.

1. Can a small singing group intervention with young children improve phonological discrimination?
2. What are the class teacher's perceptions of the singing intervention in terms of impacts on speaking and listening and other broader areas, small group singing in general and implications for practice?
3. What are the children's views about their experience of the singing intervention?

6.3. The Research Process and What it Found

A mixed method research design was used, as both quantitative and qualitative methods were required to address the research questions. A quasi-experimental design was used to assess whether a small group singing intervention would result in gains in phonological discrimination. In order to account for maturation over time, both a control group and intervention group were included in the study and children were randomly assigned to either group. The children were matched for other confounding variables such as singing experiences in the classroom, age, gender and socio-economic status. If a significant increase was an effect of the intervention, and not due to chance or maturation, it would be expected that there would be a significant increase in the phonological discrimination scores of the intervention group but not the control group.

Participants underwent a pre and post intervention assessment of phonological discrimination, with the intervention group receiving the small group singing intervention for six sessions. The scores in the phonological discrimination task for the control and intervention groups, pre and post intervention, were statistically analysed to establish whether there was a significant intervention effect.

The rationale was also outlined for the qualitative research design, using a semi structured interview, to gain the class teacher's perceptions, and a mosaic approach to gain children's views. Underlying the methodology was the increasingly emerging view of children as participants in, and co constructors of, their knowledge and experience.

Statistical analysis, using a repeated measures ANOVA and post hoc tests, revealed that there was a significant intervention effect, as the scores of the intervention group increased significantly following the intervention, compared to the control group scores, which did not. Two key themes emerged from the class teacher's perspectives: analysis of the fieldwork or intervention and the broader school context. The analysis of the fieldwork revealed sub themes of positive benefits for children which divided into motivation, confidence, communication skills and opportunities to shine. Broader school context had two sub themes: implications for future practice and recognising the potential of small group work and singing; and a smaller theme of existing skills and practice. Using a mosaic approach (Moss & Clark, 2001), the children's views of the intervention were gathered using a range of sources and collated as a rich picture in terms of enjoyment, what didn't work, social learning and building on experience.

6.4. Did the Research Meet its Aims?

The discussion considered these findings in light of the three key aims of the thesis. Firstly, it proposed that the study has, to some extent, added new knowledge to empirical findings, in terms of showing gains in phonological discrimination, following a small group singing intervention, with children aged three to four. The study attempted to address some methodological constraints, in terms of a control group, and can therefore plausibly conclude that the gains were not due to maturation. However, there are some possible alternative explanations that have been outlined, although the singing intervention may be the most plausible explanation, in light of the literature. Future research which includes a comparison group can build on these fruitful initial findings and will help to discount some alternative explanations that have been outlined.

Secondly, it contended that the second aim of the research has been met because findings from the study would appear to confirm the theoretical frameworks highlighted in the literature. Firstly, in terms of the relationship between music and language and the 'shared sound category learning mechanism hypothesis' and 'near transfer hypothesis'. Secondly, in

terms of the development of phonological awareness as part of a larger phonological processing system within broader language development. The study has provided some clarity into the potential of developing early phonological skills, which fits into the theoretical concerns of the wider literature.

Thirdly, it outlined how the findings can inform future practice. It outlined the potential of small group singing to result in specific gains in phonological discrimination, an important precursor to phonological awareness and acquiring later literacy. It highlighted other benefits, in terms of improving confidence, motivation, communication and providing opportunities to shine. It proposed that the added value of small group singing to the classroom experience was recognised, and its feasibility in practice was articulated. It appears that both the content of the intervention, as well as the nature of the intervention, are important factors to inform practice.

Finally the discussion considered limitations of the study, in terms of Hawthorne Effects, other confounding variables, challenges of assessment, interviewee and children's bias. Challenges of the study were outlined with reference to researching with young children.

The next section will outline some recommendations for future research.

6.5. Recommendations for Future Research

Reflections on the research process have produced findings which may inform future research. These are outlined below.

It would be beneficial for future research to take into account other variables such as home environment and cognitive abilities, as these are likely to impact considerably on children's learning.

The research has highlighted the importance of being flexible and responsive when working with young children. A Mosaic Approach is a useful methodology to gather children's views

meaningfully. As well as gathering children's views verbally and non-verbally, it can give a structure to making observations. Using a variety of means to gain a rich picture and triangulate views, can usefully inform the research process. Future research could also seek to gain the views of the parents or carers.

Findings from this study suggest that incorporating the social and emotional aspects of learning, within a holistic and interactive view of children, as active participants and co-constructors of their experience, are important underlying principles in research with children.

Findings also inform areas for improvement for future group interventions, such as consideration of the setting and space, timing of the sessions, minimising distractions and reviewing the process in order to maximise engagement.

Much consideration is needed with regard to informed consent and research with young children, in ensuring a clear visual process, checking frequently for understanding, ensuring clarity about consent, withdrawal of consent and challenges that may arise from research in a school setting.

It is important to give careful consideration to assessment with young children in terms of their interest, understanding and engagement. Is the assessment giving meaningful data about what is being measured? A pilot of the assessment tool could inform these questions, as well as discussions with practitioners who know the children and the setting. In order to be able to respond flexibly to research with young children, it would be beneficial to build extra time into the research process. Assessment over different days would provide more consistency and ensuring that the person that carries out the intervention does not carry out the assessment could prevent potential children's bias towards the post intervention assessment. In other words, establishing a relationship with the adult during intervention may result in better engagement with the assessment tasks and wanting to do well.
A comparison group, that would carry out an activity, not related directly to the intervention, would provide evidence of Hawthorne Effects. These could then be discounted

as variables in accounting for any gains made following intervention, which would strengthen the evidence for the intervention effect.

Future research, which could further inform which aspects of music are impacting on which language and phonological skills, could add to understanding in this area. Similar research with children with English as an additional language could inform whether a small singing group has the potential to increase their phonological discrimination and to what extent.

Repeating the study with larger numbers of children and paying attention to some of the limitations of the study have the potential to facilitate more robust findings.

6.6. Summary

The purpose of this study was to investigate whether a small group singing intervention can increase phonological discrimination, in young children. This is an important question because of the impact phonological awareness, and the precursors to it, have on later literacy. These literacy skills are crucial, not only in school, but throughout life in gaining knowledge, sharing history and culture, pleasure and enjoyment, self-actualisation and growth and making sense of the world. It is not surprising therefore that issues over literacy have been a national and international concern.

The wider literature illustrated the broader link between music and language and suggested a common early development, as well as shared learning mechanisms. Particular interest has been growing in establishing a relationship between music abilities and phonological awareness, as well as the potential of instruction in one domain, in leading to gains in the other. Some initial studies have been carried out, with children aged four to six, a time when the development of phonological awareness is accelerated, showing gains in phonological awareness following music instruction. However, there have been a relatively small number of studies, with some methodological constraints, particularly in terms of control groups. This is alongside the view that phonological awareness is part of a larger phonological processing system, which suggests that developing early phonological skills impacts on later

development. Despite this, there is a gap in the literature in terms of studies which investigate the impact of music instruction on younger children, in respect of earlier phonological skills.

The research conducted for this thesis did show gains in phonological discrimination, in children aged three to four, following a singing intervention. It was proposed that the wider literature provides a plausible explanation for these gains in terms of early common development and shared mechanisms, resulting in a 'near transfer' of similar skills. Singing, in particular, gave the children opportunities to use their voice and enjoy rhythm and rhyme. This use of voice is particularly pertinent, in light of the concerns over young children's expressive language. Findings can be further illuminated by understanding the development of phonological awareness, which highlights the important relationships between sub-skills such as large scale awareness (rime and syllable), articulation, and receptive language, and acquiring later phonological awareness and literacy. It seems likely that the singing intervention was tapping into these sub-skills.

The study did to some extent meet its objective in terms of adding new empirical findings, although limitations of the study and possible alternative explanations have been highlighted. These findings do, however, support the broader theoretical frameworks in the literature review, which provide a plausible explanation for the gains.

The research has also informed some exciting implications for practice. In addition to gains in phonological discrimination, benefits were also highlighted in terms of improved communication, motivation, confidence and providing opportunities to shine. There seemed to be something of value to the small singing group, that could add to existing classroom experience. This kind of small group singing could work well as a small focussed task group, as implemented in the Foundation Phase, as well as other early years settings. As well as acknowledging the value of small group singing, the class teacher also articulated how she intended to use this type of small group singing in her own classroom practice Of course, only one class teacher was interviewed and interviewee bias was a possibility, nevertheless, the positive findings can provide a fruitful start to an emerging dialogue around small group singing in the early years classroom.

Using a mosaic approach to gain children's view was an important feature of the research, because it assumes that children are active co-constructors in the research process. As well as other qualitative data, it has helpfully informed what broader features of the intervention may have contributed to its success, in terms of engagement. Themes that were drawn from the mosaic approach were made up of social learning, enjoyment and building on previous experiences. These social and emotional aspects of learning seemed to enable the children to participate with the group. It appears, then, that both the content of the intervention, as well as the nature of the intervention, are important factors to inform practice.

To conclude, this study has contributed some fruitful findings to this area in relation to the intervention; addressing a specific gap in the literature and supporting key theoretical concepts. It has also made important initial contributions to future practice, in terms of demonstrating the value and feasibility of small group singing in the early years. Limitations of the study have been described, suggestions for improvements made and recommendations for future research outlined.

> "It's getting everyone to realise how important singing is 'cos I don't think everybody really appreciates how important it is in the early years".

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6th April 2011

Dear

I am a postgraduate student in the School of Psychology, Cardiff University, training to become an Educational Psychologist. I am currently on placement in the Educational Psychology Service in the City and County of ---. As part of my doctorate I am carrying out a study on whether a small group singing intervention can increase phonological skills in early years' children. I am writing to enquire whether you would give permission for me to carry out this research in the nursery classes at your school.

The project would involve a short assessment of all children's phonological skills in both nursery classes. I will then randomly choose four groups of six children to join in with six singing sessions over the Summer term. The sessions will be 20 minutes or so and will hopefully be lots of fun. Children will be asked if they want to join in. If they do not wish to they will carry on with their usual classroom activities. I will then carry out an assessment of phonological skills at the end of term to see if there has been any improvement and if there is a difference in skills between those children who have taken part in the singing sessions and those who have not.

I will also be interviewing the class teacher to gain an insight into their experience of and attitude towards singing in the early years. The interview will probably take around an hour.

My background is as an early years' teacher and I also have experience of delivering singing and music sessions for pre-school children and their families. I have a current enhanced CRB disclosure.

I will also be offering an extra session at the end of term for any children who have not had the opportunity to join in a singing session but would like to. No details about any child or the school will be included in the research report and I will send out a debrief letter to the class teacher, parents and carers at the end of the project and carry out a debrief activity with the children. My University supervisor is ---..

I would not want to generate any extra work for nursery staff. I would request a small room where I can carry out the assessments and singing sessions and request that nursery staff give out the consent and debrief letter on my behalf and provide me with a list of children that parents and carers have consented to take part.

Many thanks in advance for your consideration of this project. Please let me know if you require further information.

Regards,

Educational Psychologist in Training

Dear Parent or Carer

I am an Education Psychologist in Training currently on placement with the City and County of ---.

I am planning to carry out a research project in your child's class during the Summer term. I am interested in finding out whether a small group singing session will help children to improve their sense of sounds. I am interested in finding out about this because it is an important skill for learning to read.

My background is as an early years' teacher and I also have experience of delivering singing and music sessions for pre-school children and their families. I have an enhanced CRB disclosure.

I am hoping to give all children in both nursery classes an activity to assess their phonological awareness or sense of sounds. This should take about ten minutes for each child. I will then randomly choose four groups of six children to join in with six singing sessions over the term by picking names out of a hat. The sessions will be 20 minutes or so and will hopefully be lots of fun. Children will be asked if they want to join in. If they do not wish to they will carry on with their usual classroom activities.

I will then carry out the activity to assess their sense of sounds at the end of term.
I will also be offering an extra session at the end of term for any children who have not had the opportunity to join in a singing session but would like to.

No details about your child or the school will be included in the research report and I will send out a debrief letter the end of the project. If you would like any further information, please do not hesitate to contact me on ---.

If you **would not** like your child to take part in the research project please return the attached reply slip to the school by 18th May.
Many thanks for all your help.

Yours Sincerely

Educational Psychologist in Training

I would not like my child _____ to take part in the research

project.

Dear

I am an Education Psychologist in Training studying at Cardiff University.

I am planning to carry out a research project in your class during the Summer term. I am interested in finding out whether a small group singing session will help children to improve their phonological awareness. I am interested in finding out about this because it is an important skill for learning to read.

My background is as an early years' teacher and I also have experience of delivering singing and music sessions for pre-school children and their families. I have an enhanced CRB disclosure.

I am hoping to give all children in both nursery classes an activity to assess their phonological awareness. This should take about ten minutes for each child. I will then randomly choose four groups of six children to join in with six singing sessions over the term by picking names out of a hat. The sessions will be 20 minutes or so and will hopefully be lots of fun. Children will be asked if they want to join in. If they do not wish to they will carry on with their usual classroom activities.

I will then carry out the activity to assess their phonological awareness at the end of term. I will also be offering an extra session at the end of term for any children who have not had the opportunity to join in a singing session but would like to.

No details about the class or the school will be included in the research report and I will send out a debrief letter at the end of the project. If you would like any further information, please do not hesitate to contact me on ---.

I would also like to interview yourself, to gain your observations of the intervention and your views about small group singing in the early years. The interview will probably take around thirty minutes.

If you would take part in the interview for the research project please complete the attached reply slip.

Many thanks for all your help.

Yours Sincerely

Educational Psychologist in Training

I _____would like to take part in the research project.

Signature_____ Date_____

Dear Parent or Carer

Thank you for your child's participation in the research project in their class.

The research project looked at whether a small group singing session can help children to improve their phonological awareness. These skills are important for learning to read. The research project also wanted to gain the views of the class teacher in relation to the singing sessions as well broader views about small group singing in general.

The aim of the project was to see whether a small group regularly singing can provide children with some of the key skills to prepare them for learning to read. It will hopefully be useful information for schools to inform them about what activities in particular may be beneficial for early years children in the classroom to support literacy development. The children were asked whether they enjoyed the sessions and what they liked the best. Gaining the children's and teacher's views may be beneficial for future practice.

All of the singing group data will remain anonymous.

If you wish to find out further information I would recommend www.literacytrust.org.uk .

Many thanks for your help with the project and please do not hesitate to contact me if you need any further information. I have also included the details of my supervisor if you have any concerns and in the case of wishing to make a complaint please contact the School of Psychology Ethics Committee.

Yours sincerely

Educational Psychologist in Training

Educational Psychologist in Training
School of Psychology
Cardiff University
Tower Building
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Professional Tutor
School of Psychology
Cardiff University
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School of Psychology Ethics Committee
School of Psychology
Cardiff University
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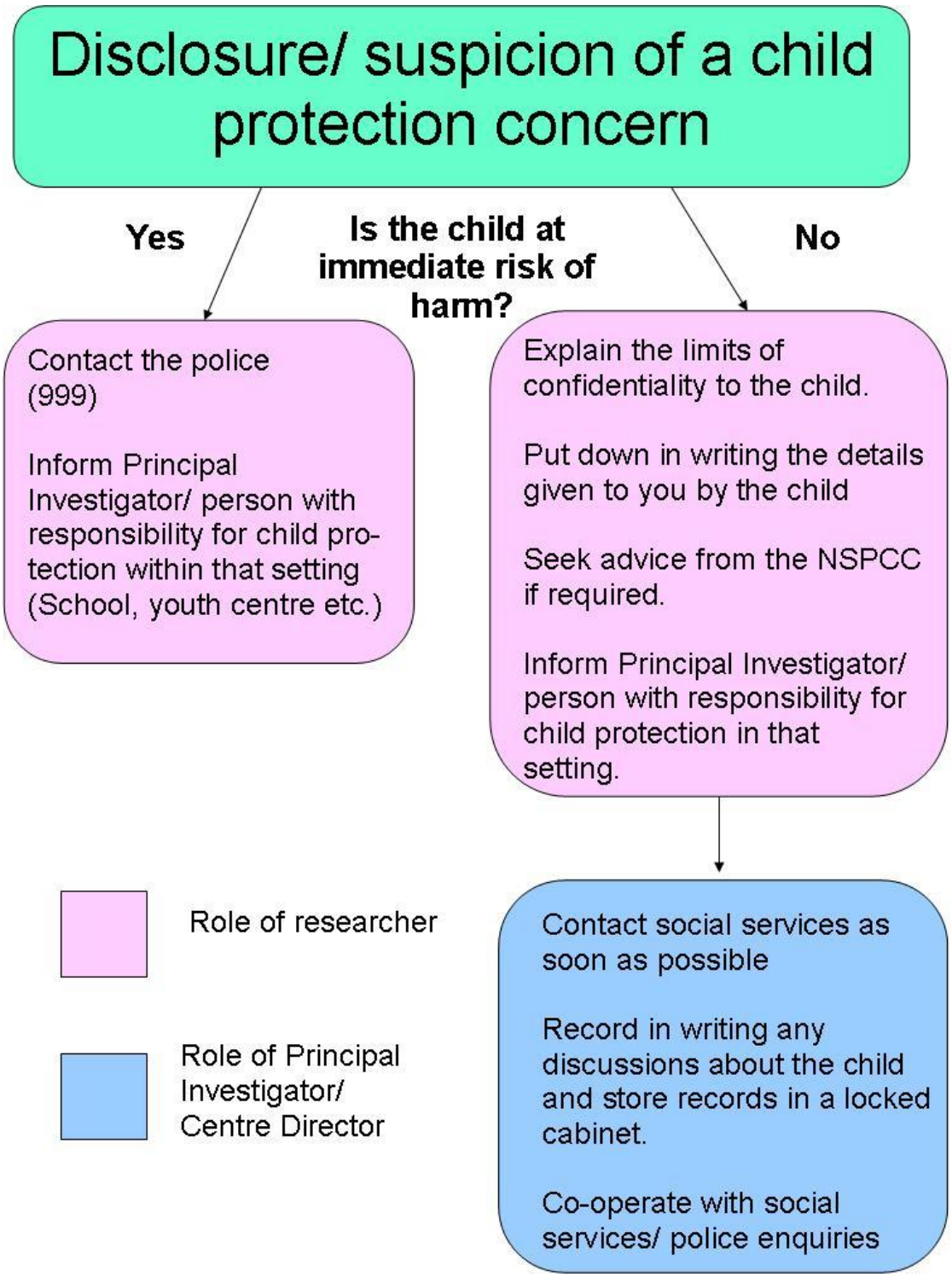
Appendix C
Decision Chart



PHONOLOGICAL DISCRIMINATION TEST

Would you like to play a listening game?

I'm going to say two things. You need to listen really carefully Can you tell me if they're the same or different – you can nod or shake your head or give a thumbs up or down, or just say same or different.

Is that OK?

Shall we have a practice?

Set 1	Set 2
Pet pat	Mat met
Lid led	Pen pin
Cat cut	Tap top
Fat fat	Sit sit
Bad dad	Cat bat
Cap cap	Lid lid
Pin thin	Bad sad
Fan van	Hut cut
Lip limp	Fan fat
Cup cut	Dig did
Leg leg	Jam jam
Dog doll	Hot hop

Phonological discrimination test scores – control group

Participant no. **CONTROL GROUP**	Pre test 1	Pre test 2	Pre test total	Post test 1	Post test 2	Post test total	Difference between scores pre and post test	Gender female1 male2	EAL/SEN
1	8	9	17	7	7	14	-3	1	
2	9	8	17	6	8	14	-3	1	
3	7	9	16	8	6	14	-2	1	EAL
4	11	12	23	11	12	23	0	1	
5	12	11	23	12	12	24	1	2	
6	7	8	15	8	9	17	2	2	
7	10	8	18	11	8	19	1	2	
8	8	11	19	8	10	18	-1	2	
9	11	12	23	12	12	24	1	2	
10	9	12	21	9	9	18	-3	2	
11	11	11	22	11	7	18	-4	2	
12	12	12	24	12	12	24	0	2	
13	9	8	17	5	11	16	-1	2	
14	11	11	22	11	12	23	1	2	
15	10	12	22	12	12	24	2	1	
16	8	9	17	6	8	14	-3	2	
17	10	12	22	6	5	11	-11	1	EAL
18	7	8	15	9	9	18	3	1	
19	11	12	23	7	4	11	-12	1	
20	9	10	19	10	11	21	2	2	
TOTAL	190	205	395	181	184	365	-30	12 male 8 female	
AVERAGE	9.5	10.25	19.75	9.05	9.2	18.25	-1.5		

APPENDIX H

Raw data - phonological discrimination test scores

Participant no.
Control group

	Pre test 1	Pre test 2	Pre test total	Post test 1	Post test 2	Post test total	Difference between scores pre and post test	Gender female1 male 2	EAL/SEN
1	11	12	23	12	12	24	1	2	
2	10	10	20	10	12	22	2	2	
3	6	10	16	10	7	17	1	1	
4	7	8	15	11	11	22	7	1	EAL
5	11	12	23	12	12	24	1	1	
6	9	9	18	8	12	20	2	1	
7	6	7	13	8	12	20	7	2	SEN
8	7	10	17	10	10	20	3	1	
9	8	9	17	10	11	21	4	1	
10	8	7	15	9	6	15	0	2	
11	11	10	21	10	11	21	0	1	
12	11	12	23	11	11	22	-1	2	
13	10	7	17	7	6	13	-4	1	
14	8	9	17	9	10	19	2	1	
15	7	9	16	12	11	23	7	1	
16	9	11	20	12	12	24	4	2	
17	11	11	22	12	12	24	2	2	SEN
18	8	12	20	12	12	24	4	2	
19	5	4	9	7	5	12	3	1	SEN
20	11	12	23	9	11	20	-3	1	
total	174	191	365	201	206	407	42	8 Male	
average	8.7	9.55	18.25	10.05	10.3	20.35	2.1	12 female	

<u>Phonological discrimination test scores – intervention group</u>

INTRODUCTION

Thank you
Overview of research
Interested in your views
Anonymity and confidentiality
Consent form
Recording
Stop at any time

PRACTITIONER OBSERVATIONS OF INTERVENTION

Generally speaking, what were your observations of the small group singing project?
Do you think the children enjoyed the sessions? What did you notice?
Do you think the children did not enjoy the sessions? What did you notice?
Did you notice any impact on children's skills in the following areas:

- Singing
- Speaking and listening
- Phonological skills

Do you think the children benefitted in other ways? For example, turn taking? How do you know this?
Do you think the sessions presented challenges or difficulties for any of the children?
Would you recommend this kind of project to others? Why?
What was difficult or challenging for you about the project?
If something similar was carried out in the future, what would help to improve it?

PRACTITIONER VIEWS OF SMALL GROUP SINGING AND IMPLICATIONS FOR PRACTICE

Do you think there is a value generally in small group singing? In your opinion does it have the potential to impact on speaking and listening, phonological skills? Other possible benefits?
Do you think that there are the differences between whole class and small group singing?
Do you have opportunities for small group singing? Would you like to have more opportunities for small group singing? What makes it difficult and what would help?
Has the Foundation Phase provided you with more or less opportunities for singing?
How confident do you feel about singing with the children?
What training have you received? Would you like to receive more training? If so, in what areas?
What resources do you have access to?
What support do you have within school or outside school? What support would you like?

Mosaic approach - researcher observations

Week 1

Children were animated and excited by each name being sung around the circle. A lot of pointing to individual children as we sung to them. J was more quiet, but content, not really singing. Eager to volunteered their favourite songs. F volunteered to sing her favourite song to the group – she sang and we all clapped along. B was a bit wary and said 'I've done this already'. T was quiet. All children were eager to express their favourite songs. Calming songs was effective to calming group down. Children gasped with excitement as stickers were shown and waited patiently for stickers when asked if they wanted to do singing next week, there was an excited yes response.

Week 2

One of the group reminded me that we needed to sing the hello song to me. Everyone joined in hello song and suggesting who should go next and joined in trying different voices. The group were eager to take turns and choose the rhyme bowls. They were very keen to sing Five Little Monkeys and all children joined in bouncing and most sung along to words. All children responded and tried actions for the calming song. M said she was missing her mum today.

Week 3

Group reminded each other not to forget me in the hello song. The group engaged in suggesting who should go next. They seemed animated and joined in activities well. In traduced a new song today with puppets and they all watched very intently, anticipating when the crocodile would strike and counting down the monkeys. T likes to choose the green bowl for the rhyming songs. T and J asked to sing their favourite song together which they did a duet. M sang her favourite song too. She is much more talkative now and will try out activities that other children are suggesting.

Week 4

H was hiding under his chair today but came out with opportunities to smooth the crocodile. G sang animatedly throughout the session. Children wanted to be snapped by the crocodile and everyone joined in with this. T offered a new idea for the song – five little dolphins

instead of monkeys and we all sung his idea. K who has been quite distractible seems much more engaged and concentrates for longer periods. She suggested Five Little dogs and sung

it to me. T suggested some other voices and we tried a leopard voice together. J showed me his new trainers. The group joined in the actions, singing, with animation and much smiling.

Week 5

J showed me his baddie and then L and J showed me theirs. C remarked on my baddie on my lip. H hadn't brought his voices today. F moving around. While choosing rhyme bowls C said that she didn't like spiders. She sang the chocolate version of Twinkle Twinkle, H and F restless, hiding under chairs . J quiet and content – singing and joining in more now. T sits contentedly and will join in actions but not singing. F wanted to ne the monkey today. The second group came to join the train immediately and seemed very keen. B asked to come along today. He said now that he had had his drink and snake he would like to come. All children eager to choose and sing hello song. F sang a French song and B asked to sing a shape song. R sang Twinkle Twinkle Chocolate Bar. Everyone wanted to be snapped by crocodile in song and waited with great excitement. B asked to sing a circle song as stickers were given out. T and J wanted to pick a bowl together for the rhyming songs. Children pointed and cheered at crocodile and monkey puppets. T tried dolphins jumping on the bed with the group and said 'you're funny like Mr Taylor!' R told the group he was four and counted.

Week 6

J, L and T really focussed and engaged today. Asked H and F if they wanted to come today because they were restless last week. They said they did and joined the train happily. Tried some magic glue. All children ready to jump up and join the train. All children in group sang own song today. R made a shape of a star using his body as we sung Twinkle Twinkle, did the same after. J and T wanted the group to sing hello to both of them together today which we did. J and T chose green together. All children really enjoyed being snapped by crocodile. All joined in different voices. M reminded the group to sing hello to me and suggested a dinosaur voice. K tried out her dogs song.

Mosaic approach - class teacher observations

- Do you think the children enjoyed the session? And if so what did you notice?

To be honest children love singing anyway. We do quite a lot of whole class singing sessions but I think it gave them the opportunity to express them--- in a smaller group, in front of a smaller group of children 'cos a lot of the children won't stand up and share a song if they're in front of a larger group but I noticed that ...I think you had... who did you have in your group, he's a quiet child and I could see the child responding to you and their friends were in that smaller group, so they felt more confident, I felt it brought out their confidence a lot more and you gave them a lot of one to one attention and focus you know and I felt it really improved their concentration and their confidence as well.

- Do you think the children didn't enjoy the sessions? What did you notice?

--- for example in the afternoon because it's around milk and fruit time, he didn't want to be taken out of that whereas normally in a whole class session he would be the first one there and he'd always want to be the focus of attention but I could see and I was quite shocked, I thought he would want to take part but like I say it was around milk and fruit time and that took priority over the singing session. In a way he let himself down there because he would have really enjoyed it and he let me down in a way. And I thought to myself 'come on now ---, you know you love singing' He loves singing because he's always the one putting his hand up to sing in front of a group. And another thing I think, children like --- like to be centre of attention so in a smaller group maybe he didn't feel as if he was getting that from a bigger group of children, you know...smaller group of children you know. But direct observations I thought they did really well and they really enjoyed it and they responded. The only downfall for you is the fact that it was in a class room environment and we haven't got a small classroom where you could have worked but I mean for the space that you had the children seemed to be really attentive to you, and really wanted to come and line up and take part with you, you know, they really did.

Mosaic approach – children's views

Did you enjoy the super singing?

Smiley face – 13, middle face – 2, not smiley – 2

Why did you enjoy or not enjoy super singing?

'Grand Old Duke of York can we sing it now?'

'Monkey song, all of the songs, I saw monkeys in Folly farm'.

'Monkey, crocodile song and lion song 'cos the croc bit my finger!'

'Bored – lion song favourite and 'all of the songs'

'Monkey on the bed – 'cos jumping'

Three children chose Incey Wincey Spider 'my best one – Incey'.

'Favourite thing singing'

'Choosing green thing with J'

'Made me happy, liked singing the monkey song'

'Hickory Dickory'

'Humpty Dumpty, mummy made me laugh'

'Monkey'

'Croc and monkey 'cos my mummy sings me that one'

'Because it was very nice'

'Choosing bowls'

'Monkey song best'

'Cos everyone else liked the monkey song as well'

What was your favourite activity?

Monkey 4

Croc 2

Rhyme bowls 4

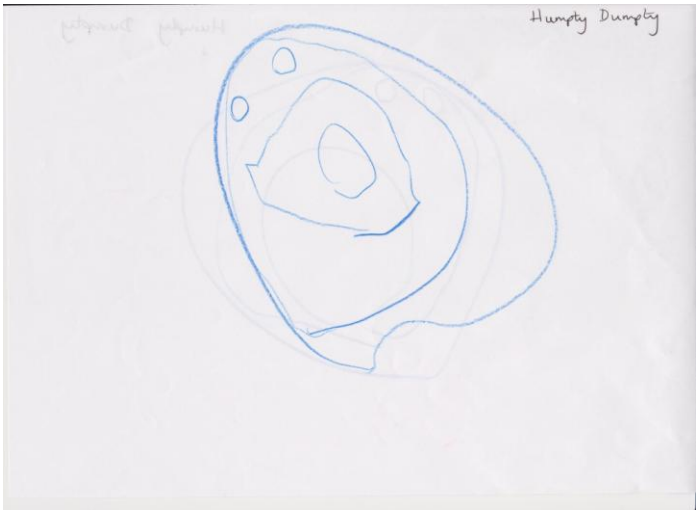
Voices 2

Hello 2

Children's drawings

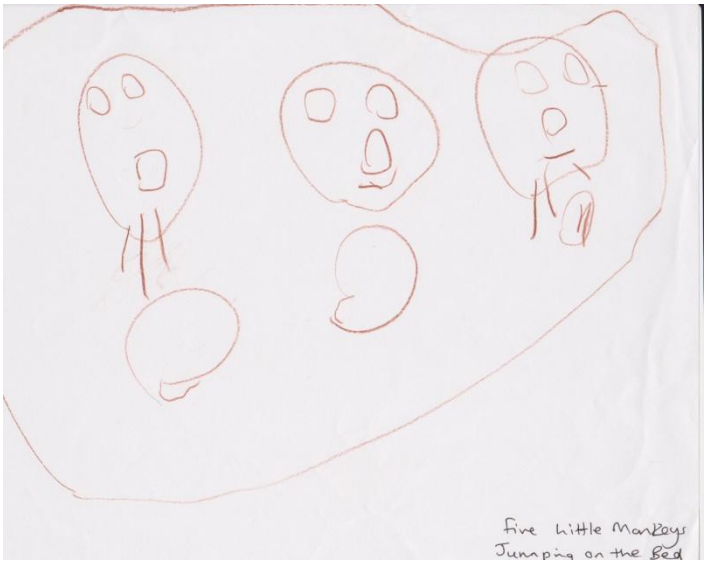
Incey Wincey Spider

Humpty Dumpty



Grand Old Duke of York

Five Little Monkeys Jumping on the Bed



Five Little Monkeys Sitting in a Tree

And the researcher!