Mapping emerging musicality: Exploring the trajectory of musical development in the early years using the Sounds of Intent Framework

by

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Abstract

This mixed-methods study applies the Sounds of Intent in the Early Years framework (SoI-EY) to explore the trajectory of young children's musical development. Musical development is considered as it occurs in relation to children's surrounding environment and social context. Seven hundred and ninety-six naturalistic observations of 44 children engaging in musical activity were captured by video in early years settings by the researcher, and at home by parents. Questionnaires were also employed to gather information on children's musical engagement at home. Video observations (ranging in length from 30 seconds to 5 minutes) were coded according to the SoI-EY framework, surrounding environment and social context. First, quantitative analysis was applied to explore broad patterns across all the data. A nonlinear logistic growth model was used to analyse the trajectory of children's musical development over time. Multiple regression analysis was used to investigate the relationship between children's SoI-EY level of musical development, surrounding environment, and musical activity. Following this, the musical development of three children was explored through longitudinal case studies, with comparisons made in relation to the results of the full data set. Researcher and parent observations, questionnaire data and parent interviews were triangulated and analysed for each case study.

Quantitative results indicate that the trajectory of young children's musical development is non-linear and includes phases of faster and slower growth; individual differences in musical development were also revealed. Results further suggest that children are observed to engage with music at more complex stages of development at home compared to early years settings, when engaging with another rather than when alone, and during singing activity rather than instrumental activity. Results of the qualitative analysis revealed that playfulness, shared musical culture, choice and

repetition encouraged children's musical engagement, particularly as observed at home; this is important in its implication for practice.

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Chapter 1: Introduction

1.1 Motivation for the Study

In 2010 I began working as a Research Officer on the Sounds of Intent project. The Sounds of Intent project arose as a result of the 'PROMISE' report (The 'Provision of Music in Special Education'), which set out the state of music provision in England for children with learning difficulties at the turn of the century (Welch, Ockelford, & Zimmerman, 2001). Results of the study concluded that while music was deemed vital in this context, practice was very varied and a clear understanding of how children with learning difficulties developed musically was lacking (Ockelford, Welch, & Zimmermann, 2002). In response, a team of researchers and practitioners formed the Sounds of Intent project in 2004 (see www.soundsofintent.org) with the aim of comprehensively exploring the musical development of children with learning difficulties in order to inform best practice, provision and policy. One result of the project was the Sounds of Intent framework of musical development (Welch, Ockelford, Carter, Zimmermann, & Himonides, 2009), a model which seeks to explain how children with learning difficulties develop musically.

Subsequently, in 2012, I was part of a small research team which explored whether the Sounds of Intent framework for children and young people with learning difficulties was applicable to 'neurotypically' developing children in the early years (Voyajolu & Ockelford, 2016). The project ran for two years until 2014 and the result was a modified framework relevant to research and practice in the field of early years education and care. A main component of my role throughout the project was to observe children in a nursery and preschool setting in London.

Coincidentally, during this time, I was also seeing the development of my son, Elliot, who was 1-year old when the project began and who had just begun attending

nursery. A particular moment of Elliot's musical engagement struck me, which would become part of my inspiration for undertaking this PhD. Elliot was playing at home with an overturned metal kitchen bowl, which he was using as a drum. He was playing his makeshift drum by alternating his hands and attempting to tap out a repeated rhythm (somewhat unsteadily). At the same time, he was singing/chanting a phrase based on the repetition of a word I understood to be "baboo". He repeated the word getting louder and louder until a final "BAH!", at which time he raised both arms in excitement. Some days after this I arrived to pick him up from nursery. He was seated with his peers at the foot of the teacher, who was singing nursery rhymes and playing a lively syncopated rhythm on a djembe drum, alternating her hands bilaterally. She sang the children's song 'I had a Little Turtle', which has a final verse based on the repetition of the word 'bubble'. The word 'bubble' is sung or chanted and increases in volume and decreases in speed, ending in a final exclaimed 'Pop!'. This is where his 'baboo' song and drumming had come from! While the 'turtle' song has since become a regular part of my repertoire, I was not as familiar with it at the time. Also, while his teachers and carers at nursery told me that Elliot enjoyed music, he was not one to join in actively in group situations. I was struck by the difference of his musical engagement in each setting and by his keen observation and replication of this song at home. This planted the seed to explore children's musical development observed both at home and in early years settings.

Furthermore, while the SoI-EY framework had been applied in the 2012-2014 project to explore children's musical development based on 'snapshot' observations (Voyajolu & Ockelford, 2016) it had not yet been applied systematically to the analysis of individual children's development *over time* in varying contexts. I was inspired by the work of Johanella Tafuri (2008) who undertook a longitudinal study in Italy, observing children from 3 months before birth to 6 years, largely based on singing, though also

involving instruments and dancing, looking at rhythmic abilities as well. Tafuri's (2008) study was important as it observed children longitudinally providing an understanding of musical development *as it occurred*, in relation to surrounding context. The notion of observing children longitudinally, applying the SoI-EY framework to capture children's musical engagement in varying contexts (in the time constraints of a PhD timeline) was exciting. Therefore, I aimed to explore the developmental process, specifically in relation to how the SoI-EY framework represents a child's emerging musicality in varying contexts.

1.2 Aims and Research Questions

Existing literature shows that the early years is a rich period of musical engagement which includes infant vocalisation and communication (Malloch, 1999; Papoušek, 1996), creative engagement with song (Barrett, 2015; Mang, 2005; Sole, 2017), instrumental play (Dansereau, 2015; Young, 2008), infant response to singing (Corbeil, Trehub, & Peretz, 2013; Trehub, 2016) and to tempo (Cirelli & Trehub, 2019; Zentner & Eerola, 2010). As Trehub (2016) maintains, 'infant musicality and its development seem to be as natural and as remarkable as infant language development' (p. 1). As well as this, it has been suggested that young children's musical engagement is highly social (Cirelli et al., 2018), is impacted by the environment in which it develops (Tafuri, 2008; G. Welch, 2006) and may be underestimated depending on the context in which it is observed or tested (Trehub & Gudmundsdottir, 2019).

The Sounds of Intent in the Early Years framework of musical development is a model from which to explore this complex period of musicality (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016). The framework is based on three forms of evidence: zygonic theory, a psychomusicological theory of how one perceives music through a sense of derivation, which stems from imitation and repetition (Ockelford, 2006), the

literature on early childhood musical development and observations of children engaged in musical activity (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016). The first iteration of the SoI-EY framework was based on 125 'snapshot' observations of children from a nursery and preschool in London (Voyajolu & Ockelford, 2016). A developmental path and age-related milestones from those observations were suggested, however, from a relatively small number of observations limited to one setting. Factors likely to promote children's musical engagement were left largely unexplored. This study proposes to address these gaps by, 1) applying the framework to analyse children's trajectory of musical development using a larger data set of observations both from early years settings and at home, as well as following individual children longitudinally and 2) identifying factors pertaining to key adults, activities and the child's environment that may support and promote musical engagement in the early years. This is important in order to evaluate the framework's applicability in capturing children's musical engagement over time, for both research and practice.

Therefore, the aims of the study are:

> Aim 1: To investigate the validity and relevance of the SoI-EY Framework by following individual children's development over time within the context of their natural environments.
>
> Aim 2: To explore whether (and if so, to what extent) children's musical development, as assessed using SoI-EY framework, is age-related.
>
> Aim 3: To explore factors pertaining to the child's environment (including interpersonal relationships with key adults and peers, activities and contextual surroundings) that may most effectively promote musical engagement and development in the early years.

The related research questions are:

Research Question 1 (Aim 1): Are the three domains, four stages and related elements of musical development in the SoI-EY framework both sufficient and necessary to capture a child's evolving musical development within the diversity of their natural environments, and if so, in what ways?

Research Question 2 (Aim 1): How do the stages, in their present or modified form, relate to one another in their representation of a child's evolving musical development?

Research Question 3 (Aim 2): Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of the relationship between these two factors?

Research Question 4 (Aim 3): What impact does the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement and development?

Research Question 5 (Aim 3): Do some activities within the home and settings such as children's centres more effectively promote musical engagement and development than others, and if so which, and in what ways?

1.3 Thesis Structure

This thesis is composed of eight chapters. Following the introduction, Chapter 2 will present a background on Sounds of Intent and Sounds of Intent in the Early Years. The literature on musical development as it relates to stages within the Sounds of Intent in the Early Years framework will be reviewed. Chapter 3 is concerned with the wider

theoretical frameworks which underpin this study and will review sociocultural theories and Froebelian philosophy, as they relate to early childhood musical engagement.

Methods will be presented in Chapter 4, starting with study design, which is based on a mixed-methods approach. Sampling approaches and participants are then discussed. This is followed by a description of materials and instruments used to collect observational, questionnaire and interview data. Details of data collection carried out in early years settings, as well as in children's homes, through participant observation, are then covered; this is followed by ethical considerations and procedures. Chapter 4 concerns data analysis and is structured into four sections. The first section deals with coding of video data, including the analysis of inter-rater reliability. The second and third sections concern quantitative analysis, including both descriptive and inferential statistics, applied to describe the data collected, explore children's trajectory of musical development and investigate the relationship between context and level of musical development. The final section covers case study data and analysis.

Chapter 5 presents the findings of the research from a broad perspective, considering all the observational data collected and coded. First, inter-rater reliability results of the coding analysis are presented, followed by a descriptive summary of the data in relation to for example, the frequency of observations coded. Results which explore the trajectory of children's musical development are then provided. Finally, results are presented which pertain to children's surrounding environment and their observed level of musical development. The chapter concludes with a discussion of all results presented thus far.

The sixth chapter is divided into three sections and presents three longitudinal case studies in succession. A detailed look at each child's musical environment at home is given and discreet observations of musical engagement are explored. Discussions for

each case are relayed comparatively to the results of Chapter 5. A comparative discussion between the three case studies concludes the chapter.

Chapter 7 lays out the final discussion in relation to the study's aims and research questions, considering the findings from both Chapters 5 and 6. Finally, the conclusion of the study is synthesised in Chapter 8, and also includes sections on limitations, contributions and suggestions for further research.

Chapter 2: Literature Review

2.1 Introduction

Many facets of children's early musical engagement and development have been explored in the literature, including the study of foetal responses to sound and music (Granier-Deferre, Bassereau, Ribeiro, Jacquet, & DeCasper, 2011; Kisilevsky, Hains, Jacquet, Granier-Deferre, & Lecanuet, 2004), infant vocal communication and singing development (James, 2002; Mang, 2005; Papoušek, 1996; Papoušek & Papoušek, 1989; Sole, 2017; Tafuri & Villa, 2002; G. Welch, 2006), responses to rhythm and tempo (Cirelli & Trehub, 2019; Cirelli, Trehub, & Trainor, 2018; Hannon & Trehub, 2005; Zentner & Eerola, 2010) rhythmic entrainment and production (Kirschner & Ilari, 2014; Kirschner & Tomasello, 2009), instrumental play (Dansereau, 2015; Young, 2008) and responses to pitch structure and melody (Mehr, Song, & Spelke, 2016; Plantinga & Trainor, 2009; Trehub, 2010). Research spans experiment-based designs, (for example Corrigall & Trainor, 2014) to observational studies of children's musical activity in their everyday lives (Barrett, 2015; Mang, 2005; Papoušek, 1996; Young, 2004, 2008).

The following literature review on young children's musical engagement will be given from the perspective of a psychomusicological theory of musical development entitled the Sounds of Intent in the Early Years framework (SoI-EY). This will set the stage for the framework's application within the current study. Therefore, the literature

review will take the following format. Section 2.2 will review the original Sounds of Intent framework as a basis for understanding it's modification and application to all children in the early years. A review of the evidence within the Sounds of Intent in the Early Years project will follow in section 2.3. The literature on early years musical development as it relates to each phase of the Sounds of Intent in the Early Years framework will be reviewed in Section 2.4.

2.2 The Sounds of Intent Framework of Musical Development

As noted in Section 1.1, the Sounds of Intent project and related SoI framework began with a focus on the musical engagement and development of children and young people with learning difficulties (Vogiatzoglou, Ockelford, Welch, & Himonides, 2011; G. Welch et al., 2009). In order to provide an understanding of how the Sounds of Intent in the Early Years framework (SoI-EY) emerged and was established, a review of the original SoI framework is warranted. It should be stressed that one framework does not replace the other. The two co-exist to be applied in the context which is most suited, always considering the individual child.

The Sounds of Intent framework (Ockelford, 2008; Vogiatzoglou, Ockelford, Welch, & Himonides, 2011; Welch, Ockelford, Carter, Zimmermann, & Himonides, 2009) is built upon three forms of evidence: hundreds of observations of children engaging with music, a review of the research on the musical development of so called 'neurotypical' children (for example (Hargreaves, 1986; Moog, 1968, 1976; Papoušek, 1996; Papoušek & Papoušek, 1989) and 'zygonic theory' (Ockelford, 2006). Briefly, 'zygonic theory' is a psychomusicological theory of how one perceives music through a sense of derivation, which stems from imitation and repetition (Ockelford, 2006). Ockelford (2013) explains,

> Almost without exception mature humans have the capacity to hear sounds and the relationships between them as being derived from one another through imitation; this requires no formal education, and typically occurs non-consciously; we are virtually all intrinsically "musical". (p.29)

The underlying assumption is that this naturally occurring capacity is part of one's developmental path, and this is reflected in the Sounds of Intent framework. The SoI framework will be described briefly here, with a more thorough description reviewed in Section 2.4, in relation to children in the early years.

The Sounds of Intent framework of musical development suggests that children engage with music in three domains. These are, reactive (how children respond to sound and music), proactive (how children create sound and music on their own), and interactive (how children create sound and music in the context of others). Within each domain six levels of musical development cover an inclusively wide spectrum of response and engagement. The framework is applicable to children with profound and multiple difficulties who may demonstrate seemingly no observable response to or intention to create sound (Level 1) to children who demonstrate mature and expressive musical understanding and performance ability (Level 6). Within this spectrum, Level 2 encompasses an emerging awareness of sound and the ability to create and interact with others through sound. Level 3 focuses on the relationship between sonic events. A sonic event is defined as 'the shortest perceived unit of activity present in a given musical context' (Ockelford 2013, p. 134), such as a note in Western musical tradition. Here, sounds are heard as being the same and different and 'when one event is deemed to imitate another, musical structure in its simplest form is created'(Ockelford, 2013, p. 135). The ability to hear and create pattern through repetition (for example through a regular beat)

emerges in Level 3, as well as the ability to imitate the sounds and patterns of others. It is also the intentionality of a child to imitate and repeat here, which is important.

SoI - Level 4, moves on to the growing perception of *groups* of sounds, as well as the relationships between them. Ockelford (2013) writes,

> While individual events may constitute the ultimate building blocks of music, they rarely convey enough information to have distinct and memorable identities, and so usually lack the capacity to function as discrete units of musical meaning in the aesthetic sense. (p.136)

Level 4 encompasses these discrete units of musical meaning, described as 'chunks' of sounds in which distinct musical motifs are recognisable and memorable. Level 5 occurs when one is able to sing or play whole pieces of music with a stable sense of tonality and tempo, processing the underlying pitch and temporal frameworks from the music of their surrounding culture.

The visual representation of the framework is designed as a set of concentric circles divided into three segments, one for each domain (reactive, proactive, interactive). The six levels are presented as headings with Level 1 at the centre, extending outwards towards Level 6 (See Figure 1). Each level heading then contains four labelled segments (A, B, C, D), which are featured in an expanded matrix. These segments (A, B, C, D) are a textual representation of musical engagement that may be observed within the level and domain underneath which they are aligned. Figure 2 displays the segments for Levels 1 and 2.

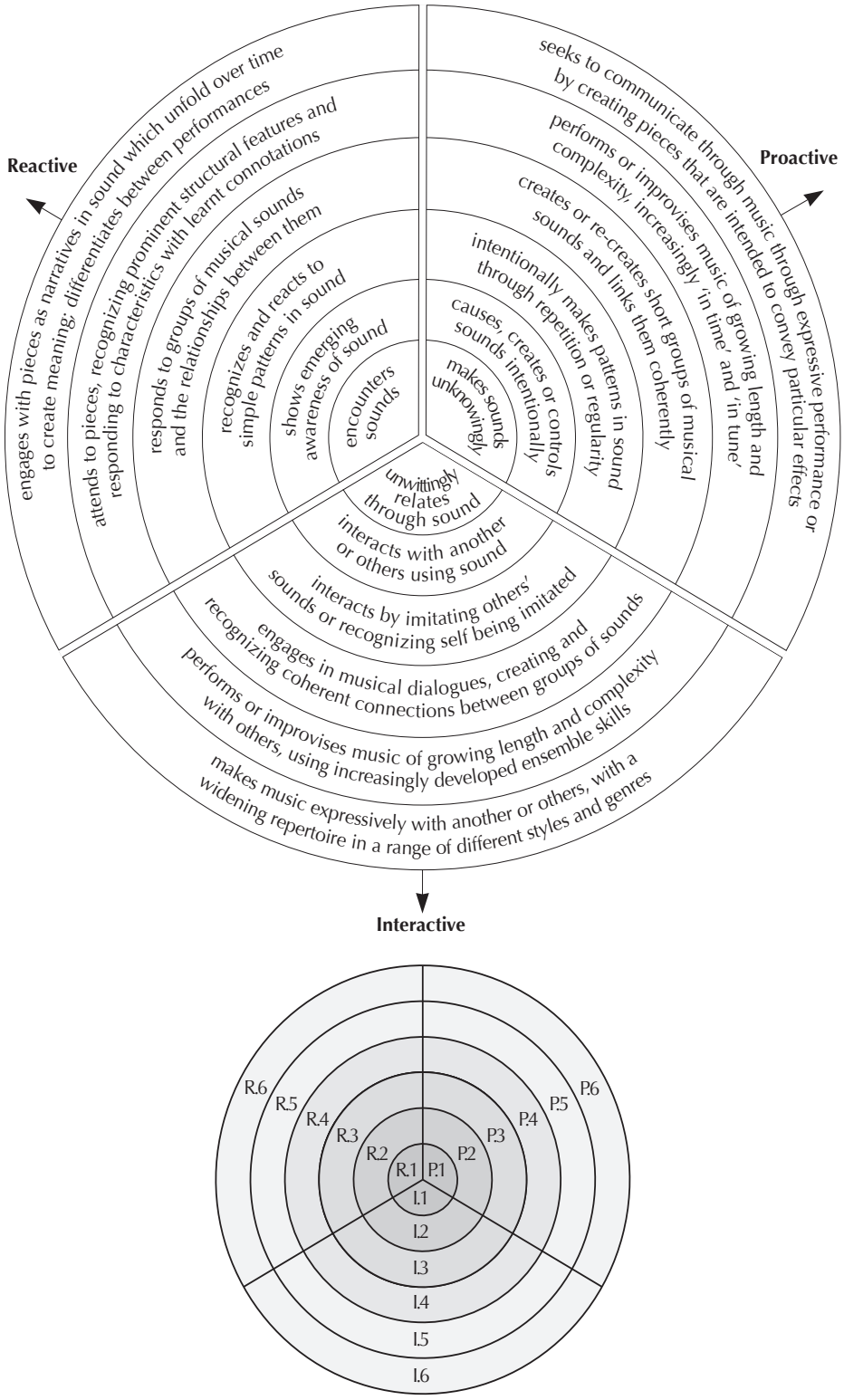


Figure 1 The SoI framework for children and young people with learning difficulties

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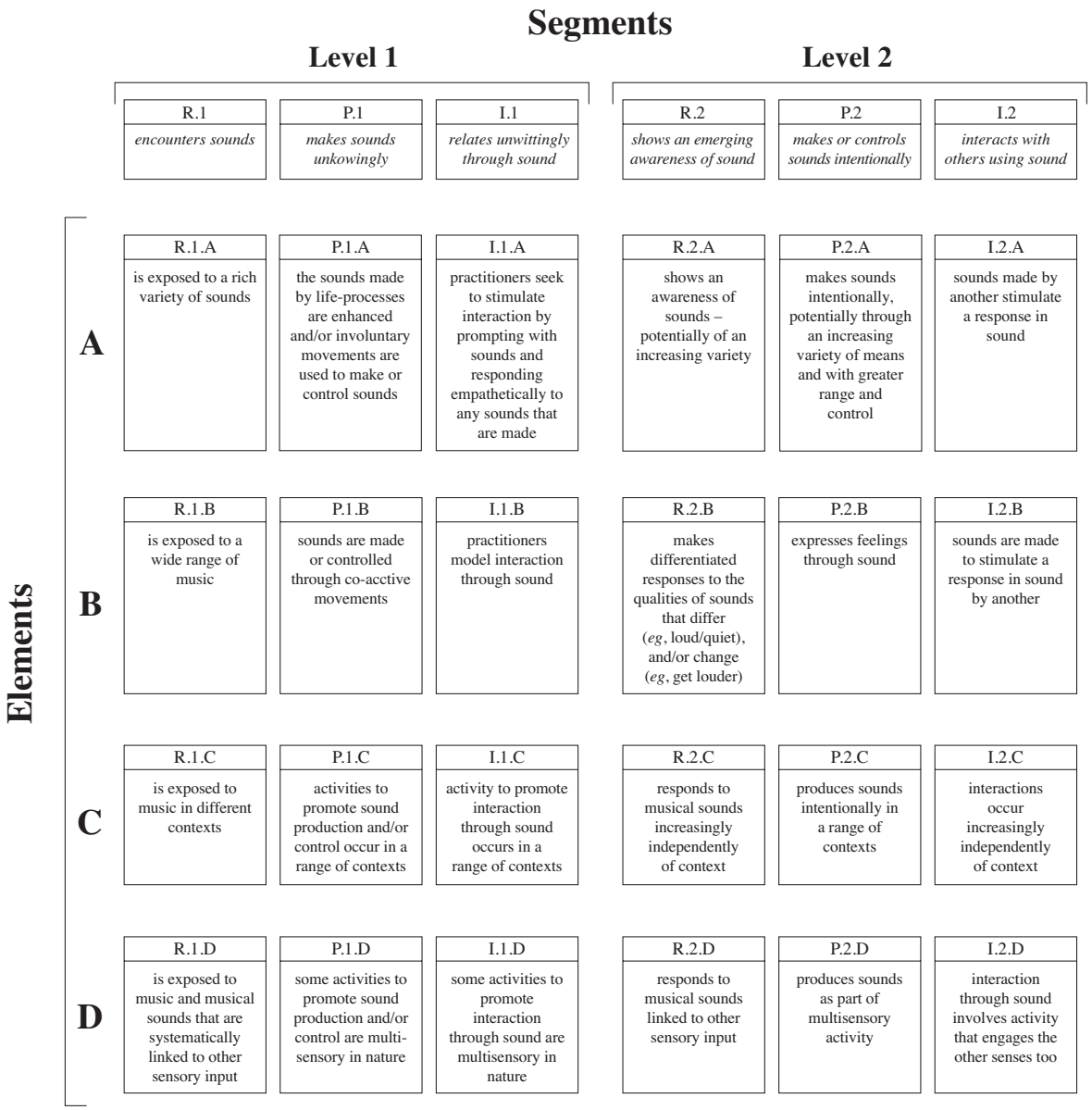


Figure 2 The Sounds of Intent segment matrix for Levels 1 and 2

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The framework's application in the field of music education, music psychology and music therapy continues to expand. It has been used for example, to explore the musical interaction and engagement between pupil and teacher (Ockelford & Matawa, 2010) to map the musical development of children with profound and multiple learning difficulties (PMLD) over a six-month period (Cheng, Ockelford, & Welch, 2009), to explore the trajectory and maintenance of musical engagement for those with neurodegenerative disease, including children and young people with Batten disease (Ockelford, Atkinson, & Herman, 2019) and to evaluate the impact of music therapy and children with Rett Syndrome (Maia & Morgado, 2020). Alongside this has been the development and application of Sounds of Intent in the Early Years, which is grounded in the original Sounds of Intent model.

2.3 Sounds of Intent in the Early Years

In 2012, the Sounds of Intent in the Early Years study was set up to explore whether the SoI framework, informed by the literature on 'neurotypical' musical development, could be applied to all children in the early years, including those within a mainstream context (Voyajolu & Ockelford, 2016). Three main forms of evidence were used: the literature on musical development in the early years (which will be discussed in depth below), zygonic theory, and newly gathered observations of children in the early years engaged in music. These were 'snapshot' observations taken of 50 children, between the ages of 10 weeks to 4 years, within an early childhood setting in London, resulting in 125 moments of musical engagement. Observations were taken during spontaneous musical activity of the children on their own, with peers and adults, as well as in more adult-led structured activities. The result of the study was a modified framework entitled, the Sounds of Intent in the Early Years framework of musical development (SoI-EY) (Voyajolu & Ockelford, 2016).

The combined evidence of literature, zygonic theory, and observation revealed that children in the early years were not seen to engage at SoI Level 1 (no observable response to sound or music) or Level 6 (mature engagement). However, Levels 2, 3, 4 and 5 described musical behaviours that were apparent both in the field and established in the literature (which will be reviewed below). Therefore, while Levels 1 and 6 are alluded to within the SoI-EY framework as reference points, they do not have the prominence seen in the original design. The usability and applicability of the framework to early years education was also considered. In response to feedback from practitioners, the language of the framework was simplified in order to cater to those who would not be trained musicians. Furthermore, the segments (A, B, C, D) originally presented in a separate matrix, were now included in the circular design in order to clarify the connection to the headings under which they were aligned (see Figure 3).

While a review of the literature on early years musical development was undertaken as mentioned above (see Voyajolu & Ockelford, 2016) a more comprehensive and updated review builds upon this and is established here. The following sections will focus on each level of the SoI-EY framework and its relation to the literature. It should be noted that the review has a basis in Western musical tradition, as this is the focus of the current study as well.

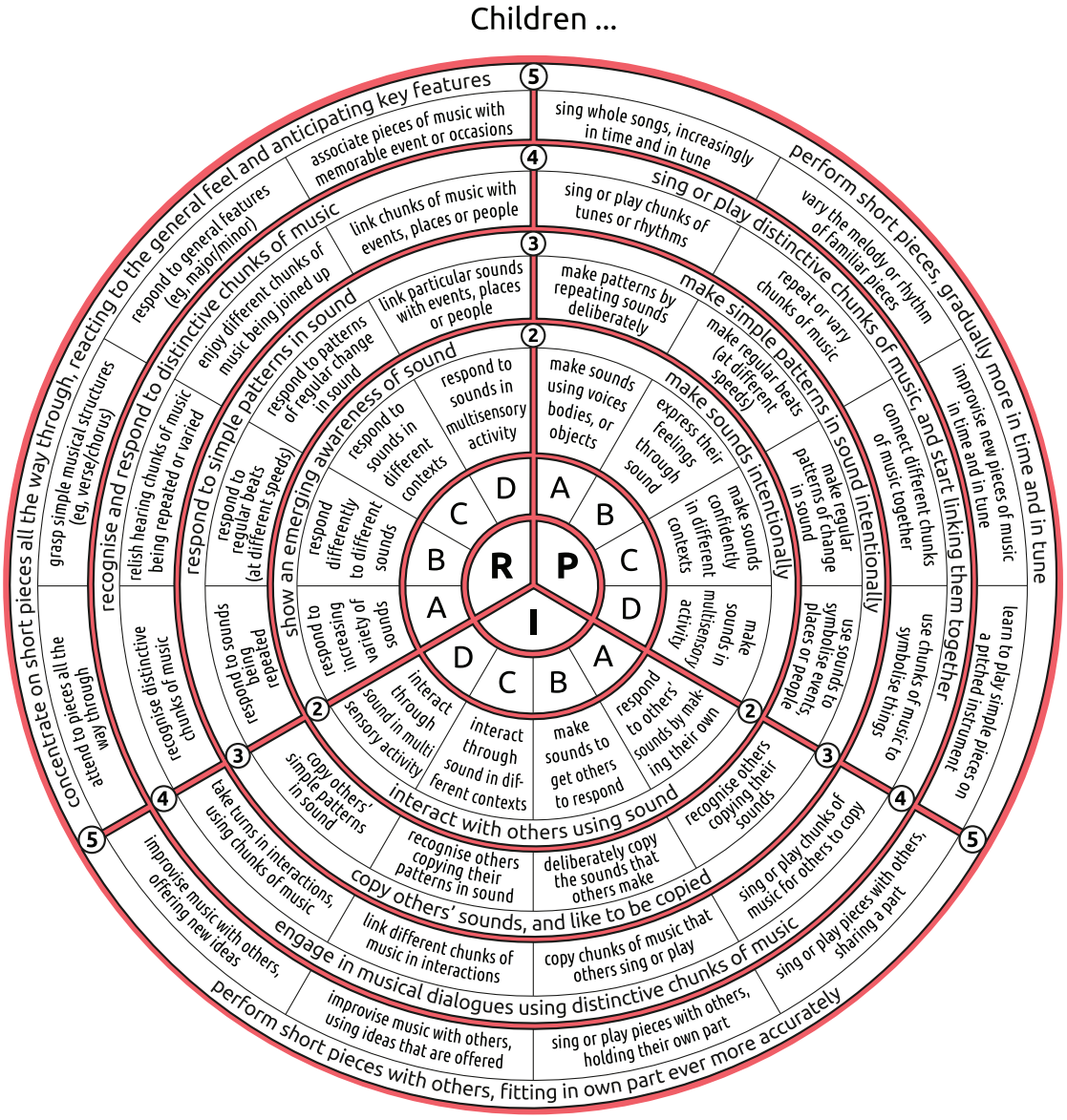


Figure 3 The SoI-EY framework and combined segments presented simultaneously

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2.4 Sounds of Intent in the Early Years Framework and Related Literature

2.4.1 Sounds of Intent Level 2

SoI-EY Level 2 describes that children primarily experience music in a 'sensory way' (Ockelford, 2019). Musical engagement in Level 2 is defined as, a child showing an emerging awareness of sound (reactive), making sounds intentionally (proactive) and interacting with others using sound (interactive).

In relation to zygonic theory, this sensory stage occurs before a child is observed to engage with repetition and imitation of sound. Zygonic theory suggests that 'before children can appreciate or make *imitatively generated patterns* in sound, they need to be able to process or create a range of sonic alternatives' (Ockelford & Voyajolu, 2020, p. 6). Consider then that SoI-EY Level 2 encompasses children's emerging and *intentional* response to sound, multi-sensory exploration of sound, and interaction with others through an increasing variety of sounds (loud, quiet, high, low, mellow, harsh etc.), before purposeful, direct imitation of, or pattern in sound is observed.

This section will now look at what the literature tells us about early engagement with sound and music at this stage. In terms of the reactive domain, research suggests that the auditory system is fully functioning at 26 weeks with foetuses responding internally and externally to sound (Graven & Browne, 2008). Foetal responses, such as changes in heart rate and movement to systematically exposed sounds, such as the mother's voice and native language (Kisilevsky et al., 2009) as well as to music (Kisilevsky et al., 2004) have been documented. It has also been suggested that infants in the period soon after birth respond to sounds they were systematically exposed to in utero. Infants have shown a preference for the mother's voice (DeCasper & Fifer, 1980; DeCasper & Spence, 1986; Lee & Kisilevsky, 2014), a response to maternal speech sounds (DeCasper, Lecanuet, Busnel, Granier-Deferre, & Maugeais, 1994; DeCasper & Spence, 1986), and response

to music (Hepper, 1991; James, 2002; Partanen, Kujala, Tervaniemi, & Huotilainen, 2013; Wilkin, 1995). Furthermore, physiological and behavioural responses of premature infants to music, such as reduced crying and heart rate, may also be relevant here (Garunkstiene, Buinauskiene, Uloziene, & Markuniene, 2014; Keith, Russell, & Weaver, 2009; Tramo et al., 2011).

The notion that infants react differently to different sounds, as well as the multi-sensory aspect of musical engagement, is seen in the literature which documents responses to maternal singing. It has been shown that infants prefer what is termed infant-directed singing, which has qualities such as elevated pitch, slow tempo, slurred articulation of words, positive vocal tone, and enhanced rhythm, as compared to adult directed singing (Corbeil et al., 2013; Trehub, 2016). Trehub (2016) emphasises and summarises the multimodal impact of maternal singing, which as well as the auditory often includes touch, movement and visual cues. Depending on the presentation and songs used (i.e., lullabies or play songs), this may have a soothing or animating effect on the infant (p. 3). Costa-Giomi (2014) also suggests that visual cues observed in the facial expression of the adult singer are an important factor in determining infants' preference for singing over speech. The social component within these responses is apparent here as well.

The literature on pre-canonical vocalisation is also considered within SoI-EY Level 2. Pre-canonical vocalisation includes the ‘earliest non-cry vocalisations and cooing, to vocal expansion and vocal play (Papoušek & Papoušek, 1989). Kuhl and Meltzoff (1996) describe infant cooing, from the age of 1 to 4 months, as the production of ‘quasi-vocalic sounds that resemble vowels’. Expansion, which occurs from 3 to 8 months is, ‘characterized by the occurrence of clear vowels that are fully resonant and a wide variety of new sounds such as yells, screams, whispers’ (Kuhl & Meltzoff, 1996,

p.1). As well as proactive vocalisation, the notion that infants intentionally engage through vocalisation with others has been extensively explored by Stephen Malloch and Colwyn Trevarthen, through their concept of 'communicative musicality' (Malloch, 1999).

The vocal interaction between parent and child in communicative musicality includes musical elements such as the timing of utterances, characteristic of vocalisation such as pitch and timbre, and narrative, in which child and carer 'share a sense of passing in time (Malloch, 1999, p. 29). Malloch (1999) defines communicative musicality as follows:

> The elements of the co-operative and co-dependent communicative interactions between mother and infant combine to make-up what I have called "Communicative Musicality". This term recognises that the mother and her infant are partners in a musical dialogue. Communicative musicality consists of the elements pulse, quality and narrative – those attributes of human communication, which are particularly exploited in music, that allow co-ordinated companionship to arise. (p. 32)

Trevarthen (2007) cites evidence of this early interaction occurring even at an extremely early age between a premature infant and her father. A key aspect of the interaction and one relevant here, is the infant's sense of agency, the intentional use of sound to communicate with another. A father and his 2-months premature baby in hospital were captured on video by Van Rees and De Leeuw. Trevarthen (2007) describes the *intention* in the exchange of coos between the two during 'kangarooing' in which the baby is held skin to skin. The agency of the infant's communication is 'an awareness of the timing of another person's responses and anticipation of an appropriate response in time' (Trevarthen, 2007, p. 95). Again, it is this purposefulness with which sounds are made,

in order to encourage a response, that is relevant to SoI-EY level 2.

As well as vocalisation, infants also explore sound using their bodies and objects, therefore, early play with objects and instruments may be considered here. The literature on children's musical play with instruments often focuses on children of preschool age, for example between the ages of 3 and 4 years (Dansereau, 2015; Young, 2008). Marsh and Young (2016) point out that musical play in early childhood most often constitutes vocal engagement, which may be due to the amount of resources available (or not available) in early years settings. They briefly describe spontaneous play with instruments during the preschool years, where children 'explore sounds and create sequences and patterns of sounds' (p. 468). However, play with physical objects that result in the production of sound, whether everyday objects or instruments, might be an overlooked area of early musical development during infancy and is considered here within the wider literature on object play.

When infants are able to grasp, they may explore objects by physical manipulation, for example, putting objects in their mouth, exploring through touch, turning objects over, waving, and banging (Vig, 2007), which depending on the object at hand, may produce sound. SoI-EY Level 2 stresses the *intention* of a child to produce sound and Vig (2007) describes the 'deliberate' exploration of early object play, which is grounded in an infant's ability to focus their attention, as well as an underlying motivation and persistence. As infants develop motor function, coordination and cognition, their manipulation of objects becomes more differentiated; they may use simultaneous and alternating bilateral movement with their arms and hands, individual fingers, palm and whole hand. This change in exploration may also be dependent on the qualities of the objects being explored (Kimmerle, Ferre, Kotwica, & Michel, 2010; Williams, 2003). This type of object exploration will include the production of sound through play with

everyday objects as well as instruments (if available) which infants will explore on their own as well as with others. For example, 'object-mediated dyadic play' between infant and parent/carer, may include parents/carers scaffolding the infants exploration of the object/toy in new ways (Williams, 2003). Howard and McInnes (2013) provide an overview of children's developmental milestones and their observational examples are relevant here. They describe the play of a 7-month old infant 'enjoying the sound and feel of shredded paper' (p. 70) and later with 'increased control of his movements…he enjoys the noise he can make by banging his hands on the piano keys' (p. 71). Both examples pertain to SoI-EY Level 2, demonstrating multisensory play with sound.

The following parental observation of a child exploring the keyboard from Tafuri's (2008) research on music in the early years also appears to describe a child's early (proactive) musical play with an object. However, over time this playing becomes more methodical and repetitive (which leads to the emergence of SoI-EY Level 3):

> At first, he banged all the keys of the keyboard with his hands, and then at about 12 months he pressed single keys with a finger and later (at about 18 months) he paused to listen to the sound produced by pressing down on each key, and he repeated this over and over. (Tafuri, 2008, p. 105)

The observation illustrates a change in the child's engagement with the instrument over time and the repetition of pressing down each key over and over exemplifies playing with pattern, which moves into the territory of SoI-EY Level 3. The following observation from Voyajolu and Ockelford (2016) also provides an example of exploration with an object to create sound at Level 2, this time supported by an adult within a nursery setting, showcasing interactive engagement:

> An 18-month old boy and two friends supported by an early years practitioner, are playing with some pieces of Lego, exploring the range of sounds that can be

> made by banging them together and on the table (SoI-EY Level 2). The practitioner shows the boy how to produce a rasping noise by rubbing a brick on a baseboard, first by modelling the action for him, and then helping him to do it hand over hand, before he has a go on his own (SoI-EY Level 3). Although he finds the level of coordination required to rub the pieces together difficult to achieve, the boy manages to make some gentle scraping sounds. Picking up two more pieces of Lego the practitioner sets up a regular beat, scraping her block to and fro on a baseboard. The boy tries to emulate her. (p. 104)

In the above example, while the child initially engages by manipulating the object to create sound (SoI-EY Level 2), there is a transition within the same activity in which imitation occurs and in which the imitation of pattern is attempted (playing in a regular beat), which is indicative of SoI-EY Level 3. This observation is also analogous to Ilari's (2016) notion of shared intentionality between adults and children during 'play with tools' (p. 30). She compares this to shared musical instrumental play between young children and peers or adults. It also showcases a transition to imitation and pattern, which is a focus of SoI-EY Level 3.

2.4.2 Sounds of Intent Level 3

Within Sounds of Intent Level 3 children respond to simple patterns in sound (reactive), make simple patterns in sound intentionally (proactive), copy others' sounds and like to be copied (interactive). First, focusing on the reactive domain, elements B and C (see Figure 3) note a response to a regular beat at different speeds (element B) and a response to patterns of regular change in sound (element C). Literature evidencing young children's responses to a regular beat or pulse heard in music is relevant here. For example, it has been suggested that infants between 5 and 24 months of age spontaneously respond to the pulse found in music through movement, more so than they do to infant-

directed speech (Ilari, 2015; Zentner & Eerola, 2010). Here, 'it is the beat, rather than other features of the music, that drives rhythmic engagement to music in infants' (Zentner & Eerola, 2010, p. 5771). Furthermore, Zenter and Eerola (2010) found that infants change movement according to tempo, with faster movement observed to a faster tempo. Although, Eerola et al., (2006) found this not to be the case for preschool children between the ages of 2-4 years. While these studies involved children in an experimental environment, Cirelli and Trehub (2019) systematically observed the movement response of a 19-month old over eight weeks at home. More complex movement corresponded with an increase in age from limb movements, to body twists, to hopping, with the most common movement being head bobbing. They suggest that a familiarity with music as well as high pulse clarity may impact responses. Interestingly, it has also been suggested that tempo and rhythmic engagement are related to positive affect in infants (Cirelli & Trehub, 2019; Zentner & Eerola, 2010). As well as this, research has indicated that while responses may be inherently driven, they may also be influenced by the infants' surrounding culture (Ilari, 2015).

These early responses to a regular beat, as well as response to gradual change (i.e., change in movement in alignment with faster speed), does not yet infer the ability to entrain to an external tempo, which has been shown to develop later in childhood (Kirschner & Tomasello, 2009; Provasi & Bobin-Bègue, 2003) and will be discussed in relation to SoI-EY Level 5.

As well as a response to this regularity in music, children in the early years may exhibit engagement at SoI-EY Level 3 during play with instruments or objects. For example, children may play a simple regular beat on a drum, demonstrating an internalised sense of tempo (before being able to entrain to an external tempo). Provasi and Bobin- Bègue (2003) suggest that for 'children at 2 ½ years a stable internal tempo

exists' (p.230). While the literature on early years musical development mainly centres on vocalisation and singing (discussed below), studies which explore children's instrumental play through observation provide some examples of engagement with pattern and repetition indicative of SoI-EY Level 3. Dansereau (2015) in her exploration of 3 and 4-year old children's musical play with instruments, observed 'musical functional play…marked by repetitive or imitative actions that served to bring enjoyment through physical sensation…incorporating the object's sounds' (p. 36). She provides an example in which a child with jingle bells attached to her ankle, turns in circles and stomps her foot, the repetitive action creating repetition in sound. She stresses the intention of the child to create sound through this form of musical play. Interestingly, the majority of observations within Dansereau's (2015) study incorporated musical functional play, which may suggest a high engagement with repetition and imitation (SoI-EY Level 3) during the preschool years (at least within her sample of observed children).

Marsh and Young (2016) summarise spontaneous play with instruments in the preschool years and describe that 'children commonly strike or tap instruments in an ordered way, making regular rhythmic groupings and extending them into sequences' (p. 468). They note that the musical structure stems from patterns of the child's physical movement and gesture and is also influenced by the instrument being played. In her exploration of children's collaborative instrumental play at 3 and 4 years old, Young (2008) also noted 'a substantial amount of repetitive, steady beat playing' (p.7), as well as imitation between peers, in which children were observed to move in and out of synchronous playing with one another.

Pattern and repetition through vocalisation are also relevant to SoI-EY Level 3. Stages of infant vocalisation, such as reduplicated babble are defined by the repetition of consonant syllable utterances such as "bababa", while variegated babble includes 'strings

of different syllables' (Gerken, 2009, p. 70) and incorporates change in volume, pitch and pitch contours. The two types of babble may occur within the same period (Gerken, 2009). Papoušek (1996) describes stages of vocal play in which infants show a 'persistent motivation to reproduce sounds discovered by chance, and to repeat and modify their vocal products with overt signs of effort, eagerness, and joy' (p. 105). This leads to 'canonical babbling ... characterised by a much more restricted vocal repertoire than the preceding stage of vocal expansion due to the emergence and transitory prevalence of rhythmic syllabic sequences' (p. 105). Sole (2017) in her study on children's bedtime vocalisation and singing, provides a rich description of a child's 'free flowing vocalisation' (p.180) at 18 months. The child's vocalisation incorporated descending and ascending glissandos, sliding up or down between pitches, squeals, alterations between short and long vocalisations, and play with volume, all demonstrating the use of pattern, in particular incorporating gradual change (p. 180). Vocal play with pattern does not necessarily end in infancy however and can be observed during children's play in the preschool years in which rhythmic vocalisation/chant is used to manipulate and play with words, to animate play with objects or to accompany movement (Countryman, Gabriel, & Thompson, 2015; Young, 2004).

As well as repetition and pattern, SoI-EY Level 3 encompasses interactive imitation between a child and their peers or adults. Imitation through vocalisation has been suggested to occur before the age of 5 months for individual pitches (Kessen, Levine, & Wendrich, 1979), pitch contours (Kuhl & Meltzoff, 1982) and vowel-like harmonic resonances (Legerstee, 1990). Infants between 12 and 20 weeks of age have been shown to match the vowels presented to them by adults in an experimental setting (Kuhl & Meltzoff, 1996). Imitation between mothers and infants during the pre-canonical phase of vocalisation at 2, 4 and 5 months of age, was explored by Papoušek and

Papoušek (1989), who found that matching between mother and infant occurred in about half of the non-cry vocalisations in the study (p. 148). The reciprocal nature of exchanges between mother and infant was stressed and the multimodality of mothers' interactions, which included both auditory and visual elements, for example through facial expression, was also apparent. However, Papoušek and Papoušek (1989) acknowledged that 'whether and to what degree infants contribute to the incidence of matching by true imitation of sound features in maternal utterances cannot be answered from interactional data' (p. 149). However, they found that infants positive affect indicated 'intentional control but also intrinsic motivation to imitate' (p. 150). They suggest that the interactive nature of vocal exchanges observed was clear, as was the adult's role in scaffolding vocalisation and imitation.

Observed instances of imitation between caregiver and infant in Tafuri's (2008) longitudinal study on early years musical development also cites observational examples of early vocal interaction and imitation. And finally, Masur and Olsen (2008) explored imitation between mothers and infants (aged between 1-2 years) during naturally occurring observations in the home environment. Alongside imitation, the authors noted the infant's *recognition* of being imitated, which is a key descriptor of SoI-EY Level 3 as well. The notion that children recognise being imitated, enjoy both being imitated and imitating others (as has also been suggested in the literature) are all aspects of SoI-EY Level 3. The next section moves on to a thorough description of SoI-EY Level 4, as related to the literature.

2.4.3 Sounds of Intent Level 4

Within Sounds of Intent Level 4 children recognise and respond to distinctive chunks of music (reactive), sing or play distinctive chunks of music and start linking them together (proactive), and engage in musical dialogues using distinctive chunks of music

(interactive). SoI-EY Level 4 is based on *groups* of sounds, in which children process and remember musical motifs and phrases which have distinct identities in and of themselves and which can be repeated, varied and combined to form a greater whole. However, children's creations at this stage are not yet consistently in time or in tune.

In terms of responses, infants at 4 and 5 months have shown a sensitivity to phrase structure in music through a preference to listen to pieces which incorporate pauses between phrases (Krumhansl & Jusczyk, 1990). Dowling (2002) suggests it is both the 'pitch contour and note duration which are important determinants of the infants' response to structural pauses' (p. 488). Reigado et al. (2011) also found that when sung to by carers, infants' vocalised responses occurred at specific moments within songs, evidencing the perception of 'musical segments' or 'musical boundaries' (p. 249). Furthermore, young children may respond to distinct motifs from songs that they become familiar with, for example theme tunes to their favourite programmes. Dowling (2002) notes that the retention of these melodies as 'stable entities' (p. 489) in the child's environment occurs around the second year and uses the following example observed in his daughter:

> My older daughter at 18 months would run to the TV set when she heard the "Sesame Street" theme come on, but not for other tunes. At 20 months, after a week or so of going around the house singing "uh-oh" rather loudly to a descending minor third, she responded with the spoken label "uh-oh" when I played that pattern on the piano. (p. 489)

Note that the above observation also points to the concept of musical phrases being linked with events, people or places within the SoI-EY framework of reactive Level 4 (see Figure 3).

A review of the literature on children's singing engagement and development documents a period in which short, distinct melodic phrases are said to be followed by the singing of longer structures, created through repetition and variation (Hargreaves, 1986; G. Welch, 2006). Papoušek (1996) suggests a stage which follows canonical babbling; this stage constitutes 'short well-structured melodies in which familiar musical elements are creatively combined into new patterns with distinct rhythm and accent' (Papoušek, 1996, p. 106). Dowling (2002) describes that around 2 years of age, in children's spontaneous song,

> the same melodic and rhythmic contour is repeated at different pitch levels, usually with different intervals between notes. The rhythm of these phrases is coherent, with rhythms often those of speech patterns. Accents within phrases and the emitting of the phrases themselves is determined by a regular beat pattern. (p. 489)

Young's (2004) observations of children's spontaneous songs in a day-care included 'free-flow vocalising' in which,

> children often sung long lines of rhythmically free-flowing melody vocalised on open vowel sounds or repeated phonemes. Sometimes this settled into short phrases of melody which were repeated. Occasionally when the free-flowing melody settled on a melodic idea, it was recognisable as a phrase from a known song. (p. 66)

Koops (2014), in her exploration of children's music making in the car between the ages of 10 months to 4 ½ years described singing which she termed 'little songs' (p. 57) more often observed in the younger children in the study (although still heard from 3 and 4 year olds). The songs were often improvised, introspective in nature and usually without words. Finally, Sole (2017) in her research on the private and spontaneous singing of

children from the ages of 18 months to 35 months at bedtime, included observations of children's improvised songs based on repetition and variation of motifs, structured within an introduction of the motif, development and resolution (p. 187); known songs were also used to experiment and play with.

While the above descriptions have a main focus on repetition and variation, Dowling (2002) notes another phase of spontaneous singing in which pitch is 'locally stable within phrases' and in which different identifiable phrases are combined to represent a 'coherent song' (p. 489), aligning with SoI-EY Level 4 in which children 'connect different chunks of music together'. This is in line with Moog's (1976) 'potpourri' songs of children observed around the age of 3 to 4 years old in which spontaneous singing consists 'partly of snatches of songs which they know, or new versions of these' (p. 44).

Such songs have been described elsewhere in the literature for example, Mang (2005) defined children's 'self-generated songs' in which 'key features of a learned song, such as repeated lyrics or melodic motif, are often reconfigured and integrated into another song' (p. 3). Young (2004) termed such songs 'reworking of known songs'(p.66), and described,

> From my observations I noted that children rarely sung the songs in their entirety, but selected portions which they had remembered. Sometimes they sung the original words, but more often they altered the words to suit a current context promoted by equipment, a movement activity or a social situation. (p. 66)

Similar songs were also observed in Whiteman's (2001) longitudinal study which followed children's spontaneous singing over a period of three years. He also observed fully improvised songs from children as well as the singing of standard songs.

Within this same period of motif, the literature often cites observations of

children's emerging ability to sing whole songs approximately in time and in tune. Mang (2005) observed that from the ages of 4-5 years, while "potpourri" songs were still present, children displayed an increase in singing learned songs. In these learned songs the 'melodic and rhythmic patterns were sung mostly correctly. Although children demonstrated a growing sense of tonality at the beginning of a song, they frequently moved though several modifications within a song'(Mang, 2005). Sole (2017) also noted children in her study as young as 2 years old, beginning to show the ability to sing through whole songs utilising lyrics and 'a notable sense of steady tempo' (p. 181). Interestingly, Sole (2017) found rhythmic abilities superseding ability to perform with accurate pitch. Young (2004) also found that children aged 2 and 3 years were observed to sing songs in their entirety. The implication in these descriptions suggest a move from the use of motif to the emergence of singing whole songs in time and in tune, reminiscent of SoI-EY Level 5.

2.4.4 Sounds of Intent Level 5

A move from song fragments (SoI-EY level 4) towards whole songs, sung or played with a beginning grasp of a tonal and temporal framework, suggests a transition from SoI-EY level 4 to 5. SoI-EY Level 5 is defined as, children concentrating on short pieces all the way through, reacting to the general feel and anticipation of key features (reactive), performing short pieces, gradually more in time and in tune (proactive) and performing short pieces with others, fitting in their own part ever more accurately (interactive).

SoI-EY Level 5 states that children 'sing whole songs, *increasingly* in time and in tune', with the implication that children at this level show an emerging sense of tonality and tempo, which progressively becomes more stable. The age at which children demonstrate the ability to sing whole songs in time and in tune has been shown to vary

and may depend on context and opportunity. Overall, the literature suggests that for many children (in terms of Western musical culture) during the end of the preschool years, around 5 years of age, this ability emerges or is established. For example, in terms of singing a whole song, Dowling (2002) notes that 4-year old children can maintain a stable scale pattern within a phrase but when moving on to the next phrase within a song may slip to a new key. He suggests that the stability of a tonal centre may occur around 5 years of age and describes that, 'through the preschool years, the use of more or less stable tonalities for songs comes to be established' (Dowling, 2002, p. 489). Welch (2006) suggests that by the time children begin school they enter with a 'diverse range of singing ability' (p. 10). Reviewing the literature on singing development from infancy he describes,

> Some children already will be extremely competent performers of complete songs from the experienced maternal culture (both words and music), whilst others will be less advanced and will be in one of the "earlier phases" of singing development. This does not mean that the latter group of "developing" singers will not gain singing mastery, particularly if they are provided with an appropriately nurturing environment in which singing tasks are designed to match, then to extend, current vocal behaviours. (p. 13)

Further studies have noted the influence of a child's surrounding environment on musical development, as well as the context in which the child is observed, as having an impact on the ability recorded. For example, Trehub and Gudmonsdottir (2019) suggest that a proportion of the literature on young children's singing development underestimates their abilities, which may exhibit a more optimal level of engagement in the comfort of their own home, rather than in an educational setting in which they are observed or tested. The age at which children sing in tune has been shown to appear earlier than typically

indicated dependent on the richness of the musical environment they are exposed to, for example, by Johanella Tafuri (2008) in her longitudinal study of children's musical development. Observations of children demonstrating levels of musical engagement at a younger age than usually defined was also encountered in the first phase of the Sounds of Intent in the Early Years project (Voyajolu & Ockelford, 2016).

Furthermore, it may be that children are internally processing the underpinning framework of tonality before they are able to demonstrate this behaviourally. Corrigall and Trainor (2014) found that a 'primitive representation of key membership and harmonic structure' (p. 157) was detected for children at age 4 using electroencephalography (EEG), which was not evidenced behaviourally. However, by 5 years, children demonstrated 'a fairly robust and sophisticated understanding of key membership' in both EEG and behavioural conditions' (p. 157). They state, 'overall, our findings suggest that there is a long developmental trajectory for enculturation to Western pitch structure, and that children may have implicit knowledge of this structure long before they can express their knowledge behaviourally' (Corrigall & Trainor, 2014, p. 157).

The notion of an increasing awareness in the underlying perception of 'frameworks' also applies to the ability to synchronise with or entrain to an external tempo. Provasi and Bobin-Bègue (2003) demonstrated that children from 2 ½ years exhibited a stable *internal* tempo through tapping, but that the ability to match external tempo occurred around the age of 4. However, Kirschner & Tomasello (2009) found that children as young as 2 ½ years were able to entrain with higher accuracy in a social, playful context rather than in an experimental situation, which used pre-recorded beats or a machine that imitated drum playing. Furthermore, participants in all age groups (2.5, 3.5, 4.5) for the Kirschner and Tomasello (2009) study were better able to entrain to the

external tempo in the social condition. This hints towards the influence of context and scaffolding on a child's observed level of musical engagement. As with singing development, it also suggests individual variation in the developmental trajectory.

While the above has focused on singing development and the internal processing of frameworks, SoI-EY Level 5 also includes the emerging ability to 'learn to play simple pieces on a pitched instrument' (segment D). McPherson, Davidson and Evans (2016), note that the age a child begins to learn an instrument may align with physical development as well as the maturation of attention span. They summarise that children may begin to learn the keyboard around 2-3 years of age, stringed instruments around the age of 3 (within the Suzuki method) and instruments such as brass and woodwind, which require more physical strength around 6 or 7 years (p. 402). All of these are within the range of early childhood. The authors note that whether children continue to engage with instruments is dependent on many factors including external motivation (from parents, teachers, peers) and internal motivation, and the level of enjoyment and development of self-regulation, for example during practice (p. 414). While the focus is on a more structured learning approach, the authors note the emphasis of play and exploration in learning an instrument during early childhood (McPherson et al., 2016). Furthermore, and important to mention here, is the literature which demonstrates that children in the early years with a visual impairment (with and without additional learning difficulties) have shown the ability and motivation to learn to play an instrument by ear (Matawa, 2009; Ockelford & Matawa, 2010; Pring & Ockelford, 2005).

In summary, the key literature reviewed demonstrates that young children engage with music in ways that align with the Sounds of Intent Early Years framework of musical development. Namely, through an intentional manipulation of sound and its variety (Level 2), through pattern, imitation and repetition (Level 3), through 'chunks' or motifs

(Level 4) and through the progressive mastery of underlying pitch and tonal frameworks (Level 5). While the levels of musical development are presented in a linear fashion for descriptive purposes here, it is not being suggested that the process of development occurs in such a clear and concise manner. For example, exploration of the musical developmental path using the SoI-EY framework suggests that the relationship between different aspects of engagement are fuzzy and layered, and that levels may overlap, sometimes even within a single observed moment (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016)

The literature also stresses that while age related milestones are suggested, this may be influenced by the child's surrounding environment and culture, the opportunities available, and by the social context in which musical engagement takes place. Indeed, Sounds of Intent in the Early Years (and Sounds of Intent) has been used to frame a child's development within the social and cultural context in which it occurs (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016). The current thesis is influenced by socio-cultural theories of development. Therefore, the following chapter looks at socio-cultural theory within musical development and as it applies to the SoI-EY framework.

Chapter 3: Theoretical Framework

3.1 Introduction

This study is underpinned by socio-cultural theories of development such as those by Lev Vygotsky and Barbara Rogoff, and by principles of early childhood education pioneered by Fredrich Froebel. This chapter looks at these theories and principles as they apply to musical development and the SoI-EY framework.

3.2 Sociocultural Theories of Development

Hargreaves and Lamont (Hargreaves & Lamont, 2017) provide a comprehensive review of sociocultural approaches in relation to the literature on musical development, which frame a child's development within the social and cultural contexts in which they occur. The authors note Lev Vygotsky's theories, in which 'social relationships form the basis of the development of thought itself' (Hargreaves & Lamont, 2017) and in which children learn from others including teachers and peers, through co-operative interaction. They note the important implications this has in terms of a child's musical engagement, which often occurs in the context of others (p.108). In considering early childhood in particular, Vygotsky acknowledged that a great deal of learning occurs before a child begins school. He wrote,

> Learning and development are not encountered for the first time at school, but are in fact connected with one another from the first day of a child's life…We have to first of all understand the relationship between learning and development in general, and then the specific peculiarities of this relationship at school age. (Vygotsky, 2017, p. 365)

Hargreaves and Lamont (2017) point out the influence which Vygotsky's concept of the Zone of Proximal Development (ZPD) has had on understanding children's development, including musical development, which will be discussed below.

3.2.1 Zone of Proximal Development

Vygotsky's Zone of Proximal Development (ZPD) defines two observed levels, a child's 'level of actual development…the level of development of the child's psychological functions formed by definite developmental cycles already taking place' (Vygotsky, 2017, p. 365) and the level the child is able to achieve under guidance of another. Vygotsky (2017) writes,

> With the help of imitation in a collective sphere, under the guidance of adults, a child is able to do much more and to do it with understanding and independently. The difference between the level at which it solves a problem under guidance, with the help of adults, and the level at which it acts on its own defines the zone of proximal development…What the child can do today with the help of adults, it will be able to carry out tomorrow on its own. In this way the zone of proximal development will help us to define tomorrow's achievements and the dynamics of the child's development, taking into account not only what it has already mastered, but also its process of growth. (p. 366)

Barrs (2017) points to the importance of imitation within Vygotsky's concept of the ZPD, as written in the above passage. Imitation plays a key role in the literature on children's musical development as summarised in Section 2.4, as well as in the SoI-EY framework.

Studies specifically relating early years musical development to Vygotsky's ZPD include Whiteman's (2001) three-year longitudinal study of eight pre-school children's spontaneous song, observed during free play within a day-care setting. The influence of peers as the 'knowledgeable other' were considered on children's singing. For example, children provided musical material to be emulated by their peers during spontaneous singing either intentionally or unintentionally. Other concepts within the ZPD noted by Whiteman (2001) to occur between children included modelling (for example through

call and response), delayed imitation (copying something which had been heard earlier), requesting peers to sing, correcting peers singing of known songs and peers acting as practice partners.

Vygotsky's ZPD in the context of a child's development as viewed through the SoI-EY framework was also discussed in Ockelford and Voyajolu (2020; 2016). For example, a girl in her preschool years, engaged at SoI-EY Level 5 when observed to sing in an adult-led group with her peers. When observed on her own, engagement occurred predominantly at SoI-EY Level 4 (singing fragments of songs). Her ZPD was described as lying between Sounds of Intent Level 4 (proactive) and Sounds of Intent Level 5 (interactive).

Another key concept explored in relation to musical engagement in the early years and Vygotskian theory includes the inter-psychic function and the intra-psychic function. Vygotsky (2017) writes,

> Every higher psychic function in a child's development makes its appearance twice – first, as a collective, social activity, i.e., as an inter-psychic function; secondly, as an individual activity, as the inner ability of the child to think, as an intra-psychic function. (p. 378)

The process of the move from the interpsychological to the intrapsychological has been explored within the literature on musical development. DeVries (2005) explored the concept of scaffolding on the informal interactions of vocal improvisation and song acquisition between himself and his son (from the age of 24 to 36 months), with a focus on the process of development from the interpsychological to the intrapsychological. Through scaffolding, his son internalised new skills and applied them without his father's help. These skills included the incorporation of expanded intervals and melodic patterns in improvised singing, and improved pitch accuracy (p. 309). Adachi (1995) also

described the process of transmitting musical skills from the interpsychological to the intrapsychological in children's singing. She stressed that for young children a song is inherently linked with the social context in which it has been learned, so that when it is recreated independently, the memory of the social context and activity is present. She writes,

> The adults transmission of musical songs does not automatically lead to the child's internalisation of them…children do not learn cultural signs as separate entities from the social interaction, but learn them as a part of the social process. The process of internalising cultural signs inevitably involves the process of internalising the social process in which these signs are originally introduced to children. (p. 29)

The current study continues to explore early years musical development guided by Vygotskian theory, exploring a child's musical development as it relates to the social context in which it occurs. It also draws on theories of development by Barbara Rogoff (2003), in particular taking into account her theory of guided participation, which will be explored in the section below.

3.2.2 Guided Participation

Barbara Rogoff (2003) noted that Vygotsky's Zone of Proximal Development was particularly focused on instructional interaction, and did not fully consider the *unintentional* instructional experiences found in daily interactions. Her concept of guided participation widens the view of the ZPD. Rogoff et al. (2018) write,

> The concept of guided participation calls attention to the mutually active roles of children and their social worlds. Children actively participate in shared activity and so does their social world, in a variety of ways that are all forms of guided participation. For example, guided participation includes engaging together

> explicitly or tacitly in social interaction - copresent or distant in time or place – as well as engaging with the practices and institutions of prior generations. (p.1010)

Here, the child is an active participant within their learning. Children's observation and participation, the initiative they take in observing and becoming involved in the activities surrounding them, play a part in their development. Rogoff (2003) defines two basic processes within guided participation, and these are mutual structuring of participation and mutual bridging of meanings (p. 285). Mutual structuring of participation, includes 'structuring children's opportunities to participate' (p. 287), in which,

> Caregivers, community practices and institutions, and children's own choices mutually determine the situations in which children are present and have opportunities to learn…This form of structuring of children's lives is central to their opportunities to observe and participate. Structuring of children's participation occurs as they choose to 'or not choose to) watch TV, do chores, or eavesdrop on their parents…Children's active monitoring of events around them make clear the importance of the choice of events they are allowed or required to be around. (p. 287)

Within mutual structuring of participation Rogoff (2003) also describes structuring which occurs during moments of direct interaction. Parents and children manipulate aspects of the activities and interactions in which they engage with one another, for example, adjusting 'prompts and assistance according to the children's development' (p. 291). This closely aligns with an example of singing interaction noted by Trehub and Gudmondsdottir (2015) between mothers and their children, in which musical prompts are adjusted as the child's ability grows. They explain,

> The earliest duets take the form of the mother pausing at the end of each line of a highly familiar song so that the toddler can fill the gap with the sound resembling

> the missing "word" …. The duets, which are highly energising for mother and infant, become increasingly frequent, extending to other songs. The gaps to be filled become progressively larger, eventually leading to simultaneous singing of entire songs. Note that there is no direction here, all the interaction takes place non-verbally and within the music, using the familiarity of the songs inherent structure. (p.461)

Rogoff (2003) also highlights children's learning through traditions of narrative and storytelling in communities as well as children's learning through engagement with play (p.295). Here she gives credit to the importance of Lev Vygotsky's work, in which play provides a context for a child to demonstrate themselves at their optimal level of development.

It is within the intricacies of shared endeavours that Rogoff's mutual bridging of meanings takes place. Rogoff (2003) writes,

> Children and their companions support shared endeavours by attempting to bridge their different perspectives using culturally available tools such as words and gestures as well as referencing each other's actions and reactions. Mutual understanding occurs *between* people in interaction, it cannot be attributed to one person or another. (p 285)

Within this, Rogoff (2003) describes that infants seek information on social interaction, for example, from non-verbal cues given by caregivers such as pointing and gaze as well as through expression. She discusses social referencing, in which children seek information in how to interpret ambiguous situations from the expressions of others – including facial expression, gesture and qualities of the voice such as intonation contours, timing and emotional tone (p 286.) This relates to the literature reviewed in section 2.4, which describes the multimodal aspects observed in carers' infant-directed singing. Ilari

(2016) also describes social referencing within musical behaviours in that, 'infants and young children learn from watching their parents engage in new repertoires within different contexts and with different people and instruments in both educational and community settings' (p. 38). As Rogoff (2003) notes, the concepts within guided participation are basic processes which have been observed globally, however, mutual structuring of participation and mutual bridging of meaning will appear differently and have unique characteristics depending on the community in which they are observed (p. 299).

This thesis will consider children's musical engagement as related to its wider context, exploring both tacit and explicit interactions. As well as drawing on sociocultural theory, the study is also underpinned by the principles of Fredrich Froebel. The following section, moves on to explore Froebelian theory, which has had a great influence on early years education (Bruce, 2019).

3.3 Froebelian Theory

The 19th Century educator, Fredrich Froebel, is considered a pioneer in early years education, with his theories and principles still considered relevant in current practice and research (Bruce, 2012a, 2019). This study, as well as being underpinned through a socio-cultural perspective, also draws on Froebelian philosophy and principles.

Literature highlights the importance which Froebel placed on music, particularly singing, in the education and care of infants (Baker, 2012; Elfer & Powell, 2019; Hargreaves, 2019; Ouvry, 2012; Powell & Goouch, 2019). The intention behind Froebel's collection of *Mother Songs*, which included songs, finger rhymes and games to encourage singing between carer and child, has been linked to current research which emphasises mother and child interaction and infant responses to the mother's voice (Ouvry, 2012). Furthermore, Powell and Goouch (2019) write that Froebel 'believed that songs and the

closeness of singing would help adults and babies to make intimate, emotional connections; and that babies responses within these singing encounters would convey their interests to those caring for them' (p. 282). They align these beliefs with Malloch and Trevarthen's work on communicative musicality (Powell & Goouch, 2019). Moreover, with a focus on singing between family and infant at home, Baker (2012) emphasises that Froebel's mother songs placed importance on learning through the senses: that a child's development is supported through the multisensory experience of singing. Indeed, since Baker's (2012) writing, the multimodality apparent in singing between carer and child, and in the wider musical experiences of early childhood, continues to be established (Costa-Giomi, 2014; Trehub, 2016, 2019). Finally, Elfer and Powell (2019) as well as Hargreaves (2019) have articulated Froebel's belief that music supports the wider development of children including socio-emotional, physical, spiritual, and cognitive development. All in all, this fundamental belief that music is an integral and vital element in the lives, education and care of children in the early years, drives the current thesis as well.

The importance of play in Froebel's philosophy of early childhood education and care is also relevant here. Bruce (2012b) has noted that Froebel preceded Vygotsky in the notion of play as 'the highest form of learning' (p. 13). Bruce (2015) discusses the contribution which Froebel made to play in early childhood teaching and learning and reviews key elements of play. These elements include an emphasis on process, choice and intrinsic motivation, a combination of both solitary play and play with others, a child's control during play (i.e., not bound by external rules), the balance between child-initiated and adult-initiated play (highlighting the sensitivity needed by adults), the concentration evident in free-flow play, play as a space for children to practice their learning and skills, and play as an 'integrating mechanism that allows flexible, adaptive,

imaginative, innovative behaviour' (p. 61). Koutsoupidou (2020) explores children's musical play in early childhood education in relation to Froebelian theory, focusing on children aged 4 and 5 in early years education in Greece. She describes that Froebel's theory of play 'promotes free self-activity, self-control, adaptivity and experimentation' (p. 88). Her findings showed that there were differences between the perceptions of musical play between adult and child, with implications that adults take on a less directive role and become partners in play with the children they care for. In relation to Vygotsky's Zone of Proximal Development, she suggests that how adults actively take part in the play process to support the development of children is key. She writes, 'In children's own worlds, musical play is constructed in a much freer way, adults and children become co-players, and tools and materials are available unconditionally. Teachers act as facilitators to children's efforts to experiment and discover the world' (p. 97). Play and in particular, musical play, both solitary and collaborative, is a principal element in the narrative case studies of musical development in this thesis. Furthermore, Sounds of Intent in the Early Years acknowledges that musical engagement (including musical play) may be personal as well as collective, as exemplified in the domains of reactive, proactive and interactive.

The Froebelian principle in the 'recognition of the uniqueness of each child's capacity and potential' (Weston, 2002, p. 115) has a strong resonance with Sounds of Intent in the Early Years. Bruce (2015), writes,

> The idea of starting with what children can do, rather than what they cannot do, is common to Froebel…Froebel's belief in this principle is encapsulated in one of his most famous remarks: 'Begin where the learner is'. For Froebel, play alerts the adult to what the child is able to do and what is needed in order both to support and, very importantly, to extend learning at that stage. (p. 34)

The SoI-EY framework allows one to observe and understand where children are in their stage of musical engagement, to see what children *can* do and work from there. This study's aim to understand the emerging musical development of children over time, will provide further understanding of where children are in their musical development (in relation to the SoI-EY framework) focusing on the strengths of the child. As well as this, Froebel's principle of 'a recognition of the integrity of childhood in its own right' (Weston, 2002, p. 115) is also relevant to this thesis and to Sounds of Intent in the Early Years. This study aims to further understand the rich period of musical engagement which occurs during early childhood through the use of the SoI-EY framework; it does not conceive children's musical engagement as an imperfect model of adult musicianship but acknowledges, and celebrates, each phase of musical engagement in the early years in its own right. Furthermore, while the current study looks at broad patterns of musical development, it makes sure not to lose sight of individual differences by honing in on unique narratives.

In order to understand where children are in terms of their development, observation is key, and Froebel's notion that 'skilled and informed observation of children underpins effective teaching and learning' (Weston, 2002, p. 115) is relevant here. Naturalistic observation of children is at the heart of the current study. These observations are used to explore the applicability of the SoI-EY framework in children's musical engagement over time and in turn, inform the understanding of children's musical development. Sounds of Intent in the Early Years is designed to provide practitioners as well as parents a tool with which to observe children with musical insight. Indeed, the Froebelian principle which recognises the child 'as part of the community' and 'that parents and educators work in harmony and partnership' (Weston, 2002, p. 115) applies here. The framework's application in projects which work with practitioners and parents to encourage the musical engagement and

development (as well as wider development) of children (Ockelford, 2018; Voyajolu, Axon, & Ockelford, 2021) makes this evident. One purpose of the current study is to further ascertain the framework's applicability in varying contexts, including early years settings and home. An understanding of how children's musical engagement manifests in differing environments, may provide a springboard for further exploration into creating a link between the home, early years settings and the community. It is intended that the observations gathered within the current study, from which the results are based, will add to the bank of understanding on children's musical development, not only applicable to research, but to practitioners, carers and parents.

3.4 Applying Theoretical Frameworks Within the Current Study

The current study explores the musical development of children in the early years through the lens of the SoI-EY framework, aiming to capture children's musical engagement in a variety of contexts in which they occur. Drawing on Rogoff's (2003) concept of guided participation and mutual structuring of participation this considers children's development and active participation within the myriad of opportunities in which they choose to engage (or not engage) with music in their daily lives**.**

Considered from the Sounds of Intent perspective, musical engagement within Rogoff's (2003) mutual structuring of participation encompasses all three domains. These are opportunities in which children are given to experience and respond to music (*reactive*), moments of musical engagement and activity, or shared endeavours within musical activity (*interactive*), as well as moments of musical engagement children take part in on their own (proactive), all within the varied musical cultures present in children's lives.

There is also an affinity here with Campbell's (1998) view in which children are members of multiple cultural units. She suggests that children's musical knowledge

begins in the family musical culture and then widens as children develop and become part of cultural units beyond the family. These cultural units may include the musical culture of the schoolyard or the musical cultures created by common repertoire taught in school. Musical cultures also include units found within the child's neighbourhood, cultures created through media, through popular music and more. Campbell (1998) also stresses the importance of both instructional and incidental learning on a child's development. She writes about the process of enculturation, stating,

> This process of acquiring cultural knowledge, including music, occurs through broader and more comprehensive ways than that which the channels of school may provide; it may occur with and without direct instruction and participation in the act of music making. Musical enculturation may seem elusive, but in fact it encompasses the varied musical experiences which children have as they grow up within families, neighbourhoods, schools and various constituent communities. As cultures change and as children become members of new sociocultural groups (for example through family relocation or their own maturational processes), they will continue to be shaped by the forces of their environment. (p. 47)

The theories presented in this chapter have guided aspects of this thesis from the aims and research questions to the methods, for example, through naturalistic observation in multiple contexts, to the interpretation and understanding of results and to the study's relevancy for practice. Distinct moments of engagement will be considered within individual case studies here as analysed through the SoI-EY framework. However, these moments will consider the perspective of the child's wider experiences and activity, both tacit and explicit. Children's musical development as seen through the SoI-EY framework is viewed as a rich period of engagement in its own right in line with Froebelian principles; it is not considered as a separate entity from the contexts in which it occurs,

but is understood as an integral aspect of a child's development in relation to others, also taking on a socio-cultural approach. The next section provides a brief review of the aims and research questions, before the study's methods are presented in Chapter 4.

3.5 Summary and Review of Aims and Research Questions

To reiterate, the literature on children's musical development, as reviewed in Chapter 2, supports the stages implicated in the SoI-EY levels of musical development. However, the main observational evidence used to develop the framework was collected through a relatively small number of 'snapshot' observations of children engaged in music from one early years setting (Voyajolu & Ockelford, 2016). Furthermore, within the first study, factors likely to promote children's musical engagement were left largely unexplored. If the stance is taken that children exhibit different behaviours depending on the environments in which they are observed and may be impacted by social context, the inclusion of varied contexts for observation is warranted. This study proposes to address these gaps by, 1) applying the framework to analyse children's trajectory of musical development using a larger data set of observations both from early years settings and at home, as well as following individual children longitudinally and 2) identifying factors pertaining to key adults, activities and the child's environment that may support and promote musical engagement in the early years. The study will explore how the framework has the capacity to capture the nuances of children's evolving musical development over time in varying contexts. For review, the aims are:

> Aim 1: To investigate the validity and relevance of the SoI-EY Framework by following individual children's development over time within the context of their natural environments.

Aim 2: To explore whether (and if so, to what extent) children's musical development, as assessed using SoI-EY framework, is age-related.

Aim 3: To explore factors pertaining to the child's environment (including interpersonal relationships with key adults and peers, activities and contextual surroundings) that may most effectively promote musical engagement and development in the early years.

The related research questions are:

Research Question 1 (Aim 1): Are the three domains, four stages and related elements of musical development in the SoI-EY framework both sufficient and necessary to capture a child's evolving musical development within the diversity of their natural environments, and if so, in what ways?

Research Question 2 (Aim 1): How do the stages, in their present or modified form, relate to one another in their representation of a child's evolving musical development?

Research Question 3 (Aim 2): Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of the relationship between these two factors?

Research Question 4 (Aim 3): What impact does the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement and development?

Research Question 5 (Aim 3): Do some activities within the home and settings such as children's centres more effectively promote musical engagement and development than others, and if so which, and in what ways?

The next chapter will move on to the methods undertaken for the study, covering the study design, sampling and participants, materials and instruments used, data collection and ethics. Following this, the chapter will go through details of analysis before results are presented in Chapter 5.

Chapter 4: Methods

4.1 Design

This study reflects a mixed-methods conversion design (Plano Clark et al., 2015; Tashakkori, Teddlie, & Sines, 2012). In a conversion design qualitative data are analysed both qualitatively and quantitatively. The qualitative data is transformed numerically, also referred to as being quantized, in order to be analysed through either descriptive or inferential statistics (Tashakkori & Teddlie, 1998, p. 128). Inferences are then made from both forms of data (quantitative and qualitative) which are juxtaposed, compared and contrasted (Plano Clark et al., 2015; Tashakkori et al., 2012). The main form of data within this study's conversion design is video observation. These observations were coded and quantized for analysis. This design allows for data to be analysed broadly as well as at the level of the individual. Quantitative data gathered through questionnaires was also used to collect information on children's surrounding musical environment at home (distributed at one time point), supplementing the observational data.

Multiple-case study design (Yin, 2018) has also been used to explore individual children's musical development over time, in relation to the larger data set. Case study design has been deemed suitable for questions of "how" and "why" (Yin, 2018) with the ability to capture the sometimes complex and highly detailed aspects of a subject in its own context (Baxter & Jack, 2008). Using multiple case studies allows the possibility of comparison between cases and corroboration of evidence, exploring both similar and contrasting results, and increasing the strength of the derived conclusions (Yin, 2018). The case studies here are longitudinal and allow for in depth exploration of how individual children's musical development manifests over time, within their surrounding environment and social context. Green and Hill (2006) state that, 'prospective, longitudinal studies of children's daily lives and experience are rare, but they offer great

potential in capturing the dynamic and changing nature of life experience and place less reliance on children's inevitably selective memories of past events' (p. 17). Interview data was also collected by parents to enrich the observational data for case study material.

Finally, naturalistic observations collected by myself and parents provided a detailed view into the musical lives of children within their daily environments. Naturalistic observation has been noted to be effective in learning about children's development (Green & Hill, 2006). Dunn (2006) writes of the importance of observation in terms of understanding children's behaviour within their relationships. She states, 'if we are to document the salient influences on children's development, we need to know not only how they respond to standardized experimental procedures or situations, but what actually happened to children in their family and school lives' (p. 87). This study takes the stance that observing children in their natural environments provides a rich set of data with which to explore children's musical development, and its possible contextual influences.

4.2 Sampling/Participants

In sampling participants for the study the outlook was to observe children between the ages of birth to 5 years within their everyday lives, the context including both physical and social dimensions (Tudge & Hogan, 2005). The goal was to observe as many facets of and as wide a variety of musical engagement as possible. Overall, the sampling process was non-probabilistic and theoretically driven; the process was guided by the research questions which revolve around children's musical engagement and how it emerges within differing contexts. As Miles et al. (2014) note, to get a sense of the construct,

> We need to see different instances of it, at different moments, in different places, with different people. The prime concern is with the *conditions* under which the

construct or theory operates, not with the generalisation of the findings to other settings. (p. 33)

The sampling scheme may be considered multistage purposeful. A multistage purposeful sampling scheme is defined as, 'choosing settings, groups, and/or individuals representing a sample in two or more stages in which all stages reflect purposive sampling of participants (Collins, 2015, p. 7). Multistage purposeful sampling meant that a larger number of children and observations could be sampled from early years settings, from which a subsample of children would also be observed at home, and a smaller subsample of children would be chosen for individual case studies. This would allow for the exploration of musical development within and between contexts and participants.

4.2.1 Early Years Settings

First, early years settings were considered on the basis that the children attending represented a culturally diverse sample, ranging in age from birth to 5 years. In order to observe children in as many contexts of musical engagement as possible (for example, during spontaneous play, with peers, with adults including educators and parents, to routine group activities such as circle time), more than one setting was chosen for observation. This represented maximum variation sampling: 'identifying and seeking out those who represent the widest possible range of the characteristics of interest for the study' (Merriam & Elizabeth, 2015, p. 98). The three settings were based in London and derived through network sampling (Merriam & Elizabeth, 2015) through professional associations. The settings were:

- Setting 1: A nursery school, day nursery and children's centre. The nursery school provides 80 places for children from the age of 3 and an earlier start for local children identified as being in need from 2 years. The day nursery provides 74 fee paying places for children from 8 weeks – 5 years with packages for families

whose children are entitled to 2-year old early education childcare provision. Children were observed in both the nursery school and day nursery sections of the site.

- Setting 2: A private nursery providing 57 places for children from birth to 5 years in which parents can apply for 2-year old early education childcare provision.
- Setting 3: A children's centre working with local families and children from birth to 5 years with services provided including activities to promote early learning and readiness for nursery, family support, adult learning and volunteering, and child and family health. This is the only early years setting where parents and children were observed together.

Meetings were held to explain the project to staff and the head of each setting gave permission for the project to be undertaken over the two-year period (see section 4.5 Ethics, for details of permission process). In order to meet the age criteria, children in Settings 1 and 2 were recruited from the baby rooms, day nursery/toddler rooms and preschool. Within Setting 3 children were recruited from a 'parent and baby to crawling' play session and a 'crawling to walking' play session. Due to the longitudinal nature of the project it was predicted that attrition would occur over the 2-year period.

4.2.2 Participant Sampling Procedure

In terms of sampling procedure, the initial strategy was to recruit as many participants as possible by sending forms to all children who attended the settings in the prospective spaces, knowing that participants would be lost for a number of reasons: for example, one dropped out of the study due to family relocation, another transitioned to primary school, and neither could be followed due to time and distance constraints. New families were recruited for the study over time as well, which also meant that not all children would be followed for the full 24-month period. The start date of observations

for individual children was staggered, depending on when permissions were signed, with first observations beginning in autumn 2015. All parents were invited to observe their child at home and those who chose to take part declared their interest and provided permission on the information and consent form. This represented a simple sampling scheme at this stage, in which 'every individual in the sampling frame (i.e., desired population) has an equal and independent chance of being chosen for the study' (Miles et al., 2014, p. 6).

Overall, 44 children participated in the study (albeit with varying observational timelines) 22 girls and 22 boys. The children ranged in age from three months to five years (M = 27.7, SD = 15.1). Of these 44 children, a subsample of 19 were observed in both an early-years setting as well as at home (with observations taken by their parents acting as participant observers of their child). This subsample included 19 children as a result of 17 parents who chose to take part in this aspect of the project, declaring their interest on the consent form. The result was a total of 950 video observation clips (ranging from 30 seconds to 5 minutes in length) taken by both myself and parents. Finally, a subsample of three children and families were chosen for in depth case studies. Three children were purposefully chosen as a rich amount of longitudinal data emerged and was available for each, which represented unique examples of musical engagement in the home environment. The parents of these children consented for them to be included as case studies and consented to be interviewed. Demographic information for the full sample of children including age, gender, ethnicity, language, and those identified as having special educational needs are included in Table 1.

Table 1 *Participant Demographic Information (N=44)*

	Overall (*N*=44)
Age in Months	
Mean (SD)	27.7 (15.1)
Median [Min, Max]	27.0 [4.00,63.00]
Gender	
F	22 (50%)
M	22 (50%)
Ethnicity	
White British	15 (34.1%)
White Eastern European	5 (11.4%)
White European	5 (11.4%)
White Irish	2 (4.5%)
Asian Indian	3 (6.8%)
Asian Japanese	1 (2.3%)
Asian Other	1 (2.3%)
Black African	2 (4.5%)
Black Caribbean	2 (4.5%)
Latin South Central American	2 (4.5%)
No response	5 (11.4%)
English as Second Language (EAL)	
Yes	18 (40.9%)
No	26 (59.1%)
Special Educational Needs	
Yes	6 (13.6%)
No	38 (86.4 %)

4.2.3 Case Study Participant Sampling

A further subsample of three children and families were purposefully chosen from the full sample for in-depth case studies, i.e., multiple case sampling (Miles et al., 2014). Children were chosen due to having a rich amount of data from differing sources over time, specifically demonstrating musical engagement, development and learning at home. Case studies were chosen as the study progressed and analysis of data revealed cases of interest. Families for each case participated in collecting video observations longitudinally throughout their involvement in the project; they also were willing to take part in interviews enriching the observational data. Therefore, this resulted in case studies

of three children, involving three sets of parents. Details of each child and contextual background are provided in chapter 6.

4.3 Materials and Instruments

4.3.1 Video Observation and the EthOS App

The use of video in research has strengths such as capturing and analysing details of behaviour, revisiting data for further analysis and coding and allowing for data analysis of observation between colleagues (Heath, Hindmarsh, & Luff, 2010; Walsh, Bakir, Byungho Lee, Chung, & Chung, 2006). Video observation in research has been used to capture children's musical experiences both in educational settings and at home (Barrett, 2015; Koops, 2012; Koops & Kuebel, 2018; Voyajolu & Ockelford, 2016).

As this study aimed to collect video data to capture children's everyday musical moments by myself and parents, a mobile app designed for digital ethnographic data collection and analysis, called EthOS (ethnographic observation system) was used. The app includes an online platform for coding and analysis. Such apps have been used in sociological and ethnographic research and have been shown to contribute to observational methods by integrating various forms of data such as video, text, and photos by both researcher and participant, allowing data from both parties to be amalgamated (Favero & Theunissen, 2018; Hein, O'Donohoe, & Ryan, 2011). The EthOS app was concurrently being used in a study exploring the musical development of children with Retinopathy of Prematurity, successfully collecting rich amounts of data from both families and researchers (Voyajolu, Axon, & Ockelford, 2017). Since parents were able to send video data using the EthOS app it was also felt this might help in dealing with issues of attrition that arise in longitudinal studies (Cohen, Manion, & Morrison, 2011). Furthermore, the use of software for analysis of video data has been suggested in the

literature (Walsh et al., 2006), which an app such as EthOS, with an accompanying platform for data organisation and analysis, would provide.

EthOS (ethnographic observation system) is an app and online cloud platform designed for mobile ethnography (see https://www.ethosapp.com). The app was used to collect video observations by myself and participant parents. It was also used to store, organise and analyse the video data through coding. The EthOS app allows for video, audio, photographic and text data to be taken on a mobile phone or tablet and sent directly to a secure cloud database. The app and platform were first piloted with three participants who did not attend the three observation settings. No technical issues arose during the pilot and results confirmed that the app would be a practical way for parents to record and send in observations of their child. Subsequently, the 17 participant parents for the project were sent an email with a personal username and password to download the app on their mobile phone and access the EthOS platform online. Videos taken by myself and all participant parents were stored in a single cloud database, where they could be reviewed side by side as they were uploaded. Parents were only able to see the videos they collected and uploaded themselves, they could not see videos of their child that I sent and they could not see videos sent by other parents. I used a project specific iPad mini to take video observations. As videos were sent to the EthOS platform they were promptly deleted from the iPad.

4.3.2 Researcher Observation Protocols

As well as providing an overall timeline to each setting for observation purposes, a key member of staff was contacted before each visit as a reminder and confirmation. Observations were scheduled both in the mornings and afternoons before and after children's nap times. Observations were naturalistic and unstructured. Naturalistic observation is conducted in the 'natural setting for the phenomenon of interest, the

researcher does not attempt to manipulate the setting in any way' (McKechnie, 2008, p. 551). Naturalistic observations allow for a view into children's everyday experiences, their social interactions and into situations which are salient and have emotional meaning (Dunn, 2006). Conducting naturalistic observations of children in varying contexts and social situations has been noted as being important when aiming to draw conclusions about their capabilities and understanding (Dunn, 2006). Particularly relevant to this study is Dunn's (2006) statement on naturalistic observation and its application in researching young children's development. She writes that naturalistic observations,

> draw our attention to the processes that may influence the development of such understanding, both in terms of normative development, and in terms of the individual differences between children that are so marked. (p. 93)

Unstructured observation while systematic and rigorous, is flexible in its approach. Observations are guided by the research questions, may take place at different times and in different areas of interest within a setting. Observations may become more focused with time but do not rely on detailed and pre-planned checklists (Bailey, 2007). Unstructured observations are often undertaken in hand with naturalistic observation (McKechnie, 2008). Naturalistic, unstructured observation suit the aim of the study to capture as much variety of musical engagement as possible in varying contexts. Any form of musical engagement observed was considered: responses to music (emotional responses, responses through movement), music listening (recorded or live), creating sound with the body (clapping, stomping) objects or instruments, vocalisation and singing. Musical engagement was captured both when it was a primary form of activity or a secondary form of activity (singing quietly while drawing, for example). Children were observed indoors, outdoors, during structured group time (for example music,

circle-time, story-time, heuristic play) and during free play on their own and with others, including peers and adults.

4.3.3 Parent Observation Protocols

While parent observations were primarily unstructured in nature, captured from a wide variety of social contexts, at varying times and in different settings, an element of structure was provided; through the EthOS platform, 'tasks' and 'tags' were set to guide participant parents in their observations. Two general tasks were written to keep the process simple and to save time for parents, as well as to give them more freedom in the content of their observations. The tasks were devised to capture children both reacting to and creating sound and music. They were: 'When convenient please send a video of your child responding to sound or music in any way (movement, listening, laughing etc.)', and 'When convenient please send a video of your child making sound or music on his/her own or with others'.

'Tags' were written for parents to include with their videos, which would act as a further reminder of musical engagement they might capture. Tags are listed on the app and can be viewed and ticked before sending in video. Parents could also write and include their own tags. Pre-set tags included, animal sounds, babbling, bedtime music, copying, dancing, favourite songs, in the car, instruments, listening, making up songs, out and about, playing the drum, pots and pans, pretending, singing, singing during routines, singing with others, stomping, tapping and clapping. Although these tasks and tags were set, parents were encouraged to use them as a guide only and capture any form of musical engagement they noticed throughout the child's day. Parents could also write brief contextual descriptions alongside the observations that were uploaded through the app.

4.3.4 Questionnaire

A questionnaire was created to collect information on children's musical engagement at home. The questionnaire was based on that of de Vries (2009) who explored the use of music at home with children under five, which in turn was based on the 'Parents Use of Music with Infants Survey' (PUMIS) in a study by Custodero, Britto and Brooks-Gunn (2003). The de Vries (2009) questionnaire was chosen as it related directly to parents musical engagement with children in the early years at home, relevant to the current project, and was simple in form, therefore, not burdening parents' time. However, the questions by de Vries (2009) were adapted and expanded for the current study to fall in line with research questions that relate directly to the SoI-EY framework, for example, the inclusion of proactive musical engagement (children's engaging with music when on their own). The format was multiple choice with responses based on a Likert-type scale (also used by deVries, 2009) for parents to report on the frequency of musical engagement seen. The frequency choices given were 'never, 'once a week or less', 'more than once a week but not daily' or 'daily'. Space for additional comments was also included (see questionnaire in appendix 6). The Online Survey Tool (formerly BOS Survey Tool) was used to create and distribute the questionnaire; a paper version was also created for parents who could not access the questionnaire online.

The questionnaire was piloted once by five parents of young children who were not involved in the current study and changes were made in response to feedback. Changes made were technical, such as ensuring participants could respond with only one multiple choice answer (when this was required), editing overall format and organization of questions to ensure clarity, editing text to ensure clarity of meaning, adding text when pilot responses were not providing the information needed and including an 'other' option for specific questions.

4.3.5 Interview Schedule

A semi-structured interview schedule based on the questionnaire was used to collect information from the subset of parents for case study material (see appendix 7 for interview schedule). The aim of the interviews was to gain more in-depth information on the child's musical environment at home and gain feedback from parents on their involvement in the project. Videos were also reviewed in order to further explore observational context as well as to note how representative the clips were of their child's behaviour. This is in line with Blikstad-Balas's (2017) suggestion to interview/review video with participants in order to tackle issues of representation and contextualisation in video research. Interviews were audio recorded using the Voice Recorder and Audio Editor App on the project iPad mini.

4.4 Data Collection

4.4.1 Observations

Naturalistic observations of musical engagement were captured by video as they occurred in varying situations throughout the children's day. I visited the three settings every other week for four hours (both in the morning and in the afternoon) over the two-year period. In the last six months visits were held once a month. The observational role lay between a non-participant and participant stance. For example, while I did not purposefully engage the children to manipulate behaviour and attempted to remain as neutral as possible, I moved among and sat with the children in order to capture close observations during free play and more structured group times. Therefore, when children approached me to ask for help or engage in play or conversation, I interacted with the children.

While I recorded observations of all 44 children in care/educational settings, a core group of 17 parents recorded video observations of their children at home creating

an aspect of participatory research. Parental observations addressed the aim to explore children's musical engagement in varying environments and social contexts. Parents were periodically sent email reminders to take and upload observations of their children throughout the study. The degree to which parents collected and uploaded video observations using the EthOS app (along with tags and context descriptors) varied.

Table 2 provides information on the observations collected, organised by age. The child's age at the first and last observation, duration of the observation timeline in months, number of timepoints and number of observations per child is included. A total of 950 observations have been collected overall, by both myself and parents. The number of observations per child ranges from 2 to 76. The observational period per child ranges from one day to a period of 26 months and the number of timepoints ranges from 1 to 35. Note that the distance between time points differed for children

The table reveals that the observational period, number of timepoints and number of observations is varied among the children. This is due to a variety of factors. First, as mentioned earlier, attrition meant that children left during the overall timeline of the study and children's start date was staggered due to the fact that children could not be observed until parental permission was granted. In terms of data collection, an attempt was made to balance the observations among the children. For example, if a high number of observations was gathered for one child during a particular visit, the same child would not be a focus on the next visit. However, the nature of observing children during their everyday activities meant that music was not always present as often for each child. Furthermore, children may not have been present on a particular day due to absence, illness, or being on holiday. Attendance at the children's centre is voluntary, which meant not all children and parents involved in the study attended from week to week.

In addition, while an attempt was made to observe all participants and gather as much data as possible, the aim was also to capture meaningful moments with the potential to provide a unique narrative about children's developmental trajectory. In this way, I was drawn, sometimes consciously and other times by chance, to particular children and moments of musical engagement. The observation process therefore had layered objectives, to capture a wide variety of types of musical engagement demonstrated by different children, and to capture observational 'gems' of musical engagement that could be substantive for thorough analysis. Saldana (2003) describes gathering qualitative longitudinal data,

> in drops and ripples as well as retrospective waves, permissing deeper analysis of the nuances and subtleties of processual participant change… it's not just how long you're in the field – quantity time- it's how and what you observe while you're there – quality time. (p. 33)

Table 2 *Participants' age at first and last obs., number of obs., obs. length in months, and timepoints*

Child ID	Age at first Obs in Months	Age at Last Obs in Months	Number of Observations	Observation length in Months	Number of Timepoints
Child 1	4	18	20	13	15
Child 2	5	7	4	2	2
Child 3	7	30	48	23	23
Child 4	7	21	26	14	13
Child 5	9	34	64	25	19
Child 6	11	34	23	23	12
Child 7	12	32	21	20	7
Child 8	13	36	40	22	14
Child 9	13	13	5	0.03	1
Child 10	14	22	25	8	9
Child 11	15	38	71	23	35
Child 12	17	39	76	21	34
Child 13	17	36	15	18	6
Child 14	18	35	35	15	13
Child 15	19	38	25	19	8
Child 16	19	30	30	11	7
Child 17	20	23	15	3	4
Child 18	21	22	6	0.5	2
Child 19	21	44	31	22	6
Child 20	22	47	33	25	16
Child 21	25	44	17	18	7
Child 22	27	48	6	21	5
Child 23	27	41	10	13	3
Child 24	27	40	33	12	7
Child 25	28	50	22	21	5
Child 26	28	42	7	13	3
Child 27	30	37	14	6	7
Child 28	30	50	28	19	12
Child 29	33	40	16	7	5
Child 30	34	37	11	3	3
Child 31	34	60	40	26	12
Child 32	35	54	24	18	6
Child 33	36	46	32	10	11
Child 34	41	51	20	9	8
Child 35	45	59	13	13	8
Child 36	46	48	3	2	3
Child 37	47	47	2	0.03	1
Child 38	47	48	6	1	2
Child 39	48	48	2	0.03	1
Child 40	50	54	6	4	4
Child 41	50	54	9	4	7
Child 42	50	56	9	6	4
Child 43	52	54	3	1	2
Child 44	63	63	4	0.03	1

4.4.2 Questionnaires and Interviews

In order to collect information from varying sources on the musical engagement, environment and activity at home, the questionnaire was distributed to all parents. The questionnaire was distributed using the BOS online survey tool, sent to parents via email, and with paper versions for those parents who preferred to respond in this way. Before completing the questionnaire, parents signed a specific consent form for this aspect of their participation (see appendix 6). Across all settings, 27 of 44 parents completed the final questionnaire.

Alongside the questionnaire data, a subset of three parents were interviewed to provide more detailed information on individual children's musical development for case study material. These cases were unique in that they could provide longitudinal observational trajectories of children from varied contexts. Each case provides a rich picture through four data sources (researcher observations, parent observations, questionnaires, and interviews) of individual children's musical development over time. As the interviews were held at the end of the study, they were retrospective in nature. The interviews were semi-structured and included a portion of written questions, which acted as a prompt for further discussion, as well as a review of key video footage. Parents signed an interview specific consent form and with permission, interviews were audio recorded. The interviews took place in the family home, and in all three interviews the children were present. In two cases, spontaneous musical activity by the child was also recorded and added to the collection of observations. Interviews lasted in length from 30 minutes to 1 hour 15 minutes.

4.5 Ethics

Ethical approval for the project was obtained through the University of Roehampton's Ethics Committee. As well as the university's ethical guidelines, the

British Psychological Society's ethics guidelines for internet-mediated research was consulted, due to the nature of the EthOS app/cloud platform and online questionnaire. Furthermore, the university safeguarding policy was reviewed as well as the safeguarding policy for each observation site. I held current DBS clearance for work with children and vulnerable populations.

4.5.1 Observation Sites

Preliminary contact was made with the head of each of the three settings through email to introduce myself and the project. Following this a meeting was scheduled via email and held at each setting with the setting head/director and key staff to discuss the project and answer questions. Information sheets were provided, detailing the project timeline, methods, and involvement of children, staff and parents (see appendix 2). With written permission to carry out the project obtained from the head of each setting, an agreed time was then scheduled via email to meet with parents on site in order to inform them of the project and provide consent forms. It was agreed that I would be available at drop-off time and during parent/child group times to speak to parents and provide information and consent forms, accompanied by key members of staff. Key members of staff also volunteered to hand out information and consent forms to parents when I was not present during drop-off and pick-up times. Details of consent form content are summarised below.

4.5.2 Observation and Video Consent

As the children were aged 5 years and under, parents provided informed written consent for the participation of their child. Anonymity was ensured and for video data in particular, parents included whether they gave permission for faces to be seen in video or whether they preferred faces to be blurred out. Staff present were also provided with consent forms if they were part of the observations or if they were inadvertently present

in the background of videos (See appendix 4 for consent forms). As this study is part of the larger Sounds of Intent in the Early Years (SoI-EY) project, participants were also asked if video could be included on the SoI-EY website (eysoi.org), a resource for parents and practitioners, at the conclusion of the study. Names would not be included on the website and video data would only be uploaded with signed consent. Participants also chose whether to give consent for photographs to be used in publication. Any photographs within this thesis are used with consent.

During observations, the children were aware of my presence. Therefore, there was no subterfuge or secrecy when videoing. The iPad being used was clear for children to see and to carefully explore. A simple, verbal explanation was given to the children so they understood the purpose of my visits. If during observations a child requested not to be filmed, this was respected, and videoing was stopped. If a child moved away from the iPad, reached out to move the equipment, or manifested distress such as crying (not necessarily due to the filming) videoing was stopped.

The use of the EthOS app and cloud platform for observational video data posed specific ethical considerations. First, the EthOS team was consulted in terms of data storage. Data storage policies were reviewed and provided for university ethical approval. In terms of data access, I set up the project via the EthOS platform and subsequently invited parents to join as participants. I had a unique username and password to use the app and online cloud platform and each parent had a unique username and password to use the app and online cloud platform. Participant parents had limited access to the platform, meaning they only had access to the videos of their own children, they did not have access to data (in any form, i.e., video, audio, text) sent in by other parents or myself. As 'manager' of the EthOS project, only I was able to view all the data that was uploaded. Furthermore, the EthOS platform allows for analysis of data, such as note taking and

coding. Again, only I had access to this aspect of the platform, participant parents could not see any analysis taking place.

4.5.3 Questionnaire and Interview Consent

Questionnaires were completed online or by paper and as suggested in the University of Roehampton's ethical guidelines, a consent page was included in the questionnaire with contact information. A separate consent form was also used for parents taking part in audio recorded interviews (see appendix 5 for consent forms). As interviews took place in participant homes, the university's Lone Working Policy was consulted.

Finally, all participants in the study were given a unique ID code and any related documents/spreadsheets with participant information were password encrypted. Names of observation sites, children, parents and staff have not been used to ensure anonymity.

4.6 Video Coding Analysis

In order to address the research questions which focus on 1) the Sounds of Intent in the Early Years framework and its ability to capture a child's evolving musical development, 2) the relation of the framework's stages in representing a child's evolving musical development, 3) the relationship between a child's age and observed SoI-EY level of musical development, and 4) the impact of children's environment, social context and activity on their musical engagement and development, a main undertaking was coding according to the SoI-EY framework. A first stage of 'familiarising' the video data (Braun & Clarke, 2006) was conducted by viewing video clips and noting down initial thoughts as observations were uploaded to the EthOS platform. After this, the first layer of data interpretation focused on applying systematic coding to video observations, using the SoI-EY framework, through a deductive 'theoretical' and 'semantic' approach (Braun & Clarke, 2006). Thus, the process was theory driven with the aim of providing an initial description of the data, to be analysed later in a more interpretive manner.

Blikstad-Balas (2017) suggests that this approach of analysing video data (on both a larger and more detailed scale) helps to avoid issues of magnifying 'events that are not representative of the participants and not a part of a larger pattern of event' (p. 519). It also allows specific cases to be analysed in the context of any larger patterns detected. Therefore, a larger picture of musical development for the full sample will be explored in relation to unique experiences and developmental journeys of individual case-study children. The initial analysis of the larger sample may be considered a variable oriented approach defined as being,

> conceptual and theory centred from the start, casting a wide net over a (usually large) number of cases. The "building blocks" are variables and their interrelationships, rather than cases. So the details of any specific case recede behind the broad patterns found across a wide variety of cases, and little explicit case to case comparison is done. (Miles et al., 2014, p. 102)

4.6.1 Video Coding Layer 1

The SoI-EY framework, which sets out how children engage and develop musically, was used to code the musical engagement observed in each video observation. For review, the framework is depicted as a set of concentric circles divided into three segments, each representing a domain of musical engagement (refer to Figure 3). These segments/domains are labelled as reactive (R), how children respond to sound and music, proactive (P), how children create sound and music on their own, and interactive (I), how children create sound and music in the context of others. Within each domain are six levels of musical engagement starting at the innermost circle at Level 1 and expanding outwards towards Level 6. To reiterate, Levels 2-5 usually occur in the early years. Each level contains a further four segments describing musical behaviours that may be observed (Ockelford et al., 2011; Voyajolu & Ockelford, 2016). These segments were

used as a reference point when coding for levels 2-5. Therefore, observations were assigned a domain (R, P, I) and level (2-5). One observation might be coded with more than one domain and level if the musical engagement present constituted it. Furthermore, if one video observation contained multiple participant children, each child's engagement was considered separately. All 950 videos ranging in length from 30 seconds to 5 minutes, were reviewed for coding.

Individual videos were viewed, systematically, one following the next on the EthOS platform; indicators were included to note whether the video contained a task, tag, notes and whether the video had been 'worked'. Text descriptors of the observations were written for each video as well as reflective notes in relation to the SoI-EY framework or other aspects of engagement/development. The videos were given codes using a dropdown menu for domain (R, P, I) and level (2-5) or to specify if they could not be coded in line with the framework. Figures 4 through 6 demonstrate this initial process of reviewing, note taking and coding, using the EthOS platform. The EthOS platform also allows videos to be filtered by elements of the data such as by code, sender, or tag. These filtered videos can be saved into 'workspaces' for further refined comparison and analysis. In this case, as videos were coded, they were set to be filtered by SoI-EY level, domain and by child. This would allow further review and analysis of engagement seen at each level and for particular children. These filters are 'smart' so that when subsequent videos are given a particular code they are automatically placed within the appropriate workspace. Information from the EthOS platform was then downloaded into a spreadsheet matrix of data in order to apply later stages of analysis (see Table 3).

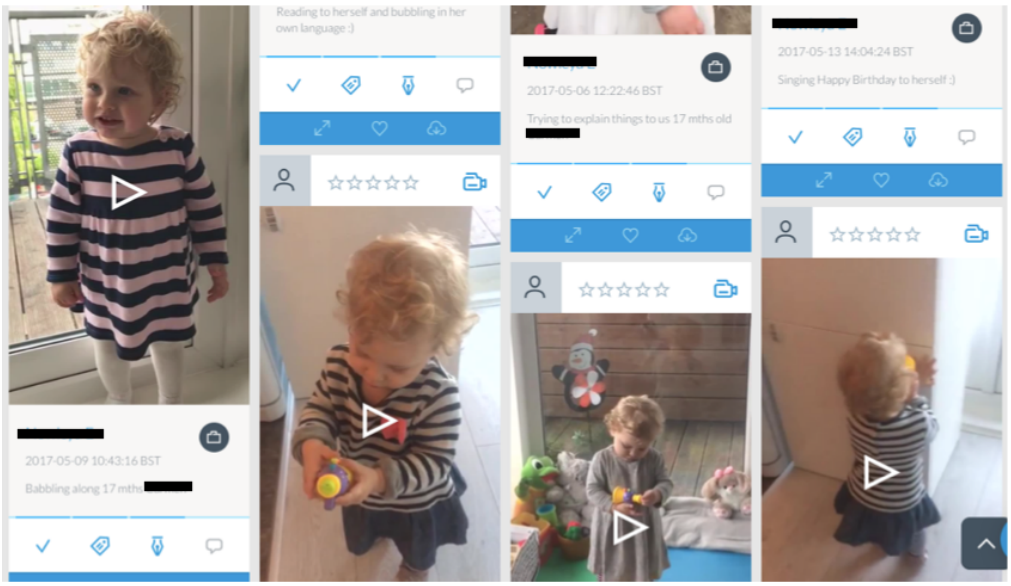


Figure 4 Example of project videos presented on the EthOS platform

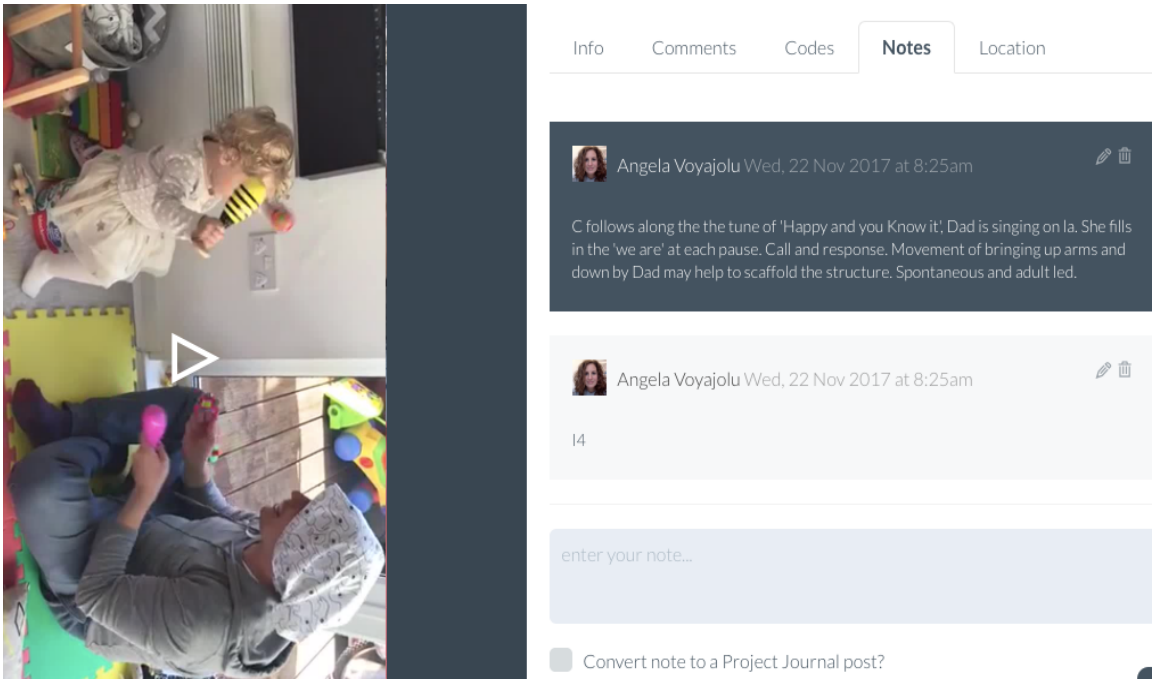


Figure 5 Example of descriptive text and reflective notes using the EthOS platform

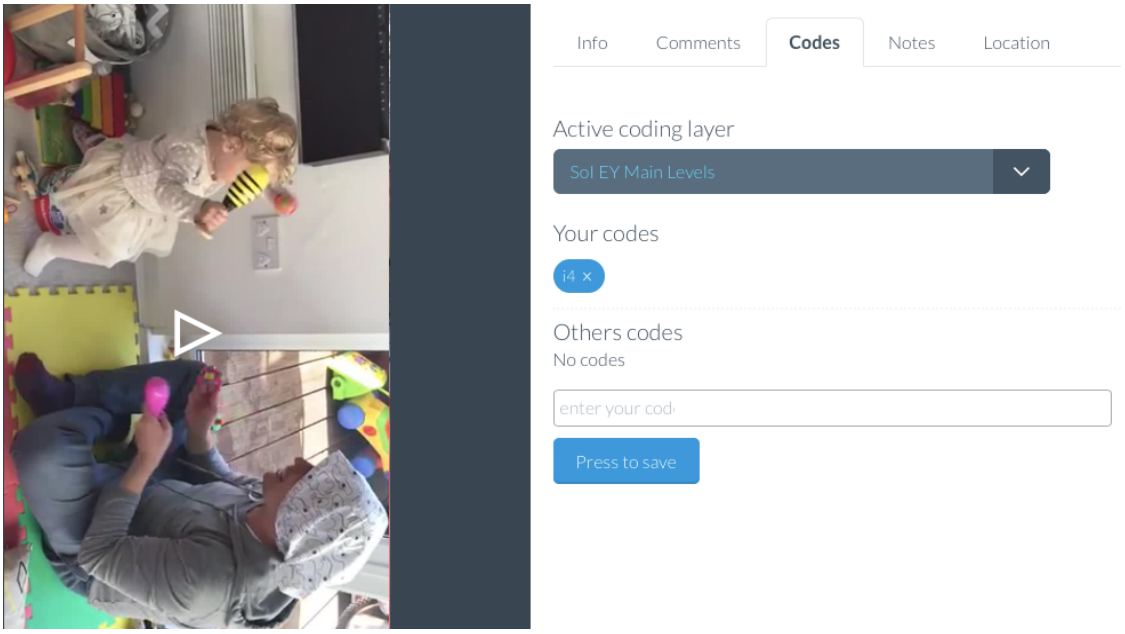


Figure 6 Example SoI-EY coding using the EthOS platform

Table 3 *Sample data matrix for level 1 coding*

Child ID	Sender	Gender	Age in Weeks	Notes sent with video	1st Coding Notes	Domain	Level
ecc201604	Researcher	F	43.86	Exploring the drum while listening to the opening song of circle time. Is she creating pattern 'tapping' 3 beats or is her playing more exploratory?	I2 - playing in response to singing?	I	2
ecc201626	Researcher	F	62.43	Responding to adult playing with different vocal sounds, using sing-song speech. Almost copies raspberry sound.	Outside in the nursery garden R2	R	2
ecc201701	Researcher	F	100.14	Tapping beads against the pole, 2/3	Outside in the garden of the nursery, bells are hanging next to a column. A taps the bells against the column, causing them to jingle. Multi-sensory aspect of the colourful hanging strings, gripping the strings/bells tapping repeatedly to create sound. Intentional pattern or physical?	P	2
ecc201601	Researcher	M	154.71	More copying I3	Z and P continue their interaction. At 00:08 Z begins to tap on his legs, P picks this up and begins to chant perhaps a chopping song, which Z attempts to copy. P moving from pattern to chanting a motif. I3/I4	I	3
kbn201502	Parent	M	158.43	Danced for an hour to various songs	Reactive but not sure where to code yet	0	0

In order to determine the reliability of the SoI-EY coding system videos were independently coded by a second researcher with prior knowledge of the framework. The second researcher and I blindly coded 20 videos, randomly chosen using an online research randomiser, after which we met and discussed agreements and disagreements found within the coding results for this trial. Following this a 10% portion of all coded videos, chosen through an online research randomiser, were blindly coded. Weighted kappa () with quadratic weights (Fleiss & Cohen, 1973) was run to determine if there was agreement between the two coders' ratings of the SoI-EY levels. Weighted kappa () was chosen due to the ordered nature of the SoI-EY levels (Hallgren, 2012). To determine the agreement on the coding of domains, as these categories are not ordered, Cohen's was run (Hallgren, 2012).

4.6.2 Video Coding Layer 2

While coding using SoI-EY level and domain provides an overall summary of musical engagement, variations within each level are apparent. It was therefore determined that breaking down the levels into further categories would allow for the spectrum of development seen *within* SoI-EY levels as well as *between* levels. While the elements (A,B,C,D) provide details of musical engagement and behaviours seen within levels, the complex relationship between them does not necessarily define a graded transition (Ockelford, 2013). Previous research using the Sounds of Intent framework to assess children with profound and multiple learning difficulties explored breaking down the elements (A, B, C, D) into three grades of 'low', 'medium' and 'high'. These are defined as "low" – 'just achieving the level of engagement that was described', "high" – 'fulfilling the terms of the descriptor comprehensively' and "medium" - 'levels of attainment between the two extremes' (Ockelford et al., 2011, p. 190). The authors

presented a protocol which allows for fine grained assessment looking at both the level and frequency of musical behaviours within each element.

More recently, during the time of this study, a new iteration of the Sounds of Intent framework for children with learning difficulties was being trialled, breaking down each SoI *level* into three gradually progressive criteria for use in the Trinity College London graded music exams. Trinity's graded exams assess musical performance, technique and theory within a number system from one to eight, with increasing difficulty (Trinity College London, 2019). The new version of the SoI framework was being tested for efficacy within the Trinity graded system, allowing for children and young people at all levels of musical development to participate. In this version of the framework each level (within each domain) is split into the categories of 'emerging', 'achieving', and excelling', with the segments removed. Table 4 illustrates this graded version of the framework for Levels 2-5, those levels which are relevant and reflect the early years iteration (SoI-EY).

An initial trial of reviewing the video data against this revised version of the SoI framework was carried out. As is evident in Table 4, this framework quantifies how often an observed musical behaviour within each category ('emerging', achieving', excelling') is seen in order to include an element of consistency when interpreting and /or assessing observations. During this initial review process, it emerged that due to the nature of quantification within the graded system, individual clips (varying in length from 30 seconds to 5 minutes) did not hold enough information to provide a full and consistent picture of a child's level of engagement, according to the three categories. Therefore, a new protocol was created that would allow video clip observations to inform one another during the coding process. First, observations would be organised and viewed by individual child. Video clips had already been organized within the EthOS platform with

workspaces created for individual children for review and analysis. Second, video clips for individual children would then be grouped according to age, broken down into 13-week (3 month) age bands. This timeline was chosen based on previous analysis of SoI-EY coded data, in which children's observed levels of development were grouped for analysis within three-month age bands (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016). Therefore, to create a systematic approach, 13-week age brackets were set from 0-13 weeks, 14-27 weeks etc. and upwards. Video clips for each child which fell into each 13-week age bracket would be viewed together. While the videos within the bracketed group informed one another, each individual video was coded.

This was an iterative coding process. As the videos were viewed and the descriptive criteria considered, aspects of engagement with sound and music relevant to early years children which arose and were not explicitly stated within the new framework were considered. The SoI-EY elements were also consulted, as well as the original SoI-EY framework descriptors found on the Sounds of Intent website (www.soi.org), which are more detailed and in depth.

Three main considerations arose when coding observations with the new criteria. The first was the multi-sensory aspect of engagement, included in the elements of the SoI-EY framework, but removed from the three criteria. Upon viewing of infants and children in the early years engaging at Level 2 of the framework, many of the observations had a strong element of multisensory engagement and interaction, for example including music and movement or music and touch, in which a reaction to each individual multisensory element could not be separated within the observation. Therefore, not only engagement to sound within this level was coded, but engagement alongside movement, touch, etc. was considered.

The next consideration was at Level 3 of the framework, here focusing on the aspect of copying. A number of observations consisted of children recreating sounds heard in the environment. For example, the sounds of animals, sounds of transport, which occurred in the proactive domain. The three criteria within the proactive domain of the framework focus on pattern, ('makes one type of pattern in sound', makes two types of pattern in sound', etc.). However, it was felt that this 'proactive' engagement in which a child is not yet creating a pattern but internalising and then recreating these sounds on his or her own, constituted engagement at SoI-EY Level 3, with its focus on copying. Therefore, observations which demonstrated a child making an individual sound heard in the environment were coded at Level 3 "emerging". If these types of sound were created within a pattern, these were coded at 'achieving' and 'excelling' respectively, dependent upon how many patterns the child was observed to create.

Finally, as the purpose of this criteria was developed with the Trinity Music Graded Exam in mind, Level 5 of the 'emerging, achieving, and excelling' criteria was re-interpreted to first consider the inherent emergence of children's singing and/or playing of whole songs (gradually in time and in tune) rather than that which would be taught for the Trinity Exam system. Taking the observations into consideration and the elements of the SoI-EY framework, it was felt that 'emerging' would constitute singing a complete simple song from the nursery rhyme repertoire or similar (i.e., 'Wind the Bobbin Up', 'Twinkle Little Star'). At this emergent stage a child may not have an entire grasp of tonality and tempo (hence emerging) but the complete structure of the song or piece would be present, distinguishing from engagement at Level 4. 'Achieving' would constitute the ability to sing/play a piece of more complexity, at which stage formal education *might* be taking place for example either in one-one or group scenarios (in line with Trinity College exam Grade Initial or Grade 1), and excelling would fall in line with

Trinity College graded exams levels 2 and 3, again for which more structured or formal music education may be taking place. Therefore, shifting the description of the criteria as seen in Table 4.

This process was undertaken for the 796 video clip observations which were given a code in the first layer of analysis, resulting in an updated matrix, which includes notes to confirm reasons for coding and the relationship between video observations. While videos were viewed in groups, each individual video clip was given a code. This is due to the fact that, although the videos informed one another, observed domains might differ from one video to the next and in some instance the level of engagement clearly differed between videos (even if in the same group). Using the graded SoI-EY framework system led to a possibility of 12 codes, respectively: 2.1 (emerging), 2.2 (achieving), 2.3 (excelling), 3.1 (emerging), 3. 2 (achieving), 3.3 (excelling), eventually reaching 5.3 (excelling). Codes were noted numerically from 1-12 in order to later apply descriptive and inferential statistical analysis.

As with the first layer of coding, a second rater, in this case with knowledge of the original SoI-EY framework but not the new graded framework, was recruited to take part in blind coding. First, a meeting was held in which videos were viewed and discussed alongside the new coding criteria. After this, the second rater and I trialled blindly coding observations within the meeting, one at a time. Results were discussed and coding disagreements resolved, resulting in some changes to original given codes. Following this a 10% portion of videos was chosen using an online research randomizer tool. Again, weighted kappa () with quadratic weights (Fleiss & Cohen, 1973) was run to determine the level of agreement. To determine the agreement on the coding of domains, as these categories are not ordered, Cohen's was run (Hallgren, 2012).

Table 4 *Emerging, achieving and excelling criteria for the SoI framework Levels 2 – 5*

Level	RPI	Main descriptor	Emerging	Achieving	Excelling
2	Reactive	Shows an awareness of sound	Consistently reacts to one type of sound	Consistently reacts to two types of sound	Consistently reacts to at least three types of sound
2	Proactive	Intentionally makes or controls sound	Intentionally makes or causes one type of sound	Intentionally makes or causes two different types of sound in two different ways	Intentionally makes or causes three different types of sound or more in three or more different ways
2	Interactive	Interacts with others using sound	Responds to one type of sound by making a sound or makes one type of sound expecting a sound to be made in response	Responds to one type of sound by making a sound and makes one type of sound expecting a sound to be made in response	Responds to two types of sound or more by making a sound and makes two types of sound or more expecting a sound to be made in response
3	Reactive	Reacts to simple patterns in sound	Consistently reacts to one type of pattern in sound	Consistently reacts to two types of pattern in sound	Consistently reacts to at least of pattern sound
3	Proactive	Makes simple patterns in sound intentionally	Intentionally makes one type of simple pattern in sound	Intentionally makes two different types of simple pattern in sound	Intentionally makes three different types of simple pattern in sound
3	Interactive	Copies others' sounds and/or is aware of own sounds being copied	Recognises own individual sounds being copied or copies another's individual sounds	Recognises own individual sounds being copied and copies another's individual sounds	Recognises own simple pattern or patterns in sound being copied and copies another's simple pattern or patterns in sound
4	Reactive	Recognises musical motifs and the relationships between them	Consistently recognises one distinct musical motif	Consistently recognises two distinct musical motifs or reacts when one motif is repeated or varied (as in 'call and response')	Consistently recognises at least two distinct musical motifs and reacts when one motif is repeated or varied (as in 'call and response')
4	Proactive	Reproduces or creates distinctive musical motifs and potentially links them together	Sings or plays a motif, with a distinct musical identity, which may be made up or copied from somewhere else	Repeats or varies motifs or links different motifs together to form short musical narratives that are not in time and/or not in tune	Repeats and varies the same motifs and links different motifs together to form short musical narratives that are not in time and/or not in tune

4	Interactive	Engages in musical dialogues using motifs	Any one of the following: (a) produces motifs to be repeated or varied by someone else; (b) repeats or varies motifs that are provided by someone else; (c) responds to motifs produced by someone else by producing different motifs that follow coherently	Any two of the following: (a) produces motifs to be repeated or varied by someone else; (b) repeats or varies motifs that are provided by someone else; (c) responds to motifs produced by someone else by producing different motifs that follow coherently	All three of the following: (a) produces motifs to be repeated or varied by someone else; (b) repeats or varies motifs that are provided by someone else; (c) responds to motifs produced by someone else by producing different motifs that follow coherently
5	Reactive	Attends to whole pieces of music, anticipating prominent structural features (such as the choruses of songs) and responding to general characteristics (such as metre and mode)	Any one of the following: (a) anticipates prominent structural features of short pieces (played and not sung); (b) moves in time to different metres (such as three and four time); (c) responds in different ways to different modes (such as major and minor keys)	Any two of the following: (a) anticipates prominent structural features of short pieces (played and not sung); (b) moves in time to different metres (such as three and four time); (c) responds in different ways to different modes (such as major and minor keys)	All three of the following: (a) anticipates prominent structural features of short pieces (played and not sung); (b) moves in time to different metres (such as three and four time); (c) responds in different ways to different modes (such as major and minor keys)
5	Proactive	Performs, improvises or composes simple pieces of music of increasing complexity	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Initial (P, M, D) and Grade 1 (P, M, D)	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Grade 2 (P, M, D) and Grade 3 (P, M, D)	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Grade 4 (P, M, D) and Grade 5 (P, M, D)
5	Interactive	Performs, improvises or composes simple pieces of music of increasing complexity with others	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Initial (P, M, D) and Grade 1 (P, M, D)	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Grade 2 (P, M, D) and Grade 3 (P, M, D)	Six levels: performs, improvises or composes pieces with others at the level of Trinity College exams Grade 4 (P, M, D) and Grade 5 (P, M, D)

4.6.3 Video Coding Layer 3

A final layer of coding took place which would be used to explore the context of the observations, including the surrounding environment, social context, and activity. This coding aligns with 'attribute coding' (Saldana, 2013, p. 70) which contains basic descriptive information. These codes would later be used for quantitative analysis in order to 1) describe and summarise the environment, social context and musical activity present within the observations and 2) explore the relationship between SoI-EY level of musical development and a child's surrounding environment and activity. Table 5 lists the codes used.

Table 5 *Codes for observed environment and activity*

Setting 1	**Setting 2**	**Social Context 1**	**Social Context 2**	**Activity Lead**	**Activity 1**	**Activity 2**
Home	Inside	Alone	Adult Present	Adult Led	Singing	Instrumental Play
EY Setting	Outside	With Other	No Adult Present	Child Led	No Singing	No Instrumental Play
Other				Unknown		

The main environments surrounding the child were set as Setting 1, whether observations took place in an early-years setting such as nursery/preschool/children's centre or at home or in an 'other' environment, such as in the car/on public transport/in the playground. Setting 2 refers to whether observations took place inside or outside.

In terms of social context, observations were coded for the child either being 'alone' or 'with other' (including both dyad and group activity), under the heading of Social Context 1. Social Context 2 indicated whether engagement with music took place when an adult was present or not present. Note that although interactive, proactive, and reactive tells us about a child's type of musical engagement, a child may be reactive while with another or a child's musical engagement may be coded as proactive but an adult may be supporting the child, (i.e., physically hand over hand, but not *interacting* with the child

musically). Therefore, the codes of 'alone' or 'with other' were used to capture this aspect of observations taken.

Activities were coded to be either adult led, or child led (Activity Lead). For the adult led/child led codes, if this was not clear within the observation, the observation was coded 'unknown'. The main two activities observed involved either singing (activity 1) or instrumental play (activity 2). As a number of observations had an overlap of musical activities taking place, videos were coded as either 'no singing', 'singing', 'instrumental play', or 'no instrumental play'. Therefore, a cross tabulation could display how many activities involved one, both or neither of the activities (which would constitute 'other' activities observed). Other activities included for example, listening to recorded music (with no singing or instrumental play involved).

All 796 videos, which were given an SoI-EY code, were coded according to Setting 1, Setting 2, Social Context 1, Social Context 2, Activity Lead, Activity 1 and Activity 2. These codes were first analysed using descriptive statistics presented in cross-tabular form to display the number of observations within each type of social context and activity, based within each environment. The codes were then applied using inferential statistics to explore the relationship between context and children's level of musical development, discussed further in the following section.

4.7 Analysing Children's Trajectory of Musical Development

Following on from the coding of videos, descriptive and inferential statistics were used to explore the whole dataset; this was followed by exploring the data qualitatively as pertains to individual case studies. In this way the research questions would be addressed at the group level while also taking into consideration the aspect of individuality in children's development. Data was analysed for both descriptive and

inferential statistics using R software version 1.1.463 (R Core Team, 2018), all graphs were made using the ggplot2 package (Wickham, 2016).

4.7.1 Describing the Data

First, descriptive statistics were applied to summarise and describe the data, for example, summarising participant demographics, the percentage of observations collected in relation to the framework, as well as summarising children's musical developmental level. Data is presented in tabular as well as visually in graph form.

4.7.2 Logistic Growth

Once data was summarised and visually inspected, inferential statistics were applied to explore the developmental trajectory of musical development. Carrying on from Ockelford and Voyajolu (2020) a non-linear logistic growth model was used to estimate the trajectory of musical development as observed through the SoI-EY framework in relation to age. Grimm, Ram, and Hamagami (2011) explain that when exploring growth processes in development,

> defining characteristics may include initial levels, rates of change, periods of acceleration and deceleration, when the process enters and leaves different developmental phases, and final or asymptotic levels. Growth curves are often estimated to understand these aspects of developmental processes, and non-linear growth curves are essential for capturing these various change components. (p. 1357)

The theoretical implication of a non-linear growth model is that development occurs in stages, first with a period of stable growth, followed by acceleration and eventual deceleration, leading to a plateau (Grimm et al., 2011) resulting in a sigmoidal or s-shaped curve. Non-linear growth curves have been applied to explore the development of children's cognition and language development such as lexical and grammatical

development (Robinson & Mervis, 1998; van Geert, 1991), and vocabulary growth and acquisition in children (Brooks & Meltzoff, 2008; Daller, Turlik, & Weir, 2013). While the particular non-linear models applied in these studies differ, the notion that development is not a linear process is shared. This study explores whether musical development can be considered in this light, applying a non-linear growth curve to understand how the SoI-EY framework may represent a child's evolving musical development; how the stages within the framework relate to one another; and how the SoI-EY levels relate to a child's chronological age.

A three parameter logistic growth model (Fox & Weisberg, 2018) has been applied using the 796 coded observations of 44 children between the ages of 3 and 63 months. For statistical analysis, the SoI-EY Levels 1 – 4, with respective emerging, achieving, and excelling criteria were converted into a scale from 1–12 (i.e., 4 Levels x 3 criteria within each level). This was then converted back to SoI-EY Level labels (i.e., 2.1, 2.2, 2.3, 3.1, 3.2, 3.3) in all tables, graphs and written work.

Let χ be a child's age in months, and denote the SoI-EY level by The SoI-EY level is related to the child's age in months through a logistic growth function, given as the logistic growth function as noted in Fox and Weisberg (2018) is:

$$y = \frac{\alpha}{1+exp[-(\beta+\gamma*x)]}, \text{ (Eq. 1)}$$

where α, β, and γ are unknown parameters to be estimated. Note that α is the asymptote (the SoI-EY level at which the plateau is reached), and β and γ determine the rate of growth.

The model parameters were estimated using non-linear least squares regression. Starting values for the non-linear least square regression were estimated using the coefficients of a linear model, approximating the asymptote as a value greater than any observed within the data (Fox & Weisberg, 2018). The R package 'car', (Fox & Weisberg,

2018) was used for this process. See Table 6 for the resulting model parameter estimates and standard errors.

Table 6 *Parameter estimates and standard errors for Eq. 1 considering 796 coded observations*

	Estimate	**Std. Error**
$\boldsymbol{\alpha}$	8.021	0.117
$\boldsymbol{\beta}$	-2.317	0.244
$\boldsymbol{\gamma}$	0.175	0.016

A 95% confidence interval (CI) was produced through bootstrapping (Mooney & Duval, 2011) a resampling technique through replacement in which 'the idea is to perform computations on the data itself to estimate the variation of statistics that are themselves computed from the same data. That is, the data is 'pulling itself up by its own bootstrap' (Orloff & Bloom, 2014). Multiple resamples with replacement are undertaken and the effect size then computed on each of these resamples, which are then used to determine the 95% confidence intervals. In this case, the percentile method has been used (Mooney & Duval, 2011). For 1000 bootstrap resamples of the mean difference, the endpoint values of the 2.5^{th} and 97.5^{th} percentile of the ranked differences are used as boundaries of the 95% confidence interval.

The parameters in Table 6 suggest that based on the average SoI-EY level across all the data the asymptote occurs at 8.02, or Level 4 (achieving) within the data set. However, we might also consider taking into account and applying the model to the highest SoI-EY level recorded at each age in months. This would assume that once children reach a level of musical development consistently, the ability does not decline but continues to be maintained or be built upon (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016). For analysis purposes, rather than considering the first instance in

which the highest SoI-EY level appeared, frequency of observations has also been taken into account to provide an element of consistency. For example, SoI-EY level 5 is first observed between 18-21 months (refer to Table 17 in Chapter 5), however with only one observation. Therefore, in order to generate the highest SoI-EY level observed according to age for analysis, the mode level at each age in months (conditional on preceding and following scores) was calculated. If the mode for a subsequent month was less than that of the preceding month, the higher preceding score was upheld. If the mode was greater than that of the preceding month, this greater score was upheld, and so on. Again, this is built on the assumption that once a certain SoI-EY level is reached, the ability to engage musically at this level is not lost; it is either maintained or moves to the following level. Model parameters for the resulting set of scores were then estimated using non-linear least squares regression. See Table 7 for parameter estimates and standard errors.

Table 7 *Parameter estimates and standard errors for Eq. 1 considering highest SoI-EY scores*

	Estimate	**Std. Error**
$\boldsymbol{\alpha}$	10.037	0.123
$\boldsymbol{\beta}$	-2.741	0.259
$\boldsymbol{\gamma}$	0.221	0.020

A 95% confidence interval was again derived through the same bootstrapping technique described above, using sampling with replacement.

Following this, the derivative of the logistic curve was used to produce the rate of growth for the curve at any point. The function of the derivative is as follows:

$$y = \frac{\gamma * \alpha * exp[-(\beta+\gamma * x)]}{(1+exp[-(\beta+\gamma * x)])^2} \quad \text{(Eq.2)}$$

Using this function, we can predict when growth is at its peak as well as when learning begins to decelerate. This can later be used to explore individual differences in children's development in relation to analysis of the larger data set. The function was plotted for both the average logistic growth curve and the growth curve based on the highest SoI-EY level for each age in months.

4.8 Analysing Children's Surrounding Environment

The aims and research questions addressed next will focus on 1) exploring the children's surrounding environment during musical engagement as well as how this surrounding environment (including social context) may relate to a child's evolving development and 2) exploring whether certain activities are more conducive to supporting a child's musical development than others.

4.8.1 Descriptive Statistics

The first stage of analysis here was descriptive. The codes pertaining to environment, social context, and activity were summarised by the number of observations per code in cross-tabular form. This provides an illustration of how often each coded social context and activity was observed within each setting (i.e., at home or in an early-years setting).

Further understanding of the children's musical environment and activity at home was determined through analysis of the questionnaires sent to all parents. Questionnaires were designed to gauge the type of musical activity that occurred at home in different contexts, for example how children created music on their own or with others, how much children listened to music and how they responded when listening. There was a 61% response rate, for the 44 parents/carers who were sent the questionnaire, 27 questionnaires were returned. Taking into account that the sampling for questionnaires was non-probabilistic and that the resulting sample size is small, the analysis is descriptive in

nature (Denscombe, 2010). For each question, parents were asked to rate how often a musical activity took place through Likert-type responses: never, once a week or less, more than once a week but not daily, or daily. The results for each question are displayed in graph form, illustrating the number of responses in relation to frequency of engagement for each activity. For this analysis again R software version 1.1.463 (R Core Team, 2018) was used and all graphs were made using the ggplot2 package (Wickham, 2016).

4.8.2 Multiple Regression Analysis

After summarising and describing the data, inferential statistics were used to explore the relationship between a child's SoI-EY level of musical development, surrounding environment, and musical activity, as well as considering variables such as gender and age. This was done using the coded data (questionnaire data were not included in this analysis). Here, multiple regression was applied for analysis using IBM SPSS Statistics for Macintosh, Version 26.0. The SoI-EY levels are considered here as being a continuous variable in order to perform analysis (Pasta, 2009; Poole, Lanes, & Rothman, 1984). As above, SoI-EY levels were converted into a linear scale from 1–12 for statistical analysis and converted back to Sounds of Intent levels (i.e., 2.1, 2.2, 2.3) in all tables, graphs and written work.

Furthermore, the coded data based on environment and activity was filtered in order to create dichotomous variables for purposes of analysis. This resulted in a total of 674 observations for analysis with the independent variables of outside/inside, home/early years setting, alone/with other, adult/no adult, adult led/child led, singing/instrumental play, as well as age in months and gender (male/female).

In terms of the multiple regression analysis, linearity was assessed by partial regression plots and a plot of studentized residuals against the predicted values. The assumption of linearity was met for studentized residuals against the predicted values and

for all partial regression plots, except for the partial regression plot of age and SoI-EY Level. This non-linear relationship between age and SoI-EY level has also been suggested above in section 4.7.2 in the use of a non-linear logistic growth model. In order to address this and build non-linearity into the multiple regression model, the variable of age-squared was added. The model was re-estimated showing a better fit with the addition of age-squared. for the model with the age variable only was 39.1% with an adjusted of 38.6%. When adding age squared to the model was 55.5% with an adjusted of 55.0%. Therefore, the multiple regression was run with the added variable of age-squared.

The assumption of homoscedasticity, the constant variance of the residuals (i.e., the difference between the actual and the predicted value of a data point), regardless of changes in (Fay, 2012, p. 2) was assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. In terms of the assumption of multicollinearity, while age and age squared are correlated and show multicollinearity, this is not interpreted as an issue as both have statistically significant coefficients (European Social Survey, n.d.). The variables of, adult/no adult and adult led/child led, were removed as they were highly correlated with the variable of alone/with other, and did not meet the assumption of multicollinearity. Each variable was removed separately with the regression run again. This resulted in no correlations and no multicollinearity for any variables (aside from age and age squared as mentioned) assessed by tolerance values greater than 0.1.

Therefore, a multiple regression was run to predict SoI-EY Level from the variables of Outside/Inside, Home/Nursery, Alone/With Other, Singing/Instrumental Play, age in months, age-squared and gender. No outliers were detected as there were no studentized deleted residuals greater than 3 standard deviations, there were no leverage values greater than 0.2, and no values for Cook's distance above 1, suggesting there were no influential

cases in the data present. The assumption of normality was met, as assessed by a Q-Q Plot. Again R^2 was 55.5% with an adjusted R^2 of 55.0%.

4.9 Case Study Analysis

The above methods focus on the analysis undertaken for the whole data set of observations and related results. Following this, a multiple case study design has been used to explore individual narratives of musical development over time in comparison to results which arise from analysis of the full data set. For these case studies multiple forms of evidence have been analysed and undergone a process of triangulation. As Yin (2018) describes,

> A major rational for using multiple sources of evidence in case study research relates to the basic motive for doing a case study in the first place: to do an in depth study of a phenomenon in its real world context. Being both in-depth and contextual- a context that potentially includes events over a period of time – means collecting a variety of relevant data and hence relying on multiple sources. (p. 127)

The sources of evidence used in the case studies include video and audio observation, parent interviews, and questionnaires.

4.9.1 Case Study Video and Audio Observation Analysis

The analysis of video coding according to the SoI-EY framework, as well as according to the type of musical environment and activity taking place, has been discussed above (See Section 4.6). The coded data was extracted for each individual child, creating an individual spreadsheet matrix per child to be used for analysis. Descriptive statistics were used to summarise observations as they pertain to each child, for example the number of observations in relation to the SoI-EY framework and the percentage of activity type observed. Within each case study, select video and audio observations have

been used to gain an in depth look at the musical engagement taking place. Musical content, such as extracts of children's singing, have been transcribed and notated using Sibelius Music Notation Software.

4.9.2 Analysing Individual Trajectories of Musical Development

Scatter plots have been used to visualise the observations of individual children against all observations in the study. Logistic growth analysis has been applied previously within individual case studies exploring language development over time (Robinson & Mervis, 1998). In two of the three cases here a logistic function was used to explore the individual trajectory of musical development in comparison to the results of the whole data set. However, there was insufficient data over time in the third case study to apply logistic growth analysis.

The same process of analysis was followed as described in section 4.7.2. Table 8 displays estimated parameters and standard errors for Case study 1: Maria, based on 50 coded observations. The derivative of the logistic curve was used to produce the rate of growth for the curve at any point using Equation 2. Table 9 displays the estimated parameters and standard errors for Cast Study 2: Charlie, based on 54 coded observations. For Charlie's case, analysis was also based on his highest observed SoI-EY level over time (estimated parameters and standard errors are displayed in Table 10). Results such as growth peak and deceleration are compared to the results of the full data set.

Table 8 *Parameter estimates and standard errors for Eq. 1 for Case Study 1: Maria*

	Estimate	Std. Error
$\boldsymbol{\alpha}$	10.897	0.988
$\boldsymbol{\beta}$	-3.066	0.440
$\boldsymbol{\gamma}$	0.219	0.042

Table 9 *Parameter estimates and standard errors for Eq. 1 for Case Study 2: Charlie*

	Estimate	Std. Error
$\boldsymbol{\alpha}$	8.212	0.235
$\boldsymbol{\beta}$	-29.667	13.230
$\boldsymbol{\gamma}$	1.663	0.735

Table 10 *Parameter estimates and standard errors for Eq. 1 considering Charlie's highest SoI-EY scores*

	Estimate	Std. Error
$\boldsymbol{\alpha}$	9.449	0.224
$\boldsymbol{\beta}$	-15.181	4.362
$\boldsymbol{\gamma}$	0.885	0.247

4.9.3 Interview Analysis

Semi-structured interviews were held with four parents of three case-study children separately, in order to further understand the musical engagement taking place at home. The interviews were audio recorded using the Voice Recorder and Audio Editor app on an iPad mini and then transcribed using QSR International's NVivo 12 software. Following this a hybrid approach to thematic analysis was taken in coding and developing themes from the transcribed data. Within this approach a-priori codes, based on research aims and questions or theory are used deductively while codes which arise from the examination of data are also considered and analysed inductively (Fereday & Muir-Cochrane, 2006; Swain, 2018). QSR International's NVivo 12 software was used for coding of interview data.

In this study the a-priori codes used were the SoI-EY levels (2-5) and domains (reactive, proactive and interactive), in order to code any descriptive moments of musical engagement detailed by parents of their children. A-priori codes also included description of activity. This would allow for corroboration of the musical activity taking place at home seen in the observational data and relayed by individual questionnaire responses.

A-posteriori codes arose as transcripts were read and any patterns or meanings emerged within the data. A first stage of coding took place in which segments or chunks of data were labelled assigning 'symbolic meaning to the descriptive or inferential information compiled during the study' (Miles et al., 2014, p. 62). Coding at this stage included 'in vivo' coding (Miles et al., 2014, p. 65) which uses text directly from the transcript as well as 'concept coding', which suggests a broader meaning or process found within the data (Miles et al., 2014, p. 67). In this first cycle of analysis the process included revision, such as redefining or merging codes.

A second stage of coding took place in which codes were grouped into themes or patterns (also termed family codes) in order to organise results, condense the data, and find patterns between cases (Miles et al., 2014; Swain, 2018). During this process video data was also considered. For example, as themes were found within the interview data, observational data was reviewed to explore whether these themes were also present. The resulting themes are discussed within each case study in chapter 6.

4.9.4 Case Study Questionnaire

The responses to the questionnaire for each child have been reviewed and compared with the description of children's musical engagement gleaned from the interview data and with the type of musical activity seen in video observations.

Chapter 5: Results

For review, the aims of the study were 1) to investigate the validity and relevance of the SoI framework by following individual children's development over time within the context of their natural environments, 2) to explore whether (and if so, to what extent) children's musical development as assessed using the SoI-EY framework is age related, and 3) to explore factors pertaining to the child's environment that may most effectively promote musical engagement and development. In order to meet all these aims, first the observational data was coded in relation to the SoI-EY framework as described in the previous section. This coding was then used to analyse the data as it related to the aims and research questions which focus on the relationship of musical development and the child's contextual surroundings. In this chapter, first, inter-rater reliability results are presented based on coding using the SoI-EY framework. This is followed by descriptive results summarising the frequency of observations according to SoI-EY code. Logistic growth results, which illustrate the trajectory of children's musical development, are then provided. Finally, results which pertain to the children's surrounding environment are given in relation to the observations, parent questionnaires and the multiple regression analysis.

5.1 Coding Results

5.1.1 Inter-Rater Reliability: SoI-EY Coding Layer 1

Results of the inter-rater reliability are as follows. For the trial session held with both raters for the first layer of coding, the percentage of exact agreement was 71% for SoI-EY level and 76% for SoI-EY domain. According to Bajpai and Chaturvedi (2015) a minimum level of exact agreement should be at 75%. For the next round of inter-rater reliability coding it was agreed that if more than one domain and level appeared applicable for an observation, the observation should be coded with the most dominant

level and domain. Furthermore, within the reactive domain, it was agreed that in order to interpret a child responding at Level 5, engagement should be seen for the full length of a whole song or piece being responded to (in order to distinguish between reactive Levels 4 and 5).

Following the trial round, 10% of videos were coded by the second rater. The results of the weighted kappa (κ_w) analysis with quadratic weights (Fleiss & Cohen, 1973), was a statistically significant agreement between the two coders κ_w = .740, 95% CI [.604, .875], *p* .001. The strength of agreement is substantial according to Landis and Koch (1977) and good according to Altman (1991). Table 11 depicts the cross tabulation detailing the number of observations coded by each rater, per level.

Table 11 *Cross Tabulation of SoI-EY Level codes by Raters 1 and 2*

		Rater 2				
		Level 2	**Level 3**	**Level 4**	**Level 5**	**Total**
Rater 1	**Level 2**	18	1	1	0	20
	Level 3	1	17	5	1	24
	Level 4	0	1	13	6	20
	Level 5	1	3	4	8	16
Total		**20**	**22**	**23**	**15**	**80**

Next, the inter-rater reliability results of Cohen's according to SoI-EY domain, showed a statistically significant agreement between the two coders, κ = .736, 95% CI [.604, .875], *p* . 001. Again the strength of agreement is substantial according to Landis and Koch (1977) and good according to Altman (1991). Table 12 illustrates the cross tabulation detailing the number of observations coded by each rater, per domain.

Table 12 *Cross Tabulation of SoI-EY domain codes by Raters 1 and 2*

		Rater 2			
		Reactive	**Proactive**	**Interactive**	**Total**
Rater 1	**Reactive**	27	1	4	32
	Proactive	0	21	1	22
	Interactive	4	4	18	26
Total		**31**	**26**	**23**	**80**

5.1.2 Inter-Rater Reliability: SoI-EY Coding Layer 2

The inter-rater reliability of the second layer of coding, in which SoI-EY level criteria were used (i.e., emerging, achieving and excelling) also showed positive results. Applying weighted kappa (κ_w) with quadratic weights (Fleiss & Cohen, 1973), there was a statistically significant agreement between the two coders, κ_w = .736, 95% CI [.624, .847], p . 001 (as stated previously, substantial according to Landis and Koch (1977) and good according to Altman (1991). Table 13 depicts the cross tabulation of SoI-EY criteria codes (emerging, achieving, excelling) by Raters 1 and 2. Considering only the main SoI-EY Levels (2-5) in this second layer of coding, the results were slightly more substantial, with a statistically significant agreement between the two coders, κ_w = .770, 95% CI [.668, .873], p .001. Table 14 illustrates the cross tabulation of SoI-EY main level codes by both raters.

Looking at the inter-rater agreement of domains within this second layer of coding, the results of the Cohen's analysis showed a statistically significant agreement between the two coders, κ = .535, 95% CI [.382, .688], p .001. The strength of agreement here is moderate according to both Landis and Koch (1977) and Altman (1991). (See Table 15 for cross tabulation results).

Table 13 *Cross Tabulation of SoI-EY Criteria codes by Raters 1 and 2, for coding layer 2*

		Rater 2												
Rater 1		**2.1**	**2.2**	**2.3**	**3.1**	**3.2**	**3.3**	**4.1**	**4.2**	**4.3**	**5.1**	**5.2**	**5.3**	**Total**
	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0
	2.2	0	0	0	3	1	2	0	0	0	0	0	0	6
	2.3	0	0	4	0	2	0	0	1	0	0	0	0	7
	3.1	0	0	0	1	2	0	0	0	1	0	0	0	4
	3.2	0	0	0	0	0	0	0	2	0	0	0	0	2
	3.3	0	0	5	0	3	23	0	2	2	0	0	0	35
	4.1	0	0	0	0	0	0	2	0	0	0	0	0	2
	4.2	0	0	0	0	0	0	0	5	4	0	0	0	9
	4.3	0	0	0	0	0	0	0	2	7	0	0	0	9
	5.1	0	0	0	0	0	0	0	1	0	8	0	0	9
	5.2	0	0	0	0	0	0	0	0	0	0	0	0	0
	5.3	0	0	0	0	0	0	0	0	0	0	0	0	0
Total		**0**	**0**	**9**	**4**	**8**	**25**	**2**	**13**	**14**	**8**	**0**	**0**	**83**

Table 14 *Cross tabulation of SoI-EY level codes by Raters 1 and 2, for coding layer 2*

		Rater 2			
Rater 1		**Reactive**	**Proactive**	**Interactive**	**Total**
	Reactive	7	0	0	7
	Proactive	5	35	16	56
	Interactive	1	1	18	20
Total		**13**	**36**	**34**	**83**

Table 15 *Cross Tabulation of SoI-EY domain codes by Raters 1 and 2, for coding layer*

		Rater 2				
		Level 2	**Level 3**	**Level 4**	**Level 5**	**Total**
Rater 1	**Level 2**	4	8	1	0	13
	Level 3	5	27	7	0	39
	Level 4	0	2	20	0	22
	Level 5	0	0	1	8	9
Total		**9**	**37**	**29**	**8**	**83**

5.2 Children's Trajectory of Musical Development

5.2.1 Descriptive Results: SoI-EY

After the coding process was completed, descriptive statistics were applied to summarise the musical engagement seen according to the SoI-EY framework across all coded observations. The data is summarised graphically and in tables. These descriptive results provide an initial view of how the framework captures young children's musical engagement.

A total of 950 observations were collected from the 44 children observed (22 boys and 22 girls). Within this, 465 observations were captured for the girl participants and 485 observations for the boy participants. Of these 950 videos, 16% (n = 154) were not coded in relation to the SoI-EY framework. Videos were not coded if the behavioural evidence was not sufficient to warrant a code according to the SoI-EY framework or if videos (sent by parents for example) did not contain any musical behaviours. However, some of these videos may still be important in terms of understanding the musical environment surrounding the child, even if no observable response were seen. Therefore, these videos have been used within later case studies. Of the 796 coded observations, 35.2% (n = 280) were in the interactive domain, 44% (n = 350) were in the proactive

domain and 20.9% (*n* = 166) were in the reactive domain (See Figure 7). In terms of level, 14.4% (*n* = 115) of the 796 coded observations were coded at Level 2, 39.7% (*n* = 316) were coded at Level 3, 30.4% (*n* = 242) were coded at Level 4 and 15.5% (*n* = 123) were coded at Level 5 (see Figure 8).

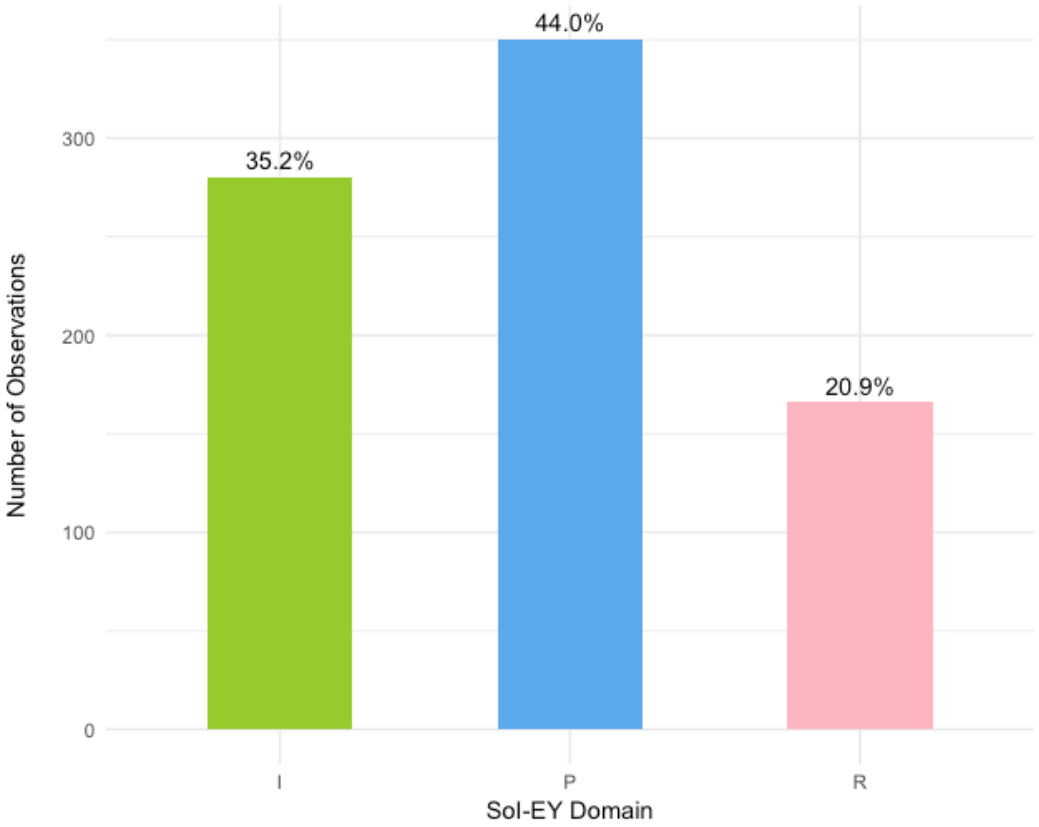


Figure 7 Number of observations per SoI-EY Domain

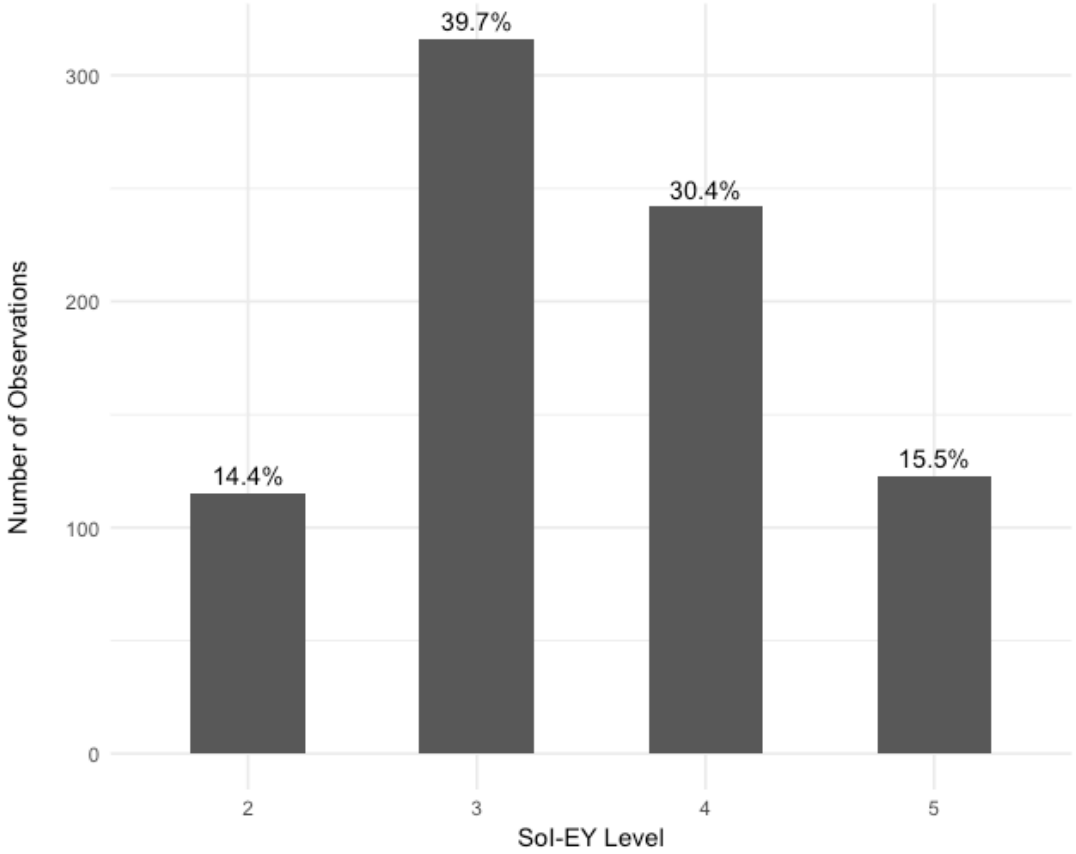


Figure 8 Number of observations per SoI-EY level

As the videos were also coded according to the categories of emerging, achieving, and excelling within each SoI-EY Level, the number of observations per category is displayed in Table 16. Note that 2.1 constitutes 'emerging', 2.2 (achieving), 2.3 (excelling) and so on, for each level. For SoI-EY Levels 2-4 the majority of observations within each level occur at the 'exceeding' range, followed by 'achieving', and finally 'emerging'. There are no instances of observations at Level 2.1. For observations at SoI-EY Level 5, the majority of observations occur at the 'emerging' stage (5.1) with only

2% of observations falling into the category of Level 5, achieving (5.2) and no observations seen for Level 5, excelling (5.3).

Table 16 *Number of observations within each of the three criteria per SoI-EY level*

Level Criteria	Level 2	Level 3	Level 4	Level 5
2.1	0	0	0	0
2.2	24 (3%)	0	0	0
2.3	91 (11%)	0	0	0
3.1	0	35 (4%)	0	0
3.2	0	66 (8%)	0	0
3.3	0	215 (27%)	0	0
4.1	0	0	26 (3%)	0
4.2	0	0	85 (11%)	0
4.3	0	0	131 (16%)	0
5.1	0	0	0	110 (14%)
5.2	0	0	0	13 (2%)
5.3	0	0	0	0
Total	**115**	**316**	**242**	**123**

Finally, the data are broken down according to SoI-EY Level, within 3-month age bands (Table 17). There are two main patterns that begin to emerge by breaking down the data in this way. First, an increase in age corresponds with moving up in the SoI-EY levels of musical development for the children within this study. Second, as higher SoI-EY levels emerge, preceding levels continue to be observed. For example, Level 3 emerges as Level 2 continues to be observed; Level 4 emerges as Level 3 and 2 continue to be observed; and Level 5 emerges as Levels 4, 3, and 2 continue to be observed. It is only Level 2 that is no longer observed at a point after 30 months of age.

5.2.2 Logistic Growth Results

Following the above descriptive results, findings will now be presented which centre on how the framework depicts children's musical development over time. The SoI-EY coded observations were used to analyse the trajectory of children's musical development in relation to age, using a logistic growth function. The results are based on 796 coded observations of 44 children between the ages of 3 and 63 months. Figure 8 depicts the resulting growth curve of musical development, including a 95% CI. The growth curve is superimposed on a scatterplot of the 796 observation points from which the analysis was undertaken.

The logistic growth function was then applied to observations within each of the three domains. Figure 10 displays the growth curve for observations within the reaction domain (*n=166* observations), proactive domain (*n=350* observations) and interactive domain *(n=280* observations).

Table 17 *Number observations per level within three-month age bands.*

Age (months)	Level 2		Level 3		Level 4		Level 5	
0-3	0	0	0	0	0	0	0	0
3-6	8	1%	0	0	0	0	0	0
6-9	14	1.8%	1	0.1%	0	0	0	0
9-12	28	3.5%	7	0.9%	0	0	0	0
12-15	27	3.4%	18	2.3%	2	0.3%	0	0
15-18	15	1.9%	36	4.5%	15	1.9%	0	0
18-21	11	1.4%	39	4.9%	30	3.8%	1	0.1%
21-24	8	1%	40	5%	34	4.3%	1	0.1%
24-27	2	0.3%	12	1.5%	26	3.3%	7	0.9%
27-30	2	0.3%	19	2.4%	25	3.1%	8	1%
30-33	0	0	22	2.8%	24	3%	22	2.8%
33-36	0	0	44	5.5%	30	3.8%	16	2%
36-39	0	0	17	2.1%	9	1.1%	17	2.1%
39-42	0	0	2	0.3%	13	1.6%	8	1%
42-25	0	0	9	1.1%	6	0.8%	15	1.9%
45-48	0	0	11	1.4%	13	1.6%	11	1.4%
48-51	0	0	8	1%	6	0.8%	10	1.3%
51-54	0	0	20	2.5%	2	0.3%	7	0.9%
54-57	0	0	3	0.4%	6	0.8%	0	0
57-60	0	0	5	0.6%	1	0.1%	0	0
60-63	0	0	3	0.4%	0	0	0	0
Total	115	14.6%	316	39.7%	242	30.6%	123	15.5%

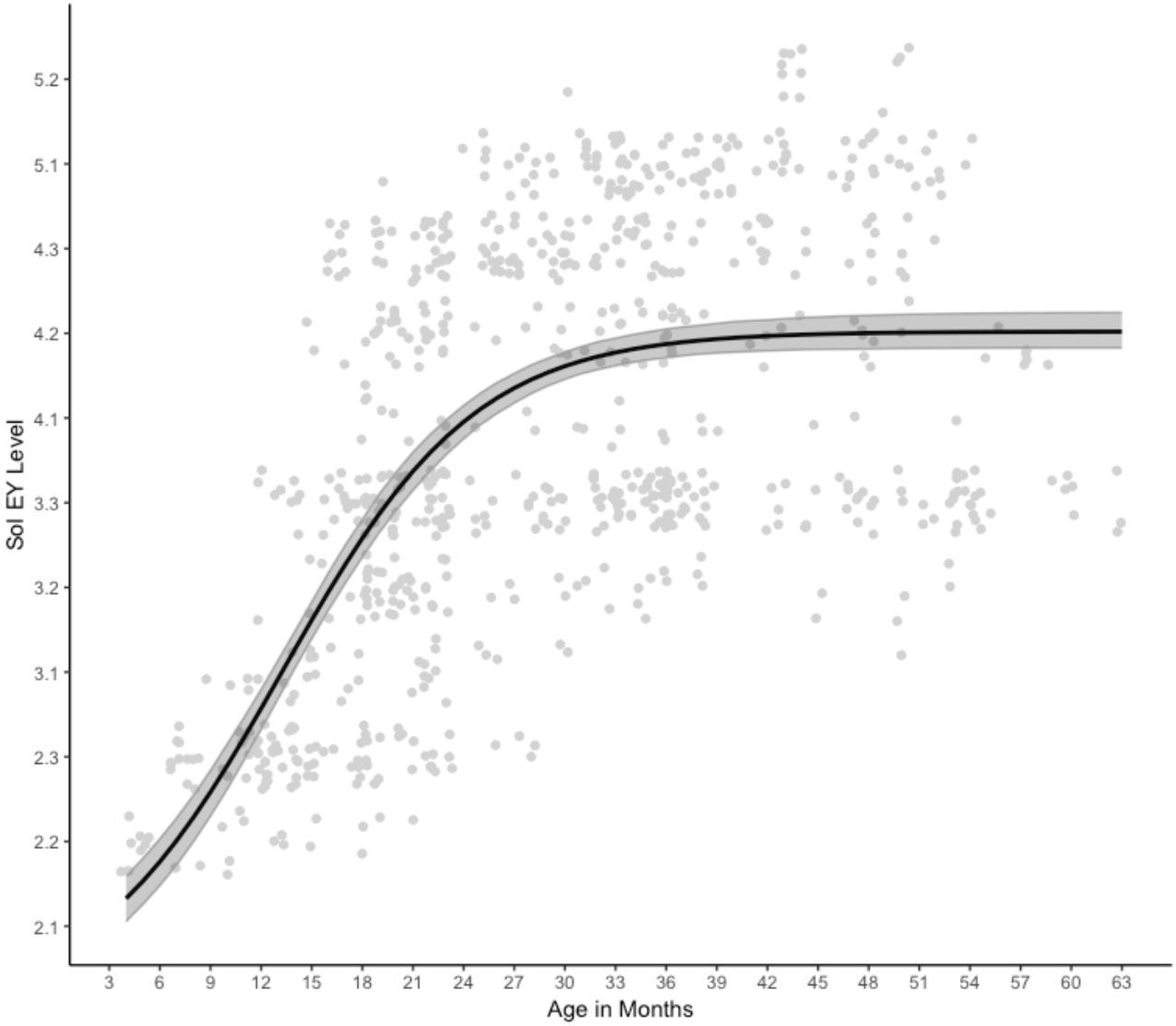


Figure 9 Scatterplot of N=796 coded observations with growth curve and 95% CI

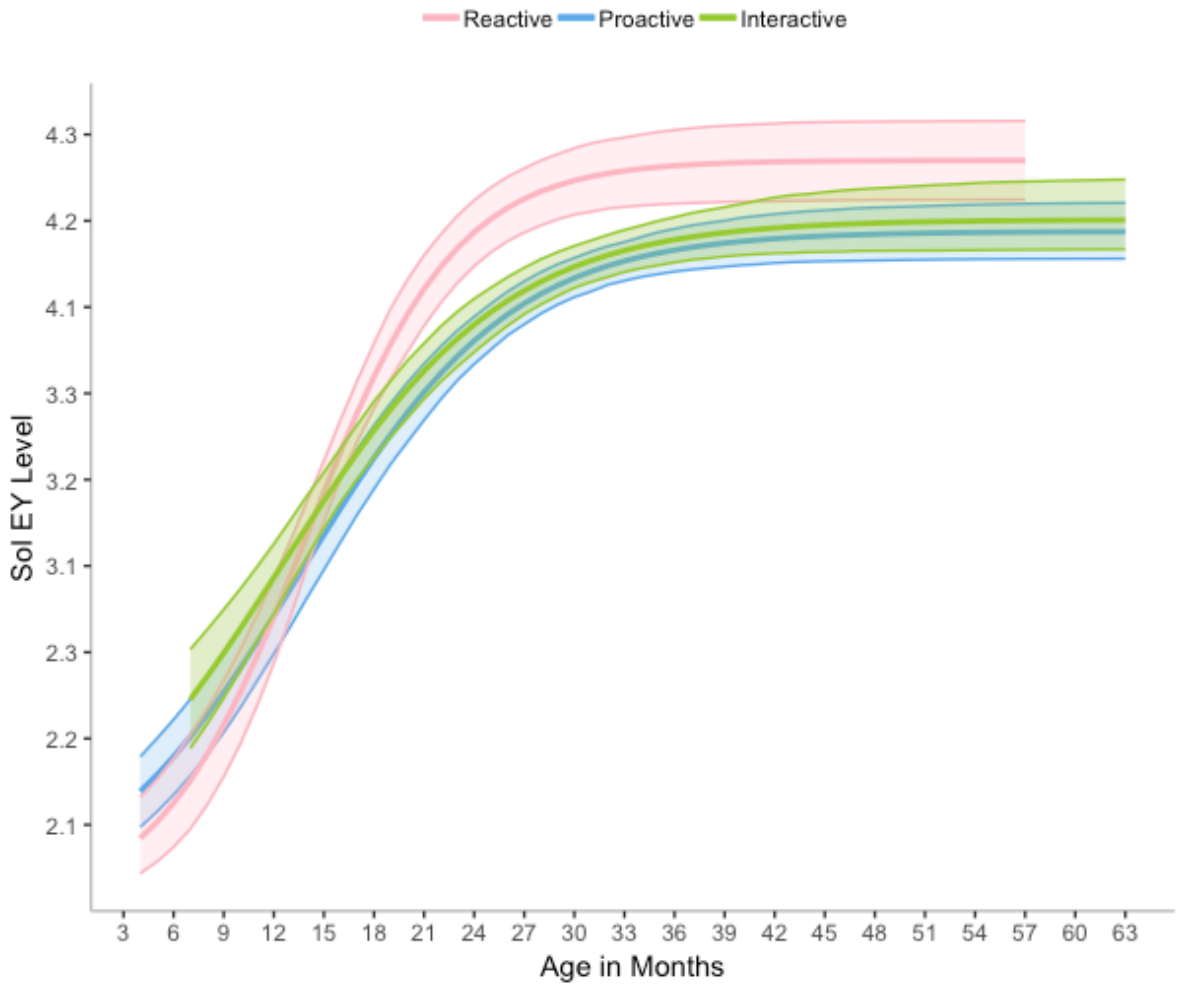


Figure 10 Growth curve for each SoI-EY domain (Reactive, Proactive, Interactive)

When based on the average SoI-EY level at each age in months, considering all domains together, and separately, the resulting plateau occurs at SoI-EY level 4 (the understanding of and creation of musical 'chunks' or motifs, not yet sung or played in time or in tune).

The model was then applied considering the optimal SoI-EY level recorded at each age in months. The resulting growth curve, with 95% CI, produced through bootstrapping, is depicted in Figure 11. This is superimposed on the growth curve based on the full set of data, superimposed over all observation points. Considering the highest

SoI-EY level the plateau now occurs at SoI-EY Level 5.1. The first predicted score of SoI-EY Level 5 occurs at 38 months, with 95% CI [9.9, 10.05].

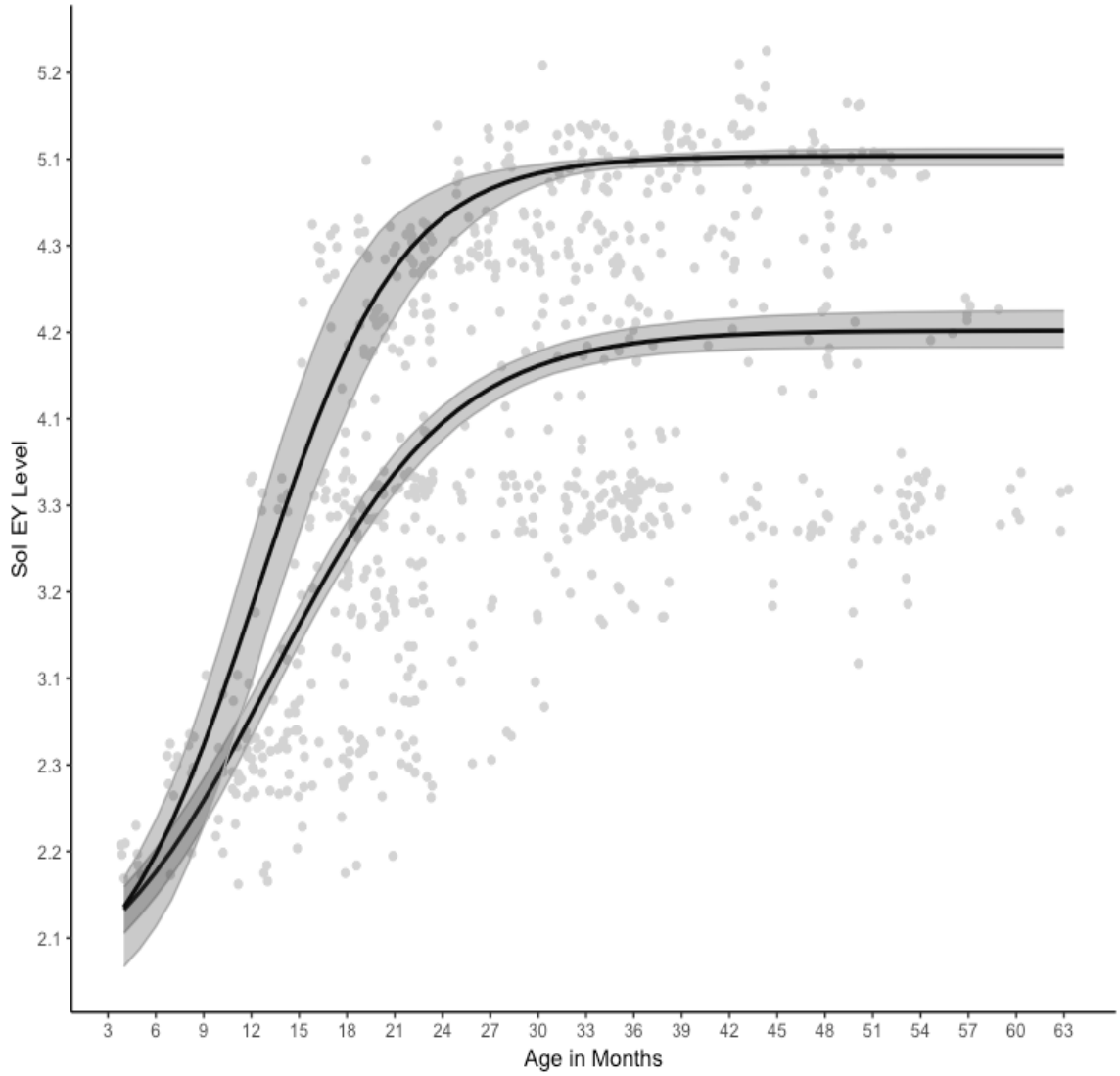


Figure 11 Growth curve with 95% CI based on highest SoI-EY level, and growth curve with 95% CI based on average SoI-EY level, superimposed on coded observation points (N=796)

The derivative of the logistic function was then used to find the rate of growth. The results based on the average SoI-EY level for all children, suggest musical growth peaks

at 13 months, with SoI-EY level at 3.92, 95% CI [3.68, 4.13]. Note that this is based on the converted scale of 1-12 for analysis, roughly translating to Level 3 (emerging). The estimated rate of growth is at .35 of a SoI-EY level per month, after which point at 14 months growth begins to decelerate (eventually reaching a plateau at SoI-EY Level 4). Note that this is .35 of an SoI-EY Level within the range of 1-12 for analysis (i.e., with 1 being level 2.1, 2(2.2), 3(2.3) etc.).

Using the same analysis, based on children's optimal level of SoI-EY musical engagement across time, growth also peaks at 13 months, at SoI-EY level 5.36, 95% CI [4.56, 6.23], with a rate of growth estimated at .58. Based on the SoI-EY scale of 1-12 used for analysis, this roughly translates to SoI-EY level 3 (achieving-excelling).

5.3 Children's Surrounding Environment

Thus far a picture of how the SoI-EY framework depicts children's development over time has been relayed. Results will now focus on data which pertains to the children's surrounding environment including the social context of others, musical activities and contextual surroundings. First, descriptive results are summarised in terms of the frequency of observations occurring in different contexts, as analysed through coding. This is followed by the descriptive results of the questionnaire, which depict the musical environment of children at home. Results of the multiple regression analysis are then presented, relating context to children's level of musical development.

5.3.1 Cross Tabulation of Observed Activity

The frequency of observations, coded according to environment, activity and social context, is summarised here in percentages. First, of the 796 coded observations 78.4% (n = 624) were coded inside, while 21.6% (n = 172) were outside, 77.6% (n = 618) took place in an early-years setting while 18.5% (n = 147) took place at home, and 3.9% (n =

31) took place in another context (i.e., transport, playground, café). These results are displayed according to setting in Table 18. Note for the setting of 'other' all observations were taken by parents.

In terms of social context, 65.6% (n = 522) of observations took place with another person(s) (child or adult) and in 34.4% (n = 274) of observations the child was engaging alone. This is illustrated per setting in Table 19.

Table 18 *Number of observations per setting inside or outside*

	Inside	**Outside**	**Total**
Home	146	1	147
Nursery	464	154	618
Other	14	17	31
Total	**624**	**172**	**796**

Table 19 *Number of observations per setting of child alone or with another*

	Alone	**With Other**	**Total**
Home	78	69	147
Nursery	175	443	618
Other	21	10	31
Total	**274**	**522**	**796**

In terms of activity, 49.5% (n = 394) of observations were coded as adult led while 44% (n = 350) were coded as child led and 6.5% (n = 52) observations were coded as unknown. This is broken up per setting in Table 20. While at home the majority of observations were child led, in the early years setting there is a slight majority for observations that are adult led. As well as this, overall in 60% (n = 461) of observations an adult was present within the activity, while in 42% (n = 335) no adult was present.

Looking at Table 21, we can see that 77% (n = 616) of observations contained singing. Of these 11.5% (n = 71) contained both singing and instrumental play, while

23% (n = 180) of observations contained either instrumental play alone (without singing) or another activity altogether. These other activities included, for example, listening to recorded music (without singing or playing).

Table 20 *Number of observations coded as adult led or child led according to setting*

	Adult Led	**Child Led**	**Unknown**	**Total**
Home	37	79	31	147
Nursery	353	248	17	618
Other	4	23	4	31
Total	**394**	**350**	**52**	**796**

Table 21 *Number of observations per activity*

	Instrumental Play	**No Instrumental Play**	**Total**
Singing	71	545	616
No Singing	140	40	180
Total	**211**	**585**	**796**

5.3.2 Questionnaire Results: Frequency of Activity Observed at Home

To supplement the overall picture of children's musical engagement, particularly at home, results of the questionnaires are displayed in graph form, detailing the frequency of activity taking place for the 27 respondents. Of the 27 responses 52% (n = 14) were for girls and 48% (n = 13) were for boys. The age of children reported in the questionnaire ranged from 5 to 52 months (M = 27.48, SD = 14.48).

The first three questions concerned how often parents heard their children making music when on their own either by singing, playing instruments or by creating sound using everyday objects. These responses are summarised in Figure 12. Of the three activities, the majority of parents , 85% (n = 23), observed their child to sing when on their own on a daily basis, followed by using everyday objects to create sound either daily, 52% (n = 14), or more than once a week but not daily, 44% (n = 12). Responses concerning instrumental play are slightly more spread, with 18.5% (n = 5) of parents observing their child using instruments daily, 37% (n = 10) more than once a week but not daily, 26% (n = 7) once a week or less and 18.5% (n = 5) never.

Following this, parents were asked how often they made music with their child in different contexts through singing, instrumental play or by creating sound with the use of everyday objects. First, Figure 13 summarises how often parents sing with their child in three different contexts, during daily routines, during play and during travel (including driving, walking, public transport). For all three contexts the majority of respondents indicated that they sing with their child either daily or more than once a week but not daily. For the majority of these children, the indication is that singing with an adult is a daily occurrence.

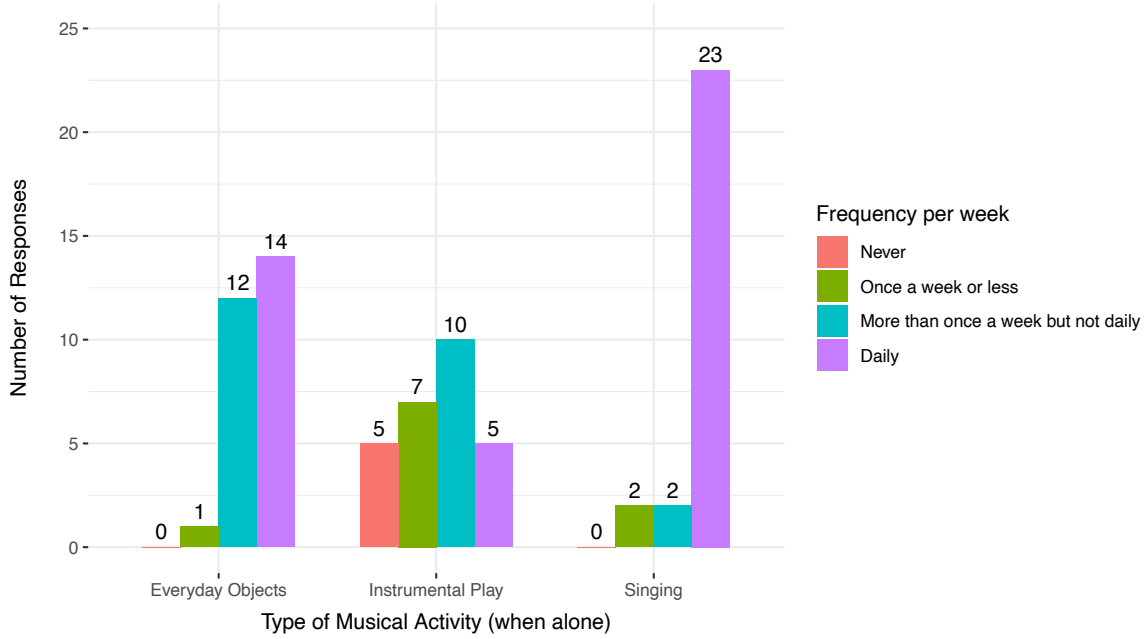


Figure 12 Survey responses: How often children make music on their own

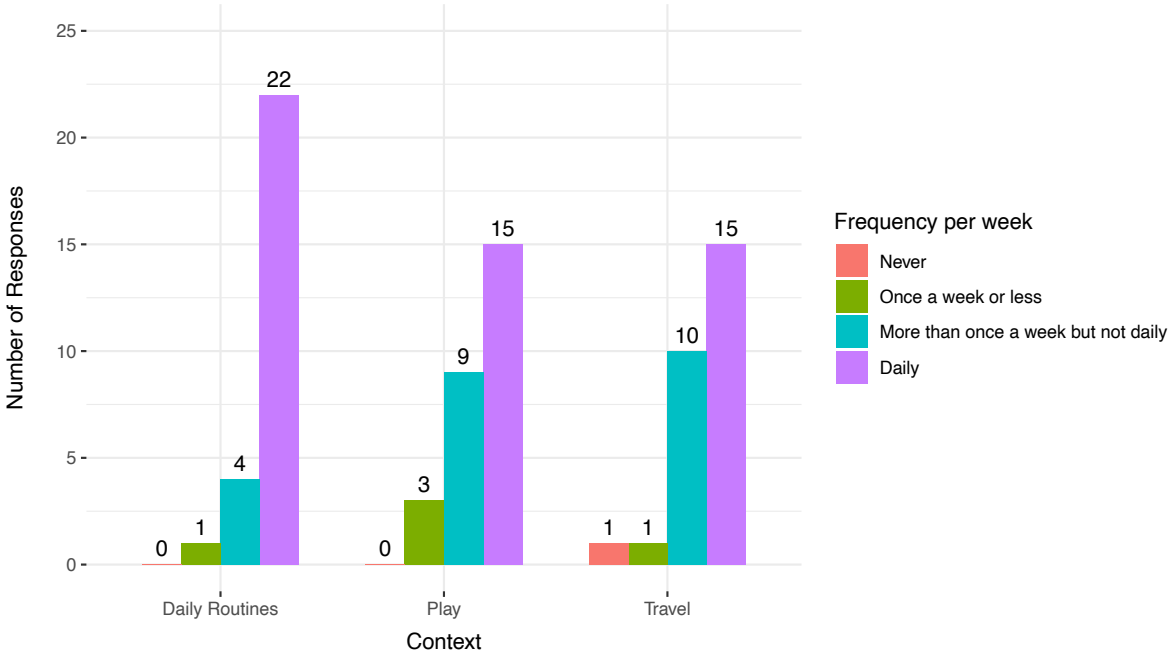


Figure 13 Survey responses: How often parents/carers sing with their child in three different contexts

The results displayed in Figure 14, which summarise the responses concerning how often parents make music with their child using instruments or everyday objects, are

more variable. More parents appear to create sound with their child using everyday objects rather than instruments, corresponding to responses in Figure 12, of how often parents hear their child creating music on their own. Overall, parents appear to engage with their child more in singing rather than in instrumental play; again this corresponds to children's music making on their own.

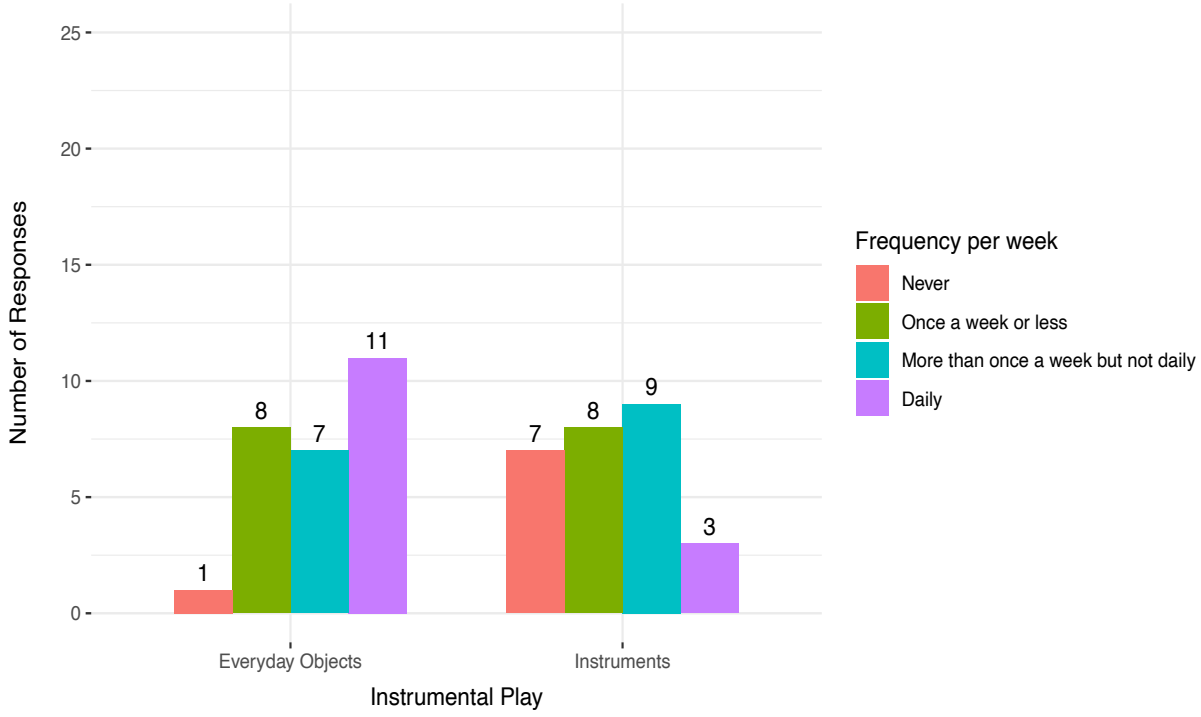


Figure 14 Survey responses*:* How often parents/carers take part in instrumental play with their child

In order to gauge how often children heard music (recorded) at home, parents were asked about the frequency of children's listening through different sources, including hearing music when watching a children's TV programme, listening to recorded music through devices such as the radio, iPod etc, through a soothing device for naps or bedtime, and through toys that play music. Figure 15 illustrates that the majority of music being heard was through recorded music played at home (either through radio, iPod, etc.),

followed by children hearing music through their favourite TV programmes, through toys that they play with and for some children through a soothing device used during sleep time.

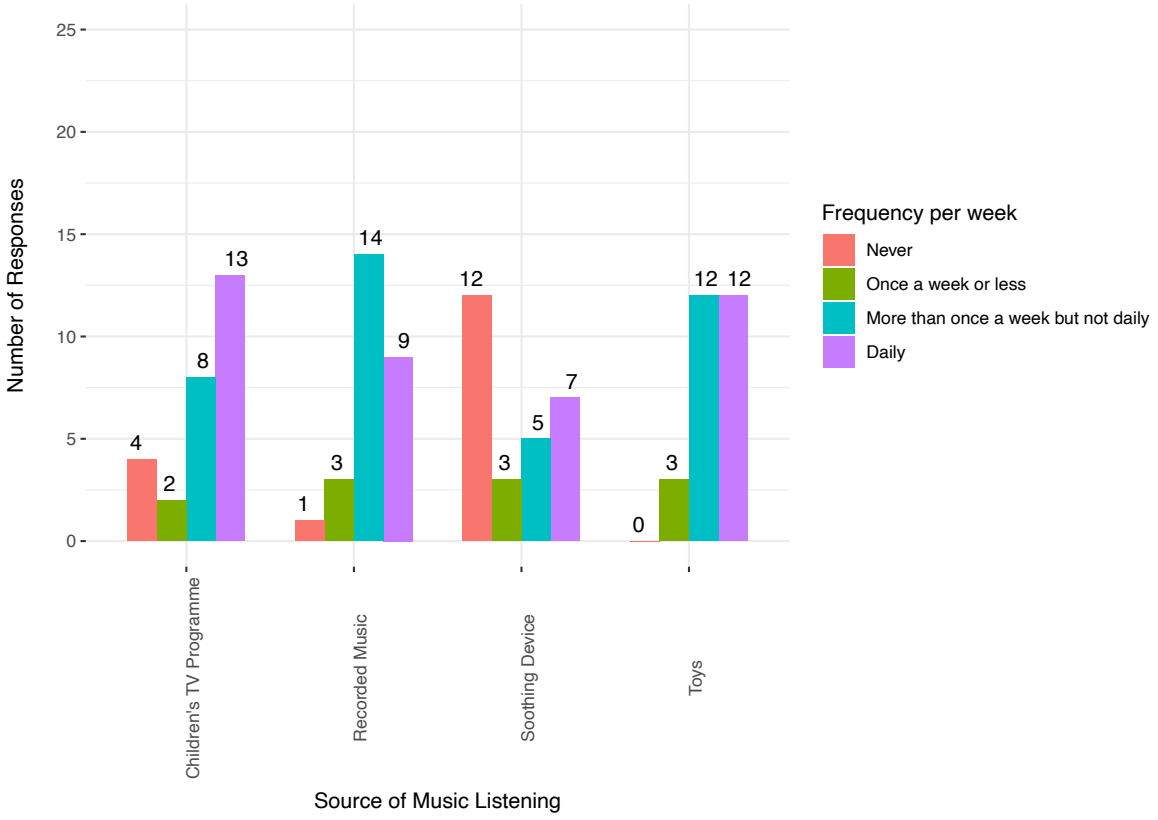


Figure 15 Survey responses: How often children hear music at home through four different sources

As well as how often children heard music at home, parents were asked to gauge how often children responded to the music they were hearing as well as how often parents responded *with* their child. Figure 16 illustrates how often children were observed to respond to the music they heard when alone or with others. All parents responded that reactions were seen in both contexts either 'more than once a week but not daily' or 'daily'.

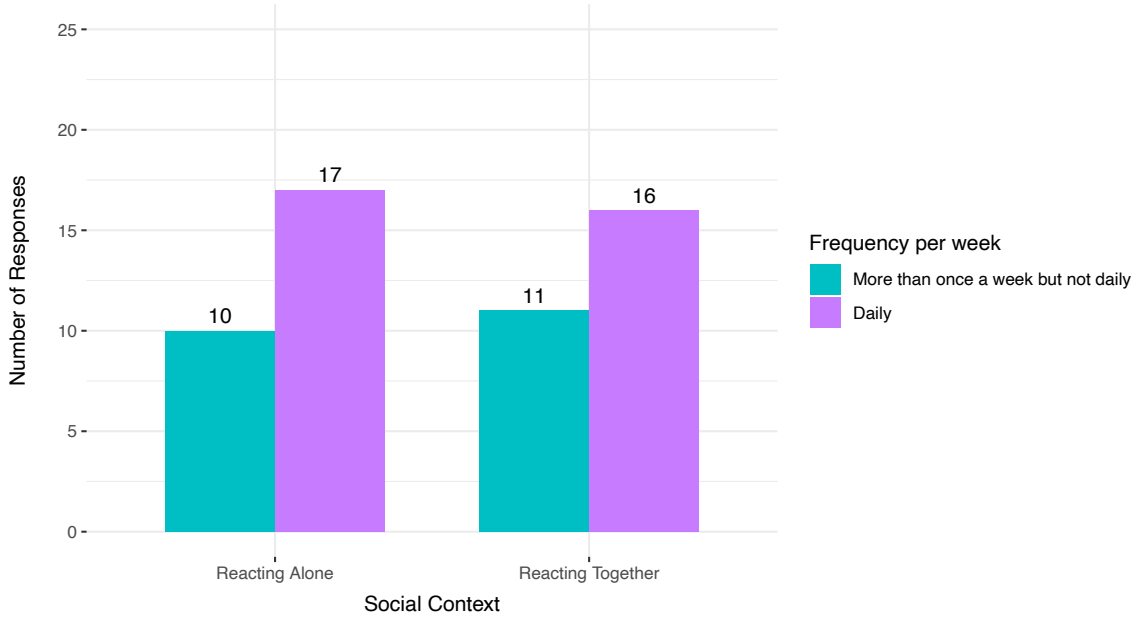


Figure 16 Survey responses: How often children respond to music they hear when alone and with others

Finally, parents were asked to report how often they took their child to music activities outside the home including: a children's centre music session, concert, library rhyme time, paid group music session, private music lesson, or a religious service which included music. No activity was attended daily. The majority of activities were attended once a week or less, with attendance at a children's centre music session and library rhyme time being attended more often than other activities listed (See Figure 17).

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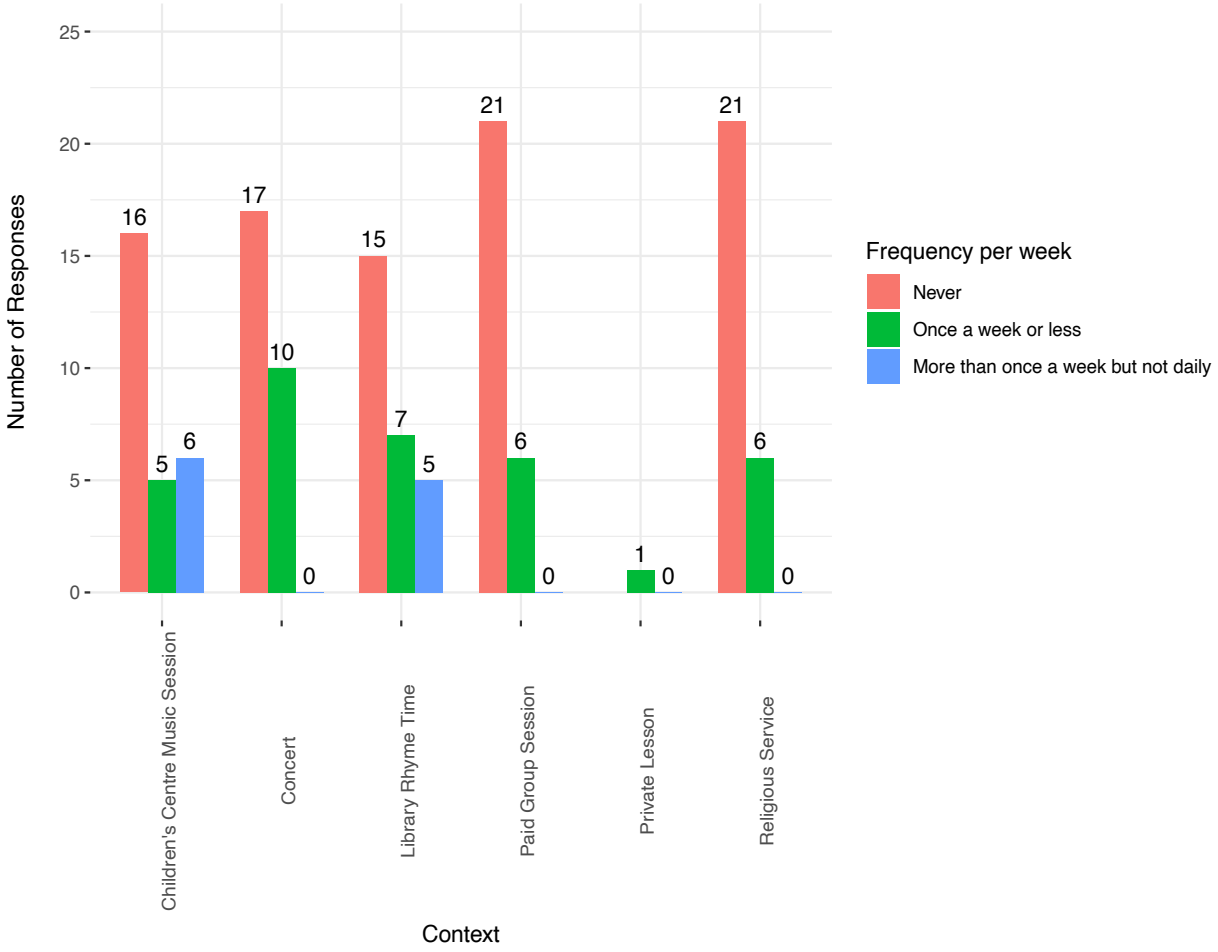


Figure 17 Survey responses: How often children attend a music group

5.3.3 Multiple Regression Results

The above results describe the musical activity at home for a portion of the children within the study. The next step was to look at the relationship between context and children's level of musical engagement according to the SoI-EY framework. Multiple regression was applied for this analysis. To review, the independent variables within the regression were outside/inside, home/early years setting, alone/with other and singing/instrumental play. Age, age squared and gender were also taken into account. Results are as follows.

Age in months, squared age, gender, outside/inside, home/nursery, alone/with other, and singing/instrumental play statistically significantly predicted SoI-EY level, $F(7,666) = 118.578$, $p < .001$, adj. = .55. Six of the seven variables added statistically significantly to the prediction, $p < .001$. Regression coefficients, standard errors, confidence intervals and standardised coefficients are displayed in Table 22.

In summary, an increase in age is associated with an increase in SoI-EY Level, however reaching a turning point, which is indicated by the negative coefficient for age squared (see Table 22). We can then explore the difference in the dependent variable (SoI-EY level) between the two categories of each of the dichotomous independent variables. In terms of gender, all other things being equal, boys engaged at an earlier SoI-EY level compared to girls, with a significant result. On average children in an early years setting, such as a nursery/preschool or children's centre, engaged at an earlier SoI-EY level of musical development, compared to children at home, with a significant result. Children engaged at an earlier SoI-EY level of musical development when on their own, compared to being with another, with a significant result. On average children engaged at an earlier SoI-EY level when outside, rather than when inside, although the result is not significant. Children engaged on average, at an earlier SoI-EY level of musical development during instrumental play rather than during singing, with a significant result.

Table 22 *Summary of multiple regression analysis*

Variable	B	SE_B	95% CI	β
Intercept	.905	.372	[.174,1.637]	
Age	.444	.023	[.400,.488]	.2.325*
Age Squared	-.005	.000	[-.006,-.005]	-1.833*
Gender (M)	-.553	.132	[-.813,-.294]	-.115*
Outside	-.232	.161	[-.549,-.084]	-.039
Nursery	-1.224	.183	[-1.582,-.866]	-.187*
Alone	-.374	.143	[-.654,-.094]	-.073*
Instrumental Play	-1.692	.167	[-2.021,-1.363]	-.271*

Note. * p value < .05, B = unstandardized regression coefficient; SE_B= Standard error of the coefficient; β = standardized coefficient.

5.5 Discussion

5.5.1 Coding and Inter-Rater Reliability

Referring back to Section 5.1, overall, the inter-rater reliability results showed a good level of agreement for the coding of SoI-EY levels and domains. However, it is interesting to note where discrepancies occurred. Looking at Table 11 (the cross tabulation of observations coded by each rater according to SoI-EY level), it is evident that the majority of disagreements occurred one SoI-EY level apart. This is of interest when considering that a child's development might be seen as being between levels and that there may be a degree of gradation within each level. In other words, advanced engagement at Level 3 of the framework might also be interpreted as the beginnings of Level 4. If we consider that for adjacent codings the child may be at a fuzzy stage between levels of development, either the lower or upper level coding may be appropriate.

For those videos coded with larger discrepancies, discussion between the two raters revealed that this was either due to error, such as a typo, or for reasons related to

interpretation. For disagreements between Levels 3 and 5, observations were within the reactive domain in which a child was moving to music. This was interpreted by one rater as responding to a whole piece of music (SoI-EY Level 5) and by the other rater as a response to a regular pattern or beat (SoI-EY Level 3). For discrepancies between Levels 2 and 4, this was again within the reactive domain: interpreted by one rater to be a reaction to familiar motifs sung by an adult within a group (SoI-EY Level 4) and another to be a reaction to the overall sound/musical experience (SoI-EY Level 2). Due to these discrepancies, it was decided that for future coding, observations in the reactive domain could consider the child's overall level of musical engagement observed in other domains as well. Furthermore, if responses were not overtly apparent, observations should be left uncoded, with notes included for reasoning. After disagreements and reasons for coding were discussed between the two raters, final codes for the videos were agreed upon.

In considering the inter-rater reliability results according to domain in this first layer of coding, disagreement between the two raters occurred most often between the reactive and interactive domains (refer to Table 12). Indeed, it was discussed that these two domains may overlap, as one may interpret a child's active response to be either a 'reaction' to another or an 'interaction' with another. For those videos which were coded interactive by one rater and proactive by another, review of videos revealed either a rating error, again such as a typo, or a situation in which an interaction interpreted by one rater was not considered a 'musical' interaction by the other. Therefore, if a musical interaction was not seen to occur, the observation was coded as proactive. For disagreements between the coding of proactive and reactive, this involved a child's singing along with a recording, for which it was decided either reactive or interactive would be a more appropriate interpretation. The decision was made that any overt musical response to a recording, such as singing or playing along, would be interpreted as 'interactive' while

those in which responses involved, for example movement, or change in expression, would be interpreted as reactive. Again, for all disagreements, after reasons for coding were discussed between the two raters, final codes for the videos were agreed upon.

Now consider results of the inter-rater reliability for the second coding layer, which implemented the SoI-EY criteria of emerging, achieving and excelling within each level (2-5). For the level of agreement concerning only the main SoI-EY levels in this instance, (see Table 14) the majority of disagreement in coding again occurs between adjacent levels. Table 13 demonstrates that when breaking down the levels into emerging, achieving and excelling a higher level of disagreement has occurred. Discussion between the two raters revealed there was a question of which of the three criteria was considered most dominant within grouped observations, which had an impact on the final code given.

In terms of rating the SoI-EY domains, the cross tabulation in Table 15 shows that while Rater 1 coded five observations as proactive, Rater 2 coded these as reactive. Inspection of the data and discussion revealed that Rater 2 interpreted for example, clapping to music and moving to music as a reaction, while Rater 1 interpreted this as proactivity – clapping, for example as creating sound. As well as this, while Rater 1 coded 16 videos to be proactive, Rater 2 interpreted these as interactive. Upon review of the differences, it was noted by Rater 2 that, 1) when observations of an individual child were being assessed within a group activity (for example, singing at the same time, within circle time) the rater focused only on the individual child's engagement rather than considering the surrounding activity/context and 2) a number of observations involving a child engaging in instrumental and vocal play next to a peer contained elements of both proactive and interactive moments, and ratings focused on the proactive, while Rater 1 felt the dominant domain of engagement was interactive. Subsequently, after all disagreements and agreements were discussed, both raters agreed upon final codes.

Overall, results of the inter-rater reliability were good. Discrepancies highlight the importance of training in the use of the SoI-EY framework, which should include discussions of how the domains and levels may be interpreted by different individuals. Next, the results which concern children's musical development over time are considered.

5.5.2 The SoI-EY Framework in Depicting Children's Musical Development

The first research question asks if the domains and levels of the SoI-EY framework are sufficient and necessary to capture children's musical development over time in varying contexts. As can be seen in the high percentage of videos which were coded using the framework, all levels and domains were applicable. Musical engagement for the children observed within this study did not appear to occur before SoI-EY Level 2 or beyond SoI-EY Level 5. While the SoI-EY descriptors of A, B, C and D (refer to Figure 3) did not feature prominently in the results, they were used to guide the coding of musical engagement within each level and were useful to the coding process in this respect.

The new criteria of emerging, achieving, and excelling provided a way to explore development within each level. Some elements of the 'emerging', 'achieving' and 'excelling' descriptors were modified to more clearly suit an early years context, as discussed within Section 4.6.2. Furthermore, as the criteria relies on a frequency of musical behaviours seen, observations were considered as a group, rather than individually. Observations of longer length may be more suited to using this modified framework, although grouping observations was a successful solution here.

Results suggest that the SoI-EY framework may be used to model children's musical development over time. Furthermore, musical development, like other areas of child development such as cognition and language (Brooks & Meltzoff, 2008; Daller et al., 2013; Robinson & Mervis, 1998; van Geert, 1991) may be a non-linear process. An

emerging pattern, seen in Table 17, suggests that an increase in age corresponds with an increase in SoI-EY level. The results of the first SoI-EY project, which explored the musical development of 55 children through the analysis of 125 observations, also found this relationship between age and SoI-EY level (Voyajolu & Ockelford, 2016). However, both the logistic regression and the multiple regression analysis suggest that a turning point occurs as growth begins to decelerate. A further suggestion is that the transition from one SoI-EY level to the next occurs while preceding levels continue to develop. This relationship between levels will be explored further in terms of children's individual development in subsequent case study chapters.

5.5.3 Application of a Logistic Growth Curve

Perhaps the most critical result here is the suggestion that within musical development stages may occur such as that of rapid growth and deceleration. These results build on the application of the logistic function applied to the analysis of data from the first Sounds of Intent in the Early Years pilot study (Ockelford & Voyajolu, 2020). However, the first study had a comparatively smaller number of observations (N=125) (Ockelford & Voyajolu, 2020) and data did not fully reveal a period of rapid growth or a plateau, as has been suggested here. The results of this study also add confidence intervals, rate of change, suggested growth peak, as well as analysis based on of the average and optimal levels of engagement over time. Furthermore, applying the graded system of emerging, achieving and excelling, provides an estimate of predicted growth *within* levels. This study also applies logistic growth analysis to individual children (which will be detailed in Chapter 6), allowing for unique trajectories of musical development to be compared to the results of the larger data set. Overall, to date these two studies are the first which explore the use of non-linear growth curve analysis as

applied to the musical development of children in the early years, using the SoI-EY framework.

Referring back to Figure 11, when based on the average SoI-EY level per age in months, the plateau occurs at SoI-EY Level 4 (the understanding of and creation of musical 'chunks' or motifs, not yet sung or played in time or in tune). Alternatively, when based on the optimal observed level of musical engagement, this plateau occurs at SoI-EY Level 5 (emerging) in which children are beginning to demonstrate the ability to sing or play whole songs in time and in tune. Consider here Van Geert's (1991) definition of 'carrying capacity' (p.6). He defines carrying capacity in relation to cognition, with the specific example of word acquisition:

> In summary, carrying capacity is a one-dimensional growth variable, namely the growth level of a specific grower (e.g. words). It expresses the multi-dimensional structure of available resources in terms of the maximal stable level the grower at issue could achieve in the presence of these resources…Increase in external resources will in general lead to an upper limit in the carrying capacity, which is characteristic of intrinsic (but changeable) limitations in the internal resource factors. (p.7)

Here the 'specific grower' would be musical engagement at a particular SoI-EY level and the multi-dimensional structure of resources would be the environmental and contextual factors surrounding the child during this level of musical engagement.

When based on all the data within this study, analysis of observations includes *all* types of musical engagement, i.e., structured adult led activities, spontaneous child led activities, instrumental play, singing learned songs with others as well as alone, and singing self-invented songs. All conditions and contexts are considered, and all types of musical engagement are considered at all levels over time. The range of musical

engagement over time is illustrated in the scatterplot over which the growth curves are superimposed in Figure 8. It may be reasonable to assume that growth, for this particular data set, reaches its plateau at SoI-EY Level 4, when based on what is occurring *on average* for the children concerned. It may also be that the continued engagement occurring at SoI-EY Level 3 (with a focus on pattern and imitation) is pulling down the average and causing the model to underpredict. Keep in mind as well that from 54 months onwards, the number of observations begins to decrease (refer to Table 17) and at this age range, no observations were captured at SoI-EY Level 5. This does not mean that children from 54 months onwards were not engaging at this level, only that this engagement was not captured. In contrast, when basing the analysis on the most optimal SoI-EY level observed, perhaps under the most optimal conditions (both internal and external) there is an increase in carrying capacity, reaching SoI-EY level 5, 'emerging'.

In both cases (results based on the average and on the most optimal level of engagement seen) a rapid period of growth peaks at 13 months, at SoI-EY Level 3 (albeit with differences in criteria stage). Up until this point the two trajectories are closely aligned. It is when SoI-EY Level 3 begins to take centre stage that the two trajectories begin to separate in their course. Consider the approach mentioned above, that the component of growth being observed is impacted by both the internal and external resources surrounding it. Perhaps during this stage, a child's developmental path is impacted by the richness of the surrounding musical environment, including social relationships, which provide opportunity for musical engagement and interaction from which to imitate. Furthermore, if we consider that in both cases the gradual deceleration in growth begins to occur within the transition from SoI-EY Level 3 to 4, perhaps this points to the increase in cognitive demand placed on the child, moving from the processing of pattern and immersion in imitation, to that of processing groups or musical

motifs. As the estimated trajectory of growth continues to slow, the cognitive demand again increases from SoI-EY Level 4 to SoI-EY Level 5 (when based on optimal observations). While this has been considered for the full set of data, the age at which these stages of growth occur may be different for individual children, and this will be explored further within case study material.

When exploring the results of the logistic growth curve a number of considerations should be made. First, in terms of the emergent 'plateau' there may be issues due to sampling as data at either end of the age spectrum is lacking. Had more extensive observations been taken for those at the youngest and eldest age group results may have shown a different picture, i.e., a rising curve that does not reach a plateau or a plateau which occurs at a later age, for example. As well as this, consider that there may be limitations in applying a particular model, such as logistic growth, in that the resulting curve is shaped by the assumptions imposed by the model, rather than being driven by the data. Finally, consider that the SoI-EY framework of musical development does not go beyond Level 5; therefore, a case made be made that the framework in itself creates a plateau when applied to children's observed level of musical development.

It is also important to note that the 'plateau' here does not suggest that musical development ceases in early childhood at SoI-EY Level 5, with no onward growth. Rather, that this represents a period or phase in one's overall developmental trajectory. Dawson-Tunik, Commons, Wilson, and Fischer (2005) in referring to the 'shape of cognitive development' suggest that over the lifespan development is not continuous but 'proceeds in a series of spurts and plateaus' (p. 187). They refer to plateaus in development as 'periods of consolidation' (p. 171) which are followed by periods of transition. Moreover, van Geert (1991), discusses the concept of growth models that 'lead to a picture of stepwise increasing growth curves, with mutually exclusive plateaus and

rises' (p. 45), which would form a wavelike pattern over time. Finally, Robinson and Mervis (1998) in their research of lexical development in language suggest that their data allow for the observation of what occurs beyond the plateau of a logistic curve, in which 'a new learning process may take over' (p 368). Overall, the results of the logistic growth analysis here suggest a pattern within the observed period of early childhood development according the SoI-EY framework. However, the limitations noted above in terms of why the 'plateau' may have emerged within the data should be considered as well as the notion that in theory, further development would follow.

5.5.4 Children's Surrounding Environment and Musical Development

The results above explore how children's musical development is depicted over time according to the SoI-EY framework. However, the aim of the study was also to take children's environment into account. Therefore, the discussion moves on to the results which pertain to the context surrounding the child. Overall, the data reveals that collectively music is prevalent in the lives of the children in the study, both within early years settings and at home. Literature exploring the musical activity of children at home has revealed similar results. Blackburn (2017) noted that the majority of young children in her survey of musical activity at home in England, took part in musical activity on a daily basis or at least on a weekly basis. Lamont's (2008) research into the musical worlds of children in the UK between the ages of 3 to 4 years, revealed that children were exposed to music for 81% of their day (p. 252).

The type of musical activity most prevalent within the current study, in terms of both observation and questionnaire data, is of children's singing activity. While Blackburn (2017) found that listening to music with others was the most prevalent activity within her survey, this was followed by singing with others. Indeed, if we take a closer look at the observational data of the current study overall, 70% of singing activity took

place with others, while 30% of singing activity observed took place alone. The children represented in the questionnaire (*n=27*) were observed by parents to sing when alone as well as with others (most notably during daily routines) on a daily basis. Whether alone or with others, this suggests that singing is clearly a major aspect of children's daily musical engagement, at least for the sample of children observed here.

There may be a number of reasons why singing occurred more predominantly than other activities. It may be that there are less opportunities for instrumental play or creating sound with objects; resources may not be as readily available for instrumental play to take place while singing can occur in any context at any time. Furthermore, while the use of devices for music listening did occur within the current study, the aim was not to explore the prevalence of technology within the musical engagement of early years children. Therefore, if singing was occurring while listening to music, the singing component was considered the primary activity to note. In regard to children's listening to recorded music at home, although the sample is small, responses to the questionnaire suggest that the majority of children are listening to music on a device 'at least more than once a week but not daily' or 'daily'. For these children this appears often as a social activity, with parents reporting they respond *with* their child to the music, again 'at least more than once a week but not daily', or 'daily'.

In summary the overall picture provided for the sample of children within this study suggests a high engagement with music, both at home and in early years settings. One limitation here is that questionnaires sent to parents at home were not distributed to early years settings. Therefore, we cannot compare the frequency of musical activity, as relayed through the questionnaire, between these two contexts. What the data suggests however, (both observationally and through questionnaires) is that singing is a major aspect of musical engagement in the early years, for this sample, more so than music

listening. While we know that for many children this appeared to be a daily activity, we do not know for this sample, how often this occurs throughout the day. Interestingly, in her study which tracked the singing of fifteen children aged three and four years at home using LENA all day recording technology, Dean (2017) found that the amount of singing recorded for each child on a daily basis was highly variable and individual.

5.5.5 Applying Multiple Regression

After gathering an overall picture of children's musical activity, we now look to the results which explore the relationship between surrounding context and SoI-EY level of musical development. For the children in the current sample, girls' level of musical development appears to supersede that of boys. Literature has noted gender differences, in terms of children's singing ability, however in the upper age range of the early years (for example between the ages of five and nine years) and concerning pitch matching and improvisation singing tasks (Ilari, Fesjian, Ficek, & Habibi, 2017), and singing competency (Mang, 2006; G. Welch, Sergeant, & White, 1997). However, Welch, Sergeant, and White (1997), with a focus on pitch accuracy or singing in tune, noted that their overall findings revealed less differences between girls and boys than had previously been supposed. Pollatou, Karadimou and Gerodimos (2005) found that for children aged 5 years, girls outperformed boys within rhythmic tasks (matching an external tempo through body movement), however, not in tonal and rhythmic discrimination as measured through Gordon's (1986) *Primary Measures in Music Audiation*. The findings from the current study differ from those cited in that musical engagement was not measured within a tested context but rather assessed within varying contexts in the children's everyday lives, during an earlier stage of childhood.

The notion that children are observed to engage with music at a more complex stage of musical development at home compared to early years settings could be

representative of children being within a context, which allows them to demonstrate engagement within optimal circumstances. For example, Trehub and Gudmonsdottir (2019) suggest that a proportion of the literature on young children's singing development underestimates their abilities, which may exhibit a more optimal level of engagement in the comfort of their own home, rather than in an educational setting in which they are observed or tested. Results here may also have an element of bias in that parents who chose to observe their children at home, have a higher interest or investment in musical activity. Results also suggest children's musical engagement is observed to be at a higher SoI-EY level during singing activity rather than during instrumental play. If children are exposed to singing on a daily basis, rather than instrumental play, perhaps this has an impact on how much opportunity and motivation children have to explore sound using objects and instruments. Furthermore, while singing seems to dominate and have an impact on observed level of musical development within the current sample, research exploring the musical engagement of children with visual impairment (with and without concurrent learning difficulties) has shown that emergent musical engagement and potential has often demonstrated itself in the form of self-taught instrumental play (Matawa, 2009; Pring & Ockelford, 2005). This highlights the importance of considering musical engagement in the context in which it occurs, as well as taking into account the variability and individual differences between children. However, the results here may suggest that (within the context of mainstream early years musical activity) the opportunity for children to partake in instrumental play, both through self-exploration, during play and in a more guided format with others, may be lacking.

Finally, that children engage at a higher SoI-EY level when with another, rather than when alone, suggests the impact which scaffolding may have on a child's musical development. However, these results should not discredit the role that children's solitary

activity may have on a child's musical engagement as well. The results so far are a step in understanding the impact of social interaction and context on a child's level of musical engagement and development. The application of case studies to investigate the musical engagement of individual children over time, seeks to explore these results in more detail.

Chapter 6: Case Studies

Thus far, exploring the results as they pertain to the full data set has followed a 'variable oriented approach', in which broad patterns are explored rather than single cases and comparisons between them (Miles et al., 2014, p. 102). From this point onwards, the research aims and questions will be considered as they relate to individual case studies. For review the aims of the study are 1) To investigate the validity and relevance of the SoI-EY framework by following individual children's development over time within the context of their natural environments, 2) To explore whether (and if so, to what extent) children's musical development, as assessed using SoI-EY framework, is age-related, and 3) To explore factors pertaining to the child's environment (including interpersonal relationships with key adults and peers, activities and contextual surroundings) that may most effectively promote musical engagement and development in the early years.

The case studies will be presented individually followed by a final comparative discussion. Each case will first explore the trajectory of children's musical development using similar methods as those for the full data set, summarising the observational data according to the SoI-EY framework over time. The discussion of these results will address two research questions: 'How do the stages in their present or modified form relate to one another in their representation of a child's evolving musical development?' and 'Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of this relationship between these two factors?'

Research questions concerning each child's musical development in relation to the contexts in which they engage, will also be addressed. These questions are, 'What impact does the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement

and development?' and 'Do some activities within the home and settings such as children's centres more effectively promote musical engagement and development than others, and if so which, and in what ways?'

The relationship between context and musical development will be explored with an emphasis on qualitative analysis and results. Case studies are organized into three themes, which arose from the research aims and from data analysis. Each theme provides a broad picture of the child's musical engagement; the themes are 1) the child's surrounding musical environment and activity, 2) family musical culture and history and 3) interaction with musical activity through choice and repetition. Within each case study, select moments of musical engagement as they relate to the SoI-EY framework of musical development will be explored. All three cases will then be discussed in relation to one another and to the results of the larger data set.

6.1 Case Study Characteristics

Three children and families will be presented, providing a narrative of individual musical engagement and development over time. Given the results, which suggest that children tend to engage at later stages of musical development when observed at home, the case studies will focus on the home environment to explore musical engagement in this context further. General characteristics of the children are described here first.

All three children and families attended a children's centre in London (Setting 3 as describe in Section 4.2.1). For review, I observed children and their parents in the children's centre stay and play session. This was a free play session, in which children explored a range of toys and activities, both indoors and outdoors. A music area was included inside with instruments laid out for free play. Each session ended with a ten-minute group singing session led by children centre staff and including the children and their parents. While children and their parents were observed during this session, the

majority of observations for each of the three case study children were sent from home. Table 23 lists the case study children, age at first and last observation and total number of video observations collected. Observations ranged in length from 30 seconds to 5 minutes for each child. Pseudonyms for the children are used to ensure anonymity. For two of the three case studies, Maria and Mateo, permission has been given to share photo and video material, however for Charlie, photos and or/video will not be used.

Table 23 *Case study participants, age at first and last observation and number of observations*

Case Study	Age at first Observation	Age at last Observation	No. of Video Observations
Maria	7	30	48
Charlie	17	42	76
Mateo	15	38	71

The data used within each case study (as described in the case study methods section, 4.9) includes video observations, interview transcripts and questionnaire responses.

6.2 Case Study 1: Maria

Maria and her family joined the project when Maria was 7 months old. Maria was an only child and lived with her father and mother in London. Her father was born in Italy and mother in Poland, now both settled in the UK. Three languages were spoken at home; Italian, Polish and English. At the start of the project Maria and her mother attended a weekly play session in the children's centre as described above.

6.2.1 Maria's Observations According to the SoI-EY Framework

In total, 48 observations were collected for Maria over a 24-month period both from the children's centre and at home, starting when Maria was 7 months of age and ending when she was 30 months of age. Although with time Maria no longer attended the

children's centre, video observations from home continued to be uploaded via the EthOS app. Indeed, the majority of observations were taken at home. Of the 48 observations collected, 39 were coded according to the SoI-EY framework. If the observations did not include clear evidence of activity with sound or music it was not coded. For example, if Maria was listening to music, she may have been responding internally, but externally this was not possible to see.

Broken down, 25.6% (n = 10) of observations were in the reactive domain, 51.3% (n = 20) were in the proactive domain and 23.1% (n = 9) were in the interactive domain. Table 24 provides the number of coded observations for Maria according to SoI-EY level, within three-month age bands. Overall the majority of observations were coded at Levels 2, 3 and 4 with only three observations at Level 5, first observed when Maria was between 18-21 months.

Table 24 *Maria's number of coded observations per level within three-month age bands*

Age (months)	**Level 2**		**Level 3**		**Level 4**		**Level 5**		**Total**	
6-9	3	7.7%	0	0	0	0	0	0	3	7.7%
9-12	10	25.6%	1	2.6%	0	0	0	0	11	28.2%
12-15	0	0	7	17.9%	1	2.6%	0	0	8	20.5%
15-18	0	0	4	10.3%	2	5.1%	0	0	6	15.4%
18-21	0	0	0	0	4	10.3%	1	2.6%	5	12.8%
21-24	0	0	0	0	3	7.7%	1	2.6%	4	10.3%
24-27	0	0	0	0	1	2.6%	0	0.0%	1	2.6%
27-30	0	0	0	0	0	0	1	2.6%	1	2.6%
Total	**13**	**33.3%**	**12**	**30.8%**	**11**	**28.2%**	**3**	**7.7%**	**39**	**100.0%**

6.2.2 Maria's Trajectory of Musical Development

In order to explore Maria's musical engagement over time according to the SoI-EY framework, her observational data is first depicted visually using a scatterplot. Figure 18 displays Maria's observations (n=39) superimposed on the observation points of the full data set (N=796).

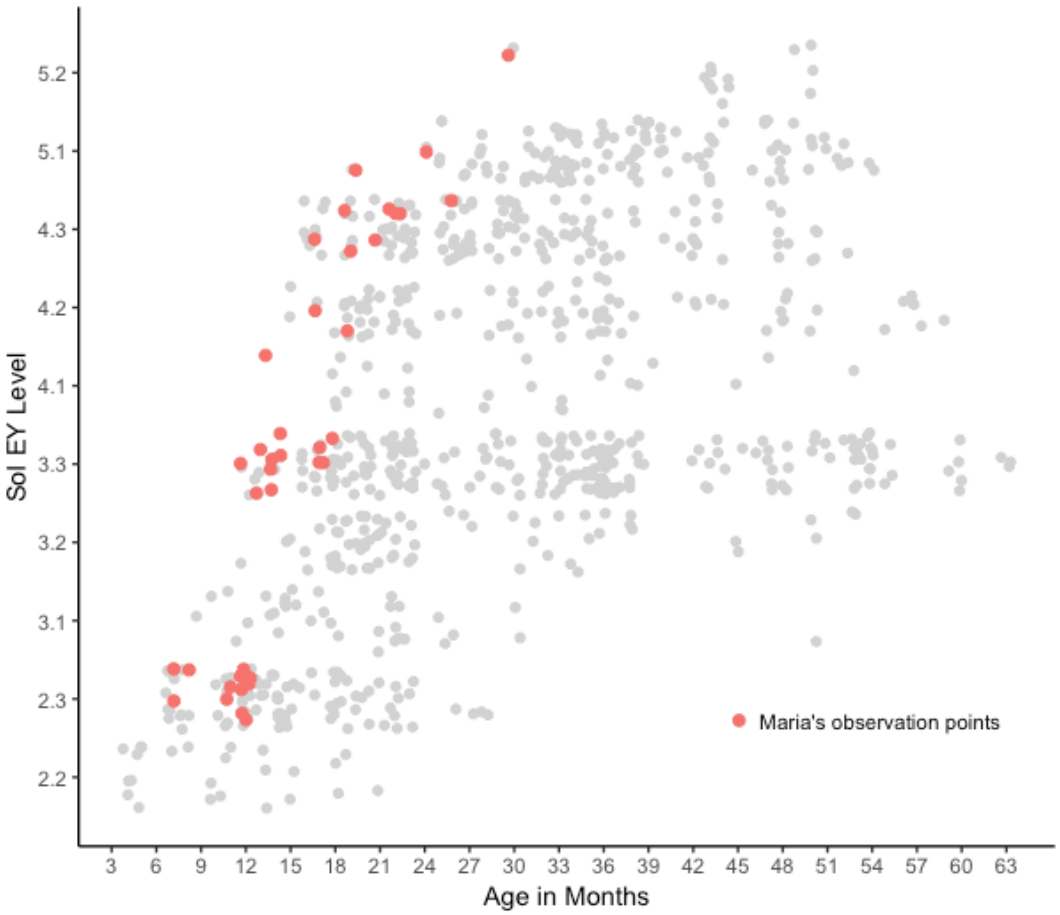


Figure 18 Maria's raw observation points superimposed on all observations within the study

To further explore how the SoI-EY framework depicts Maria's musical development over time, her average SoI-EY level per domain is displayed in Figure 19.

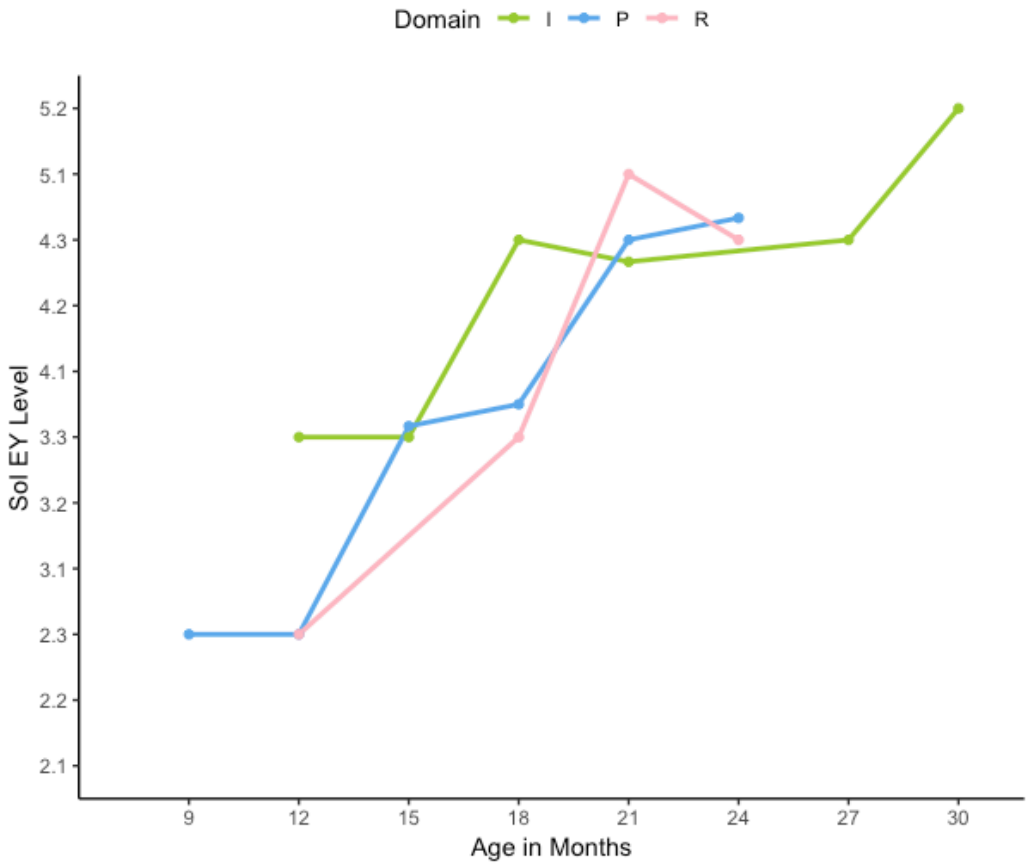


Figure 19 Maria's average SoI-EY Level over time per domain

The trajectory of Maria's musical development was further analysed using the logistic function (see Methods Section 4.9.2). All 39 observations were used within the analysis. Maria's growth curve is superimposed on the growth curve based on the average SoI-EY scores for the full data set as well as the growth curve based on the highest SoI-EY scores of the full data set. Figure 20 illustrates that Maria's projected average trajectory is in line with that of the highest scores observed for the full data set over time.

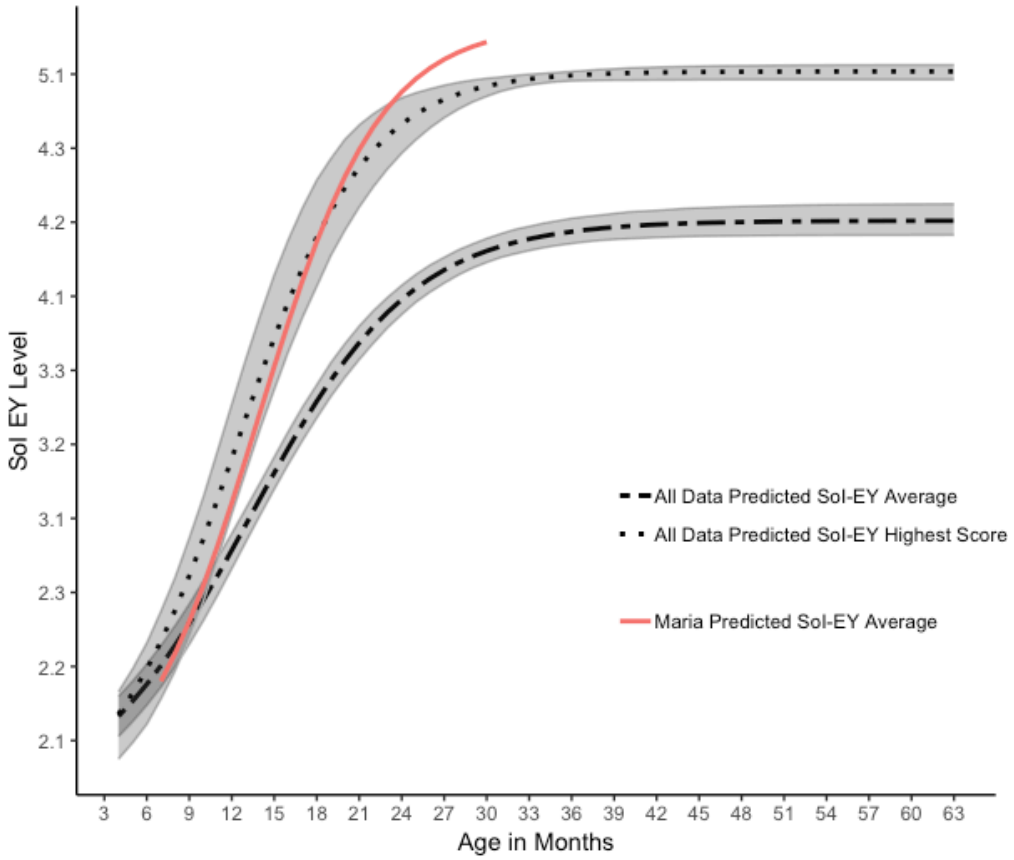


Figure 20 Maria's growth curve superimposed on the predicted growth curves for both the average SoI-EY score and highest SoI-EY score of all observed data

The derivative of the logistic function was then used to find the rate of growth for Maria (see Methods Section 3.7. 2 and 3.9.2). The results suggest that in terms of musical development, Maria's growth peaks at 14 months. Her predicted SoI-EY Level at 14 months is 5.43, analysed on the scale of 1-12 (i.e., with 1 being level 2.1, 2(2.2), 3(2.3), 4 (3.1), 5 (3.2), 6 (3.3) etc.). This translates to SoI-EY Level 3, achieving. The estimated rate of growth is at .595 of a SoI-EY criteria per month.

This provides an overall picture of how Maria's musical engagement has developed over time, according to the SoI-EY framework and in relation to her peers. Next, an in-depth illustration of Maria's musical engagement and activity in the context of her surrounding environment will be explored.

6.3 Overarching Themes: Contexts of Musical Engagement and Activity

6.3.1 Maria's Surrounding Musical Environment and Activity

A summary of activities which Maria takes part in, as well as how the environment and context is structured for Maria by adults, will be explored here. An amalgamation of interview data, observational data and questionnaire responses demonstrate that Maria engaged with music both at home and through organised external activities. Activities included singing, instrumental play, listening to recorded music, dance, listening to everyday sounds, playing with toys that make music, and watching/listening to live music. Singing, instrumental play and music listening were daily activities for Maria.

Singing and activities which focus on language such as reading were prevalent from birth. Her mother described that she always sang to Maria when going out, while Maria was in her pushchair: 'I think from the moment she was born…I used to sing to her every time we leave the house. Even now I sing. Now I can ask what song shall we sing, and we sing together.' She also described how she would talk to her while carrying out daily activities such as cooking. Reading by both parents was also prominent and her mother explained how books were often sung: 'We used to sing to her not read. So, we sung all the books… so everything was sung from the moment she was born.' Singing and vocal play are prevalent in the collected video observations as well. In fact, 69 % of videos include singing/vocal play for Maria.

Instrumental play was also part of Maria's musical activity at home. Her mother described a bag of instruments which Maria could play with freely and noted that while it 'depends on the day, she likes going in that bag; she's got all the instruments.' Instrumental play appears in 36% of the observations collected for Maria.

An important aspect of Maria's musical activity is also intertwined with dance. In her interview, Maria's mother recalled,

> That's how I used to dance when she was little, when she wasn't walking. So, she loves that sort of contact, dancing together…she loves any moment, now she's heavy so it's more difficult but we used to do a lot of (dancing)…spinning around and I used to play some sort of more classical stuff. I'm a very expressive person, so if someone was looking at us they would think, who is that crazy mum dancing ballet with her baby in her hands! But it was enjoyable for both of us, so I did a lot of that.

She also described that every week she and Maria attended a children's puppet show in a pub, after which they sat and listened to music together:

> This is interesting, after the puppet show because it's in the pub, we sit on the sofa and we listen to music and very often, they have very good music, and she dances on the sofa and she dances around.

From the age of 24 months Maria also attended ballet classes on a weekly basis, providing another example of dance activity.

Listening to recorded music was also prevalent in Maria's environment, and was often social, as can be seen in the examples of dance above. Furthermore, her mother recounted that during pregnancy she would play Mozart recordings for Maria daily. She also described a 'weekly disco' at home on the weekends, in which the family listened to music (recorded), sang, and danced along. Moreover, from the age of 12 months music listening was part of Maria's daily routine in the car on the way to nursery:

> On a typical day, which is a working, nursery day, in the morning we have the routine and when she comes downstairs we put her in the car seat and by the time she is in the car seat, E puts a CD, and she already says what songs she would like. And there were days where for example she wanted the same song being

> played over and over and over again and now, I think she already kind of knows what CD she would like. She's got a variation of different CD's…

However, recorded music played in the house and sound/entertainment from other devices such as television, were considered carefully. Maria's mother explained that learning three languages might be a challenge for Maria. She wanted to ensure that Maria had the opportunity to hear the languages being spoken at home without distraction:

> We don't have a radio in the background, because I knew the radio as a background was not good for speech development… I read that, and as well TV. We don't have TV since she was born and OK, she knows that TV exists, she knows there is something there. But majority of the programs they were not suitable for her and I...from the moment she was born I wanted to improve on her language abilities. So, it was a lot of reading…so it was more talking. So, since she was born, I used to cook and because it's open plan she would lie on the playmat in the living room and I would say to her all the time what I'm doing and playing with her. So, the radio would be problematic...

As well as making certain that equipment, such as the radio and TV, did not detract from hearing the languages spoken at home, there was also a desire for Maria to be able to engage with environmental sounds. At the time, the family lived in a flat close to a canal, which her mother felt provided opportunity to listen to the natural sounds surrounding them. She described,

> There are a lot of sounds, the wind, the boats, the birds. So, since she was probably 18 months, she would say what bird it is by the sound. Which is amazing and if the boat is coming…she knows what sound. With all this background she wouldn't understand now, this is a tree. She knows it's rain, even though it could be dark, she knows…ah it's raining, because of the sound...

Further activities, which involved music listening, included taking Maria to concerts on occasion as well as stopping to listen to music that the family encountered while out and about, for example street performers.

As well as musical activity at home, Maria attended various external activities which were either specifically music focused or in which music was an element of the wider session taking place. From infancy she and her mother attended sessions at the library and children's centre. Within the children's centre, this included a specific music session as well as play sessions which incorporated free instrumental play and group singing (as described earlier). As well as this, they attended a baby sensory class (which included music). From around 18-24 months Maria also attended an outdoor activity with her father on Saturdays (which included music), a weekly ballet class, and a weekly puppet show, of which music was a strong focus. Furthermore, from 12 months Maria attended nursery three times a week, in which she would have further opportunities to take part in musical activity with peers and the adults caring for her.

All three forms of evidence, the questionnaire, video observations and interview, provide an illustration of Maria's musical engagement in varying contexts. The surrounding environment, particularly in terms of sound, was consciously considered by her parents. Maria had the opportunity to engage with sound and music at home with her parents in a myriad of ways, with other adults and peers in the external activities she took part in, and eventually in nursery. Two further themes arose in relation to musical engagement, context and activity, particularly from the interview data. These are, musical activity and preference related to the cultural context of her parents' histories and background and Maria's participation through choice and repetition. Each of these will be described in more depth.

6.3.2 Family Musical Culture and History

Maria's preference and love for particular music and activities appeared to be grounded in her parent's own histories, background and culture. First, this was apparent in her preference for 'old music' and Italian songs introduced by her father. One particular song, emerged from both the observation and interview material: Perry Como's 'Magic Moments'. Maria's mother explained,

> One of her favourite songs which is the song from holidays, is 'Magic Moments'. She tends to like the old music…So we play Frank Sinatra, and E because he is Italian he puts all the Italian songs...'Mambo Italiano', all those songs and she loves it.

She further described how 'Magic Moments' was introduced during their visit to Italy, when Maria was 23 months. Dancing to the song with her father became a daily occurrence:

> E introduced (the song) to her. I think when we were on holidays in South Italy...probably he had this kind of feeling of, you know you are reminded of something, of some sort of song. And his musical knowledge is amazing because the number of CD's and the knowledge is amazing. So, he just went and kind of played this song (Magic Moments) and they danced and they enjoyed so it was kind of a song of the holidays…and she loves that song. And we played that every day at the holidays. It was kind of like a...morning fun. When I was doing breakfast, they were outside doing their own dancing and having fun with 'Magic Moments'.

The song also appears in an observation in which Maria sings phrases of the chorus on her own, during the same holiday. Again, it is heard in a video observation of Maria's second birthday party, in which she and her mother dance to the song together. A further

example includes the family listening to 'old' songs, with Maria singing along and dancing, sometimes with her father joining in. These activities and songs are rooted in music tied to her father's cultural heritage and are meaningful in terms of their association with the family holiday, as well as the daily ritual of dance and playfulness described above. The songs and the activities in which they are bound are inextricably linked and inherently social.

As well as this, Maria's love of dance is described by her mother. Maria's mother explained that she danced as a teenager: 'As a teenager I was dancing jazz, Afro, Broadway, and ballet. So, on a not very interesting day I used to dance for her a little bit, like that and kind of, show her. And she loved dancing…' Dancing, as stated earlier, was a large part of the musical engagement taking place at home between Maria and her mother (and indeed as above with her father). Dance was also part of Maria's weekly external activity. It is described as something which is loved by both Maria and her mother and is an activity which is rooted in her mother's experience and past. Music and musical activity which is particularly meaningful to both parents is shared with Maria, and plays a key role in her engagement during this period.

6.3.3 Interaction with Musical Activity through Choice and Repetition.

We next explore two ways in which Maria engaged with musical activity: through choice and repetition. In terms of music listening, Maria made clear choices about what she would like to listen to, when she had the ability to communicate this clearly. This can be seen in various instances of music listening noted above. Within the daily routine of music listening in the car on the way to nursery, Maria chose CD's (from the options that had been provided for her over time). This is also true of the songs that Maria and her mother sang together when out and about. Her mother recalled that while she sang to Maria in the pushchair since she was born, with time, she asked Maria what songs she

preferred, providing opportunity for her to make a choice and join in singing. Maria made choices in other ways as well, for example, through an illustrated book of nursery rhymes at home, she chose the songs she would like to sing with her mother or father by pointing to the related picture. The opportunity to make choices was also apparent in her nursery. Her mother described,

> So, I think at nursery as well, they do a lot of singing and sometimes when she was going to nursery she would for example say what she wants…and I know the nursery as well, would play music from the CD player for the older kids. So sometimes when she comes in...they ask her "what do you want to do, this, this or that" and for example she says she wants music…so the music is part of when she goes in. There was a time when she wanted to paint, so every day she would just go straight to the painting section, but now...

Maria's mother also commented that musical activities were reliant on Maria's mood and preference. For example, she said, 'We tend not to push her to listen to something, only when she says.' This comes up again in relation to the family disco: 'On Saturday and Sunday, *depending obviously on her mood*...but we do a little disco at home.' She later stated in terms of music listening, 'That's why it's important, the time I think with kids and what sort of music they want…depending on their mood, like we are.' As activities and opportunity for musical engagement were provided, Maria played a part in choosing what to listen to and what to engage in, based on her preferences and mood, which her parents were attuned to. Another way in which Maria appeared to engage to a high degree, both on her own and with others, was through repetition.

Interview data revealed that Maria's engagement with music consisted of much repetition. For example, there were periods of time in which she requested to listen to the same piece of music (either recorded or sung by others) or would sing the same songs

herself repeatedly. This was seen in the description of music listening in the car: ‘there were days where she for example wanted the same song being played over and over and over again.’ Three other examples in which Maria engaged through repetition are relevant:

> Before 18 months she knew that...I think...we kind of said it's going to be her birthday you have a video where she is singing ‘Happy Birthday’ to Maria. So yes, there was like a few months where she would ask E to play ‘Happy Birthday’ in the car, over and over and over again. And there was a time for example where she liked ‘Bah Bah Black Sheep’ and I have to constantly sing that… Twinkle, Twinkle Little Star’ (laughing).

> When we eat at the table and what she does, she goes ‘row, row, row your boat’ (singing), so she takes his hand and my hand, and we have to do 'row, row, row the boat' and it's really nice…it's obviously making fun and doing things together and it's always at dinner. Before Christmas we had to do 'Row, Row, Row the Boat' *every day*.

> I've got something in mind, when she was around, when she started nursery, so she was 12 months. She had quite a long period where she went, before going to sleep, she would sing three times ‘Bah Bah Black Sheep’, and one ‘Twinkle, Twinkle’, and then she'd fall asleep.

The above descriptions illustrate Maria relishing the repetition of the same songs and the same activity on at least a daily basis for certain periods of time, before moving on. For example, in her mother’s observation of Maria singing herself to sleep, by the time of the interview, this ritual of bedtime singing, had ended.

So far, a picture has been drawn of the varying contexts in which opportunities for musical engagement and development were provided. Maria took part through reactive, interactive, and proactive engagement, as well as through choice and repetition. The next step is to connect the context of Maria's musical engagement with her development as seen through the Sounds of Intent in the Early Years framework. This will be done by taking a closer look at distinct moments of musical engagement.

6.4 Observations of Musical Engagement

Three observations of engagement will be explored. The first centres on an example of interaction, in which play with pattern and imitation are clear and provide a typical example of Maria's engagement with music at SoI-EY Level 3. As discussed in Section 2.4.2 the central feature of Level 3 is pattern and imitation. The main descriptors for Level 3 are that children respond to simple patterns in sound (reactive), children make simple patterns in sound intentionally (proactive) and children copy others sounds and like to be copied (interactive).

6.4.1 Observation 1: Bella

> At 14 months, Maria and her father are taking turns, copying one another on the word 'bella', chanted in a simple quaver pattern of 
>
> . The two engage in dialogue, and Maria often varies the pattern by repeating it a number of times or changing the dynamic with which it is spoken. For example, as Maria copies and repeats the pattern, she gets louder and louder, laughing, squealing in excitement and walking around the room and towards her father as she does so. Towards the end of the interaction, Maria walks to her father excitedly, at which point he hugs her and lifts her up above his head, smiling broadly and laughing.

In terms of the SoI-EY framework, the prominent musical components within the above observation are that of pattern and imitation, indicative of SoI-EY Level 3. During

the period from 12-15 months, the majority of observations for Maria lie within this area of musical engagement, in which pattern and copying are prevalent.

Three main features of the observation are imitation, interaction and playfulness. Sumsion and Harrison (2014) point out key characteristics of playfulness both with peers and adults: physicality (running, jumping, falling on purpose, bouncing), joyfulness and delight, affection, and elements of humour which elicit laughter for all those involved. The following description by Sumsion and Harrison (2014) seems particularly relevant here: 'The repetition and variation of simple, structured actions and routines and the escalation of the intensity of these actions to a culmination point also tend to be a source of great delight' (pg. 6). The above observation demonstrates these characteristics, for example Maria toddles around the room as she chants, the interaction is full of squeals of delight from Maria and laughter from her father, and the moment is infused with affection and joyfulness. Figure 21 demonstrates these characteristics through a series of three photos.



Figure 21 *A series of photos in which Maria and her father take part in a playful musical interaction at SoI-EY Level 3*

Parker-Rees (2014) explains that playfulness provides a familiar space in which children can feel free to try out new things and demonstrate new levels of engagement and development. He writes,

> Playful interaction can escalate into exuberance only when the participants are able to relax into a flow of mutual 'liking' adjustments and it is in this heightened form of intimate exchange that babies are able to borrow from their partner's abilities, allowing them to appear a 'head taller'. (Vygotsky, 1978: 102, in Parker-Rees, pg. 4)

Parker-Rees (2014) uses the example of a child introducing new variations in a game of peek-a-boo to illustrate development through playfulness. Here, Maria creates variations on the two-note pattern of 'Bella' through repetition and change in dynamic, within a playful dialogue grounded in imitation.

Multi-modal characteristics seen in the vocal exchange through facial expression, gesture and movement are also apparent in this observation. As discussed in the literature review, multi-modality has been shown to be a main component of vocal and singing exchange from infancy, between carer and child (Trehub, 2016, 2019), and is exemplified here as well.

6.4.2 Observation 2: 'If You're Happy and You Know It'

Similar elements found in the above observation are seen in another moment of musical engagement between Maria and her father. Maria is now 18 months and here the focus is on SoI-EY Level 4, in which engagement with music through motif is the main component:

> Maria and her father are singing the tune of 'Happy and You Know it' in call and response form. Her father starts each musical phrase (sung on 'la'), leaving a pause at the end for Maria to respond to and complete. He shakes the maracas in

a steady duple pattern throughout. At the end of each phrase, when it is Maria's turn to answer, she chants, 'We are!', and their arms are raised up and down, in time with each word. Maria also copies her father's playing of the maracas and although she is not in time with him, she attempts to follow.

In order to provide a clear picture of the above observation a portion of the interaction has been transcribed in Figure 22, followed by a photo of the observation in Figure 23.

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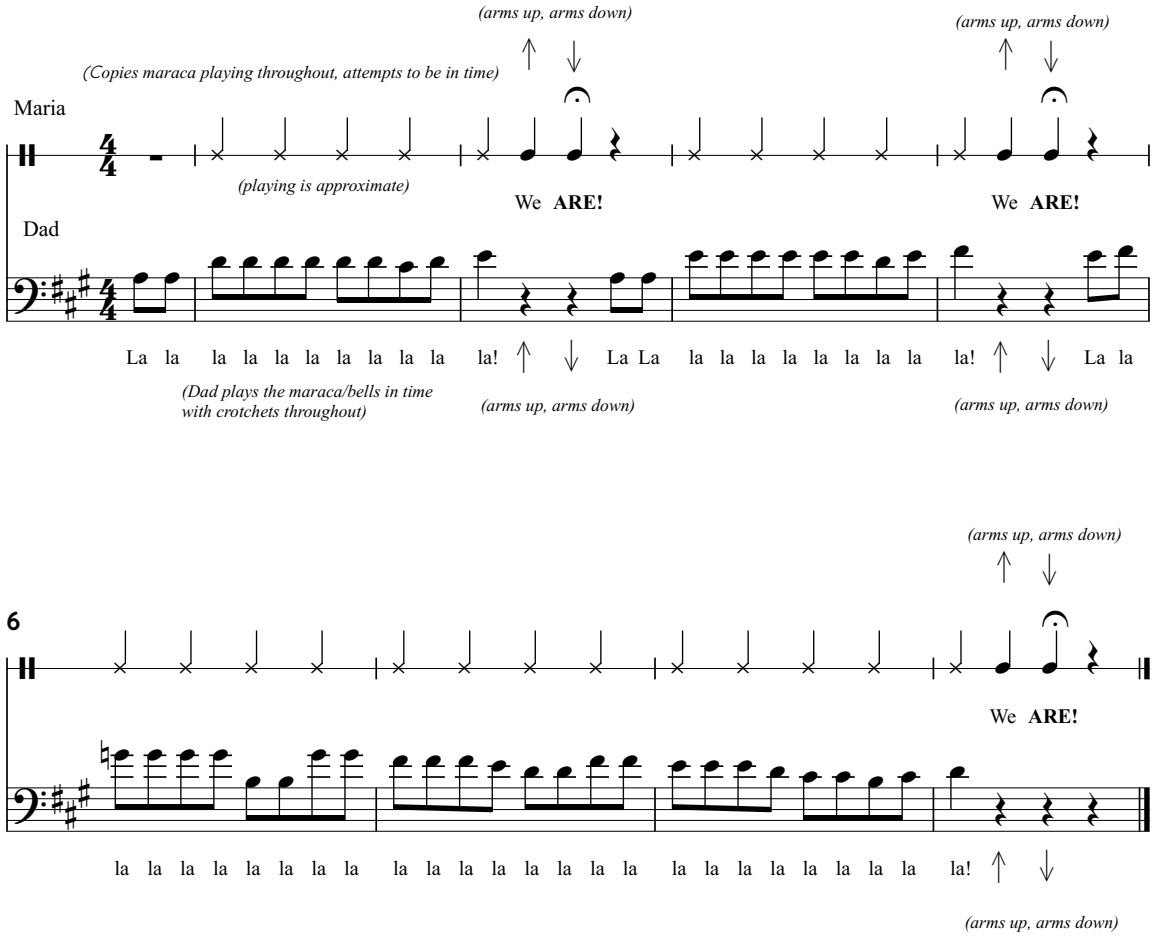

(arms up, arms down)
(arms up, arms down)
(Copies maraca playing throughout, attempts to be in time)
Maria
(playing is approximate)
We ARE!
We ARE!
Dad
La la la la la la la la la la! La La la la la la la la la la! La la
(Dad plays the maraca/bells in time with crotchets throughout)
(arms up, arms down)
(arms up, arms down)
(arms up, arms down)
6
We ARE!
la la la la la la la la la



Figure 23 Maria and her father bring their arms up and down in time with the song during the text 'We are!'

The maracas, shaken in a simple duple pattern by Maria's father, and copied by Maria, are indicative of SoI-EY Level 3, in terms of the ability to play and copy a simple pattern in sound. However, rather than imitation taking place through turn-taking, the two play their instruments at the same time. Although she has not quite mastered it, Maria is attempting to stay in time with her father as he plays and sings.

Above this patterned playing is the familiar song, sung in dialogue between the two. As can be seen in Figure 22, Maria's father leads with the main tune of the verse sung on 'la', and Maria interjects and responds with 'We Are!' With the melody sung on 'la', the use of language is scaled back and Maria is clearly aware of the song's call and response structure; she knows when it is her turn. She does not rely on the verbal instruction inherent within the text, i.e., 'If you're happy and you know it shout, we are!' Instead, she is guided by the music and the interaction, which is non-verbal throughout. For instance, movement combined with instrumental play, matches the structure of the song and its dialogue. They shake the maracas in a simple duple pattern during the 'call' verses (sung by her father); they then raise and lower their arms (in Maria's case her

whole body moves up and down), during the response of 'We Are!' (see photos in Figure 23). Furthermore, Maria's father does not sing with her, but mouths the words in time, further providing support. Through this, the two are within the realm of SoI-EY Level 4, engaging in musical dialogues using motifs. This is layered above engagement at SoI-EY Level 3 (through their instrumental play). Their instrumental play may also be interpreted to contain an emerging element of SoI-EY level 5, in which simple pieces are sung or played *together*, *sharing a part,* gradually in time (relevant here) and in tune. The observation demonstrates multiple levels of musical engagement, according to the SoI-EY framework, within one activity.

Maria's father, through movement and by leading the song with the main phrases for her to respond to, scaffolds the interaction. Playfulness and humour are evident here as well. For example, Maria's father wears her scarf on his head as they play. This is reminiscent of object based early humour production as described by Hoicka and Akhtar (2012), for example putting a cup on one's head, i.e., using an object in an incongruous way (p. 589). Maria's father plays to this type of humour, wearing something of Maria's on his head as they interact together. He becomes a 'partner in play' (Koutsoupidou, 2020, p. 98). While watching this observation during the interview, Maria's mother described the humour present, laughing as she did so:

> She's got a bag with instrument toys…so it depends on the day but she likes going in that bag. She's got all the instruments. And her father's very creative, and I think it's on Saturday morning. So yes, it was hilarious how he started to do this. Not only for her but he was quite funny...

Humour and playfulness in early childhood are noted to be highly social in nature (Hoicka & Akhtar, 2012; Whitebread, D., Basilio, M., Kuvalja, M., Verma., 2012; Zosh et al., 2018) and this is a main characteristic of both activities described thus far. Indeed,

Maria's mother further recalled that Maria's engagement with song during this period was marked by humour. In response to observations in which Maria creates new words to familiar tunes she said,

> Oh, she does a lot of that...she loves the mixing up the songs, the typical nursery rhymes and she adds something herself. And she knows it's funny...because she knows kind of the meaning...she does this a lot.

In summary, these first two observations explore the social context in its relation to Maria's musical engagement. The observations emphasise engagement according to the SoI-EY framework through pattern and imitation (SoI-EY Level 3), motifs (SoI-EY Level 4) and whole songs in time and in tune (SoI-EY Level 5). However, it is also important to look at Maria's proactive musical engagement observed during solitary moments of activity.

6.4.3 Observation 3: Bedtime Songs

The following observation was described by Maria's mother during the interview. She recalled,

> I've got something in mind, when she was around, when she started nursery, so she was 12 months. She had quite a long period where she went, before going to sleep, she would sing three times 'Bah Bah Black Sheep', and one 'Twinkle, Twinkle', and then she'd fall asleep. She couldn't sing the whole thing, but she was singing...'twinkle, twinkle' (sings tune). We could understand that this is the song she's singing and this was quite amazing to see because that's what comforted her to sleep.

Within the data, this is the first instance in which Maria begins to engage at SoI-EY level 4 (through motif) and she does this within a private moment of singing. This activity, in which the same songs are sung at bedtime, begins just before Observation 1 (at 14

months) and continues through the period at which Observation 2, was recorded at 18 months. The phenomenon of children's bedtime singing has been termed 'crib songs' by Meryl Sole (2017). Sole (2017) has suggested that these private moments of music making serve varying purposes for the child and may include trying out and playing with musical ideas, as well as acting as a mechanism of self-comfort and providing opportunity to process relationships and transitions. In this light, Maria may be demonstrating her exploration of musical ideas through emerging engagement at SoI-EY level 4 (through groups of sounds or musical motifs, singing portions of familiar songs), from 12 months of age.

Furthermore, consider that using this bedtime ritual of song for self-comfort occurred when Maria began attending nursery. Maria had been experiencing music as a comfort since she was an infant. For example, her mother recalled a particular salient moment:

> And I think as well when she was little, I remember it was my birthday so she must have been 2 ½ months and we went quite far away outside London. It was a special pub we went to that day, and I remember that moment because it's quite special. And for some reason she didn't settle to sleep and she started crying and I remember they played the jazz which was very nice. And she calmed down, with me dancing with her, cuddling and singing.

As well as this, when discussing her singing to Maria in the pushchair (described previously) her mother stated,

> And I think that makes it easier as well to do the journeys because she was obviously singing and listening and it always helped me through the whole, her growing up, to keep her calm and enjoy. And that's how she probably learned the songs.

Furthermore, she recalled,

> When she was little we used to drive. We were very adventurous, we would drive outside London, like two hours away, and we didn't realise that the baby wouldn't last that long. So, what we did being parents in stress...we would sing 'Twinkle, Twinkle Little Star' for like an hour. (laughing)

At the end of the interview, she further emphasised the notion of music and comfort for Maria stating, 'the beautiful thing is that I know that she loves music, I know that it's...it's comforting her.'

The point here is twofold, first through the musical opportunities and activities which Maria has been a part of, her ability to engage with music, at the level of motif (SoI-EY Level 4) has emerged within a private moment, exploring singing and song in her own time and space. However, this is taken further in that engagement at this level, allows her to self-soothe. She has been experiencing music as comfort with others since infancy and now uses music for this purpose on her own. This ties in with Sole's (2017) observation that solitary singing at bedtime may be used for self-comfort and processing transitions, if we consider that this is the period in which Maria was starting nursery.

On the surface these moments, in which Maria demonstrates a new form of engagement or ability, may seem to emerge out of nowhere. Her mother described,

> These probably actually are the moments that stood out, where she stands there and she just sings a song but we don't record all this. So, she for example sang the whole song with words. So, we don't know for example that she learned but she stands and she just goes boom!

We see Maria's development in this last observation as it emerges and presents itself through proactive engagement. However, these proactive moments of musical engagement have been supported through observing and listening, in SoI-EY terms

'reactive' and in engaging with others, in SoI-EY terms 'interactive'. In a sense, both the interactive and reactive feed into her solitary and proactive musical engagement.

6.5 Case Study 1: Discussion

6.5.1 Maria's Trajectory of Musical Development

Applying the SoI-EY framework to explore the trajectory of musical development for an individual child refers to the research questions of,

- How do the stages in their present or modified form, relate to one another in their representation of a child's evolving musical development?
- Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of the relationship between these two factors?

Maria's musical developmental trajectory was explored by summarising and averaging observational SoI-EY data, as well as applying logistic growth analysis. When graphically displayed (see Figure 20) results suggest that Maria's predicted *average* level of musical development lies at the upper end of musical engagement seen in her peers. One explanation for this may be that the majority of video data collected for Maria is based on observations from home, an environment in which her optimal level of musical engagement may be more on display. Indeed, it has been suggested that when observed within a familiar context, such as at home, children's musical potential and engagement may be more evident rather than when tested in a more formal context (Trehub & Gudmundsdottir, 2019). It may also be that the observations sent by family members are biased in that the moments chosen are those that illustrate Maria at her best, and what may be considered more interesting, novel or important. So, what we are really seeing here may be examples of Maria at her optimal level of musical development, rather than what is occurring on average for her.

Nevertheless, results suggest that for an individual child a pattern of growth is hypothesised in which stages occur such as that of rapid growth, followed by deceleration and an eventual plateau, which we see the beginning of in this case. The data suggests that for Maria, following engagement at SoI-EY Level 2, a phase of rapid growth peaks around 14 months. This is similar to the results of the full set of data, in which growth peaked at 13 months. In all cases, the growth peak occurs at SoI-EY level 3, which is characterised by pattern and imitation. This is followed by a gradual deceleration (in which SoI-EY Level 4 is observed) reaching the beginnings of an eventual plateau for Maria, which just begins to appear around 28 months, occurring at SoI-EY Level 5. Overall, the results suggest that the relationship between a child's age and predominant SoI-EY level of musical development is non-linear, in this individual case as well as in the results of the full data set.

Summarising Maria's coded data according to the SoI-EY framework also suggests that the emergence of a particular level does not necessarily indicate completion of development at previous levels. First, this is evident in the data summarised in Table 24 and Figure 18. While observations at SoI-EY Level 4 emerge, engagement continues to be observed at SoI-EY Level 3 and while observations at SoI-EY Level 5 emerge, engagement continues to be observed at SoI-EY Level 4. This is also apparent within the individual observations relayed in section 5.4. Maria is in the midst of engagement with pattern within Observation 1, taken at 13 months. However, as relayed by her mother, Maria's engagement at SoI-EY Level 4 emerges one month before this, and continues. This layering of musical development was reported in Voyajolu and Ockelford (2016) in relation to the first SoI-EY project results, using 'snapshot' observations and cross-sectional data; it is supported here through the use of longitudinal data.

6.5.2 Maria's Surrounding Environment

The discussion based on Maria's surrounding environment addresses the research questions of 1) What impact does the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement and development? and 2) Do some activities within the home and settings such as children's centres more effectively promote musical engagement and development than others, and if so which, and in what ways?

Maria has a rich array of musical activity surrounding her daily life, interspersed within her daily routine, within both structured and spontaneous activity, including adult and child-led scenarios at home and in the community. Singing is a major part of her daily life, both in the context of others and on her own, as is music listening and dance. The effect of the sound environment, especially when Maria was an infant, was carefully considered by her parents. Space was provided for her to hear every day natural sounds, speech and singing, without distraction. The nature of this study does not allow for a causal relationship between Maria's environment and her musical engagement. However, it is evident that Maria's musical development is supported by a rich musical environment with a strong component of social interaction by her parents, balanced with space and opportunity to explore music on her own.

Adachi's (1995) suggestion that the transmission of musical skill from the interpsychological to the intrapsychological is integrated within the music activity's originating social context, may be relevant here. She wrote, 'children do not learn cultural signs as separate entities from the social interaction, but learn them as a part of the social process. The process of internalising cultural signs inevitably involves the process of internalising the social process in which these signs are originally introduced to children' (p. 29). Particularly relevant to this case may be Maria's use of song for self-comfort and

her recreation of songs, which are embedded in social interaction, for example ‘Magic Moments’. As well as this there may be a transmission of enjoyment and joyful engagement with music, which is apparent in the musical interactions observed here.

In terms of what activities may more effectively promote musical engagement, themes which arose from the data included activities that were grounded in the musical history and culture of Maria’s parents. These activities in turn formed part of Maria’s musical preferences. Activities were often linked to salient moments of social interaction and events (dancing with one another, being on holiday). As well as this, activities provided choice and repetition. In addition, individual observations exemplified qualities of playfulness, humour, and multimodality. Further discussion of activities in relation to musical engagement will be explored within the final discussion as related to each case study, the full data set, and research literature. The next section moves on to Case Study 2.

6.6 Case Study 2: Charlie

Charlie joined the project at 17 months of age. At the time he was attending stay and play sessions at the children’s centre where he was observed during free play and during the end of the session in which staff, parents and children took part in group singing for 10 minutes before saying goodbye. Charlie’s parents moved out of London mid-project and so were no longer able to attend the children’s centre. However, they continued to observe and upload videos of Charlie, providing a rich amount of data from home. When the project started, Charlie was an only child, however, by the end of the project he had a baby brother, who joined in some of the observations. Both Charlie’s mother and father took part in the case-study interview, with Charlie present as well.

6.6.1 Charlie's Observations According to the SoI-EY Framework

There were 77 video observations taken of Charlie in total and he was observed from the age of 17 months to 41 months. Of these videos, 63 were coded according to the SoI-EY framework. In relation to domain 23.8% (n = 15) of observations were coded in the reactive domain, 52.4% (n = 33) were coded in the proactive domain, and 23.8% (n = 15) were coded in the interactive domain.

Table 25 shows Charlie's observations per level within three months age bands. It is evident that the majority of observations for Charlie during this period were at SoI-EY Level 4, followed by engagement at SoI-EY Level 3, 2 and finally SoI-EY Level 5. Interestingly, his observations between 15-18 months contain engagement seen across Levels 2-4.

Table 25 Charlie's number of coded observations per level within three-month age bands

Age (months)	Level 2		Level 3		Level 4		Level 5		Total	
15-18	6	9.5%	4	6.3%	2	3.2%	0	0	12	19%
18-21	0	0	0	0	11	17.5%	0	0	11	17.5%
21-24	0	1.6%	5	6.3%	1	1.6%	0	0	6	9.5%
24-27	0	0	2	3.2%	16	25.4%	1	1.6%	19	30.2%
27-30	0	0	2	3.2%	2	3.2%	1	1.6%	5	7.9%
30-33	0	0	1	1.6%	0	0	1	1.6%	2	3.2%
33-36	0	0	2	3.2%	0	0	0	0	2	3.2%
36-39	0	0	2	3.2%	1	1.6%	2	3.2%	5	7.9%
39-42	0	0	0	0	0	0	1	1.6%	1	1.6%
Total	**7**	**11.1%**	**17**	**27%**	**33**	**52.4%**	**6**	**9.5%**	**63**	**100.0%**

6.6.2 Charlie's Trajectory of Musical Development

To display the data visually, Figure 24 illustrates Charlies raw observation points superimposed on the raw observations of the full data set. This is followed by looking at Charlie's average SoI-EY level over time per domain (Figure 25).

A logistic growth curve has been displayed based on Charlie's average SoI-EY level in Figure 26; it is superimposed on the predicted growth curves for both the average SoI-EY score and highest SoI-EY score of all the observed project data. Figure 27 displays Charlie's predicted SoI-EY level over time based on his highest SoI-EY score over time, again superimposed on both growth curves for the full data set.

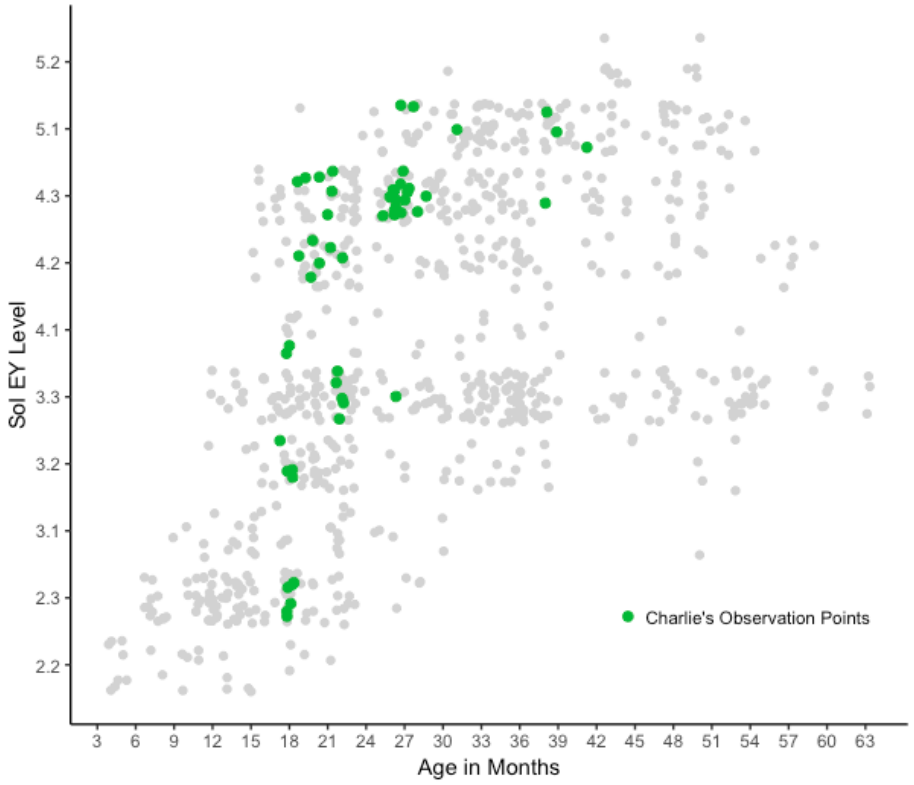


Figure 24 Charlie's raw observations points superimposed on all observation points within the study

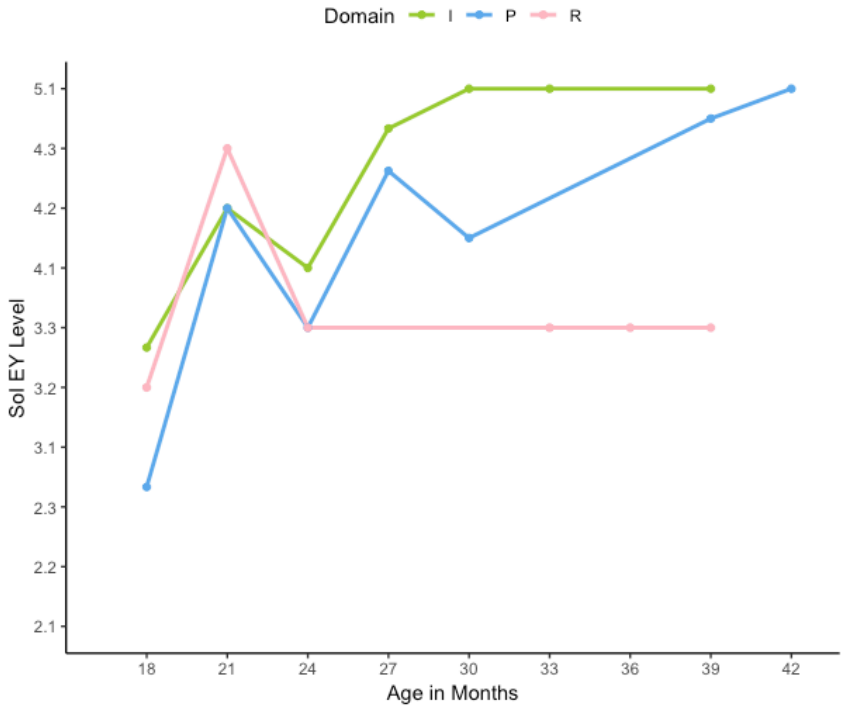


Figure 25 Charlie's average SoI-EY level over time per domain

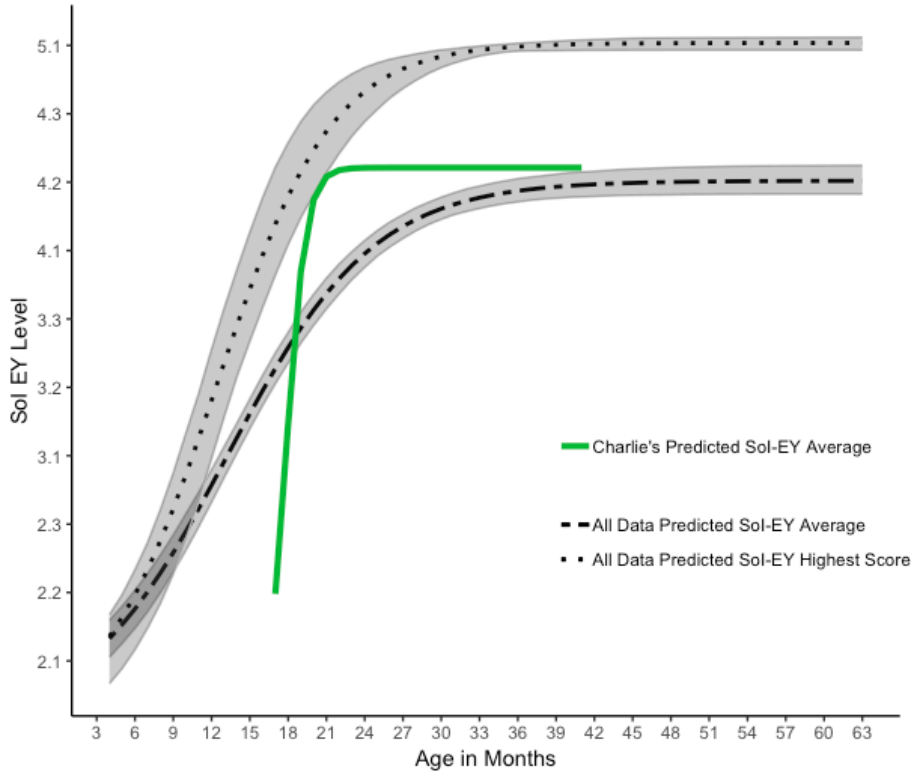


Figure 26 Charlie's growth curve superimposed on the predicted growth curves for both the average SoI-EY score and highest SoI-EY score of all observed data

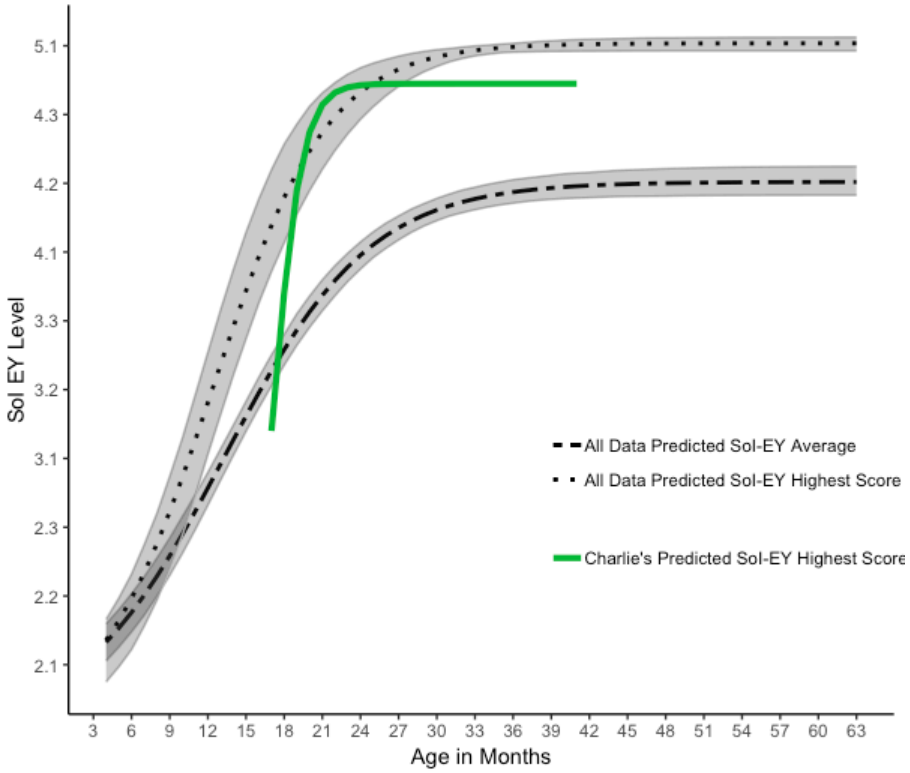


Figure 27 Charlie's growth curve based on his highest SoI-EY score over time, superimposed on the predicted growth curves for both the average SoI-EY score and highest SoI-EY score of all observed data

This data portrays the trajectory of Charlie's musical development during this twenty-four-month period, according to the SoI-EY framework. The context in which musical engagement and development occurs is considered next.

6.7 Overarching Themes: Contexts of Musical Engagement and Activity

6.7.1 Overview of Charlie's Surrounding Musical Environment and Activity

Drawing from all three forms of evidence, including interview data, observational data and questionnaire data, an overview of Charlie's musical engagement is summarised here. First, singing is a prominent aspect of Charlie's daily musical activity. His parents commented that Charlie sang on his own every day, 'all day long…sometimes when I'm by myself with him he just, he's just singing to himself kind of all day, when he's playing or just...playing, eating...' At the time of the interview, when Charlie was 39 months old, he had a baby brother. His parents described how Charlie would sing to his brother: 'We sing to Jack quite a lot, if Jack's in the pushchair, or having his nappy changed we sing to him a lot, yeah. Charlie makes Jack happier than I do...' His parents also noted that a lot of singing was done at nursery and they observed this in Charlie's engagement with particular songs, learned at nursery and sung at home. This included daily singing at nursery in preparation for performances, such as the Christmas show, as well as singing songs incorporated into topical learning, such as healthy eating. Furthermore, singing was apparent in 73% of observations taken for Charlie.

Charlie also had the opportunity to take part in instrumental play at home, and his parents described a conscious decision to build up a collection of instruments for him:

> We slowly built up, that's the music box currently, but we slowly built it up with presents and stuff. We didn't have anything to begin with, on the day he was born we had nothing. Then people give bits here and there. We specifically asked for a xylophone from my mum for Xmas so that's where the xylophone came from.

They further described his engagement explaining,

> Getting things out of the music box...the keyboard...that entertains him for ages. When we go to our parents' house they both have pianos and he does like to play around, which is why we got the keyboard and we had the idea that we would get a piano but we haven't got round to it...

Observations of Charlie engaging with instruments include him playing on his own, with his parents, as well as with extended family, and constitute 41.3% of the videos collected.

Dance/movement is also prevalent in Charlie's observations. His father explained that Charlie often loved to dance to the music he listened to. Video observations demonstrate a particular activity, which his parents confirmed took place often, in which Charlie listened to his favourite recorded music and ran around in circles getting faster and faster as the music sped up. He does this in a number of observations on his own and with his father.

In terms of external activities, his parents recalled that when Charlie was younger they attended library rhyme time, music groups for two terms held at the children's centre, as well as regular 'stay and play' sessions at the children's centre, which included group singing. His mother's friend also ran a small music group for children in their house for a limited time. They also attended a music group together which included singing and instrumental play, when Charlie was around 2 years old.

Listening to recorded music was also a daily occurrence at home with particular favourites being listened to, for particular purposes. They described,

> Charlie knows how to turn it all on (CD player) and select the track, so we have specific tracks that we use for like tidy up music, and then there's one track that starts up really slowly and builds up and gets faster and faster then goes slow again, and we like using that for running around and we probably listen to it every

day I'd say. And he likes the one's where you can hear like a clip clop, that sounds like a horse...

The family also listens to music when travelling in the car. In particular, as was seen with Maria, much of music listening for Charlie was linked to his parents' musical histories and this will be explored in more detail next.

6.7.2 Family Musical Culture and History

The CD described above, which Charlie plays on a daily basis, is of The Huckleberries, a UK based band consisting of banjo, mandolin, fiddle, guitar, electric bass and drums described as having the influence of traditional folk, bluegrass, Latin music, Eastern and Celtic music (http://www.neilevans.co.uk/huckleberries/). His parents relayed how the CD gradually became a prominent aspect of their lives:

> Charlie's favourite CD, which is permanently in the CD player, is of a band that C used to listen to when we were students in Bath. She bought the CD off of buskers and we just happened to put it on when Charlie was a small child, maybe even a baby and I think he kind of got used to it and now it's kind of become this like, soundtrack to our lives almost...

As well as this, Charlie's favourite CD to listen to in the car was of a recording given to the family by his maternal grandparents. The recording is of the BBC radio program *Listen with Mother*, which Charlie's mother used to hear when she was a child. Her parents recorded the programme off the radio when she was young and transferred the recording on to a CD for Charlie. The program ran from 1950-1982 and included nursery rhymes, stories, and music for children under 5 (BBC, 2020). Charlie's father described the recording saying,

> So that's another classic CD yeah, it's a lot of really, really old children's songs, kind of recorded like 30 years ago off the radio. You can even hear C as a baby in

> the background because they're literally recorded. Her Dad has made it into a CD, quite good but in a rough way, there's still a lot of editing marks, you can hear (makes a scratching sound) ...starting and stopping and crying in the background...(laughing).

Although Charlie's mum commented that she does not remember listening to the programme as a child, it has become a prime aspect of music listening in the family, specifically for car journeys.

As with Maria, music has been shared with Charlie by his parents, and in this case grandparents, which stems from their own personal musical histories. In turn this music has become part of Charlie's daily engagement. This moves on to the notion of preference, choice and repetition in Charlie's engagement with the music and activity in his environment.

6.7.3 Interaction with Musical Activity through Choice and Repetition

As with Maria, one way of engaging with the musical environment for Charlie appeared to be through choice. In terms of instrumental play and singing his father noted, 'we'll get the music box out and we'll sing... *it's when he just chooses to do them*.' Interestingly, for a time Charlie's parents recalled that early on, he did not want to listen to recorded music and would request that music be stopped. They described,

> He actually, he didn't like listening to music when he was younger…like CD music, he would visibly tell us to turn it off...which is interesting. Initially I was a bit kind of surprised...he was very much like 'turn it off, turn it off, I don't want to listen to it'...if we put any kind of music on at all. He's still kind of like that if we change the Huckleberries. And if we try and do anything new he's just like...ugh...I want to listen to the music I know...

Charlie clearly makes a choice in whether or not he wants to hear music in his environment and what type of music he would like to hear. His parents also highlighted that within external group activities, Charlie's overt participation in terms of singing or playing along was minimal:

> Actually, my friend started to run a little music group in our living room...total silence, didn't really join in very much. He did sometimes when there was maybe just her or just one or two other people, but when there were maybe just four or five other people he just wasn't interested, but we stopped that when he went to the nursery so...and he's become a lot more confident I think since then...but that was always interesting but afterwards he would talk about the music group and sing some of the songs.

A number of video observations are taken with Charlie at the children's centre, during group singing with staff and parents. While Charlie can be seen to observe and sometimes follow along the movement of action songs, overall as described above, he does not interact in an overt way, such as through singing along. However, his parents stressed that he took the information in and replayed it at a later time:

> But it's funny because he's taking it all in...because we went to a birthday party last week and they were playing games, and he didn't want to join in any of the games and as soon as we got home he basically recreated the entire game with me and he wanted to play with me and he knew exactly what to do and he was saying 'now do this, now do this', so he was obviously taking it in but just didn't want to join in…

Charlie makes clear choices about how and when he prefers to engage with activities. His replaying of the activities and songs which emerge outside of the group scenario, at home, demonstrate that his participation through observation may be important for him. Equally

important is a familiar space to replay these activities either on his own or with those closest to him. Repetition was also highly apparent in Charlie's engagement with music.

Repetition for Charlie was seen in his music listening as well as in his singing and emerged from the interview data as well as observational data. First, consider the recorded music which Charlie chooses to listen to on a daily basis, the Huckleberries CD and the *Listen with Mother* CD. As well as this, his parents made a Spotify playlist of Charlie's favourite songs from playgroup. His father described,

> We made a little Spotify playlist of songs that he learned at playgroup, and then later on the ones that he did for his Christmas play, three or four of those, he wanted to hear again and again and again and again, especially through November and December so we'd listen to those a lot (with emphasis, laughing).

However, this repetition is also seen in the songs he sings on his own and with others. His father explained, 'Yeah, he really likes a certain song and he just wants to do them again endlessly.' This is especially true of Charlie's engagement with the children's song 'Old MacDonald'. The song forms a major part of the observations sent over time for Charlie and provides an opportunity to explore his musical engagement and development in detail.

6.8 Charlie's Observations

6.8.1 Observation 1: 'Old MacDonald' at 18 months

Charlie's observational data allows for an exploration of his engagement with one song over time. Key observations will be discussed based on his singing of 'Old MacDonald.' The first observation occurs when Charlie was 18 months old. The observation is transcribed in Figure 28 and demonstrates Charlie and his mother singing the song together. His mother sings the majority of the song, leaving a pause at the end of phrases for Charlie to complete. He follows on with the successive pitch, as can be

seen in bars 8 and 16. The final note (E_4) which he sings in bar 17, is a repetition of the first two notes he sings in bar 16 – rather than a C_4, which would be expected to follow and complete the phrase.

This type of scaffolding is highlighted by Trehub and Gudmondsdottir (2015) in their chapter on mothers as singing mentors for their children. This was discussed in section 3.2.2 in relation to Rogoff's (2003) mutual structuring of participation, in which parents adjust 'prompts and assistance according to the children's development' (p. 291). Trehub and Gudmondsdottir (2015) state,

> The earliest duets take the form of the mother pausing at the end of each line of a highly familiar song so that the toddler can fill the gap with the sound resembling the missing "word"….The duets, which are highly energising for mother and infant, become increasingly frequent, extending to other songs. The gaps to be filled become progressively larger, eventually leading to simultaneous singing of entire songs. Note that there is no direction here, all the interaction takes place non-verbally and within the music, using the familiarity of the songs inherent structure. (p. 461)

As Trehub and Gudmondsdottir (2015) note, the interaction takes place within the music here and is non-verbal. Cues within the music are emphasised, for example by looking at Charlie expectantly and providing a slight pause with space for a response. During this period there are a number of observations of Charlie and both his parents, as well as his grandparents, singing a variety of songs in this way together.

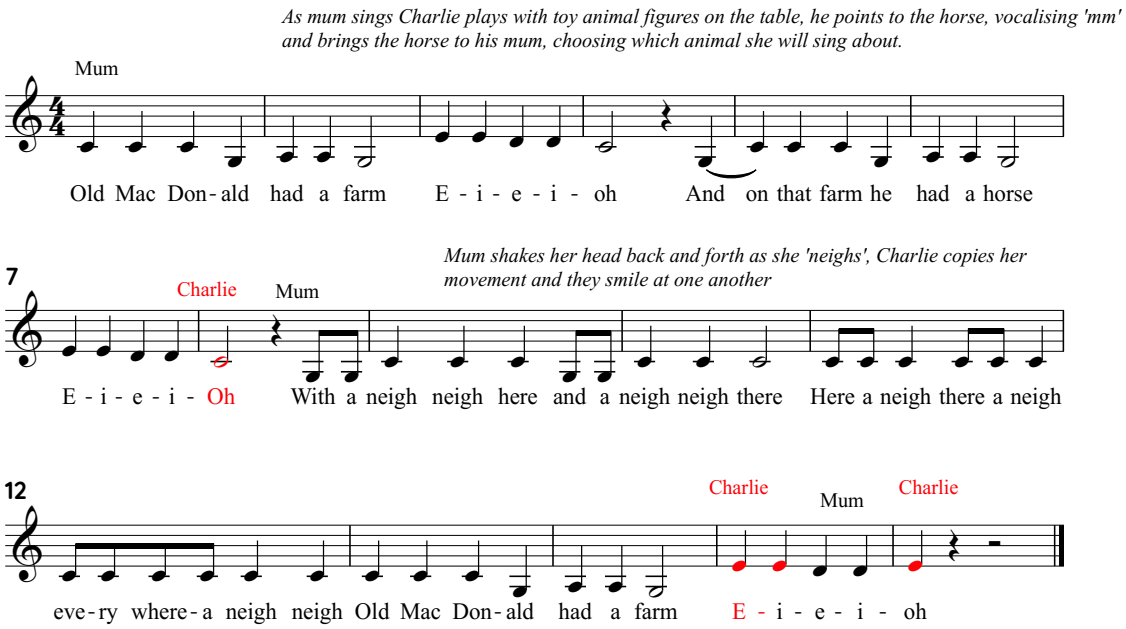


Figure 28 Charlie and his mum sing 'Old MacDonald'

6.8.2 Observation 2: 'Old MacDonald' at 21 months

The next observation moves on to Charlie at 21 months and demonstrates how he engages with this song proactively:

> Charlie is sitting with his box of instruments and is playing the glockenspiel with one beater. As he plays he hums and sings to himself. His playing of the glockenspiel appears to be physically driven; he does not seem to intentionally use the melodic qualities of the instrument. As Charlie plays his father sits beside him and comments, 'That's brilliant Charlie.' He listens to Charlie sing and play a bit more and asks, 'What song are you playing?' Charlie replies 'e-i-e-i-o' and his father confirms verbally, 'Old MacDonald'. At this point Charlie sings and repeats the phrase, 'e-i-e-i-o'. This has been transcribed in Figure 29.



Figure 29 Charlie engages with the motif of 'e-i-e-i-o' through repetition (SoI-EY Level 4, achieving)

As mentioned above, Charlie appears to use the percussive qualities of the glockenspiel intentionally, while any pitches which occur as a result are accidental. The physicality of his playing, which results in pattern, relates to descriptions of instrumental musical play in the literature, which suggest that pattern in sound is integrated with the child's movement and gesture (Dansereau, 2015; Young, 2008). Taken on its own, his percussive playing creates a simple duple pattern, as in SoI-EY Level 3. Layered over this pattern, Charlie sings and repeats, 'e-i-e-i-o', the motif which he sings with his mother in Figure 28. However, now he sings the motif on his own. His singing revolves around the pitches of A_4, G_4 and E_4; these pitches appear to derive from his playing (even if these notes are not played intentionally). He maintains the contour of the motif and its general rhythmic structure. According to SoI-EY terms, his singing is in the midst of Level 4, (achieving) in which he 'repeats or varies motifs or links different motifs together to form short musical narratives that are not in time and or in tune.' Here, the aspect of repetition is clear. As well as this, within one observation, two levels of musical

engagement occur simultaneously (SoI-EY Levels 3 and 4); his singing ability is observed at a more advanced stage of musical development when compared to his instrumental play.

6.8.3 Observations 3 and 4: 'Old MacDonald' at 26 Months and 28 Months

Moving on to Observation 3, Charlie is now 26 months old:

> Charlie is looking at his picture book of 'Old MacDonald' and sings 'E-i-e-i-o'. His mum sings the first phrase of the song, leaving a space for Charlie to respond. However, now he takes over and sings the rest of the song on his own (which can be seen in Figure 30).

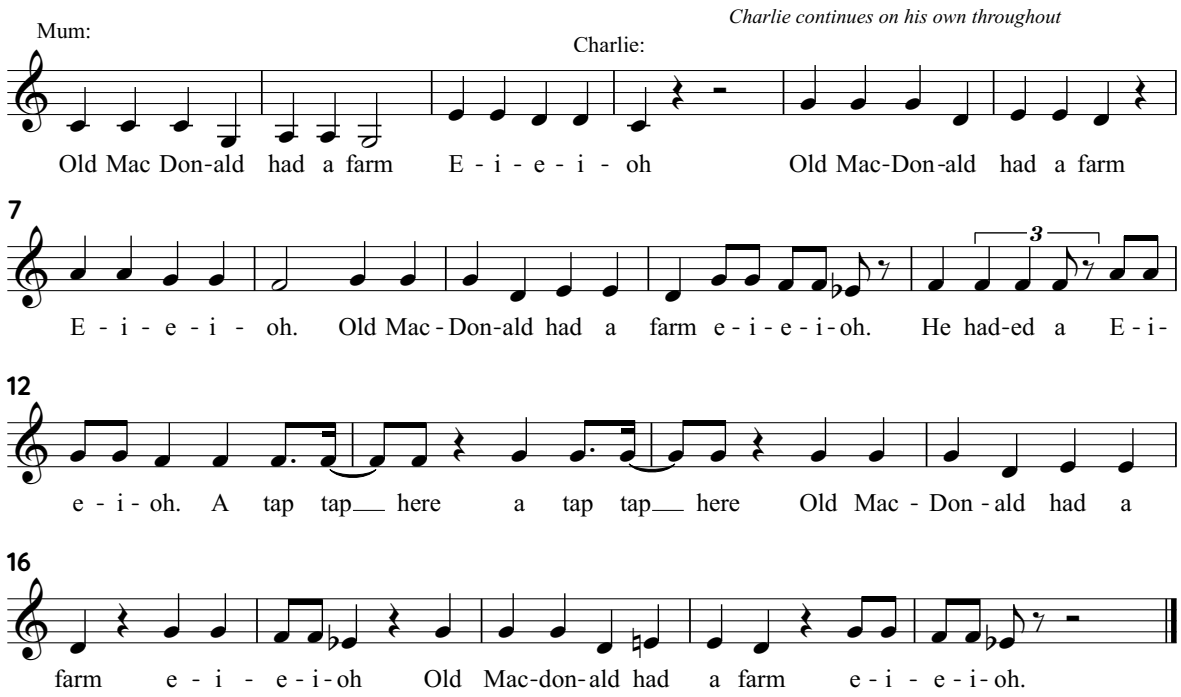


Figure 30 Charlie sings 'Old MacDonald' demonstrating engagement at SoI-EY Level 4 (excelling)

In SoI-EY terms, Charlie is now engaging with the song by repeating and varying the same motifs *as well as* linking different motifs together to form short narratives,

however a stable sense of tempo or tonality is not yet present throughout. This is indicative of SoI-EY level 4, *excelling*. His use of motif has extended to create a more coherent narrative here. While there is an interaction between Charlie and his mother to open the song, he takes over, making this primarily a proactive domain of engagement. During this time Charlie engages with this song (and others) in similar ways, demonstrating varied engagement at SoI-EY Level 4, both interactive and proactive.

We now move on to Charlie at 28 months:

> Charlie is sitting by the Christmas tree with his box of instruments, his glockenspiel is sitting beside him. He is holding a set of bells and tapping them on his hands while he sings 'Old MacDonald'. Here his tapping is precisely in time with the melodic rhythm of the song. His playing and singing are now coordinated. He sings through the whole first verse, now approximately in time and in tune. After the first verse his father sits beside him and begins to play the song on the glockenspiel, supporting Charlie to continue singing. The two sing and play the rest of the song together, Charlie singing, with his father on the glockenspiel. Charlie is approximately in tune with the glockenspiel throughout and the two are in time with one another. Charlie continues to tap his bells in time as well. When he sings the penultimate phrase, he initiates the end of the song as he gradually slows down and his father follows. The two end together with emphasis after which Charlie claps to applaud their performance.

At 28 months, Charlie now sings the song in full with his father – at SoI-EY Level 5, in which they sing and play simple pieces of music, sharing a part. It is interesting to note that now his instrumental play is in sync with his singing. For Charlie, the emergence of SoI-EY Level 5 (within the observations that are available) occurs within the interactive domain.

Over time Charlie has experienced this song (as well as many others) through interactive engagement, in which his singing has been gently scaffolded. He has also had the opportunity to sing and play with the song on his own. The experiences in which he has listened to the song through recordings and within group contexts, such as at the children's centre, are also considered to contribute to his engagement. This is not the only song with which Charlie engaged during this period, indeed a varied repertoire is apparent in all the observations seen. However, it is one of his favourites in which repetition played a strong factor at his request.

At 28 months Charlie is now engaging at SoI-EY level 5. Referring back to Figure 25, which displays his average SoI-EY level over time per domain, eventually his average interactive level of musical development reaches and maintains SoI-EY Level 5. In the proactive domain SoI-EY Level 4 dominates, before gradually reaching Level 5. Observations in the reactive domain remain at SoI-EY Level 3. It may be that Charlie engages with whole pieces in time and in tune through the repertoire that is most familiar to him when he is with others, and which he has experienced repeatedly. While this final observation demonstrates SoI-EY Level 5, he still engages at SoI-EY Levels 3 and 4 during this time. The observations at SoI-EY Level 3 demonstrate that Charlie has an immense enjoyment of playing with pattern. His engagement at Level 3 derives from observations in which Charlie and his father dance to his favourite tracks of the Huckleberries. The music starts out slowly, gradually increasing in speed, Charlie and his father use the space of the room to emulate the gradual speed as they take slower, larger steps, which lead to faster and faster running accompanied by laughter and squealing. While he responds to gradual change in tempo, synchronisation with the music is not yet seen. His engagement at SoI-EY Level 3 also continues through instrumental play during this time. Charlie is now able to engage with songs in full (SoI-EY Level 5),

demonstrating another layer of development in which he can create music on his own and with others. However, he continues to draw from, engage with and enjoy pattern and musical motif.

6.9 Case Study 2: Discussion

6.9.1 Charlie's Trajectory of Musical Development

The results based on Charlie's observations, as analysed and summarised using the SoI-EY framework addresses the research questions of,

- Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of the relationship between these two factors?
- How do the stages in their present or modified form, relate to one another in their representation of a child's evolving musical development?

Charlie's musical development was viewed over a 24-month period. His observations start later in terms of age when compared to Maria, with his first observations beginning between 15-18 months of age. First, in relation to the analysis of Charlie's data using the logistic growth function, displayed in Figure 26, an initial period of stable growth as seen in the full data set and in Maria's data, is not present here. This may be due to the later age at which observations begin for Charlie. Furthermore, the spread of observations (which includes SoI-EY Level 2) within the period of 15-18 months, is demonstrated in the predicted average of SoI-EY Level 2 at 17 months. This perhaps underestimates Charlie's ability at this time.

Looking at Figure 27, which is based on Charlie's highest observed level of musical development over time, engagement generally begins at the average predicted SoI-EY level of the full data set (SoI-EY Level 3). His growth curve eventually reaches the highest predicted scores of the full data set, before reaching an earlier plateau, which

occurs for Charlie between SoI-EY Level 4, excelling and Level 5, emerging. We know from the raw observations that Charlie is indeed capable of singing whole songs in time and in tune, however, the majority of observations are still at SoI-EY Level 4 here, even when considering his highest SoI-EY level across time. This may suggest that observations captured before 15 months of age and after 42 months of age might provide a more complete picture of Charlie's development over time. Nevertheless, the data available demonstrates that again we see a non-linear relationship between age and SoI-EY level. The results also demonstrate individual variation in children's musical development.

In terms of how the SoI-EY stages relate to one another, again, when musical engagement emerges at one level, engagement at previous levels continue (as apparent in Table 25 and Figure 24). This is evident for example between 15-18 months when Charlie is engaging with music at SoI-EY Levels 2, 3 and 4. However, as with the full data set, engagement at SoI-EY Level 2 eventually ceases; this occurs for Charlie after 24 months of age. The emergence of engagement at SoI-EY Level 5 is also accompanied by continued engagement at SoI-EY Levels 3 and 4.

6.9.2 Charlie's Surrounding Environment

Charlie's surrounding environment and musical activity will now be discussed in relation to the research questions of 1) What impact does the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement and development? and 2) Do some activities within the home and settings such as children's centres more effectively promote musical engagement and development than others, and if so which, and in what ways?

Charlie is provided with multiple opportunities to engage with music in his environment and he clearly takes part in the opportunities he is surrounded by through listening, creating music with others, and on his own. While Charlie may not always overtly display responses in a structured group environment, these contexts still appear to have an impact on his engagement. This is seen as he replays the activities which occur during these groups at home. Charlie also brings home his musical experiences from nursery, for example, in the concept of using 'tidy up' music and in sharing his favourite songs learnt in nursery with his parents.

Furthermore, while Charlie has the space to explore music on his own, a select number of observations demonstrate gentle scaffolding which takes place during spontaneous moments of interaction. These observations exemplify the impact of social context in the moment and over time. Charlie's engagement is guided by his parents through the inherent qualities in the music and through the use of instrumental play (as in Observation 3). Interpreted through the lens of Rogoff's (2003) guided participation, Charlie's proactive engagement may stem from the multiple contexts in which he interacts, listens to and observes musical activity. As was suggested in the case of Maria, perhaps it is the combined experiences of the reactive and interactive, which feed into the proactive here.

Looking at which activities most effectively promote musical engagement, again the themes which emerged centred on activity grounded in family musical culture and history, choice and repetition. While Charlie engages with activities that include children's songs and nursery rhymes, an integral part of musical activity which has particular meaning for the family and stems from Charlie's parents and grandparents, forms part of his daily engagement and activity. Activities often provide an element of choice and have a high element of repetition. Repetition here is relevant over time – the

same two CD's have been listened to as a favourite over a two-year period and the same songs are sung alone and with others during this time as well. Perhaps important to consider, is that the repetition in activity is guided by Charlie and is in turn supported by his parents. Playfulness and multimodality in musical activity are also apparent in this case study. Take for example the favourite activity of running around in circles to the increasing tempo of Charlie's favourite CD. Overall, musical activity is woven into Charlie's daily life, is supported by his parents and is often social, while leaving space for and acknowledging solitary engagement. While the majority of observations discussed here have been interactive in nature, the final case study presented will focus primarily on the proactive domain.

6.10 Case Study 3: Mateo

As with Charlie and Maria, Mateo attended the children's centre stay and play session with his mother. Mateo lived with his mother and father in a flat in London. He is of Mexican-American and Turkish descent and is bilingual, speaking both Spanish and English. At the time of the project Mateo was an only child. As with the other children, midway through the project he began attending nursery and preschool, meaning he no longer attended the children's centre. However, his mother continued to send observations of Mateo from home. For Mateo, in particular, observations were sent which captured engagement in other contexts such as in the car, on public transport and in parks and playgrounds.

6.10.1 Mateo's Observations According to the SoI-EY Framework

Seventy-one observations were collected for Mateo in total, from the age of 15 months to 38 months. Forty-six of these observations were coded according to the SoI-EY framework. In terms of domain 6.5% (n = 3) were coded as reactive, 84.8% (n = 39) as proactive and 8.7% (n = 4), as interactive. The majority of observations for Mateo lie

within the proactive domain and will be the focus of this case study. Table 26 shows the number of observations for Mateo per level according to three-month age bands. The data within Table 26 illustrate that across the observation period, Mateo engages at SoI-EY Level 4, and at SoI-EY Level 3 (although not within the first and last period). Engagement at SoI-EY level 5 begins between 30-33 months. No observations are seen at SoI-EY Level 2 and between 21-27 months there is a gap in the number of observations sent.

Table 26 *Mateo's number of coded observations per level within three-month age bands*

Age (months)	Level 2		Level 3		Level 4		Level 5		Total	
12-15	0	0	0	0	2	4.3%	0	0.0%	2	4.3%
15-18	0	0	8	17.4%	8	17.4%	0	0.0%	16	34.8%
18-21	0	0	0	0.0%	2	4.3%	0	0.0%	2	4.3%
21-24	0	0	1	2.2%	0	0.0%	0	0.0%	1	2.2%
24-27	0	0	0	0.0%	1	2.2%	0	0.0%	1	2.2%
27-30	0	0	1	2.2%	4	8.7%	0	0.0%	5	10.9%
30-33	0	0	2	4.3%	4	8.7%	3	6.5%	9	19.6%
33-36	0	0	1	2.2%	6	13.0%	2	4.3%	9	19.6%
36-39	0	0	0	0.0%	1	2.2%	0	0.0%	1	2.2%
Total	**0**	**0**	**13**	**28.3%**	**28**	**60.9%**	**5**	**10.9%**	**46**	**100.0%**

6.10.2 Mateo's Trajectory of Musical Development

Mateo's observations are first depicted visually using a scatterplot; his observations are superimposed on those of the full data set in Figure 31. While Mateo's data does not allow for a logistic growth analysis, his average level of musical

development per domain is shown in Figure 32. In order to illustrate Mateo's musical engagement as compared to that of his peers, his average SoI-EY points over time are superimposed on the logistic curve of the predicted SoI-EY average and the logistic curve based on the highest SoI-EY level for the full data set (Figure 33). It is evident that Mateo's average level of musical development fluctuates between both growth curves, with the exception of the average point at 24 months.

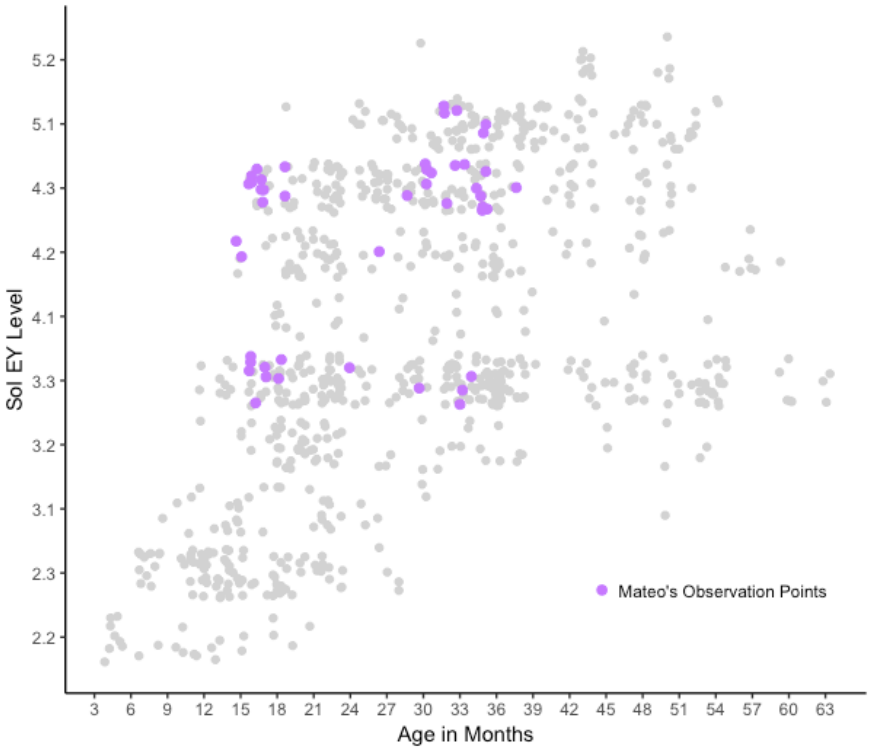


Figure 31 Mateo's raw observation points superimposed on observation points of all data

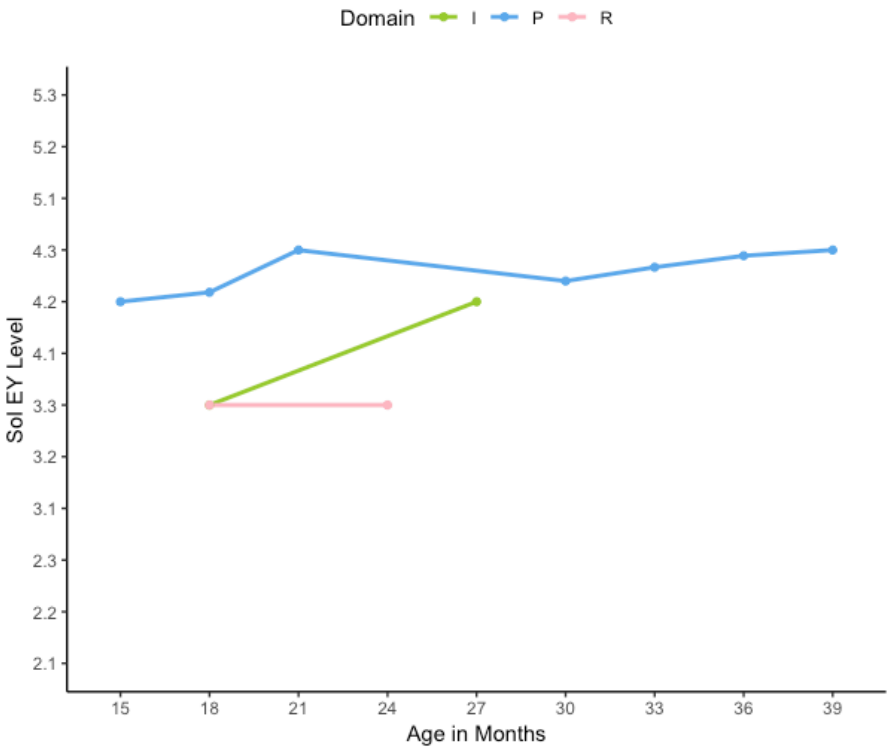


Figure 32 *Mateo's SoI-EY average over time per domain*

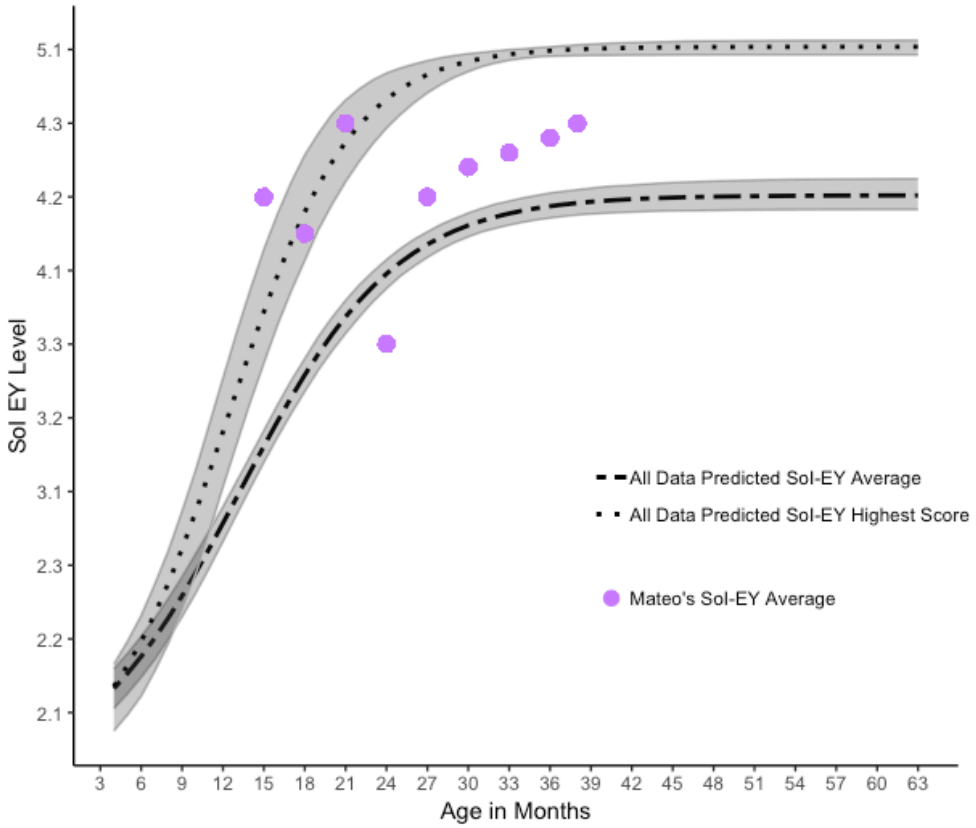


Figure 33 Mateo's average SoI-EY level at each point, superimposed on the predicted growth curves for both the average SoI-EY score and highest SoI-EY score of all observed data

As with the first two case studies, the next step is to gather an overview of Mateo's surrounding environment and musical activity, putting his musical engagement in context, and exploring individual observations.

6.11 Overarching Themes: Contexts of Musical Engagement and Activity

6.11.1 Mateo's Surrounding Musical Environment and Activity

The activity and environment surrounding Mateo will be described by summarising information gathered from observational, interview and questionnaire data. As with Maria and Charlie, singing was a daily activity for Mateo, both alone and with others. In fact, 84.8% (39) of coded observations capture Mateo singing and are seen in a number of different contexts as well as at home. For example, he is observed to sing when at the playground, walking outside in the city or park with his mother, when on the bus, and in the car. Mateo's mother also described that he sang a great deal at home during routine activities. She explained, 'He'll sing when he's putting on his socks, or brushing his teeth, he sings when he's doing I guess boring stuff…so he'll be singing like, putting on the clothes.'

Instrumental play is also apparent for Mateo, although it does not occur as much as singing. Only 13.9% (n = 5) observations capture him during instrumental play. However, the questionnaire and interview suggest he does engage with instruments more often than this. Mateo also had a collection of instruments at home to play with:

> He likes to play, we have a box with musical instruments, he'll play with those for a while, or he'll test stuff out...and he'll say, 'oh it makes music'. He used to at the beginning when we had the music class, like try and test stuff and he kind of stopped and now he started again...he likes to play with the musical instruments...

Mateo engages with music listening as well on a daily basis, both on his own and with others, often through movement and singing. In the interview his mother mentioned,

> In the morning sometimes we put the radio… stuff on the computer. When I go pick him up or if we're in the car sometimes he wants some CD's that he likes in the car, sometimes he wants things like audio books. But usually it's music or radio, the local radio and then, when we come back yeah, there's always some music. Usually there is some music until it's bedtime. And he has his favourites, he'll ask "Can you put this on'. Depends on what he likes at the moment. There is always a song that he wants to always hear…

In terms of planned external activities Mateo attended library rhyme time with his mother about once a week and attended the children's centre, in which music was a part of stay and play sessions, more than once a week. His mother explained that his favourite portion of the stay and play session was when staff, parents and children sang together. He also attended a specially organised music session at the children's centre for a 10-week period.

As well as these more planned activities, his mother described that when they were out and about, Mateo loved to watch and listen to street musicians. For example, she explained that on Sundays they would go to a specific spot in London where a group of musicians met to play congas in the park. She described that for Mateo, 'anything with a beat he really likes.' Although they didn't attend planned concerts at the time, whenever they were out and about, if there were street musicians, Mateo would stop what he was doing to listen. His mother observed Mateo's responses to music from infancy: 'Even when he was really small, like maybe 7 months...I noticed that, if there was anyone singing on the street, he was in a trance…so I was like...I think he really likes music.'

Musical experiences for Mateo also included interactive moments with peers and adults. When Mateo was two years old his mother looked after a four-year old girl, who would often sing with him. For example, his mother described that when they were in the car together and often stuck in traffic Mateo's friend would sing to him when he got

fidgety or upset and this would calm him down. Interestingly, the song she would sing is one which her mother made up for her. A video observation also shows her singing nursery rhymes to Mateo at home, while he dances along.

Dance is also highlighted in Mateo's observational data. His mother explained that for Mateo, dance was more often a social activity rather than something he did on his own. Examples of this are present in the observations. For example, in one observation he and his cousin are dancing together to his uncle's playing of the harmonica. She described the observation saying,

> He got a harmonica as a present from a friend and he likes to mess around with it. And then we took it with us to Arizona and then he wanted my brother to play for him and then my brother was just messing around and his cousin loves music too. When the other one dances, he'll dance so they were jumping together...that was really funny.

She further explains how a family friend took on the role of Mateo's dance partner:

> When my friend used to live in this house. They used to put music on and dance together for ages...and let out all the energy. Sometimes he'll kind of move along, but it has to be someone else messing around with the music then he'll get really involved.

The above descriptions demonstrate that those engaging with Mateo musically at home included peers, extended family, and family friends. As with Maria and Charlie, Mateo also attended nursery and was looked after by a childminder. His mother noted that he often sang music from these contexts at home:

> I know they sing a lot because he comes home with loads of new songs. So, he'll start singing them and I'll ask, 'Where did you learn that', and he'll say 'at

school'...or at his childminder too, they used to take him to toddler groups so he would come back with other new songs.

Thus far, an overall picture emerges in which musical activity is interwoven throughout Mateo's day in varied contexts. As with Case Studies 1 and 2, interview data revealed that family musical culture and history also played a key role in Mateo's musical engagement and this will be reviewed next.

6.11.2 Family Musical Culture and History

Mateo's mother explained that they drove together often and would listen to CD's, in particular, they listened to a lot of Latin music. She described that he loved Latin music saying, 'For a long time we would ask him, "what music do you like"… "mambo, mambo"…now it's a little bit of everything even some Beatles and some 70's music, just a mix, but a lot of it is Latin.' This is music which his mother introduced to him and which were favourites for her as well.

She further described that Mateo developed particular favourites within this genre: 'From the songs he likes now, the new ones are usually in Spanish. It's really funny because I put a lot of groups but he likes that group, they are called Bomba Estereo.' Another of Mateo's favourites was Tito Puente, who he had been listening to since a baby. His mother mentioned that while he had developed new favourites such as Bomba Estereo, he still enjoyed listening to songs he had heard since infancy. She said, 'He still likes the old songs too, there's one from Tito Puente and he really likes that. There's some that he really likes and he remembers their names and stuff…it's really funny…he's the music guy.'

As well as sharing a love of Latin music with his mother, specific musical experiences also stemmed from further generations in the family. Mateo's maternal

grandmother sang made-up songs to him, which originated from his great-grandmother. His mother described,

> My mom used to sing for him as soon as he was born and I was like 'ah ok' and my mom used to make up songs too and she still sings him some of those old songs and he's like...'ah yeah that song'. They are made up songs, she said my grandma made it up and then she copied my grandma. She sang them to us when we were little, my grandma, her mom, and now she's singing them to him. And my mom loves music too.

The multi-generational sharing of music seen here was also present in Charlie's case study. As with all cases, this music forms a large part of Mateo's engagement at home. We also look at the concept of choice and repetition seen in Mateo's musical engagement.

6.11.2 Interaction with Musical Activity through Choice and Repetition

Mateo also demonstrated choice-making in his music listening, for example, during car rides he would choose what CD's to listen to, requesting favourites:

> When I go pick him up or if we're in the car sometimes he wants some CD's that he likes in the car, sometimes he wants things like audio books. But usually it's music or radio, the local radio and then, when we come back yeah, there's always some music, usually there is some music until it's bedtime. And he has his favourites, he'll ask "Can you put this on'. Depends on what he likes at the moment. There is always like a song that he wants to *always* hear…

Mateo also demonstrates choice in how he participates in musical activity, depending on the context. This is demonstrated in observations of Mateo's engagement in external group music activity, in which he preferred to observe. His mother commented on this, describing,

> No, he wouldn't sing. He would only sing when we were finished or when we got home...he only participated maybe in the singing once when we were in the children's centre...it was really funny...but at home he'd always be repeating the songs or remixing the songs (laughing)…He was getting it yeah...

However, she also mentioned that he loved this portion of the session and described, 'he would just stop everything; I could just tell he really liked it because he would just sit down and listen.' This response, to predominantly observe within group sessions and explore the music on his own at home, was something also described by Charlie's parents.

The aspect of repetition in Mateo's musical engagement is seen both within his music listening as well as in his singing. Interview data reveals repetition was apparent in Mateo's request to listen to the same favourite CD's and songs. This is demonstrated in the above quote describing music listening in the car, in which his mother emphasised that there was a song 'that he wants to *always* hear.'

Mateo's mother also described that Mateo tended to either make up his own songs or combine songs, into what she called his 'remix songs'. She explained that these new or remixed songs were not only sung once in the moment, but were often repeated at other times. For example, she explained there was a made-up song, which he sang only to accompany putting on his shoes. This ties in with the comment previously, in which Mateo was described to sing specific songs during routine activities. In a sense, Mateo created rituals out of these routines, assigning specific tunes to accompany them, elevating the repetitive nature of what may have been a mundane activity. Indeed, the majority of Mateo's observations provide a rich example of his creative engagement with song and will be the focus of the next section.

6.12 Mateo's Observations

As noted in section 6.10.1 the majority of observations for Mateo lie within the proactive domain of musical engagement and will be the focus here. Furthermore, from his first observation at 15 months to the final observation at 38 months, Mateo engaged at SoI-EY level 4 throughout, in fact 60.9% of observations are at SoI-EY Level 4. The observations below will also focus on this stage of musical development.

6.12.1 Observation 1: 'Papi'

This first observation was recorded when Mateo was 15 months old; the video was recorded for his father (Papi). It is a typical example of Mateo's self-composed songs at the time. His short song is based on the word 'Papi', which he repeats and varies. Figure 34 provides a transcription of his singing.

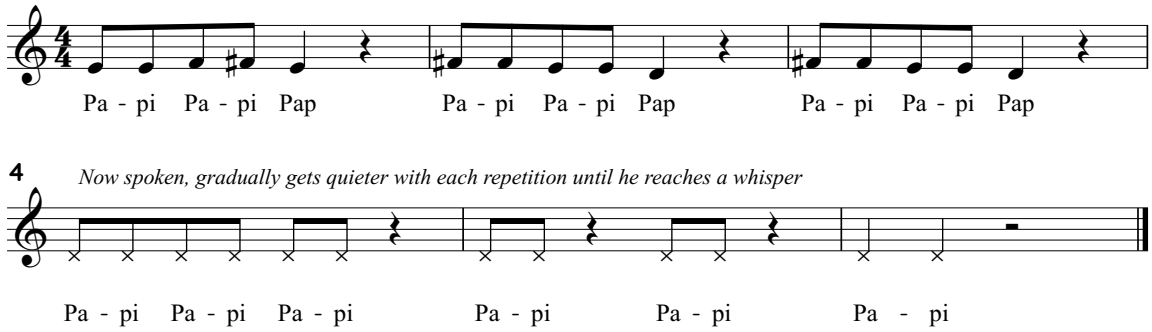


Figure 34 Mateo's 'Papi' motif, sung and videoed for his father

Looking at Figure 34 Mateo's motif centres around the natural cadence of the word Pa-pi; repetition of the motif is clear. This aligns with Dowling's (2002) description of young children's early songs in which the rhythm of sung phrases emulate speech patterns (p. 489). Evidence of variation in Mateo's 'Papi' motif can be seen for example in bar two as Mateo inverts the phrase (except for the final note). While repetition and

variation are central here, there is also a coherent shape from start to finish, created through Mateo's use of pauses, decrease in dynamic, and increase in note length, evident from bar four onwards. Overall, the song fits the criteria for Sounds of Intent Level 4, achieving, in which a child repeats and varies the same motif. Interestingly, although the observation portrays an example of proactive engagement, it is still socially bound in that Mateo is singing *for* someone. Singing is mediated through technology for the purpose of communicating with another; Mateo is singing especially for his father. A number of observations include videos which were taken for this purpose. The next few observations demonstrate Mateo singing a familiar song, again within SoI-EY Level 4.

6.12.2 Observation 2: 'Remix Songs'

The next set of observations focus on songs which Mateo's mother termed his 'remix' songs. These songs are similar to examples found in the literature such as the potpourri song (Moog, 1976) or Mang's (2005) self-generated songs and referent guided improvisations. In the first observation Mateo is 16 months old; this was taken two weeks after the observation in Figure 34. Mateo is in the car, his mother driving. He is singing to himself, beginning with the children's song 'Wind the Bobbin Up', however using nonsense syllables. He performs the actions to some of the song as well, before singing only (without actions). Figure 35, provides an excerpt from the observation, illustrating his singing of 'Wind the Bobbin Up', which appears to transition to 'Twinkle, Twinkle Little Star'. The transcription includes the text of the songs as they would be sung, beneath the syllables being used by Mateo. This is in order to provide the reader with an idea of the nursery rhyme in relation to Mateo's singing.

The transition from one nursery rhyme to the other appears to grow out of the common tune shared by both. The move from 'Wind the bobbin up' to 'Twinkle, Twinkle' as seen at the end of bar eleven is apparent to the listener through the change in

the duration of the notes sung, which are lengthened to now match the underlying text of ‘Twinkle, Twinkle Little Star’. It is difficult to say whether Mateo is consciously aware of his move from one song to the next in such a seamless transition between the shared melodic element of the two songs, especially as he plays with syllables here rather than using the words. In any case, this provides an example of Level 4, excelling, in which a child repeats and varies the same motifs *and* links different motifs together to form short musical narratives that are not yet in time and/or in tune.

This observation is the first which was coded at SoI-EY Level 4, excelling and from this point onwards, up until the final observation, when Mateo is 38 months, he continues to engage with music in this way. Throughout this time engagement includes made up short motifs which are repeated and varied as in Figure 34 and elements of familiar songs taken and ‘remixed’, as his mother described them, forming longer narratives as in Figure 35. Apparent during this period is a playful and humorous nature, which Mateo often infuses in his singing.

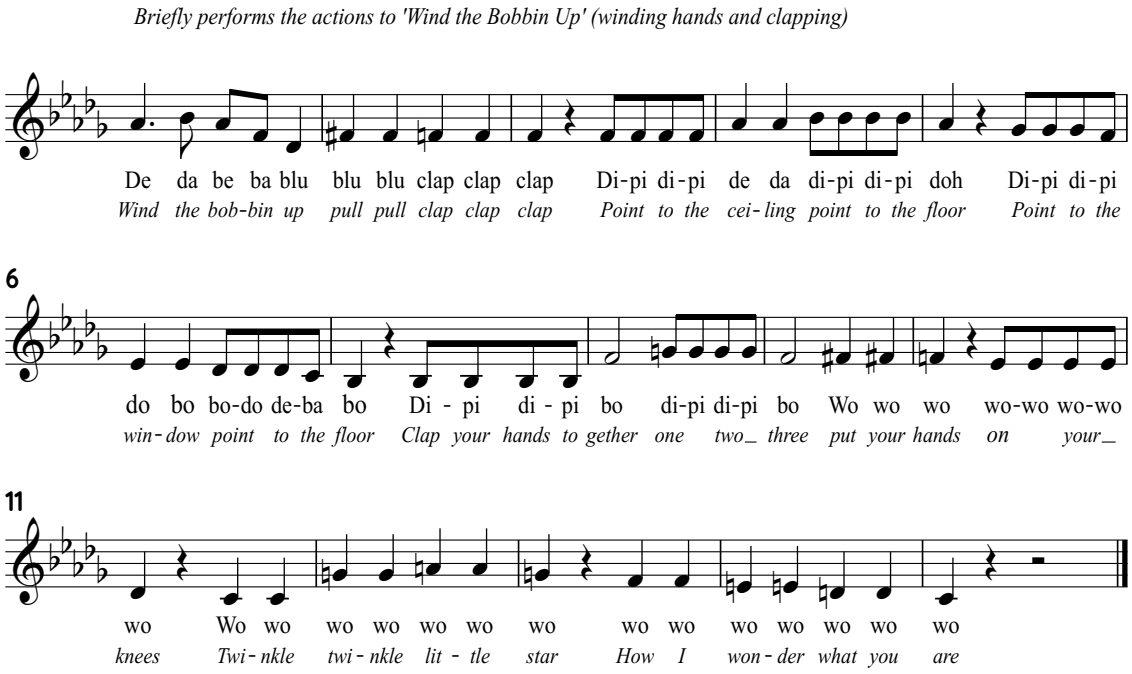


Figure 35 Selection of observation in which Mateo sings 'Wind the Bobbing up' moving into 'Twinkle, twinkle'

An example of Mateo singing a familiar tune at 19 months, his 'remix' of the song 'Wheels on the Bus', demonstrates playfulness. His mother is encouraging him to sing by saying, 'the babies on the bus go.' Mateo starts out singing 'the babies on the bus go', but as he continues the phrase he intersperses varied vocal noises, sings in intentional low tones, uses funny voices, takes apart the phrase and repeats it with new syllables. For example, he changes the words 'wheels on the bus' to 'one diddy bus'…which moves into play with the words 'one diddy do' and 'all day long.' His mother intersperses at one point saying, 'the wheels, the wheels on the bus', attempting to get him to sing the song, but Mateo carries on with his version, playing and 'remixing'. There is a purposeful nature to Mateo's use of the song material, both stemming from the music and from the text, which aligns with descriptions in the literature in which songs by young children are used for their malleable qualities (Mang, 2005; Young, 2004). However, what is seen

here, as well as in much of Mateo's singing, is a sense that a musical joke is being made, and here he has an audience.

This sense of humour in children can be seen in the literature. For example, Loizu (2005), in her study on humour in children up to two years described the theory of the absurd, which includes, 'events that are a mismatch from the children's world and do not fit their existing schemata' (p. 48). Within this Loizu (2005) observed play with sounds and words, for example, purposefully recreating words in the 'wrong' way repeatedly. She described that 'children are aware of the specific use of materials and toys in their infant space, and in their attempt to be humorous they alter the way they use those materials and smile or laugh about their action' (p. 49). This is seen here as well: humour through the alteration of both song and language.

6.12.3 Bedtime Songs 1

The emergence of engagement at SoI-EY Level 5 (whole songs in time and in tune), first appears in the data when Mateo is 32 months old, in an audio recording taken of his bedtime singing. As was seen with Maria, solo songs are a regular part of Mateo's bedtime ritual. Here, while Mateo sings on his own, his mother is in the room with him.

In this observation, Mateo chants through the song 'Monkeys on the Bed', and although he is not singing the song in tune, he is chanting through the whole simple piece and is in time; he maintains a steady tempo throughout and maintains the melodic rhythm of the song's phrases (SoI-EY Level 5). While gauging a sense of tonality cannot be determined, he is clearly in time. At 33 months, Mateo again demonstrates engagement at SoI-EY Level 5, while singing himself to sleep. He sings through two familiar nursery rhymes, both approximately in time and in tune: the 'ABC Song' and the children's song 'Five Little Ducks.' He sings the 'ABC Song' both using the alphabet as well as using nonsense syllables. Interspersed between the singing of these two songs, Mateo briefly

plays with a motif based on the word 'Mommy', repeating the word playfully, which would be interpreted as engaging with SoI-EY Level 4. Within one observation Mateo engages with song in its entirety, as well as continuing to play with motif.

From this point onwards, Mateo engages at SoI-EY Level 5 through song, although engagement at SoI-EY Level 4 dominates (as can be seen in Table 25). An observation again during Mateo's bedtime singing provides an example of further engagement at SoI-EY Level 4, at 34 months and is discussed below.

6.12.4 Bedtime Songs 2

Mateo demonstrates continued engagement at SoI-EY Level 4, while having the ability to sing whole songs in time and in tune (SoI-EY Level 5). Within this next observation Mateo again is singing to himself before going to bed, captured through audio recording. Three main motifs are heard and are transcribed in Figures 36, 37 and 38. As in previous observations, Mateo continues to enjoy engaging and playing with words and their syllables. The first example is based on 'Mama', the second on 'dun, dun, dun', and the third on 'deepti time'.

The observation is a continued example of SoI-EY Level 4, *excelling* in which the same motifs are repeated and varied and different motifs are linked to form short musical narratives. Interestingly, here each motif is sung accurately within its tonal framework. This sense of tonality within phrases (not necessarily retained from one phrase to the next) in young children's spontaneous singing, has been described by Dowling (2002). Furthermore, earlier observations which demonstrate the linking of musical motifs to form short musical narratives were based on familiar song; here Mateo is creating these musical narratives using self-composed motifs. He also plays with extended intervals (for example in the incorporation of the perfect fifth in Figure 37), note duration, and incorporates dotted rhythms. These musical elements are not seen in the earlier

observation of Figure 34 when Mateo is 15 months (except for the variation of note duration); however, they are seen in the use of familiar song at 16 months, as illustrated in Figure 35.

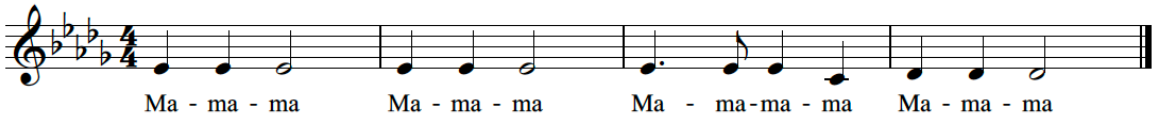


Figure 36 Mateo's bedtime song phrase 1



Figure 37 Mateo's bedtime song phrase 2

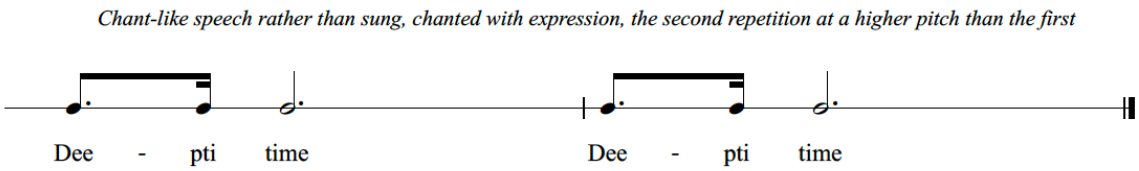


Figure 38 Mateo's bedtime song phrase 3

In summary, the observations here have focused on Mateo's proactive singing, which over the 24- month period of his participation in the project, had a strong basis in SoI-EY Level 4. While emergence at SoI-EY Level 5 is clear, the continuation of engagement with song through motif is also evident. Mateo's made-up and 'remix' songs often have a sense of playfulness and humour. While Mateo's case allows for a particular look at the proactive domain of engagement, a view of social context created through technology, for example in videos made for family members, was also observed.

6.13 Case Study 3 Discussion

6.13.1 Mateo's Trajectory of Musical Development

The results based on Mato's observations as analysed and summarised using the SoI-EY framework will further address the research questions of:

- Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of the relationship between these two factors?
- How do the stages in their present or modified form, relate to one another in their representation of a child's evolving musical development?

Referring to the summary of Mateo's musical engagement in section 6.10.1, while it was not possible to analyse the data using the logistic function, the average musical development according to the SoI-EY framework was taken over time. When plotted over the average predicted level of musical engagement and the highest predicted level observed over time for the full data set, we see a fluctuation in Mateo's data between the two. However, Mateo's highest observed level of musical engagement (at SoI-EY Level 5) lies within the predicted highest SoI-EY level over time, perhaps demonstrating his optimal level of musical development. The emergence of his engagement at SoI-EY Level 5, within the data available here, occurs during a proactive moment of musical engagement, as was seen with Maria, during bedtime singing.

While an increase in age shows a gradual increase in SoI-EY level during this period, with SoI-EY Level 5 occurring at 32 months, overall there is a constancy in the data. Mateo's analysis did not involve logistic growth. However, the logistic growth analysis of the full data set demonstrated that from around 15 months onwards, development begins to decelerate. This deceleration coincides with engagement at SoI-EY Level 4 (see Figure 11). As suggested previously in Section 5.5.3, perhaps this points

to the increase in cognitive demand placed on the child through the processing of groups, leading to the processing of frameworks, which begins to emerge for Mateo during this same period. From 15 months of age to 39 months of age, over a two-year period, Mateo's predominant level of musical development is within SoI-EY Level 4. In terms of the relationship between age and SoI-EY level of musical engagement, we might explore when levels of musical engagement emerge, but also what remains constant over time within a certain period.

While constancy is apparent in a broad sense – with SoI-EY Level 4 continuing over a two-year period, change is still seen within this stage. Here, this appeared in the use of more varied musical elements (both melodic and rhythmic) added to Mateo's later self-composed or self-generated songs, a more stable sense of tonality, and a more purposeful sense of using the musical material creatively.

Finally, as was seen in both the case of Maria and Charlie, and in the data as a whole, the emergence of SoI-EY Level 5 does not constitute the end of engagement at SoI-EY Levels 4 or 3. Engagement at SoI-EY Level 2 is not observed for Mateo, which does not necessarily indicate it did not exist. However, with the previous case studies, engagement at SoI-EY Level 2 was not seen after a time and this is clear in the full data set as well (see for example Table 16 in section 5.2.1). The following section will now discuss Mateo's musical engagement and development in relation to his surrounding context.

6.13.2 Mateo's Surrounding Environment

Here we explore, 1) what impact the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement and development and 2) whether some activities more

effectively promote musical engagement and development than others, and if so which, and in what ways.

Mateo's case study differs from the first two in that the emphasis is on proactive musical engagement. As with both Maria and Charlie, music which Mateo learns in other contexts, such as nursery and in the children's centre, is often heard at home through singing. This suggests an impact on Mateo's musical repertoire, which he infuses into his daily musical experiences outside of these settings. While social context in terms of direct musical interaction is not apparent in many of the video observations, interview data suggested that singing with others was a key part of Mateo's daily social interaction. Overall, Mateo's world is filled with music which includes listening and singing in the car with his mother, listening to live music and singing when out and about and listening and singing to music at home. All these incidental experiences within his environment, if considered from the point of view of Rogoff's (2003) mutual structuring of participation, may play a role in his engagement and development.

As seen in Case Studies 1 and 2, it is perhaps the qualities inherent and the context apparent within activities that promote engagement. For example, activities which are meaningful and salient and in which enjoyment is shared. For Mateo, music listening has a strong link with the musical culture of his family; the enjoyment and love of Latin music by Mateo's mother is also felt by Mateo. Made-up songs are passed on from his grandmother (and indeed great-grandmother) and are an integral part of Mateo's activity. Playfulness and humour also appear to be an overarching characteristic within Mateo's engagement. Consider also that the majority of musical activities observed are woven throughout the day. Indeed, this has been true for all three case studies. While more structured activities are apparent in terms of external settings (perhaps most prevalent for Maria), there is a balance in that spontaneous moments of both shared and solitary activity

occur. Furthermore, this solitary musical activity is supported and acknowledged positively by each family.

6.14 Comparative Discussion: Case Studies 1-3

Looking at the musical development over time for each child, it is evident that there are individual differences. However, an interesting feature when comparing the range of observational data across cases, from the period of 15 months onwards, is that the majority of observations for all three lie within SoI-EY Level 4, followed by SoI-EY Level 3. Indeed, individual observations demonstrated that engagement at SoI-EY Level 4 (in which children engage through the grouping of sounds or motifs) served different functions and was closely linked to the context in which it occurred. For example, comfort, opportunity for musical dialogue with another, and as material for play with sound and language. The idea that songs are used for their potential in creating new material is seen in the literature on children's singing in the early years (Mang, 2005; Young, 2004). However, this also appears to share features in the literature on language play.

Levy (1984) reviews the role of play in language development and describes that children in the early years 'manipulate language as they do objects, using the sounds and words as ever-present toys with limitless possibilities'(p.49). She summarises literature which suggests that play with language indicates children are aware of the meaning and use of the words they play with, that play includes manipulation of both sound and structure, and is important for 'meta-linguistic awareness', 'the ability to make language forms opaque and attend to them in and for themselves'(Levy, 1984, p. 57). There are close ties in Levy's (1984) description of children's crib speech and that of Sole's (2017) crib songs. Sole (2017), also suggests that children's private bedtime singing and

vocalisations serve a function (among others) to practice musical ideas and skill. This is further supported in the case studies here.

Furthermore, Cekaite's (2018) ethnographic exploration of children's language play and creativity may have an affinity with observations seen here. She defines creativity from a socio-cultural perspective and connects the idea of humorous incongruence and creativity. She writes that it is 'possible to suggest a link between children's pleasure in incongruent conduct (including language transformation) and the socio-cultural (Vygotskian) notion of creativity, conceptualised as the ability to rework elements of past experiences and combine the old in new ways' (Cekaite, 2018, p. 28). This link between humour and creativity within a social context was also seen within the case studies here. All three case studies demonstrate a lengthy period of engagement with music, particularly song, through motif in both solitary and social contexts (from which engagement within the solitary derived). This suggests a rich period for children to creatively explore music as a means of play, which in turn is a vehicle for development. Indeed, Barrett (2015) explored young children's singing as related to the development of musical identity and children's musical culture. She wrote,

> When we attend to these musical performances as intentional acts rather than inaccurate and incomplete versions of adult music-making, it is evident that children's singing and song-making is not arbitrary. Rather, it is a rich resource for the narration of self. Further, children's generative musical play as singers and song-makers may also be viewed as a form of learning in which they explore, experiment with and practise the rule- governed structures of "how songs go". Given these multiple and powerful uses of singing and song-making in young children's lives, it is vital that we strive to create learning environments in which such engagement with music is encouraged and supported. (p. 51)

Another common feature between these case studies was a family musical culture which stemmed from parents' background and histories. For Maria, this included music sung in three languages (Polish, Italian and English), her father's songs from Italy, her mother's dance, and the family's summer song 'Magic Moments'. Charlie's father highlighted how the Huckelberries CD (drawn from their university days) held special meaning, with the album as a whole becoming a 'soundtrack' to their lives; as well as this the *Listen with Mother* recording was associated with travel in the car. Finally, Mateo and his mother shared an enjoyment of Latin music, which they often listened to together and had roots in their Mexican-American heritage, associated with their family abroad. There is a key link here to the element of SoI-EY Level 5, in which children associate pieces of music with memorable events or occasions.

These activities and their associations may also play a part in children's development of musical identity. Barrett (2011, 2015) has shown that young children's singing and invented song provide a window into their musical cultures and development of identity in and through music. As well as children's singing (alone and with others) development in relation to musical identity, both individual and collective, may be formed through shared music listening. In the cases here it is not music listening alone, but the social elements within it (for example dancing and singing along), which perhaps create ties and positive experiences. Indeed Cirelli et al., (2018) review the evidence which suggests that melody and rhythm act as social indicators for infants. They write, 'we argue that moving synchronously with infants and singing familiar melodies to them may also signal group membership, highlighting the social relevance of rhythm and melody in musical engagement (p. 70).

The case studies also shared elements of playfulness within the musical activity observed. Interestingly, in a recent report on the impact of targeted music sessions on the

musical and wider development of children in their early years, playful activities, within a guided structure of limited verbal interaction, were seen as being most effective (Ockelford, 2018). Furthermore, the importance of playfulness has been documented in relation to children's wider development and learning, as well as being an element of effective practice in early childhood education (Howard & McInnes, 2013; McInnes, Howard, Crowley, & Miles, 2013). It would seem that playfulness, if understood to have a positive impact on children's wider development, may also have a positive impact on children's musical engagement and development.

Finally, children often had choice in the music they listened to, the activities they chose, the songs they sang and the instruments played. The elements of choice and agency have been suggested to enhance children's musical play and encourage engagement (Koops, 2012). A particular form of choice observed here was the request to listen to and sing the same songs repeatedly. This repetition shares a familiar quality with children's requests to hear the same stories again and again. Indeed, repetition in story-telling has been linked to word learning (Flack & Horst, 2017; Horst, 2013). Similarly, the familiarity of hearing and singing the same repertoire over time (alone and with others), guided by the child's request, perhaps plays a part in children's musical learning.

In conclusion to this chapter, each case study offered a unique narrative of musical development over time as gauged through the SoI-EY framework, particularly in relation to musical engagement at home. Individual differences in development over time were seen. However, shared themes emerged between the cases which highlight that the musical activity observed held particular meaning shared between family members. Activities were often playful, provided choice and were often repeated over time. Next, a final discussion in relation to Chapter 5 results, as well as the Chapter 6 case studies, will be reviewed in line with the study's research aims and questions.

Chapter 7: Final Discussion

7.1 Thesis Summary

This thesis sought to explore the trajectory of young children's musical development, captured through naturalistic observation and gauged using the Sounds of Intent in the Early Years framework. First, a large body of observational data (N=796), taken from early years settings and from the home environment, was analysed broadly. Following this, the data was explored more closely through longitudinal case study narratives. In this chapter results from both perspectives will be considered as they relate to the aims and research questions set out in Chapter 1.

7.2 Aim 1 and Related Research Questions

The first aim of the study was to investigate the validity and relevance of the SoI-EY framework by following individual children's development over time within the context of their natural environments. The related research questions were,

> Are the three domains, four stages and related elements of musical development in the SoI-EY framework both sufficient and necessary to capture a child's evolving musical development within the diversity of their natural environments, and if so, in what ways?
>
> How do the stages, in their present or modified form, relate to one another in their representation of a child's evolving musical development?

7.2.1 Capturing Children's Musical Development using the SoI-EY Framework

This study set out to widen the context in which children's musical development is captured and understood through the Sounds of Intent in the Early Years framework, building on previous research (Voyajolu & Ockelford, 2016), in which observational data was gathered from one preschool and children's centre in London. While the framework has since been applied to explore the musical development of children in their home

environment (Wu, 2018), this is the first time it has been used within one study to explore it's applicability in varying contexts. Indeed, this has demonstrated that the framework can be applied to gauge children's musical engagement and development in settings such as the nursery and preschool as well as at home. Furthermore, the framework has been applicable in exploring children's musical development on a larger scale, analysing data quantitatively as well as on the individual level through qualitative analysis.

Overall, SoI-EY levels 2-5 were represented within the data of the study, with the majority of observations occurring at Levels 3 and 4. While the segments of the framework (A, B, C, D) were not prominent within the results of the study, they were part of the analysis, as was stated in the methods section on coding (Section 3.6.1). However, the segments do not necessarily imply a progressive relationship and it was felt a more nuanced system in which development might be inferred within a level, as well as between levels, was warranted. This was explored in previous research through the use of the original SoI framework (Ockelford et al., 2011).

A new iteration of the SoI framework for children with learning difficulties was applied here, which breaks down each SoI level into three gradually progressive criteria: 'emerging', 'achieving', and excelling', with the segments removed (See Table 5). This version of the framework provided a more fine-tuned scale with which to analyse and interpret results, suggesting a developmental trajectory over time within as well as between levels. However, as mentioned earlier, elements of the new criteria were modified for the data within this study. For example, in relation to SoI-EY Level 5, the Trinity exam criteria did not necessarily align with children's naturally observed development in the early years. Moreover, while SoI-EY Level 5 notes that children begin to associate 'pieces of music with memorable events and occasions', an acknowledgement of the social and emotional component within these associations may

be emphasised further. For example, this was demonstrated through the case studies in which 'events' were closely related to the children's social interactions and relationships with others. Case studies also suggest a response to particular performers or genres of music, which is related to Sound of Intent Level 6, in which 'children and young people differentiate between different styles of music and different performances' (see www.soi.org). Similarly, Wu (2018), found in her research on the musical development of young children in the Chinese Diaspora in London, that children's expressivity in music making (which is detailed in Sounds of Intent Level 6) is excluded within the SoI-EY framework. It may be considered that elements of a child's development, in relation to SoI Level 6, may be integrated into SoI-EY Level 5, excelling. Another observation here is that multimodality is not only present within SoI-EY Level 2 but throughout engagement in the early years; this is evident in the literature as well. Indeed, new iterations of the SoI-EY framework are being trialled in current projects, which take into account wider development including movement and socio-emotional components.

In relation to the reactive, proactive and interactive domains, first, these three domains allowed for an understanding of how the study captured children's musical development. For example, referring back to the descriptive results (Figure 7, section 5.2.1), the majority of observations were proactive, followed by interactive, and reactive. This provides information on how observations were carried out. For example, was I as an observer, drawn to engagement which was more obviously active and perhaps easier to capture behaviourally, thus resulting in a smaller number of observations which document how children respond to music? Furthermore, consider that 16% (n = 154) of videos were not coded. This often occurred when children were listening and responding internally (as was clear in the case study material) but could not be captured observationally. However, evidence of reactive engagement might be revealed later, in a

different context, both proactively and interactively, for example when the child is at home. This was demonstrated in the case studies. Therefore, while reactive observations may be more difficult to capture and were not as prominent within the current study, children's responses are still vital in understanding musical development.

In summary, the SoI-EY levels and domains captured children's evolving musical development *as it occurred in the diversity of their natural environments*. The domains provided a consideration for the combined contexts of musical activity in which children observed and responded (reactive), engaged with others (interactive) and engaged on their own (proactive). An adapted version of the framework might consider illustrating the findings which suggest the importance of children's surrounding context on their musical development. An example has been created and is depicted in Figure 39 (adapted from Ockelford & Voyajolu, 2017). This version uses only the main headings within the circular design. The text around the framework represents the child's surrounding context, with arrows pointing towards and away from the framework to illustrate children's active involvement with their context. Below this is an illustration of the three criteria within each level (labelled 2.1, 2.1, 2.3 etc). The criteria are detailed in Table 27 in their original format (as used in the Trinity exam pilot for children and young people with learning difficulties) with notated suggestions in red to be considered in the context of early childhood. However, as noted above, since the writing of this thesis, further iterations of the SoI-EY framework are being trialled, which take into account multimodality and socio-emotional aspects of development.

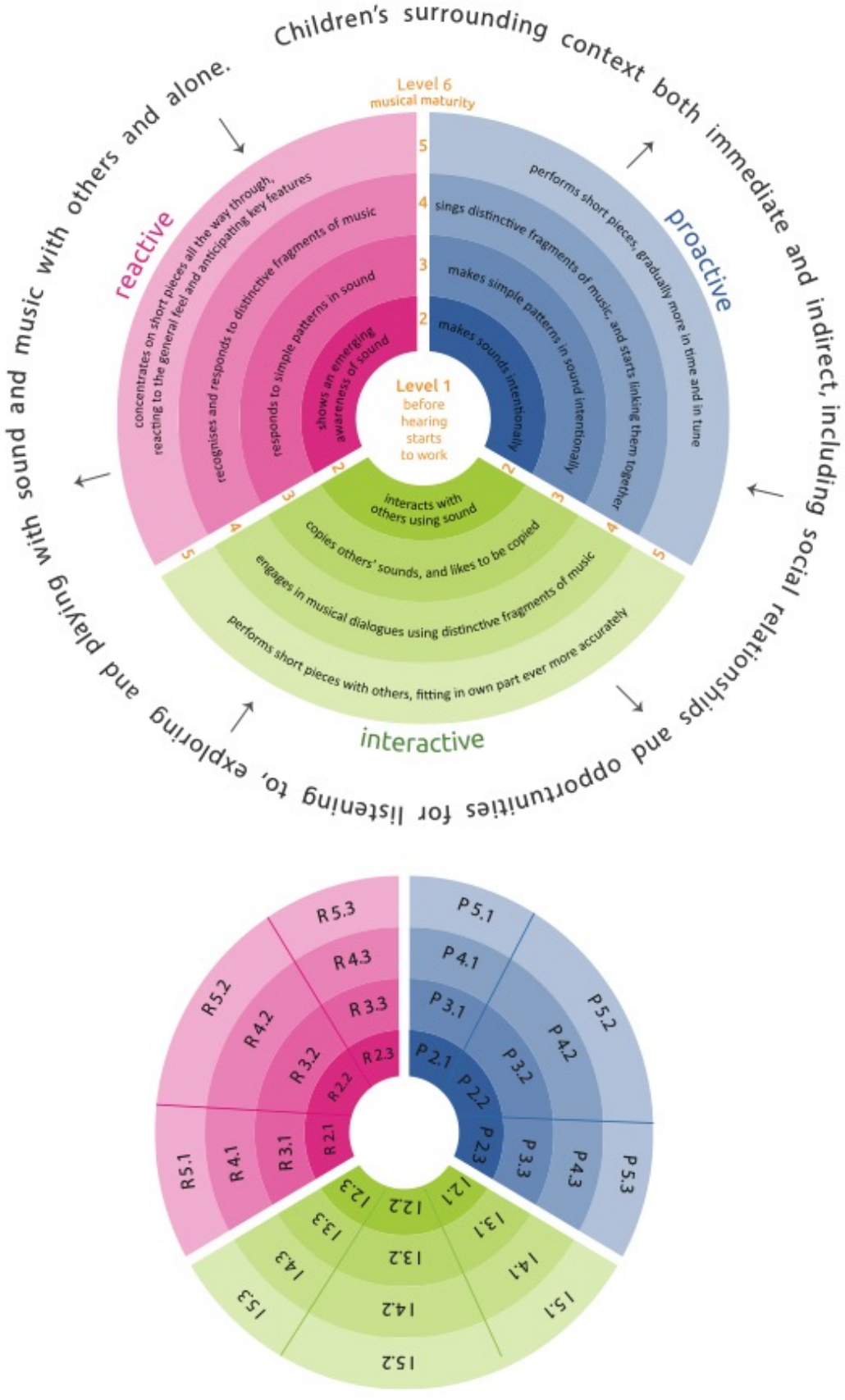


Figure 39 Suggested iteration of the framework considering children's surrounding development and the criteria which represent development within levels

Adapted from "Musical play and play through music in early childhood" by A. Ockelford & A.Voyajolu, in T. Bruce, P. Hakkarainen and M. Breidkyte (Eds), *The Routledge international handbook of early childhood play* (p.399), 2017, London: Routledge. Copyright 2017 by Routledge.

Table 27 *Emerging, achieving and excelling criteria for the SoI framework Levels 2 – 5, with suggestions in the context of early childhood*

Main Level	RPI	Main descriptor	Emerging		Achieving		Excelling	
2	Reactive	Shows an awareness of sound *(consider multimodal experiences)*	R2.1	Consistently reacts to *one* type of sound	R2.2	Consistently reacts to *two* types of sound	R2.3	Consistently reacts to at least *three* types of sound
2	Proactive	Intentionally makes or controls sound	P2.1	Intentionally makes or causes *one* type of sound	P2.2	Intentionally makes or causes *two* different types of sound in *two* different ways	P2.3	Intentionally makes or causes *three* different types of sound or more in *three* or more different ways
2	Interactive	Interacts with others using sound	I2.1	Responds to *one* type of sound by making a sound or makes *one* type of sound expecting a sound to be made in response	I2.2	Responds to *one* type of sound by making a sound and makes *one* type of sound expecting a sound to be made in response	I2.3	Responds to *two* types of sound or more by making a sound and makes *two* types of sound or more expecting a sound to be made in response
3	Reactive	Reacts to simple patterns in sound	R3.1	Consistently reacts to *one* type of pattern in sound	R3.2	Consistently reacts to *two* types of pattern in sound	R3.3	Consistently reacts to at least *three* types of pattern sound
3	Proactive	Makes simple patterns in sound intentionally *(consider sound symbolising things heard in the environment and used to accompany play as well as pattern in sound created through movement)*	P2.1	Intentionally makes *one* type of simple pattern in sound	P2.2	Intentionally makes *two* different types of simple pattern in sound	P2.3	Intentionally makes *three* different types of simple pattern in sound
3	Interactive	Copies others' sounds and/or is aware of own sounds being copied	I3.1	Recognises own *individual* sounds being copied or copies another's *individual* sounds	I3.2	Recognises own *individual* sounds being copied and copies another's *individual* sounds	I 3.3	Recognises own simple *pattern* or *patterns* in sound being copied and copies another's simple *pattern* or *patterns* in sound
4	Reactive	Recognises musical motifs and the relationships between them	R4.1	Consistently recognises *one* distinct musical motif	R4.2	Consistently recognises *two* distinct musical motifs or reacts when one motif is repeated or varied (as in 'call and response')	R4.3	Consistently recognises at least *two* distinct musical motifs and reacts when one motif is repeated or varied (as in 'call and response')

4	Proactive	Reproduces or creates distinctive musical motifs and potentially links them together	P4.1	Sings or plays a motif, with a distinct musical identity, which may be made up or copied from somewhere else	P4.2	Repeats or varies motifs or links different motifs together to form short musical narratives that are not in time and/or not in tune	P4.3	Repeats and varies the *same* motifs and links *different* motifs together to form short musical narratives that are not in time and/or not in tune
4	Interactive	Engages in musical dialogues using motifs *(consider sometimes this may happen at the same time as well as in dialogue)*	I4.1	Any one of the following: (a) produces motifs to be repeated or varied by someone else; (b) repeats or varies motifs that are provided by someone else; (c) responds to motifs produced by someone else by producing different motifs that follow coherently	I4.2	Any two of the following: (a) produces motifs to be repeated or varied by someone else; (b) repeats or varies motifs that are provided by someone else; (c) responds to motifs produced by someone else by producing different motifs that follow coherently	I4.3	All three of the following: (a) produces motifs to be repeated or varied by someone else; (b) repeats or varies motifs that are provided by someone else; (c) responds to motifs produced by someone else by producing different motifs that follow coherently
5	Reactive	Attends to whole pieces of music, anticipating prominent structural features (such as the choruses of songs) and responding to general characteristics (such as metre and mode)	R5.1	Any one of the following: (a) anticipates prominent structural features of short pieces (played and not sung); (b) moves in time to different metres (such as three and four time); (c) responds in different ways to different modes (such as major and minor keys)	R5.2	Any two of the following: (a) anticipates prominent structural features of short pieces (played and not sung); (b) moves in time to to different metres (such as three and four time); (c) responds in different ways to different modes (such as major and minor keys)	R5.3	All three of the following: (a) anticipates prominent structural features of short pieces (played and not sung); (b) moves in time to different metres (such as three and four time); (c) responds in different ways to different modes (such as major and minor keys)
5	Proactive	Performs, improvises or composes simple pieces of music of increasing complexity	P5.1	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Initial (P, M, D) and Grade 1 (P, M, D) *(For early years, this may instead be described as a simple nursery rhyme or made up song. Songs may not always be entirely sung in tune/ time)*	P5.2	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Grade 2 (P, M, D) and Grade 3 (P, M, D) *(Instead this may singing and playing songs that are more complex ,children may show more stable tuning and tempo)*	P5.3	Six levels: performs, improvises or composes pieces with others at the level of Trinity College exams Grade 4 (P, M, D) and Grade 5 (P, M, D) *(Shift P 5.1 here: Six levels: performs, improvises or composes pieces at the level of Trinity College exams Initial (P, M, D) and Grade 1 (P, M, D)*
5	Interactive	Performs, improvises or composes simple pieces of music of increasing complexity with others	I5.1	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Initial (P, M, D) and Grade 1 (P, M, D)(Instead *this may be a simple nursery rhyme or made up songs. Songs may not always be entirely sung in tune/time)*	I5.2	Six levels: performs, improvises or composes pieces at the level of Trinity College exams Grade 2 (P, M, D) and Grade 3 (P, M, D) *(Instead this may singing and playing songs that are more complex ,children may show more stable tuning and tempo)*	I5.3	Six levels: performs, improvises or composes pieces with others at the level of Trinity College exams Grade 4 (P, M, D) and Grade 5 (P, M, D) *(Shift I51 here: Six levels: performs, improvises or composes pieces at the level of Trinity College exams Initial (P, M, D) and Grade 1 (P, M, D)*

7.2.2 The SoI-EY framework in Representing Children's Musical Development

Results which pertain to the whole data set and the case studies suggest that children move up through the SoI-EY framework as musical development emerges (See Table 16). However, results also support earlier findings, which suggested that the emergence of engagement in subsequent levels occurs as continuation of development in prior levels continue (Ockelford & Voyajolu, 2020; Voyajolu & Ockelford, 2016). However, while this was previously inferred from 'snapshot' cross-sectional data, it is seen here longitudinally, solidifying the notion of this process in relation to children's development over time. Another relationship which arose here and was possible through the application of the 'emerging', achieving', and 'excelling' criteria, suggests that development occurs within levels as well as between levels. Children's musical development in relation to age is also relevant here, and pertains to Aim 2 of the study.

7.3 Aim 2 and Related Research Question

The second aim of the study was to explore whether (and if so, to what extent) children's musical development, as assessed using SoI-EY framework, is age-related. The related research question was,

> Is there a link between children's observed SoI-EY predominant stage of musical development and their chronological age? If so, what is the nature of the relationship between these two factors?

7.3.1 The Relationship between the SoI-EY Framework and Chronological Age

The current study postulates that the relationship between chronological age and musical development, as gauged through the SoI-EY framework, is non-linear. Ockelford and Voyajolu (2020), presented the first application of a logistic function to analyse children's musical development, based on the data from Voyajolu and Ockelford (2016). However, the range of data did not allow for the period of stasis or increased growth

found in the logistic function, to be represented in the results (Ockelford and Voyajolu, 2020). The current study applies the logistic function to a larger and more comprehensive data set. Results suggest a non-linear growth pattern, including a period of increased growth followed by deceleration and an eventual plateau. Grimm (2011) reminds us that nonlinear growth curves are essential for understanding processes of development such as 'rates of change, periods of acceleration and deceleration, when the process enters and leaves different developmental phases, and final or asymptotic levels' (p. 1357). It is also important to keep in mind the suggestion that such asymptotic levels may be followed by further development (Dawson-Tunik et al., 2005; Robinson & Mervis, 1998; van Geert, 1991). These patterns of growth have been seen in other areas of children's development, for example children's cognition and language development (Robinson & Mervis, 1998; van Geert, 1991), and vocabulary growth and acquisition (Brooks & Meltzoff, 2008; Daller et al., 2013). To date this thesis, alongside Ockelford and Voyajolu (2020) are the first which explore the use of non-linear growth curve analysis as applied to the musical development of children in the early years using the SoI-EY framework. Non-linear analysis was possible both at the group level as well as at the individual level, demonstrating individual differences in development. The underlying observational data, which highlights the range of engagement according to age, also demonstrates this variability. However, children's musical development is not isolated from the context in which it occurs and this is considered in the study's next aim.

7.4 Aim 3 and Related Research Questions

The third aim of the study was to explore factors pertaining to the child's environment (including interpersonal relationships with key adults and peers, activities and contextual surroundings) that may most effectively promote musical engagement and development in the early years. Related research questions were,

What impact does the child's environment, including the social context of adults and peers both at home and in settings such as children's centres, have on a child's musical engagement and development?

Do some activities within the home and settings such as children's centres more effectively promote musical engagement and development than others, and if so which, and in what ways?

7.4.1 Children's Surrounding Environment and Musical Development

This study was influenced by socio-cultural theories of development, considering children's musical engagement as it occurs in relation to their surrounding context and in relation to others. First, results suggested that children engaged at more complex levels of musical development at home rather than in early years settings (nursery, preschool and children's centre). This is in line with research that suggests observing children's musical engagement at home may be an important context for understanding musical engagement and potential (Cirelli & Trehub, 2019; Trehub & Gudmundsdottir, 2019). However, the results of this study should be considered in relation to a possible bias in that participant parents sending observations from home may have had a higher investment in young children's musical activity or may have been sending observations which were perceived to be more interesting, or to show their children at their best, rather than showing what occurred on average. Secondly, results of this study suggest that children engaged at more complex levels of musical development when they were with another rather than when they were on their own. This indicates the impact of social interaction on a child's musical engagement. However, as shown in the case studies, solitary musical engagement may provide a space in which to play with ideas derived from these interactive (and reactive) contexts.

7.4.2 Musical Activity and Children's Musical Development

The question of which activities may be more effective in promoting musical development and engagement, when addressed broadly, revealed that children were observed to be at a more complex level of musical development during singing activity rather than instrumental activity. Singing was the most prevalent type of musical activity observed in the observational data and this was echoed in the questionnaire data, as well as within the case studies. Singing may be more readily available for children to engage with, rather than instrumental activity. The results do not allow for the conclusion that singing is more effective in promoting musical development. Rather, it raises the question of why this discrepancy emerged and warrants further investigation.

These results are pertinent to professional practice. First, if singing is so prominent in children's everyday lives, the integration of singing into early years settings, not only during structured group activity such as circle time, but spontaneously woven throughout the day, may be important. Not only may this be relevant in supporting children's musical engagement but also in supporting wider development. Recent research has suggested that musical engagement in the preschool years is linked with linguistic skill (Politimou, Dalla Bella, Farrugia, & Franco, 2019). In particular, melodic processing was associated with language grammar while the ability to synchronise to a beat and rhythmic perception was associated with phonological awareness (Politimou et al., 2019). Rhythmic engagement, which may be scaffolded through instrumental play, is important to consider and provides further impetus to explore how it may be used within professional practice to support musical and wider development.

As well as a broad view, a more detailed look at musical activity in the home environment was taken. First, consider that when children were observed to engage with another at home, these observations involved close interaction, usually with one or both

parents, sometimes with extended family. Themes emerged within the case studies highlighting that musical activity at home was salient for the family; certain activities were grounded in the family's musical culture, activity was often playful, multimodal and provided choice, with activities and material often being repeated at the child's request. Overall, what this suggests is that it may be the characteristics and qualities of the musical activity and how the activities are shared and presented, which are important when supporting a child's musical engagement and development.

The following chapter will present the final conclusion of the study, including contributions to research, limitations and key findings.

Chapter 8: Conclusion

This chapter will relay the contributions of the study to research and practice as well as consider its limitations and recommendations for future investigation. A final synthesis of the research findings will be provided in relation to the study's aims.

8.1 Research Contribution

This study contributes to the body of research which supports the Sounds of Intent in the Early Years framework as a valuable model from which to gauge young children's musical development in varying contexts. It adds to the literature on young children's naturally occurring musical development, in particular providing a view on the developmental process over time from both a broad and individual perspective. The application of a nonlinear growth curve to explore children's musical development using the SoI-EY framework, builds a case for extending these methods in future research.

Furthermore, the implications made here suggest that social interaction has an important part to play in supporting early childhood musical development. An understanding of how musical development emerges through time provides those

working with and caring for children a model from which to observe and build experiences based on what children can do, celebrating their abilities and potential.

As well as this, an understanding of the trajectory of musical development in early childhood, allows for a baseline from which to explore the musical engagement, development and potential of children within the context of special educational needs and disabilities (SEND). Preliminary research has taken place, in a qualitative longitudinal study of five children in the early years who were blind due to Retinopathy of Prematurity (RoP), with and without additional learning difficulties. Results suggest that some children's musical development is delayed in comparison to their peers, others despite delays in areas of wider development, are in line with or demonstrate advanced musical engagement. For all cases music was a vital and integrated aspect of the children's daily lives (Voyajolu et al., 2017, 2021). This builds on the evidence that learning difficulties need not be a barrier to a child's musical potential and that musical engagement is essential for all children in the early years.

8.2 Study Limitations

Limitations to the study are now considered in relation to the results. Children who were given permission to take part in the study may have been within households in which a high level of musical engagement was taking place at home, even more so for those families who chose to be participant observers. Observations sent by parents may have also been biased. While the sample of children is diverse, it is not random and not representative of the wider population.

In terms of inter-rater reliability, while overall results were good, results of the second round of coding, in particular concerning the domains, were moderate. Further meetings and trials for coding may have improved this issue and this result points to the importance of training when applying the SoI-EY framework to observe children.

While the results of the questionnaire provided insight into the musical activity which took place at home for a portion of the children in the study, the response rate was not sufficient to analyse the results beyond the descriptive. However, the results provided an illustration of what occurs within the home environment for some children and provided information for case study material. As well as this, parent interviews added insightful data into the musical engagement and development within the case studies. Each case study child moved onto nursery and preschool or was cared for by a child minder. Observations in these settings and interviews with the child's key carers and teachers would have provided additional rich data. However, time and resources did not allow for further sites to be reached and was not possible.

Finally, as would be expected with longitudinal data, attrition was present and analysis and results reflect what was possible with the data and resources at hand. However, all in all, data collection and analysis was rigorously carried out, following methodological conventions, which minimise these limitations. Therefore, the results do provide an indication of how children develop musically in relation the SoI-EY framework, including factors which may influence this development.

8.3 Recommendations for Further Research

The use of nonlinear methods of analysis allowed for an exploration of a broad trend in the trajectory of children's musical development over time. Future research may consider a more targeted approach to data collection, with more data gathered at either end of the age spectrum. Furthermore, methods such as multilevel modelling may be considered in order take into account the hierarchical structure of observational data when exploring the musical development of children in different contexts.

Musical engagement at SoI-EY Level 4 was a prominent and rich stage of development for the children observed here. Within individual case studies engagement

at this level continued for a period of two years. Examples which illustrated play with song appeared to have a strong affinity with humour and language play in the literature (Cekaite, 2018; Levy, 1984). Further research may delve into this aspect of children's musical development in more detail, exploring the relationship between humour, creativity, musical play and language play.

Finally, future research may explore children's early instrumental play in relation to their musical development, beginning before and continuing on through the preschool years. While observations often occur of children engaging in free play with instruments (or everyday objects as instruments), a more in depth exploration may include if and how instrumental play is being integrated into early years settings, and for what purposes.

8.4 Conclusion: Main Findings

First, this study set out to explore the trajectory of young children's musical development as gauged through the Sounds of Intent in the Early Years framework of musical development, using both quantitative and qualitative methods. It sought to investigate the capacity of the framework to capture children's emerging musical development in their naturally occurring environments. The second aim of the study was to explore whether children's musical development, as assessed through the SoI-EY framework is age-related. Finally, a tertiary aim was to explore factors in the child's environment (including social context and activities) that may most effectively promote musical engagement and development. Notwithstanding the limitations mentioned above in Section 8.2 and in relation to these aims, this study suggests that:

- The SoI-EY framework is an effective model from which to capture children's emerging musical development in the diversity of their naturally occurring environments. Results suggest that the emergence of musical engagement in

subsequent SoI-EY levels occurs as continuation of development in prior levels continue.

- The implied relationship between a child's age and predominant SoI-EY level of musical development represents a non-linear growth curve, including phases of faster and slower growth; individual differences in musical development are seen among children.
- Children demonstrate engagement at a higher SoI-EY level of musical development when observed, at home versus in early years settings, with others (regardless of setting observed), and during singing activity versus instrumental play (again regardless of setting observed).
- Musical activity which may support and promote children's musical engagement and development is grounded in social context and includes characteristics of playfulness, multimodality, and a balance of choice and repetition. Shared musical culture between parents and children was also observed to support musical engagement at home.

The next step is to apply the findings of this research in order to inform policy and practice, for example, through the creation of resources for families and practitioners. This would draw on schemes already in place which are grounded in research based on the Sounds of Intent framework. For example, see the Little Amber scheme (https://www.ambertrust.org/littleamber/app/), which has been created for children in their early years with a visual impairment and provides support for families to incorporate music into their everyday lives. The aim would be to use the findings of this thesis to create new resources for families and practitioners which are based on an understanding of how children develop musically.

In conclusion, this study applied the SoI-EY framework to capture broad patterns of musical development quantitatively, to explore the musical development of individual children through qualitative longitudinal case-studies, and to illustrate discrete moments of musical engagement in time. The findings offer a new perspective on the fascinating process of young children's musical development, as seen through the lens of the Sounds of Intent in the Early Years framework.

Appendix 1: Ethics Statement

The research for this project was submitted for ethics consideration under the reference EDU 15/089 in the Department of Education and was approved under the procedures of the University of Roehampton's Ethics Committee on 02.11.05.

Appendix 2: Setting Information Sheet

University of Roehampton London

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CENTRE INFORMATION SHEET AND CONSENT FORM

Mapping emerging musicality: A longitudinal study of musical development in the early years using the *Sounds of Intent* Framework

Brief Description of Research Project, and What Participation Involves:
This PhD research project explores the musical engagement and development of 100 children between the ages of birth and five years. To gain a thorough understanding of musical development, a group of children will be observed for two years in different environments including their Children's Centre, nursery and at home. This research is part of the larger Sounds of Intent in the Early Years (SoI-EY) project; you can find more information about SoI-EY at eysoi.org.

Research in your centre

With your and the children's parents' permission, I will observe children in your setting while they are taking part in their usual activities, using video to capture moments of their engagement with music. Children will be filmed when playing on their own or with their peers during free play or with adults during structured or spontaneous activities.

Ideally I would like to observe about ten children in different age groups, watching each group grow over two years. For example:

	0-12 months	12-24 months	24-36 months	36-48 months	48-60 months
Group 1					
Group 2					
Group 3					
Group 4					

I hope to follow children over a period of two years to understand how they develop musically. Therefore, I would like to visit your centre for three periods each year from 2015–2017. Each period will last a month and I would hope to visit twice a week for half a day. For example, this may be two half days a week in October, February and June, depending on what is convenient for you, the staff, the children and their families.

Staff Involvement
I would like to invite you to attend a meeting, which will be held at the end of the first and second year of the project. Any staff members interested in the project are welcome to attend. Depending on your centre those attending may but need not be a music specialist. The meeting will provide an update on the study and we will watch a collection of the videos gathered, sharing views related to the children's musical engagement.

The meeting would be held at a location most convenient to all involved which may be the university or your site if preferred and will involve all centres taking part in the research. There are three

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centres taking part therefore there will be at least three staff members in total attending. The meeting will last about 90 minutes and travel expenses will be included.

Parental Involvement
I would like to ask some of the parents in your setting to use an app to take brief videos of their children engaging with music at home. I am hoping to work with around 6–8 parents per setting (1–2 per age group). Parents will also be asked to answer a brief online questionnaire, lasting approximately 15 minutes, about the musical activities that take place at home and some will also be interviewed. Interviews will last approximately 45 minutes. This will provide a rich and detailed picture of children's musical engagement in different settings.

Permission and Consent
Children will only be videoed with permission from their parents. I will not video a child who shows, either through words or non-verbally, that he or she does not wish to be filmed. Children not involved in the project will not be filmed. If children not involved in the project wander in and out of a video taken I will confirm with you whether these children have general permission from you organisation to be filmed and will then ask for specific project permission from parents. If parents decline permission, these clips will not be used and will be permanently erased.

Staff will also be asked to consent to being filmed if they are part of a musical activity that is captured, if they are with a child or inadvertently filmed with a child while not engaging with them directly. If staff do not wish to be filmed, this will be respected.

Anonymity
Parents and staff will be given the option to have faces blurred in any video taken if they prefer not to be identified. Any non-video data gathered, for example written descriptions of observations and demographic data, will be anonymous. The name of your centre, names of staff and names of children will not be used in any publications or presentations.

Sounds of Intent in the Early Years
Sounds of Intent in the Early Years (SoI-EY) is a project exploring the musical engagement of children from birth to approximately five years. SoI-EY provides a framework of musical development and resources for practitioners and parents to promote the use of music in children's daily lives. Resources include a framework of musical development to gauge where children are at musically, a poster and booklets of ideas for musical activities, and materials for assessment. It is a large-scale project, led by the charity Soundabout, and involving the University of Roehampton, taking place from 2016–2018, and funded by Youth Music.

SoI-EY training for your Centre
I would be happy to provide training for the staff and parents in your Centre on *Sounds of Intent in the Early Years.* I will be providing training as part of the large-scale project and would be happy to offer this to you in appreciation of your involvement in my PhD project. The training is approximately three hours (but can be adapted to the needs of your site) and covers aspects of SoI-EY such as children's musical development, using the SoI-EY materials, and includes video observations of children engaged in music.

The project will not take place without your consent. If your centre decides to take part you can withdraw at any time without giving a reason. Any video/photos taken up to the point of leaving the project will be destroyed at your request. However, anonymous data (for example brief written descriptions or statistical data) may still be used in collated form, from which your centre, children

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and staff cannot be identified. There is no compulsion or pressure for your centre to take part in this project. If you decline to take part or subsequently withdraw the treatment of your centre, staff and children will not be adversely affected.

Please complete as appropriate:

_____(site name) **agrees to take part in the project in the following ways:**	**YES**	**NO**
Children can be observed and videoed by the researcher with parental permission. Demographic information about the children such as age can be gathered by the researcher from records kept at our centre.		
Staff, may be involved, with their own permission, to be videod alongside the children, attend the meetings suggested and act as blind assessors.		

On behalf of our centre I give permission for video and photographs to be used in the following:	**YES**	**NO**
In publications such as journals and books		
In presentations at conferences		
As a part of the online Sounds of Intent Early Years online resource for parents and practitioners on young children's musical development (eysoi.org)		

Please read and sign if agreed:

I consent to our centre taking part in the project. I am aware that our centre is free to withdraw at any point without giving a reason, although if we do so I understand that the data collected might still be used in a collated form. I understand that the information provided by our centre will be treated in confidence by the investigator and that our centre, children's and staff's identity will be protected in the publication of any findings, and that data will be collected and processed in accordance with the Data Protection Act 1998 and with the University's Data Protection Policy.

On behalf of ..... Signature.....

Date .....

Please note: if you have a concern about any aspect of your participation or any other queries please raise this with the investigator (or if the researcher is a student you can also contact the Director of Studies.) However, if you would like to contact an independent party please contact the Head of Research.

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Appendix 3: Parent Consent Form

University of Roehampton London

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PARENT/CARER PARTICIPANT CONSENT FORM

'Mapping emerging musicality: A longitudinal study of musical development in the early years using the *Sounds of Intent* Framework

Brief Description of Research Project, and What Participation Involves:

This PhD research project explores the musical engagement and development of children between the ages of birth to five years. To gain a through understanding of musical development, a group of 100 children will be observed for two years in different environments including the children's centre, nursery and at home. This research is part of the larger Sounds of Intent in the Early Years (SoI-EY) project; you can find more information about SoI-EY at eysoi.org.

There are three ways you and your child can participate:

1. With your permission, I will observe your child approximately every two weeks for two years, visiting for half days while he/she is attending nursery/preschool. Videos will be taken of your child to keep a record of his or her engagement and development in music during activities that he or she already takes part in. 100 parents will be asked if their child can be observed from different centres.

2. If you choose, you can also take part in seeing how your child engages with music at home – a very important part of the study, of which I hope 24 parents will join. You would do this by using an app I will give you to download on your smartphone. You can use the app to take brief videos of your child when you see him or her engaging with music at home or when out and about, and send these videos quickly and easily to a secure online cloud database (only my supervisors, you and I can see this database). You will have restricted access to view your videos only. No other participants taking part can view your videos and you cannot view theirs. You will be given tips on what types of things to look for and will be asked to do this for about one day every two weeks over two years, capturing videos of about 1 minute in length.

3. For those who do send videos, you will be asked to answer a brief 15 minute questionnaire of ten questions at the start, middle and end of the project, which you can complete online. You may also be asked to take part in a 45-minute interview with me, which can take place in your home and will be audio recorded (8 parents will be invited for interviews).

- Videos or photographs of you and/or your child will not be taken without your permission. Your child's name and your name will not be included in any presentations or publications related to the study. You may choose to have the face of your child blurred so that he or she cannot be identified. All demographic data, such as your child's age, will remain anonymous.

- If you decide to take part you and your child can withdraw at any time without giving a reason. Any video/photos taken up to the point of leaving the project will be destroyed at your request. However, anonymous data (for example brief written descriptions or statistical data) may still be used in collated form, from which you and your child cannot be identified. There is no compulsion or pressure for you and your child to take part in this project. If you or your child decline to take part or subsequently withdraw you and your child's treatment will not be adversely affected.

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Please complete as appropriate and return to your class teacher by Tuesday 16th Feb 2016 .

Child's Name: .....

I would like to take part in the project in the following ways:	**YES**	**NO**
My child can be observed and videoed by the researcher while at his/her children's centre, nursery, or preschool. Demographic information about my child, such as age, can be gathered by the researcher from records kept by the children's centre, nursery or preschool.		
I would like to use an app to video my child at home and answer a brief questionnaire. I may also be asked for an interview, which will be audio recorded.		

If you would like to take part by using the app to send videos please provide your email address and phone number here:

Parent Carer/Email: _____Phone: _____

I give permission for video and photographs to be used in the following:	**YES**	**NO**
In publications such as journals and books		
In presentations at conferences		
As a part of the online Sounds of Intent Early Years online resource for parents and practitioners on young children's musical development (eysoi.org)		
Please blur my child's face in videos so that he or she cannot be identified.		

Please read and sign if agreed:
I consent to my child taking part in the project. If I am involved with collecting video at home I agree to take part as well. I am aware that my child and I are free to withdraw at any point without giving a reason, although if I do so I understand that my data might still be used in a collated form. I understand that the information I provide will be treated in confidence by the investigator and that my child's identity will be protected in the publication of any findings, and that data will be collected and processed in accordance with the Data Protection Act 1998 and with the University's Data Protection Policy.

Name ..... Signature .....

Date .....

Please note: if you have a concern about any aspect of your participation or any other queries please raise this with the investigator (or if the researcher is a student you can also contact the Director of Studies.) However, if you would like to contact an independent party please contact the Head of Research.

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Appendix 4: Staff Consent

Investigator Contact Details
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07916527298

STAFF PARTICIPANT CONSENT FORM/VIDEO

'Mapping emerging musicality: A longitudinal study of musical development in the early years using the *Sounds of Intent* Framework'

Brief Description of Research Project, and What Participation Involves:

This PhD research project explores the musical engagement and development of children between the ages of birth and five years. To gain a through understanding of musical development, a group of children will be observed for two years in different environments including their Children's Centre, nursery and at home. This research is part of the larger Sounds of Intent in the Early Years (SoI-EY) project; you can find more information about SoI-EY at eysoi.org.

Your participation:

Observations of children engaging in musical activity in the centre where you work will be made and collected in video or photographic format, with permission from their parents. As you work directly with the children there may be moments when, with your permission, you will be filmed or photographed as part of an observation.

This may occur if you are taking part in a structured or spontaneous musical activity with a group of children or one-to-one. If you are near children being observed you may also be filmed inadvertently as you may be seen in the background or close by.

You will not be asked to do anything specific while I am observing the children. Video will be taken during musical activities that you and the children already take part in. Videos or photographs of you will not be taken without your permission. Videos will be stored on a secure online cloud database (only my supervisors, parents of the children, and I can see this database) as well as on a password-encrypted hard drive.

If you decide to take part you can withdraw from the project at any time without giving a reason. Any video/photos taken up to the point of leaving the project will be destroyed at your request. However, anonymous data (for example brief written descriptions or statistical data) may still be used in collated form, from which you cannot be identified. There is no compulsion or pressure for you to take part in this project. If you decline to take part or subsequently withdraw your treatment will not be adversely affected.

Your name will not be included in any presentations or publications related to the study. You may choose to have your face blurred in any video taken so that you cannot be identified.

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Please complete as appropriate:

Video and photographic observations:	**YES**	**NO**
I give permission for video and photographic observations to be taken of me whether I am directly involved in an activity with the children being observed or whether I am inadvertently recorded if I am nearby or in the background of observations being made.		

I give permission for video and photographs to be used in the following:	**YES**	**NO**
In publications such as journals and books		
In presentations at conferences		
As a part of the online Sounds of Intent Early Years online resource for parents and practitioners on young children's musical development (eysoi.org)		
Please blur my face in videos so that I cannot be identified.		

Please read and sign if agreed:

I consent to taking part in the project. I am aware that I am free to withdraw at any point without giving a reason, although if I do so I understand that my data might still be used in a collated form. I understand that the information I provide will be treated in confidence by the investigator and that my identity will be protected in the publication of any findings, and that data will be collected and processed in accordance with the Data Protection Act 1998 and with the University's Data Protection Policy.

Name ..... Signature .....

Date .....

Please note: if you have a concern about any aspect of your participation or any other queries please raise this with the investigator (or if the researcher is a student you can also contact the Director of Studies.) However, if you would like to contact an independent party please contact the Head of Research.

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Appendix 5: Interview Consent

University of Roehampton London

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PARTICIPANT CONSENT FORM/INTERVIEW

Mapping emerging musicality: A longitudinal study of musical development in the early years using the *Sounds of Intent* Framework.

Brief Description of Research Project, and What Participation Involves:

This PhD research project explores the musical engagement and development of children between the ages of birth to five years. To gain a thorough understanding of musical development, a group of children will be observed for two years in different environments including the children's centre, nursery and at home. This research is part of the larger Sounds of Intent in the Early Years (SoI-EY) project; you can find more information about SoI-EY at eysoi.org.

Your participation: Interview
Many thanks for already agreeing to participate, consenting to use the app to video your child's musical activity and for answering the online questionnaire. Four parents are being interviewed to gain an even deeper understanding of the musical activities that take place in the home with family. This will provide a rich and detailed picture of your child's musical life.

The interview will be based on the questions you have already seen in the questionnaire, discussing your answers in more depth. These interviews should take approximately 45 minutes.

The interview will be audio recorded and saved as an audio file to a secure, password-protected hard-drive. All the information you provide about your child and anyone else will remain anonymous. Your child's name and the names of any others will not be included in presentations or publications related to the study.

Please note you are free to withdraw from this project at any time, although the information you provide may be used in collated form, from which you and your child cannot be identified. There is no compulsion or pressure for you and your child to take part in this project. If you or your child decline to take part or subsequently withdraw you and your child's treatment will not be adversely affected.

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London

Please read and sign if agreed:

I agree to take part in this interview portion of the research, and am aware that I am free to withdraw at any point without giving a reason, although if I do so, I understand that my data might still be used in a collated form. I understand that the information I provide will be treated in confidence by the investigator and that my identity will be protected in the publication of any findings, and that data will be collected and processed in accordance with the Data Protection Act 1998 and with the University's Data Protection Policy.

Name …….. Signature ……

Date ……

Please note: if you have a concern about any aspect of your participation or any other queries please raise this with the investigator (or if the researcher is a student you can also contact the Director of Studies.) However, if you would like to contact an independent party please contact the Head of Research.

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Appendix 6: Questionnaire

University of Roehampton London

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Musical development in the early years

Welcome to this questionnaire about your child's musical engagement and development

Dear Parent/Guardian:

You are being asked to complete this questionnaire because you have given permission for your child to join in the above research project taking place at your child's nursery/preschool or children's centre. The project aims to explore how children from birth to five years engage and develop musically in different environments including at home; about 50 parents will be involved in answering the questionnaire.

Many thanks for allowing your child's musical engagement to be observed in his/her nursery, preschool or children's centre. This questionnaire will provide a deeper understanding of the musical environment that surrounds your child at home.

You will be asked to answer 17 questions about the musical activities your child takes part in at home. This should take about ten minutes to complete. Most questions will be in multiple choice format, with space to expand on particular answers if you choose.

You may also fil out the questionnaire online by emailing me at voyajola@roehampton.ac.uk

Before filling out the questionnaire please read and sign the consent form on the next page.

With many thanks,



Angela Voyajolu,

PhD Student, University of Roehampton

1

1. Child's Forename:	2. Child's Surname:	3. Child's Date of Birth:

Your child's identity will remain anonymous and his/her name will not be used in any presentations or publications. This is only so that I can match the information from the questionnaire with the information that is gathered through video evidence. Many thanks.

Your child's music

4. How often do you hear your child babbling or singing on their own (for example when playing or when in the cot/bed)?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

5. How often do you hear your child making sound/music on their own using everyday objects (tapping/using pots/pans/spoons)?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

6. How often do you hear your child making sound/music on their own using musical instruments?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

Singing and making sound/music with your child

7. How often do you or others at home sing with your child during daily routines (for example, dressing, bath time, bedtime)?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

8. How often do you or others from home sing with your child during travel (while driving, walking, taking the bus or train)?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

9. How often do you or others at home sing with your child while playing with them (also consider when in the park or playground)?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

10. How often do you or others at home play musical instruments with your child?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

11. How often do you or others at home create sound using everyday objects with your child (tapping, using pots/pans, spoons)?

○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

Hearing music played through electronic devices				
12. How often does your child hear music at home through……*(Please tick an answer for each type of device)*	*Never*	*Once a week or less*	*More than once a week but not daily*	*Daily*
• Radio/CD player/iPod/MP3 player?	○	○	○	○
• Children's programme being watched on TV or other device?	○	○	○	○
• Toys that play music?	○	○	○	○
• Through a soothing device (such as night light or hanging mobile) for nap or bedtime?	○	○	○	○
If your child hears music through a device *not* listed above please specify the type of device(s) here.				

Responding to music heard through electronic devices			
13. How often does your child respond to the music heard through electronic devices, for example by moving, dancing, singing, clapping or becoming still?			
○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily
13.a. Can you briefly describe your child's typical response?			
14. How often do you or others at home respond ***with*** your child to the music heard through electronic devices for example by moving, dancing, singing, clapping or becoming still?			
○ Never	○ Once a week or less	○ More than once a week but not daily	○ Daily

Music Groups				
16. How often do you or another family member/carer/friend take your child to any of the following? *(Please tick an answer for each activity.)*	*Never*	*Once a week or less*	*More than once a week but not daily*	*Daily*
1. Library Rhyme time	○	○	○	○
2. Children's centre music session	○	○	○	○
3. Paid group music session	○	○	○	○
4. Individual music lesson	○	○	○	○
5. Religious service, which includes music	○	○	○	○
6. Concerts	○	○	○	○
If you take your child to events or activities not listed above please provide details here.				

Other Information
17. Please use this space to describe any other information about your child's musical engagement that you would like to share. This could be an overall description and/or particular moments that come to mind when you've been at home or out and about.

Thank you for taking the time to fill out this questionnaire! Your input is very important for the study!

Please use the pre-paid envelope, included for your convenience, to post the questionnaire directly to the university.

Appendix 7: Interview Schedule

Questions on environment/activity

1. Can you describe the music that takes place in your family on a typical day? (Perhaps choose a day this week?)
    a. At home, when out and about, during travel (either in car or public transport)
    b. Singing/making sounds/listening
    c. With others
    d. On his/her own

2. Can you describe ____'s musical interests?
    a. Favourite style of music, favourite songs, favourite sounds, favourite activities…

3. In the questionnaire you noted that ___ hears someone in the house play a musical instrument or sing as a practicing hobby or profession…can you describe this a bit more (what instrument, hobby, profession, how long, etc.)
    a. Can you describe _____'s response when you are practicing/playing/singing?

4. Does ____ attend any music groups or groups that involve music regularly or as a one off?

    a. Can you describe these and _____'s response to these?

Questions on use of App/observation

5. Can you describe what it was like to focus on and observe ____'s musical activity for the project over these two years?

    a. Are there any moments that stood out for you while watching ___? Can you describe these?
    b. Is there anything you would have liked to capture but were not able to? Can you describe this?

6. Can you describe what it was like to use the app?
    a. Was there anything that you particularly liked about using the app?
    b. Anything that you did not like?

7. Can you describe the process you used with the app (for example, did you set up specific time for musical activities, did you try to capture things in the moment as they came up.)

8. Can you describe how ___ responded to your videoing him/her throughout the project?

9. Do you have any final thoughts about ____your involvement in the project? About ____'s musical activity?

Appendix 8: Maria's Observations

Maria's Observations				
Age in Months	**Domain**	**Level**	**E/A/X (1-12)**	**Video Clip Notes**
7	P	2	3	Maria is making sound during touch. She only makes this sound if something is pleasant to her touch.
7	P	2	3	Maria is tapping the xylophone, while she plays she squeals, enjoying the experience. Pattern is not heard during her play
8	P	2	3	Maria is making sounds with a range of different cutleries in her kitchen. Example of using everyday objects to explore sound
11	P	2	3	At 11 months Maria is making the same noise since as she was little (comment by mum). Maria repeats the same vocal sound over and over while exploring the book.
11	P	2	3	Maria uses the beater to tap the xylophone, creating sound, physically driven, pattern is not heard in her playing.
12	P	2	3	In the children's centre instruments are left out for the children and parents to explore freely during the play session. Maria gently explores some of the instruments, multi-sensory aspect of the way they feel.
12	R	2	3	In the children's centre, instruments are left out for parents and children to explore during the play session. Maria responds to the different sounds mum is making with the instruments, bells, triangle. She also responds to the voices of those around her.
12	R	2	3	As mum plays the triangle she sways back and forth, Maria copies her swaying movement. She reaches out for the instrument mum is playing, swaying to the sound (or copying mum's swaying).
12	R	2	3	C is watching the adult next to her playing the shaker, perhaps responding to the sound, also responding to her voice as she turns around to listen to her
12	R	2	3	Maris responds to the multisensory aspect of being lifted up at the end of the song, smiling and laughing in response.
12	R	2	3	In the children's centre at the end of the free play session, adults lead parents and children in singing. Monkeys, jumping in the bed...C responds bobbing up and down. Perhaps responding to the rhythmic aspect of the chant?

12	R	2	3	In the children's centre at the end of free play, adults lead parents and children in singing. C responds to the 'beep, beep, beep' (pattern) in the song, tapping her nose...perhaps she is copying movement here.
12	I	3	6	At the end of free play in the children's centre, adults lead parents and children in singing together. C claps in response to clapping in 'wind the bobbin up'. perhaps copying the clapping of others. Appears to anticipate the clapping so perhaps also following the phrasing. Further detail observations would be needed.
12	R	2	3	In the children's centre, at the end of the free play session, adults lead children and parents in singing. Maria responds to the multi-sensory aspect of being lifted up at the end of each phrase in the song.
13	P	4	7	Interview material, Maria sings Bah, bah black sheep, Twinkle, twinkle before falling asleep
13	I	3	6	Copies and repeats 'hoppa, hoppa, hoppa', with her parents, as she hops and down in her bouncer
13	I	3	6	Maria is saying in Italian 'bella' means beautiful. She is very happy to learn new words in different languages as we use Polish, English & Italian at home but mainly Polish and Italian (sent by mum). Interaction between Maria and her father, copying of the pattern 'Bella'.
14	P	3	6	Maria's favourite bird - crow and she is making the sound 'craw craw' like the bird :) (comment sent by mum)
14	P	3	6	Maria is making noise of the plane: sssssssss, uses sound to symbolise an object. She combines this with movement, moving her arms up and down, like a plane flying.
14	P	3	6	When blowing the toy trumpet, pattern can be heard through duration of notes played (perhaps due to running out of breath?). Engages with pattern often during this time.
14	P	3	6	Playing trumpet again, exploring instrument but pattern can be heard in her playing.
14	P	3	6	Second day playing trumpet, is being encouraged by her mum as she plays - variation in playing, short and long in pattern.

17	P	3	6	Trying to explain things to us 17 months old (comment by mum). Extensive observation of Maria babbling, very expressive using hand gesture and facial expression. Lots of vocal pattern or grouping, difficult to tell.
17	P	3	6	Babbling along, clear patterns, although possible grouping here as well, clapping pattern while babbling.
17	P	3	6	Reading to herself and babbling in her own language :)
17	I	4	9	C follows along the tune of 'Happy and you Know it', Dad is singing on la. She fills in the 'we are' at each pause. Call and response. Movement of bringing up arms and down by Dad may help to scaffold the structure. Spontaneous and adult led.
17	P	4	8	Repeating the phrase 'Happy Birthday to you...'.
18	R	3	6	Copies sounds of birds she hears outside, copying sound from her environment
19	I	4	9	At home, while playing at the table, singing phrases of 'mummy finger' with mum, finishing phrases, varying them. At 00:33 can hear the melody of the song
19	R	5	10	At home listening to 'Twinkle, twinkle' being played on a toy. She completes all the action to the tune; which mum can be heard to whisper in the background. C is also mouthing the words of the whole piece.
19	I	4	9	Monkeys jumping on the bed, doing the actions and at times joining in with Dad chanting.
19	I	4	8	Doing the actions for 'head, shoulders, knees and toes as mum and dad sing for her. She adds some of the words along and requests for the song to be sung faster at 00:46 and at 1:10.
22	P	4	9	Maria singing "magic moments " by Perry Como as it was our holiday song. I manage to catch her singing once playing with the sand on the beach (Comment by mum) While outside on the beach, C sings portion of 'Magic Moments' Perry Como' - follows the contour of the phrase...linking phrases together
22	P	4	9	Maria singing like an old singer her own idea. Responding to particular song, style of singer? Copying the sound of his voice, trying to copy phrases at the same time rather than in dialogue.

22	R	4	9	At 2:15 new song comes on, change movement and copies style of singer...movement changes as song gets livelier (Mambo Italiano) ...2:48 copies 'mambo' - and mouthing along - copying phrase or pattern of 'mambo'. Also, at 3:40 copies the end of the line 'Italiano...'responding to phrases perhaps R4?
22	P	4	9	pomegranate falling down, oh my goodness...to the tune of London bridges...
24	P	5	10	Although repeating the same text, she is following the melodic contour of the full song even if she does not reach all the intervals.
26	I	4	9	Singing row, row your boat with mum and dad at L4, not singing whole song yet
30	I	5	11	Her latest favourite song Pinocchio in Italian she knows the whole song (comment by mum). Singing along with music on her iPad to a Pinocchio song in Italian, more complex piece than previous observations.

Appendix 9: Charlie's Observations

Charlie's Observations				
Age in Months	**Domain**	**Level**	**E/A/X (1-12)**	**Video Clip Notes**
17	P	3	5	Animal noises which are interchangeable with the description of the animal itself! (comment sent by Dad). Sounds to represent other
18	R	4	7	Ring a Ring a Roses - falling down at appropriate moment each time when phrase ends, without prompts
18	P	2	3	Playing with wooden instrument, pattern not heard
18	P	2	3	Playing with instruments, playing with a rattle and bells, cannot hear a pattern in playing
18	P	2	3	More shaking, enjoying playing really fast and by turning the instrument, playing in different ways
18	P	2	3	Plays with the xylophone, physically driven, cannot hear pattern in playing
18	P	2	3	Pulling the toy, making it go clickety clack with Dad. Two weeks ago, making a similar toy go around and round with me and he remembered, showing me this session
18	R	2	3	Adult led singing with parents and children in the children's centre after free-play session. Hokey, kokey- enjoyment of movement, being swept up by mum, multisensory
18	I	3	5	In the children's centre during free play- copying mum's tapping on the floor and other mum on the table... :-) - copying sound not pattern (Achieving)
18	I	3	5	Watching and responding to Dad, making the toy move and make sound as it rolls against the floor - copying sound not pattern
18	I	4	7	Singing Old McDonald, finished motif, stops in the middle for mum to continue as well
18	R	3	5	In the children's centre adult led singing with parents and children - aware of anticipation- pattern in 'round and round

				the garden' response to pattern of anticipation…
19	I	4	8	Links motifs in Old McDonald, responding providing the animal noises for others to sing about in Old McDonald and finishing e-i-e-i-...'o', and at 00:45 sings the whole phrase 'e-i-e-i-o'
20	I	4	8	Finishing Happy Birthday in between motifs
20	I	4	8	Finishing some of the phrases with words and actions to Dad singing Polly had a dolly"
20	I	4	8	Finishing phrases that dad sings - of old McDonald - dad scaffolding--leaving pauses for B to fill in. Using props/toy animals to support song.
22	I	4	8	Repeating e-i-o and varying it, singing e-i-o for response. At 1:15 says 'e-i-e-i-o' to request the song - while tapping on the xylophone - ends some of the phrases and makes animal noises to request which animal should be sung.
22	I	3	6	Playing the Xylophone with mum. At 2:35 B requests mum to play - she plays on the drum and B copies - plays quietly when mum asks and then loud - pattern - soft to loud - enjoying the change and copying (copying pattern loud/soft tapping on drum)
19	R	4	9	Recreating all the actions to Twinkle, twinkle, actions as scaffold for phrases of music?
20	R	4	9	Singing along to end of the closing song from 'little explorers group'. The song is sung at the end of every session, which ends with the whole group of parents and children singing together.
21	R	4	9	Responds to change in volume at the end of the phrase sung in Roly, Poly. He anticipates...also perhaps knowledge of phrase, evidenced from another video as well
21	R	4	9	Presses button to hear tune again each time it stops on his toy. Presses the button to hear "happy and you know it' moving the music- stamping feet. When the song stops each time, he starts again (indication of responding to phrases)

				Responding through regular movement, twirling and stamping feet (also making pattern by stamping feet)
21	R	4	9	Appears to respond at end of phrases in Happy and Know it although may be driven by text, Responding throughout to the recording and Dad's singing
19	R	4	9	In the children's centre adults lead parents and children in singing after free play session. He responds, anticipating the countdown phrase, of the Zoom song, standing up to get ready - anticipates, familiar with phrases of the song
21	P	4	8	Starts out tapping the xylophone and vocalising. At 00:40 sings e-i-e-i-o, repeating, varying
22	P	3	6	Arranges the xylophone bars and then plays them with a beater, going up and down, perhaps guided by the colours, but shows pattern.
22	P	3	6	Raps the cup with the beater, creating a simple pattern.
22	P	3	6	Arranges the xylophone bars before playing them, perhaps between. At one point plays quietly when asked by Dad.
22	R	3	6	Anticipates and enjoys the pattern of the countdown, 5, 4, 3, 2, 1, blast-off - chanting gets louder as well and he is lifted up at the end
25	P	4	9	Repeating the phrase 'Old McDonald had a farm, e-i-e-i-o'. at 00:14 Dad scaffolds, singing as well and pausing for B to continue the song. B wants to sing alone:-) Singing "Old MacDonald" with aid of companion book.
26	P	4	9	Singing, repeating phrases of Old McDonald. At 00:16 finished the phrase sung by mum....'Old McDonald had a farm, e-i-e-i-....'o'.
26	P	4	9	Sings phrases of Old McDonald, linking together while listening to recording
26	P	4	9	Singing "Old MacDonald had a farm" and clapping and running, singing chunks of motifs
26	P	4	9	Singing "Old MacDonald had a farm" with real and nonsense words, and walking and playing the tambourine

26	P	4	9	Singing "Old Macdonald", and playing instruments, and following the song in the book, with grandma, singing fragments of the song and playing the rhythm of the melody as well.
26	P	4	9	Singing Humpty Dumpty and other nursery rhymes while playing instruments. Chants parts of Humpty Dumpy, Keeps a somewhat steady beat while the adults sing Polly Put the Kettle On. (scaffolding at I5 but playing is
26	P	3	6	Chants the whole of Humpty Dumpy, Keeps a steady beat while the adults sing Polly Put the Kettle On (Scaffolding at I5 but playing is P3)
26	P	4	9	Nonsense song, while playing instruments. Pieces phrases together.
27	P	4	9	Singing phrases of Sleeping bunnies, not yet in time or in tune
27	P	4	9	Singing, dancing and playing instruments with others to "Old MacDonald".
27	P	4	9	Singing "Old MacDonald" aided by soft toy animals, linking phrases together
27	P	4	9	Singing "Little robin redbreast" again with Xmas decorations. Not quite singing the whole song, but linking phrases together
27	P	4	9	Singing "Little robin redbreast" aided by robin Xmas decorations., again linking phrases here
27	P	4	9	Singing the ‘Grand Old Duke of York' while walking round and round. Perhaps not as much in tune as other video of Old MacDonald, not quite L5, Not being scaffolded here as he was in other video.
28	P	4	9	Singing the "Slippery Fish" song he learnt at playgroup, linking phrases together
26	I	4	9	Playing a clear rhythmic motif over and over, Dad copying. At 1:22 Dad plays the motif and Charlie copies on a different instrument. At 1:55 Dad shows Charlie how to play the guiro? Charlie copies and copies the motif as well.
26	I	4	9	Continues phrase and then stops for Dad to continue (responds to motif and produces to be responded to) Od McDonald, mum plays on the flute

27	I	5	10	Singing and doing actions to "Five little snowmen standing in a row". He is singing in time and in tune along with Dad.
28	I	5	10	Singing Old MacDonald. In time and in tune, also his clapping is in time with his singing and with Dad's playing on the xylophone. His singing is also in tune with Dad's xylophone playing. The third barnyard song. Dad sings the first few phrases and at 2:34 B takes over...varying the song a bit.
27	P	3	6	Playing the drums at a local music group, playing with pattern
28	P	3	6	Dancing and shaking shakers with the whole extended family, while listening to "Here we go round the maple pole, playing with pattern through instruments
29	P	3	6	Playing the mouth organ (harmonica), creating pattern while playing
29	P	4	9	Humming nursery rhymes while playing with blocks, humming phrases linking together
31	I	5	10	Singing "Old MacDonald" with multiple animal, singing in time and in tune with mum
33	R	3	6	Responds to regular beat and responds to change in speed, Dancing and doing the moves for the "Grand old duke of York
35	R	3	6	Dancing to folk music with younger brother in door bouncer! Running around in circles, increasing in speed as music gets faster, responding to gradual change in pattern
35	R	3	6	Dancing to his favourite folk music with younger brother. Recorded on 22-Jul-2017. In the beginning of the video, steps appear to be in time with tempo of the music for short period.
38	R	3	6	Dancing to Casio keyboard, Dancing style is different in comparison to other video of dancing to folk music. responding to different characteristics of the different styles? Responding to fast upbeat music
38	R	3	6	Running to music getting faster and faster. Responds to regular beat and responds to change in speed of music getting faster and faster

38	P	4	9	Singing "Jingle bells". Repeats the first and second phrase of Jingle, bells over and over
38	I	5	10	Singing "I hear them on the roof" Christmas song. Singing with mum and dad (singing sometimes along to scaffold on request)
39	P	5	10	Not quite in tune but in time, closer to chant. Signing and doing actions for "Five little reindeer prancing on the roof".
42	P	5	10	Singing a song in time and in tune learned at preschool about healthy eating.

Appendix 10: Mateo's Observations

Mateo's Observations				
Age in Months	**Domain**	**Level**	**E/A/X (1-12)**	**Video Clip Notes**
15	P	4	8	Singing a song for Dad, repeating 'papi, papi, pap' and varying
15	P	4	8	Looking at books and singing, making up short tunes, repeating and varying them
16	P	4	9	wind the bobbin two motifs (varies) into twinkle…linking together as well
16	P	3	6	Chants the end of the turtle song in pattern. Bubble, bubble, bubble...pop!
16	I	3	6	copying stomping and clapping of if you're happy and you know it in the singing session of the children's centre, copying is tentative
16	I	3	6	During the singing of monkeys on the bed in adult led group singing, copies the jumping and hopping pattern
16	P	4	9	Sings the Incy, Wincy Spider, mostly repeating and varying, putting motifs together
16	P	4	9	Repeating, varying and linking motifs of bah, bah black sheep, singing in the car
16	I	3	6	Exploring chimes with mum in the children's centre, pattern can be heard, consider other observations as well
16	P	4	9	Singing in the car, creating made-up phrases on various syllables
17	P	4	9	Potpourri song example, made up and bits of known songs
17	P	4	9	E-i-e-i-e into twinkle variation /starting to hear some tonality- linking motifs
17	P	4	9	Singing a made-up song on syllables for Nana, using chunks/motifs
17	R	3	6	dancing along to reggeaton, very rhythmic
17	P	3	6	clapping and vocalising in pattern
17	P	4	9	Singing a remix of Roly-Poly, linking coherently
18	P	3	6	Playing the piano, choosing notes to play carefully
18	R	3	6	Dancing along to jam session/street musicians outside in London, very rhythmic, responding to pattern, regular beat
19	P	4	9	Daisy remix. Made up version of song his dad sings to him. Playing with words rhythmically, linking to form a whole

19	P	4	9	Wheels on the Bus Remix, creating nonsense syllables and phrases even though mum is trying to get him to sing the song
24	R	3	6	Dancing with his cousins to his uncle playing the harmonic rhythmically
26	I	4	8	Singing phrases of Daisy, with some help/scaffolding from mum at 00:14,
29	P	4	9	Mateo is singing on the bus, repeating and varying the phrase 'I dig my garden'.
30	P	4	9	- Repeating/chanting/singing the word 'twinkle, twinkle, twinkle'...in a brief repeated motif.
30	P	3	6	Consider other videos, chanting a repeated pattern before falling asleep, more pattern than motif here
30	P	4	9	Singing phrases to himself, repeating the phrases (can also link at this stage)
30	P	4	9	Role, poly, chants phrases from the song and then goes on to repeat musical phrase on "la, la la". Potpourri song
31	P	4	9	While outside with mum, chanting 'dum, dum, de dum dum', repeating the vocal pattern over and over, consider can also link at this stage
32	P	5	10	More monkeys in the bed, again chanting all the way through in time, adding la, la, la, "if you're happy and you know it'
32	P	4	9	If you're happy and you know...on 'la la la la la la la', not yet the whole song, linking phrases
32	P	5	10	Monkeys jumping on the bed, chanting all the way through in time, although no tune, in time
33	P	4	9	Sings the ABC's...followed by singing 'mommy'...followed by ABC from mum's prompt at 00:22, with letters and then on syllables...from 00:55 sings 5 little ducks with verbal prompt from mum…Focus on 'Mommy' motif L4 here
33	P	5	10	Sings the ABC's...followed by singing 'mommy'...followed by ABC from mum's prompt at 00:22, with letters and then on syllables...from 00:55 sings 5 little ducks with verbal prompt from mum. Focus on whole songs L5 here
33	P	4	9	While walking outside, out and about with mum, chanting and repeating 'elephant and castle'...this moves into a new motif of

				syllables at 00:29 on 'tacki, lacki, lacki, la...'the pattern/phrase is varied at 1:0
33	P	3	6	Briefly exploring the large wooden chimes in the playground at Hyde park. Slight pattern of playing? There is some scaffolding from mum.
33	P	3	6	Playing with sound through movement, in the playground music garden, being encouraged by mum, movement creates pattern.
34	P	3	6	Repeating/singing/chanting 'aqui'. More pattern than motif
34	P	4	9	Stringing syllabic/melodic phrases together, singing to himself at bedtime (analyse in more detail).
35	P	4	9	Bedtime singing, starts with 'All the hungry children' (Today is Monday? song). Moving into a counting song, @ 1:10 begins to sing 'eggs in a pan, 'e', 'e' 'e'. repeating the phrase (song used for learning phonics), new song starts @ 1:41 (I lick a lollipop...the snake is in the bag) ...repeating the melodic phrase again and again...
35	P	4	9	Singing at bedtime, repeating phrases, particularly, descending scale of 5-4-3-2-1, before mum requests 'make a circle'... sings this whole song at 1:31. Approximately in time and in tune. Example of L4 and 5 in same moment.
35	P	5	10	Singing at bedtime, repeating phrases, particularly, descending scale of 5-4-3-2-1, before mum requests 'make a circle'...sings this whole song at 1:31. Approximately in time and in tune. Example of L4 and 5 in same moment.
35	P	4	9	Repeating 'na, na, na, na, nap time...first chanting which moves into the tune of 'Twinkle, twinkle @ 00: 19...followed by 'tidy up time' @ 00:30...'all the people' @1:27...followed by quiet chatting...@(L4) 3:00 sings 'make a circle'... (5)
35	P	5	10	Repeating 'na, na, na, na, nap time...first chanting which moves into the tune of 'Twinkle, twinkle @ 00: 19, followed by 'tidy up time' @ 00:30...'all the people' @1:27...followed by quiet chatting...@ 3:00 sings 'make a circle'... (5)

35	P	4	9	Repeating a short phrase - chorus - from the theme of the children's program 'Miffy'.
35	P	4	9	Do you like ice cream? Singing short phrase, repeating but these are in tune, excelling P4
38	P	4	9	Link with interview, mum was explaining that he made up a song specifically while he puts on his shoes. Audio recording of shoe song, made-up, use of motifs

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