CHAPTER ONE

INTRODUCTION

Young children naturally tune into the sounds of music....With objects and processes clarified, music for young children can be a means of combined intellectual and emotional growth, learning that is significant as well as joyful and far reaching in its influence (Aronoff, 1969:1).

1.1 THE PROBLEM

The experience of music is a holistic one. Cognitive perception, which includes an understanding of and ability to use concepts and development of skills, and affective response, which involves feelings and aesthetics, go hand in hand to create musicians. The degree to which each of these areas is experienced in the curriculum is continually questioned. Debate about music education and finding a comprehensive way to present it is a continual challenge for teachers and curriculum developers. Do we focus on the concepts or the aesthetics? How do we assess these areas? What type of musicians do we want our children to be? These questions are always being asked and the answers have varied according to the prevailing theory of the time.

The development of concepts is as important as the development of aesthetics and music is not music without both elements. Parker (1990:63) has noted that “aesthetic sensitivity and musical ability are co-determinants of the nature of musical experiences”. This study is not ignoring the
importance of aesthetics but maintains that the understanding of concepts complements the aesthetic experience. A builder needs tools to build a building, a chef needs ingredients to bake a cake and a musician needs a working knowledge of concepts to continually evolve as a composer and creator of music. Without these musical tools, the aesthetic experience, the creating and understanding of music, can only go so far. As teachers we expect our children to learn all the letters of the alphabet and the ways of combining them to make words which in turn communicate our thoughts and feelings through literature. We expect our children to learn numbers and number facts so that they can use maths in everyday life. We should thus expect children to learn about and experience pitch, rhythm, harmony, tonal qualities and form to help them to become better musicians and composers.

Concept development also relates to curriculum provision for our students. Our curriculum must take into account a child’s cognitive development as well as affective development. Concepts must be taught as an integral part of the music curriculum and these concepts must be reinforced through the use of creative activities. Creative activities, such as composing, improvising and performing, give children an opportunity to explore concepts and to further develop their understanding of them. The delivery of the curriculum is as important as good curriculum design. The skills music teachers need to be effective are specific to this art form. Does teacher expertise affect the development of concepts in the primary school aged child? This is another question which this study will attempt to answer.

The study will attempt to outline the development of concepts for children from six to twelve years of age and use these to make recommendations
regarding their use in a comprehensive curriculum. The concepts are pitch, rhythm, harmony and melody. This study will focus specifically on primary school aged children in the state school system in Victoria and a cross-section of children will be used to represent differences in background and education. The two school used in this study also have music teachers with differing levels of musical expertise.

To this end, this study focuses on one aspect of the music education experience - that aspect is concepts. This study will investigate whether concepts can be accurately measured? Do these concepts, when measured, show developmental progress? What are the implications for curriculum design and teacher training? This study will attempt to answer these important questions.

1.2 THE AIM

The aim of this study is to investigate whether the acquisition of concepts, particularly rhythm, pitch, harmony and tonality (melody), are developmental in nature. This study will focus specifically on primary aged children in the State school system in Victoria.

1.3 RESEARCH QUESTIONS

In order to provide a focus for the aim of this study it was necessary to devise research questions. The following research questions will be addressed throughout this study.

1. To what extent can music skills and concepts be measured in the primary school child?
2. Can these results be interpreted so as to align with established developmental stages?

3. Can these developmental stages lead to a better understanding of what is required in a primary school music curriculum?

1.4 RESEARCH APPROACH

To achieve the aim of this study, Chapter Two looks briefly at the concept of development with a definition of its use in this study. Following this a discussion of current research focussing on the developmental nature of music will be undertaken. Much developmental research has been based on the writings of Jean Piaget, therefore a summary of his theory and its use in music education will be explored. Gardner (1973) and Gardner, Phelps and Wolf (1990) have suggested models of development in arts aestheticism, which have been used to explain development in music. Researchers such as Swanwick and Tillman (1986) have devised a developmental model of music skill acquisition, which look on concepts as incidentals rather than integral parts of the music making experience. Each of these theories will be examined and discussed with regard to the way in which they relate to concepts and their usefulness when using concepts as a curriculum focus. The chapter then discusses past findings concerning the acquisition of the concepts examined in this study.

Chapter Three discusses the need for music in the curriculum and the place concepts take in its design. The reasons for teaching concepts in the curriculum are explored and studies of concepts in curriculum by researchers such as Hargreaves (1986), Parker (1990), Lawson, Plummeridge and Swanwick (1994) and Major (1996) are considered. Swanwick (1990) describes different forms of curriculum design and the
benefits of each are explored. These designs are then related to past and present curriculum initiatives that have been implemented by the Department of Education in the State of Victoria over the past 17 years.

Chapter Four summarises the different research methods that can be used when studying musical phenomena. Both qualitative and quantitative methodologies are discussed with reference to the research questions of this study. The chosen research method is explained further and the procedure used to gather data is given.

Chapter Five is a summary of the results of the data that was gathered. The data is analysed using individual test scores as well as combined scores and the results are explained. The individual questions are also analysed with error rates being reported. The most significant findings are explained to the reader and preliminary discussion points are suggested. The chapter concludes with a summary of results and a response to the originally stated aim.

Chapter Six will discuss the results, and implications that can be drawn from these, in detail. The findings of the research are further explained and conclusions are drawn. The developmental aspect of the acquisition of concepts is explored and efforts will be made to show any development that may have occurred. The development of concepts is discussed by age and by concept area and a developmental profile is devised. The original definition of development is revisited and factors that may have influenced this development are investigated.
Chapter Seven will conclude this study. It comments on where this research may lead the reader and provides suggestions on the direction of further research in this area.

1.5 SUMMARY

The problem of concepts versus aesthetics in music research is a continual one. Past research must be consulted and the importance of concepts needs to be assessed. The following chapters will analyse the problem and reach conclusions that may be used by teachers when attempting to provide a balanced music curriculum.
CHAPTER TWO

DEVELOPMENT, DEVELOPMENTAL THEORIES
AND THE DEVELOPMENT OF CONCEPTS.

And so from hour to hour we ripe and ripe...And
thereby hangs a tale.
William Shakespeare.

2.1 INTRODUCTION

Research in music education has taken many twists and turns over the past
80 years and musical development in children can be considered a major
issue in music education. Educators are continually attempting to develop
comprehensive music curricula that incorporate the musical elements
considered important by teachers. From Seashore's (1919) tests of musical
aptitude which were concept based and quantitative in nature, to Swanwick
and Tillman's (1986) study which was composition based and qualitative in
nature, music researchers have tried to evaluate all areas of musical
development. These theories of musical development, however, are scarce
and are limited in their scope (Koopman, 1995). Researchers who have
attempted to provide comprehensive views of this area are Swanwick &

This particular study is concerned with music and cognition, that is, whether
developmental stages can be applied to the acquisition of music concepts
and skills in the primary school child. The focus areas chosen for this study
are pitch, rhythm, harmony and tonality (melody), which are the basic tools
required to create a musical work. Other concepts such as dynamics, tempo, form and tone colour are not examined in detail for this study, but while they are also integral to the overall effect of a musical work, it is the four concepts stated above which provide the basis from which a musician must work. This study concentrates purely on the acquisition of concepts and is not concerned with studying emotional or aesthetic responses to music.

Music provides students with a unique educational experience. It is a subject which integrates different types of learning and provides students with the ability to express themselves in ways other than those found in literature and the visual arts. Music is culturally defined and resides in belief systems held by the community (Reimer & Wright, 1992). Music is a subject which provides students with the opportunity to explore both the logical and the esoteric. Music allows students to use their multiple intelligences (Gardner, 1993), as the following example shows:

- Verbal-linguistic intelligence is developed through the discussion of music and its unique features.
- Logical –mathematical intelligence is developed through theoretical knowledge in concept areas.
- Visual-spatial intelligence can be accessed when a child is asked to show their perception of the music through visual art forms.
- Bodily-kinesthetic intelligence is developed in children as they express how they perceive a musical work through movement.
- Musical-rhythmic is developed through all musical activities.
- Inter-personal intelligence is developed through children working together to solve musical problems, especially when listening, composing and performing.
• Intrapersonal intelligence is developed, as children become able to express their thoughts and feelings through music. This researcher believes that due to the unique nature of music and its ability to access so many different areas of our intelligence, that it should be given suitable importance in a curriculum. To this end music teachers should have a thorough understanding of the developmental stages a child will progress through in concept areas.

This chapter outlines child development, developmental theories and concept development. Firstly an explanation of the term ‘development’ is attempted, drawing on various researchers’ definitions to establish a meaning which is suitable for this study. Developmental theories are then explored from the perspective of cognitive-developmental psychology and the work of Jean Piaget. As noted by Hargreaves, “a good deal of contemporary research on musical development is rooted in theories of children’s thinking: Piaget’s theory is by far the most influential of these” (1986: 31). Different perspectives on the use of Piaget’s theory in the development of music attributes in children are discussed including research that is both quantitative and qualitative in nature. Three widely regarded theories of musical and artistic development are outlined, Gardner’s (1973) original theory of aesthetic development, Swanwick and Tillman’s (1986) theory of musical development and Gardner, Phelps and Wolf’s (1990) developmental theory which is a model that bears some resemblance to Gardner’s original theory (Koopman, 1995). Finally a review of previous research in the four concept areas chosen for this study: pitch, rhythm, tonality (melody) and harmony is presented. The conclusion leads the reader to the following chapter where the linking of music development and
music education takes place.

2.2 WHAT IS DEVELOPMENT?

What is development and how can it be defined within the parameters of this study? A teacher must understand the patterns of development through which a child moves in order to provide comprehensive and meaningful learning experiences. Development is related to change and is both qualitative and quantitative. Qualitative development leads to radically new behaviour, whereas quantitative development only changes some particular behaviour that is already encompassed within an individual’s repertoire (Peterson, 1989). Development, therefore, can be said to involve a “process of change which occurs over a certain period of time and in which two or more qualitatively different stages occur, each stage being a precondition for its successor” (Koopman, 1995:50). Macoby (in Swanwick, 1988) also notes that there are two different meanings of the term development. The ‘softer’ definition

is the idea of sequential pattern; that development will occur usually in a certain order, that ‘early behavioural acquisitions are necessary, though not sufficient, for later steps to occur’. The second definition ‘goes beyond sequence’, and predicates ‘broad developmental changes that occur in almost all children according to a fairly standard timetable. (Macyo in Swanwick, 1988:53)

This definition acknowledges the idea of a sequential pattern, but that not all sequences need be timed perfectly for development to occur.
Developmental psychology is the area of psychology that is concerned with how people change. Music researchers who test how children perform at different ages, and those who develop theories to explain how children develop musically, all draw on a particular area of developmental psychology, the area of cognitive development. The scope of the work of a developmental psychologist ranges from “changes in physical structure and perception through to changes in the capacity to reason, use language and form friendships” (Baron, 1989:235). Developmental psychology contains three main branches, physical, cognitive and social. Educators are required to understand all three areas so that they are able to best meet the needs of the children in their care. This study is concerned with cognition and development, that is at which developmental stages does a child acquire new understandings of musical concepts. This understanding of a child’s cognitive development helps us to understand how a child’s mind grows and gives us signposts to developmental stages. This study will attempt to provide signposts that will show music educators the levels of acquisition able to be attained in the areas of pitch, rhythm, tonality (melody) and harmony.

One of the foremost cognitive psychologists who specialised in child development was Jean Piaget. The use of the work of Piaget to explain musical development will be discussed later in this chapter. In understanding cognitive development it is important to understand how this concept was viewed in the terms of Piagetian research. The following is a summary of Piaget’s concept of development:

1. There is an absolute continuity of all developmental processes.
2. Development proceeds through a continuous process of generalisations and differentiation.

3. This continuity is achieved by a continuous unfolding. Each level of development finds its roots in a previous phase and continues into the following one.

4. Each phase entails a repetition of processes of the previous level in a different form of organisation (scheme). Previous behaviour patterns are sensed as inferior and become part of the new superior level.

5. The differences in organisational pattern create a hierarchy of experience and actions.

6. Individuals achieve different levels within the hierarchy, although "...there is in the brain of each individual the possibility for all these developments but they are not all realised". (Maier, 1969:102)

Koopman (1995) states that development occurs within a specific domain and that musical development belongs to part of the aesthetic domain. Researchers such as Swanwick, Gardner, Reimer and Eisner who deal with the development of aesthetics in the arts, that is, the intrinsic power of music to cause feelingful responses (Reimer & Wright, 1992) would probably agree with the assertion that music is part of the aesthetic domain. Domains may also cross and those researchers such as Pflederer-Zimmerman, Sloboda and Hargreaves who deal with music in a more cognitive sense, that is looking at concepts in music and the ways in which they are acquired, would probably argue that music also belongs to the psychological domain. These domains should not be regarded as exclusive, rather that the development in one domain should complement the development in another. This is one reason why, whilst developing musical concepts in children, we should also be developing the aesthetic realm of music.
Within each domain there are different dimensions of musical experience. Koopman (1995:50) lists examples such as “musical production (composing, improvising), musical reception (listening) and musical experience (aesthetics)”. This researcher believes that the musical reception dimension can be taken one step further from only listening to both listening, understanding and experiencing. Children develop when understanding and experiencing of a phenomenon takes place and therefore the term ‘reception’ lends itself to taking this extra step. An integral part of this understanding is memory. When children remember a specific detail about a musical concept, recognise it and use it, it can be said that they have understood that particular concept. As children’s memory develops so does their ability to use their memories or experiences to consolidate understanding. The significance of memory in musical development will be discussed later in this chapter. The third domain mentioned (the aesthetic domain) more difficult to analyse and there has been less writing of significance on this domain that is specific to music. Current theories have attempted to study the aesthetic domain in broader terms, relating to the arts and other symbolic domains such as mathematics and science in general and these will be explored later in this chapter.

It is imperative for a researcher to be aware of dimensions when analysing results related to development, as different aspects of the musical domain have different courses of development (Koopman, 1995). Dimensions must not be confused as this can lead to researchers presenting misleading and
unclear pictures of development. After considering the vast amount of research undertaken in the area of development, this researcher had decided that the dimension of musical reception (listening, understanding and experiencing) would be the focus of this study. Koopman (1995) asserts that musical understanding is often implicit and an unconscious understanding of the dominant musical system of each culture is developed in children. This will need to be considered when looking at the development of concepts in this study. This researcher will need to be aware of children actively listening and actively understanding when considering whether any conceptual development has taken place. To show true development, understanding must go beyond the unconscious and into the conscious.

The definition of development, which will be used for this study, is as follows.

Development is the acquisition of new understandings which appear to be consolidated at different ages. This type of development is fairly sequential with one stage of understanding preceding the next. This development is inclusive with each stage complementing the other and providing a basis of knowledge on which to build understandings. Development is not uniform and takes place according to individual patterns in each child.

This definition will be used when looking at how children acquire musical concepts and the level of understanding they can attain at each age. As Maier (1969:264-265) has stated: “every individual is in a constant state of
change" and "despite widely varying individual patterns, this change becomes increasingly complex as it progresses". It must, therefore, be understood that some children will fall outside the developmental range of their group and these children must also be taken into account when planning developmental models.

2.3 DEVELOPMENTAL THEORIES

CONCEPT DEVELOPMENT AND MUSICAL ABILITY
Prior to and during the early 1960s musical development was usually regarded as the development of the concepts of music. Tests of musical ability were devised to pinpoint students with a proclivity to high levels of aptitude in music. Seashore (1919) and Bentley (1966) both developed tests of musical ability based on concepts such as pitch, melody, harmony and rhythm. These researchers believed that these concepts were fundamental to the development of musical ability and that children who scored highly on these tests would show an aptitude for music. The analysis of these tests was used to decide which children would be recommended to study voice and instruments. The degree of development between age groups was not widely explored. General statements were made regarding achievements at different levels but the reasons for these differences went largely unexplained. While this study will be examining the concepts studied by the above researchers, it will attempt to move beyond the boundaries of previous research and also explore how educational backgrounds may influence development.
During the mid-1960s and 1970s, researchers began looking at ways of assessing development in both the dimensions of musical reception and musical experience. Test (some of which will be discussed) were published which claimed to be able to measure both concept development and musical development in children. Though still concerned with measuring children’s proclivity to musical aptitude, these researchers formally acknowledged that a child’s musicality, that is an ability to interpret music, would also affect her ability to perform well as a musician. The tests often provided educators with developmental norms with which to compare children at specific grade or age levels. These tests, however, did not provide any explanation as to how development occurred.

Wing (1961) and Gordon (1965, 1979, 1982) undertook further research in the area of concepts. These researchers also tried to test for musicality (in music) to indicate norms for children at different grade levels. Wing incorporated tasks into his *Standardised Tests of Musical Intelligence* (1961) which asked subjects to indicate preferences for phrases played which alter in accent, harmonisation, dynamics and phrasing. Subjects were asked to indicate which of two items sounded ‘better’ and these responses were used to identify ‘musicality’. Although Wing asserted that his test is both valid and reliable, Boyle & Radocy (1987:147) noted that while “the judgement of rhythmic accent, harmony, intensity, and phrasing may require a certain musical achievement, ... conceivably a person can have developed the necessary sensitivity through immersion in Western musical culture”.

Gordon created three different tests to assess both concepts and musicality. His first test battery, the *Musical Aptitude Profile* (1965), which is suitable
for subjects from grades 4 to 12, tested Tonal Imagery which included melody and harmony, Rhythm Imagery which included tempo and metre and Musical Sensitivity which included phrasing, balance and style (Boyle & Radocy, 1987). The Musical Sensitivity tests are preference tests which "provides an appraisal of appreciation for musical expression and, indirectly, musical creativity" (Gordon, 1967:1). Gordon states that this profile can be used successfully for the following purposes:

1. To identify musically talented students who can profit most from and contribute most to school music activities.

2. To adapt music methods and materials to the individual needs and abilities of students by compensating for their specific musical weaknesses and by enhancing their specific musical strengths.

3. To aid in the formulation of educational plans in music.

4. To compare the collective musical aptitudes of groups of students.

5. To apprise parents of the musical aptitudes of their children. (Gordon, 1967:1)

Statement 4 relates to the use of tests for developmental comparisons. Gordon developed grade norms for each grade level so that developmental comparisons could be made. Gordon also used his test battery to find out whether children who were given specialised training made greater developmental progress than those who did not. The longitudinal study employed by Gordon (1967) found that there was no significant difference in the development between children who received specialised training and those who did not. He concluded that changes in scores were related to general maturation and the practice effects of retaking the test. Gordon's
*Musical Aptitude Profile* was by far the most comprehensive attempt at providing developmental milestones relating to children's ability to understand concepts and to assess their musicality.

The second test battery, *Primary Measures of Music Audiation* (1979), is suitable for children from kindergarten to third grade, and includes a tonal and rhythm test. The third test battery, *Intermediate Measures of Music Audiation* (1982), is an advanced version of the *Primary Measures of Music Audiation*. These two test batteries were not as comprehensive as the original *Musical Aptitude Profile*. They concentrated on the understanding of concepts and did not include musicality tests.

Other early tests that attempted to measure musicality were the *Indiana-Oregon Music Discrimination Test* (1965) and Colwell's *Music Achievement Tests* (1970a). These tests were again preference tests, that is, children were asked to indicate a preference for musical excerpts played in different ways. Boyle and Radocy (1987:201) noted that these types of tests "seem to raise more questions than they answer regarding the measurement of preference" and that "although all require respondents to express preference, the lack of significant correlation coefficients among the tests suggests that they may be measuring different constructs". It is important for a test to truly measure what it is supposed to in order for reliable results to be inferred.
These initial attempts to describe musical development through the use of testing were valuable in bringing attention to the fact that children did show, through their test results, patterns of improvement. Although these patterns of improvement often were not explained, these tests acted as catalysts for subsequent researchers to design new tests which would include the ability to explain musical development in children. This researcher believes that when used correctly and when sufficiently analysed, the results achieved in these tests can be used to explain some developmental patterns, especially for concepts. For the purposes of this study, it is this detailed analysis which will be used to attempt to explain concept development in children. This researcher also believes that although the successful evaluation of musicality in children warrants more detailed examination, it is not within the scope of the study. Attempts that have been made to explain how musicality and aestheticism develop in children will be discussed later in this chapter through the work of Howard Gardner and Keith Swanwick.

PIAGET’S THEORY OF DEVELOPMENT AND MUSIC

In the 1960s the work of Jean Piaget and his theories of development were used to try to explain musical development. Pfleiderer-Zimmerman (1964) was one of the first researchers to link the theory of conservation with music and she has continued to refine her theories in subsequent research (Pfleiderer-Zimmerman, 1967, Pfleiderer-Zimmerman & Sechrest, 1968). Pfleiderer-Zimmerman was concerned with the 'conservation' of musical tasks and how they could fit into Piaget’s developmental stages. Swanwick
on the other hand, prefers to use Piaget’s theories of play rather than “his detailed analysis of the structure of scientific thinking” (1988:54). Because of the importance of Piaget’s theories to past and present developmental research, a brief history of his developmental stages is required.

Peterson (1989) outlines the four main stages of development recognised by Piaget in Table 2.1. The stages in which this study is most interested are the preoperational and the concrete-operational stages because they cover the age groups of the intended subjects. Using Piaget’s theory Pflederer-Zimmerman (1964) developed ‘musical conservation’ tasks which corresponded to Piaget’s ‘non musical’ ones (Hargreaves, 1986). According to Piaget, in order to attain conservation, a concrete-operational style of thinking must be achieved (Peterson, 1989). This would mean theoretically, that children in the preoperational stage would find the ‘musical conservation’ tasks more difficult than the child in the concrete-operational stage. Pflederer-Zimmerman’s pilot research supported Piagetian theory and although some methodological concerns were raised regarding the size of the subject sample, the use of well known tunes and the definition of terms, overall this research explored what musical conservation might be and also provided the basis for further research (Hargreaves, 1986). Subsequent research has shown that success in music conservation tasks does seem to improve with age. It has been concluded that “conservation of tonal patterns seems to appear earlier than that for rhythmic patterns, and deformations of instrumentation, tempo, and harmony are recognised earlier than those of
mode contour and rhythm" (Hargreaves, 1986:44).

**Table 2.1 Piaget’s stages of development.**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Sensorimotor stage.</strong></td>
<td>(Up to age two): This is a period during which the infant learns to deal effectively with the physical and social world at the level of overt behaviour. It ends with the beginnings of symbolic thought.</td>
</tr>
<tr>
<td><strong>Preoperational stage.</strong></td>
<td>(Two to seven years): This is a period during which the ability to think about objects, words and other symbols, and to mentally manipulate symbols, evolves and spreads into other areas of play, moral awareness and social functioning. Thinking is ‘prelogical’ according to Piaget: children at this stage spontaneously devise their own intriguing explanations for problems such as why the sun rises and sets or how dreaming occurs.</td>
</tr>
<tr>
<td><strong>Concrete-operational stage.</strong></td>
<td>(Seven to eleven years): During this stage the child’s thoughts become organised into an integrated system of logical operations called groupings. As a result, the child acquires a rational and consistent understanding of tangible objects and events. Thinking is still limited, however, when it comes to higher order abstractions and intangibles.</td>
</tr>
<tr>
<td><strong>Formal-operational stage.</strong></td>
<td>(After age 11): For Piaget, this stage is the pinnacle of logical thought. When fully mastered, formal operations enable the adolescent to think rationally, hypothetico-deductively and thoroughly about even such remote abstractions as friction and momentum, the mechanisms of human thought or the possible future of the world. Genuine cognitive development ceases, according to Piaget, with the attainment of formal operations. But the quantitative accumulation of further information and its integration into existing formal thought structures can continue indefinitely.</td>
</tr>
</tbody>
</table>

Swanwick is another researcher who uses the work of Piaget as a theoretical basis for research. Rather than looking at the "tightly formulated and age related stages of development", he prefers to use the part of Piaget's theory "concerned with fundamental human processes, those ways in which we make sense of and grow into the world" (Swanwick, 1988:55). Swanwick (1988) compares the mastery of musical activities to children's use of play to explore and make sense of their environment. He believes that as children explore music through play and discovery, they are building up a mastery of the musical experience. Children feel delight at discovering new sounds that they have made and even experienced musicians feel delight at mastering new techniques or sounds. This delight, as Swanwick would argue, is the reason we develop musically, for it is exploration that teaches us new ways of learning musical concepts.

Swanwick (1988) also discusses the use of the Piagetian terms 'imitation' and 'imagination' in a musical sense. Swanwick argues that 'imitation' is present in music when characterisation of a musical work occurs. Although performers add their own interpretation whilst playing, always evident is the "particular universe of gestures, of feeling and emphasis" (Swanwick, 1988:7). Imagination is also used in a musical sense through the use of compositions. Swanwick (1988) cites research undertaken by Moog where children, at around the age of four, begin to create "imaginative songs". Swanwick uses these ideas of mastery, imitation and imaginative play in his sequence of musical development, which will be discussed in more detail later in this chapter.
Piaget’s theory of development is an excellent starting point when looking at
cognitive development in children, however, recent evidence suggests that
some modifications are necessary (Baron, 1989). The two most important
areas to be looked at are:

1. Piaget seems to have underestimated the cognitive abilities of infants
   and young children, and
2. There are several aspects of cognitive growth Piaget did not consider
   which are worthy of careful attention (Baron, 1989:249).

Past research has shown that children in the pre-operational stage are able
to understand the concept of conservation and are able to understand
relationships such as ‘greater’ and ‘lesser’ as well as ‘higher’ and ‘lower’
(Baron, 1989). Given specific training techniques, children are able to learn
the principle of conservation, which supports the contention of this
researcher that teacher expertise will affect child development in music.
Gelman & Baillargeon (in Baron, 1989) note that past research findings do in
fact support the assertion that Piaget underestimated the cognitive abilities
of young children. This occurred due to the unsuitability of some of the tasks
presented and confirms that in order to determine what young children can
do “it is essential to use the right tasks and present the right questions”
(Baron, 1989:251).

One area of cognitive development not directly considered by Piaget is that
of memory (Baron, 1989). Memory is an intrinsic part of development in
that children develop when they remember and understand a concept.
Children’s memory not only changes in speed and accuracy, but children also change the strategies they use to remember as they get older. In order to develop as musicians, children use their memories to internalise new information and recall this information when required. As memory develops they are able to retain more information and build upon it with new knowledge. In order to develop an understanding of rhythm children must learn and remember information about beat and metre, then use these in musical experiences to consolidate their learning. This understanding of beat and metre becomes more complex as notes with different values and time signatures are introduced. A child needs to understand what a time signature means and how notes can be used to fill each bar with a rhythm. Without an increasing capacity to remember, children would not be able to develop complex understandings of musical concepts.

**GARDNER’S THEORY OF AESTHETIC DEVELOPMENT**

This theory by Gardner (1973) covers visual and literary arts where the arts are viewed as forms of communication. This theory is said to be aesthetic in nature and is based in the development of the following systems: making, feeling and perceiving. Koopman (1995), however, argues that this theory is actually referring to the development of musical understanding, that is a cognitive process. Using these systems Gardner (1973) distinguishes two stages of aesthetic development – the presymbolic stage and stage of symbol use. These two stages are used when discussing all arts except for that of music. The musical model does not follow his developmental model and ignores symbolic function of the musical medium (Koopman, 1995). The table below summarises the development of musical understandings that Gardner believes children pass through at various ages.
**Table 2.2 Development of musical understandings in children.**

<table>
<thead>
<tr>
<th>Age</th>
<th>Ability</th>
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<tbody>
<tr>
<td>2 months</td>
<td>match pitch, loudness and melodic contour.</td>
</tr>
<tr>
<td>4 months</td>
<td>match pitch, loudness, melodic contour and rhythmic contour, creative sound play.</td>
</tr>
<tr>
<td>2 years of age</td>
<td>explore intervals: 2(^{nd}), Minor 3(^{rd}), Major 3(^{rd}), 4(^{th}), produce spontaneous songs, reproduce small sections of familiar songs.</td>
</tr>
<tr>
<td>3-5 years of age</td>
<td>the melodies of the dominant culture mastered.</td>
</tr>
<tr>
<td>6 years of age</td>
<td>little further musical development, repertoire expands, accuracy, expressivity, knowledge about music and critical categories develop.</td>
</tr>
<tr>
<td>8 years of age</td>
<td>proceeds on sheer talent, memory and good ear.</td>
</tr>
<tr>
<td>9 years of age</td>
<td>skill training, adult’s ambitions intervene; child becomes self-motivated and self-sacrificing.</td>
</tr>
</tbody>
</table>

Source: Poulton, 1996:38

In this theory “there is no account of the way children communicate subjective experiences” (Koopman, 1995:53), rather, musical development is portrayed as learning to understand and use the dominant musical code. This theory is summarised by Koopman (1995) as the exploration of the musical medium and the internalisation of the musical system. Koopman (1995:60) asserts that although this theory is described as aesthetic in nature, “Gardner describes musical development almost exclusively in cognitive terms and has practically nothing to say about the feeling system”.

**THE DEVELOPMENTAL THEORY OF GARDNER, PHELPS & WOLF**

Gardner, Phelps & Wolf’s (1990) theory is a three-stage developmental model that partially resembles the model discussed in the previous section.
This model not only encompasses the arts but all symbolic domains including mathematics and science (Koopman, 1995). In this model, Gardner et al. (1990) focus more strongly on the dimension of creativity rather than that of musical understanding. This theory includes three stages when discussing the notion of creativity – preconventional, conventional and postconventional. Koopman (1995:55-56) summarises the three stages as follows:

In the preconventional stage, creativity is independent of the culture in which the child grows up. In the conventional stage the child becomes sensitive to ‘cultural dictates’. The postconventional stage is characterised by a critical attitude towards conventions.

Whilst Koopman (1995) describes this theory as very general because it covers such a large domain, that of symbol systems, he attempts to link it specifically to music in the following ways. The conventions discussed can be related to the dominant musical codes, therefore the code an individual learns is directly related to the culture to which he or she belongs. In the discussion of the acquisition of music concepts which takes place later in this chapter it becomes very obvious that an individual’s musical culture has a profound effect on the type of learning which takes place. This type of enculturation can not be broken through during Gardner et al.’s (1990) preconventional and conventional stages. It is only during the postconventional stage that the ability to appreciate, or become receptive to, music beyond that to which one is accustomed comes into force. This theory also depends upon inclusion of the preceding stage. As Koopman (1995:56) notes,
although stage two embodies a totally different way of dealing with music, the knowledge of the symbolic medium acquired in stage one is preserved. Similarly, the postconventional stage includes its predecessor, the conventional stage. Conventions, though now having a different status, continue to play an important role.

**SWANWICK & TILLMAN’S THEORY OF MUSICAL DEVELOPMENT**

Swanwick and Tillman’s theory developed from a longitudinal study that analysed 745 musical compositions of 48 children over a period of four years. From the analysis of compositions came the developmental stages discussed below. This developmental theory, unlike the two mentioned previously, was specifically written for music and although it only relates to musical development thorough the use of compositions, it nevertheless provides a valuable discussion point for this study.

Swanwick and Tillman (1986) created a developmental spiral that allows for both vertical and left to right or right to left movement. This movement around and up the spiral indicates that Swanwick and Tillman believe that there is a polarity in development. Swanwick (1988:63-64) describes this developmental theory as one where “each one of the ‘stages’ or perhaps better transformations, is swept up into the succeeding developmental thrust. We do not merely pass through one of these modes, but carry them forward with us into the next”. There are four stages in this theory; mastery, imitation, imaginative play and meta-cognition. The stages of the spiral represent aspects relevant to all ways of relating to music including composing, performing, listening and criticising (Koopman, 1995). Contained within each stage are two developmental modes and this spiral of development is illustrated by figure 2.1.
Figure 2.1 Swanwick & Tillman's spiral of musical development.

Table 2.3 summarises the six developmental modes from Swanwick and Tillman’s (1986) theory, which relate specifically to young children:
### Table 2.3 The developmental modes of Swanwick and Tillman’s theory of musical development.

<table>
<thead>
<tr>
<th>Developmental mode</th>
<th>Description</th>
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<tbody>
<tr>
<td>Sensory</td>
<td>Children focus on the impressiveness of sound, especially timbre and dynamic levels. Children experiment with a variety of sound sources, elements are fairly unorganised and the pulse is unsteady.</td>
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<tr>
<td>Age: up to 3 years</td>
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<tr>
<td>Manipulative</td>
<td>Children show an increasing control of techniques when using instruments and other sound sources. Children gain control over a steady pulse and include musical techniques such as glissandi, intervallic patterns, trills and tremolos. Compositions are long and rambling.</td>
</tr>
<tr>
<td>Age: 4-5 years</td>
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<tr>
<td>Personal Expressiveness</td>
<td>Children communicate direct personal expression through songs. Children use changes of speed and dynamics in their work and further explore instruments. Elementary musical phrases appear. Compositions are spontaneous and uncoordinated which reflects the immediate feelings of the child.</td>
</tr>
<tr>
<td>Age 4-6 years</td>
<td></td>
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<tr>
<td>Vernacular</td>
<td>Melodic and rhythmic patterns appear and repetition is used. Children begin to structure phrases in 2, 4 and 8 bar units. Metre emerges, as does syncopation and sequences of melody and rhythm. This stage is identified as the first stage of conventional music making.</td>
</tr>
<tr>
<td>Age: begins at 5-6 years, established by 7-8 years</td>
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<tr>
<td>Speculative</td>
<td>Children begin to show an imaginative deviation of patterns. The control of pulse and phrases appears less fixed as children explore music to find the exact effect they require. There is greater experimentation as children explore structural possibilities.</td>
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<tr>
<td>Age: 10 years</td>
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<tr>
<td>Idiomatic</td>
<td>Structural surprises are integrated with answering phrases and ‘tag’ endings are common. Technical, expressive and structural control is established over longer periods of time. The world of popular music is influential in compositions and children seek to enter formal musical communities.</td>
</tr>
<tr>
<td>Age 13-14 years</td>
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</table>

Source: Swanwick & Tillman (1986)
Koopman (1995) states that the first three stages of the theory relate to musical production and the last relates to musical experience. Because of the limited focus of the study, that is the study of children’s compositions, a wider study should also be conducted to take into account other areas that make up musical understanding. As Koopman (1995:57) states, whilst this theory is a good tool to show musical development in children, “other ways of dealing with music should also be examined in an effort to substantiate the claim that the stages of the model are about the overarching developmental dimension of musical understanding”.

2.4 CONCEPT DEVELOPMENT

A judgement considered fundamental to a listener’s comprehension of music is that of similarity or difference between two musical ideas. The ability to discriminate between variations in such essential melodic elements as pitch and rhythm influences a person’s sense of musical coherence and structure. (Demorest, 1992:126)

The tools children need to help them become musicians are musical concepts. These concepts are the building blocks of knowledge used when experiencing music in ways such as singing, listening, playing, moving and creating. These building blocks, or concepts integral to musical knowledge, are rhythm, melody (which includes pitch and tonal awareness), dynamics, tempo, tone colour, style, harmony and form. These concepts are accumulative in nature, with children needing to build up their knowledge gradually over time. The processes upon which developmental knowledge is based are those of volume, pitch, rhythm, tonality (melody) and harmony. A Guide to Music in the Primary School (1981) cites research that suggests
that these concepts are developmental in nature and Table 2.4 outlines these age-related findings.

**Table 2.4 The developmental sequence of music concepts.**

<table>
<thead>
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<th><strong>Volume discrimination.</strong></th>
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<tr>
<td>By the age of about four years a child usually has achieved a basic ability to perceive overall “loudness” and “softness” of sound. The subtleties of volume discrimination need to be developed as the child matures.</td>
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<tr>
<th><strong>Pitch and rhythm discrimination.</strong></th>
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<tbody>
<tr>
<td>While a child begins to respond to pitch and rhythm at a very early age, research findings to date suggest that a child is best able to develop pitch and rhythm discrimination between the ages of six and eight years. These develop simultaneously and are dependent on the child’s increasing attention span and improving memory.</td>
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<tr>
<th><strong>Tonal memory and harmonic awareness.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonal memory is the ability to recall a sequence of sounds and harmonic awareness is the ability to hear accompanying sounds. These abilities usually begin to develop between the ages of eight and ten years. However a young child needs experiences which help prepare for this development.</td>
</tr>
</tbody>
</table>


Keeping in mind this acknowledged development of concepts, this researcher has decided to focus on the development of the concepts of pitch, rhythm, tonality (melody) and harmony for this study. The remainder of this chapter will focus on past research in each of these four areas and the main findings of that research.
PITCH

Pitch is one concept area where research is plentiful partly because “the ability to differentiate between tones of different frequencies (i.e. pitch) is generally assumed to be a requisite component of musical ability” (Cooper, 1994:56). In the past, assessing pitch has been used fairly exclusively to identify students who would benefit from training on a musical instrument. It is still fairly common today in secondary schools in Victoria to use pitch discrimination tests as part of a battery designed to identify those students who should be learning an instrument or to help match students to an appropriate instrument.

Researchers have studied children’s ability to discriminate between sounds of different pitch (Bentley, 1966; Mills, 1986; Cooper, 1994; Demorest & Serlin, 1997) to match pitch when singing (McCoy, 1997) and the use of language to label directional movements in pitch (Costa-Giomi & Descombes, 1996). The ability to identify differences in pitch is “generally assumed to be a requisite component of musical ability” (Cooper, 1994:56) and it has also been found that “only formal musical training develops a sensitivity to pitch information equal to that of rhythm” (Demorest & Serlin, 1997:69). Singing, for example, is large part of a child’s musical experience, often beginning in infancy with parents singing nursery rhymes and playing singing games. Some babies under the age of five days have been shown to notice pitch differences of about four semitones (Bridger, 1961 in Hargreaves, 1986) so it is fair to say that a child’s perception of pitch begins at a very young age. Researchers have also suggested that by the end of the pre-school period, the mastery of pitch is largely accomplished (Hargreaves, 1986).
Hargreaves (1986:84) states that there is "general agreement amongst researchers that pitch discrimination improves in later childhood, but disagreement about the levels of discrimination that are attained at different ages". Most researchers agree however that children can detect pitch differences to less than a semitone (Bentley, 1966; Mills, 1996, Cooper, 1994) and that age can be directly attributed to the improvement in the discrimination of pitch (Bentley, 1966; Mills, 1996).

Researchers often use pitch discrimination testing to ascertain whether this concept improves with age. It is the assertion of this study that concepts are developmental in nature and that as children mature they improve in their understanding of all concepts. Cooper (1994) assessed differences of pitch to less than a semitone by using a modified version of Sergeant's (1979) pitch test. The children in Cooper's (1994) study had to recognise which note was different from a series of sounds and then had to identify the direction of the difference. Cooper found overall that children were generally more able to detect differences in pitch than the direction of the change. This finding was further refined to show that children from grades 2 to 5 found it easier to detect pitch differences from the direction, while students in grade one showed no significant difference between their scores. Older students were better at the task than younger students and all scores increased over each age level. Gender was not a factor with both boys and girls scoring similarly on all tests.

The difficulty the grade one students had in detecting pitch differences and pitch direction was attributed to the fact that the tasks used may not have
been suitable for young students and further research in this area was recommended (Cooper, 1994). It was also thought that the overall lower scores for all age groups in the area of pitch direction might have been caused by the confusion with tonal direction terminology, such as higher, lower, up and down. Research by Cooper and Costa-Giomi & Descombes (1996) have shown that this is a common problem for English speaking children and further research in this area will be discussed later in this chapter. Cooper concluded that pitch discrimination ability does improve with age.

In research by Bentley (1966), children from 7 to 14 years completed a battery of concept based tests, including pitch discrimination. In his test, a semitone was the largest pitch difference. Bentley's subjects showed a steady increase in the mean scores from his battery of tests in all age groups. The highest scores in each age group also increased. His work showed that the majority of subjects could discriminate pitch difference of a tone and fifty percent of the 10 and 11 year olds and the majority of 12 year olds could identify semitones correctly (Bentley, 1966). Bentley also found that more accurate pitch discrimination occurred with notes in the middle of the vocal range.

**PITCH AND SINGING**

Pitch studies that are related to singing in tune are plentiful (Green, 1994; Moore, 1994; Cooper, 1995 & McCoy, 1997). A large number of these studies have been conducted using children as subjects and the general findings indicate the areas of pitch which children find most accessible when using their voices. Singing is an important area of the music curriculum in
primary schools and understanding how children match pitch in order to sing in tune is beneficial to all music educators. McCoy (1997) cites past research, which asserts that the ability to hear and distinguish pitch differences may be a prerequisite to accurate pitch singing.

Green (1994) tested the vocal pitch accuracy of children in grades 1, 2, 3 and 5 when singing both individually and in unison. She found that children were much better at singing in tune when singing in unison with peers than when singing individually, that scores for both group and individual singing improved with each age group and that girls sang more accurately than boys did.

Cooper (1995) tested the ability of children from grade 1 through to grade 5 to match pitch when singing in both individual and unison singing in a similar study to that of Green (1994). Unlike Green, however, Cooper found that there was no difference between individual and unison vocal pitch accuracy in this study. The difference in this finding and that of other similar studies cited by Cooper is because, according to Cooper, this study used a child’s voice as the vocal model. Green also used a child’s voice as a vocal model so this discrepancy cannot be accounted for in this way. The main difference between these two studies was the melodic fragment used for pitch matching. Green used the song ‘Bow Wow Wow’ whereas Cooper used a four-beat melodic pattern. The difference in length of the two pieces could account for pitch not being maintained by the subjects in Green’s study when singing individually. The short length of the piece used by Cooper would give the children more opportunity to be correct both individually and as a group. Both studies used a similar vocal range, that of a child’s chest
voice, so they did not have to access their head register. Cooper found overall that whilst older children sing more accurately than younger children there was no significant developmental pattern shown and she also found that there was no discrepancy between boys and girls.

Moore (1994) studied talented 8–11 year olds on pitch matching activities that included both melodic and harmonic patterns. He found that boys and girls scored similarly and that a definite pattern emerged when studying the ability of children to hear pitch in harmonic patterns. Overall, children found it easier to select the upper note of intervals of a sixth, fifth and third rather than the lower note and that the highest error rate occurred in the singing of both upper and lower notes of a major third interval (Moore, 1994). The implications for music educators when considering part-singing can be summarised as follows:

Upper parts are easiest to sing.
Lower parts are more difficult to sing.
Middle parts are the most difficult to sing (Moore, 1994).

RESEARCH INTO PITCH DISCRIMINATION AND TEST TYPE

The type of test used can directly influence pitch discrimination, such as those employing 'task structures'. Sergeant and Boyle (1980) identified two types of 'task structure' - one-step and two-step. One step tasks, such as those used in the Kwalwasser-Dykema music tests (1930 in Sergeant and Boyle, 1980) and the Sergeant pitch discrimination test (1979 in Sergeant and Boyle, 1980), rely on children providing a same or different response to the pairs of pitches presented. Two step tasks are those used in Bentley's Measures of Musical Ability (1966), Colwell's Music Achievement Tests
(1970) and Seashore's *Measures of Musical Talent* (1919). These tasks rely on children identifying same or different pitches and, if different, identifying whether the second sound of a pair moves higher or lower (Sergeant and Boyle, 1980). Two step tasks are more difficult and Sergeant and Boyle found that subjects' levels of accuracy were 95% for one-step tasks and 75% for two-step tasks. It could be argued, therefore, that tests involving two-step tasks are more valid and will more accurately reflect the level of pitch discrimination being tested.

**PITCH DISCRIMINATION AND LANGUAGE**

One problem that has been identified in the assessment of pitch discrimination in children is the language that is used to denote 'high' and 'low' sounds. The terms 'high' and 'low' and 'up' and 'down' can be confusing for small children, especially in English speaking countries, where these words can have multiple meanings. These terms are not only related to pitch but also to space and volume (Costa-Giomi & Descombes, 1996). Examples of the multiple use of the word 'high' can be found in the following sentences. "She threw the ball up high". "She has a very high voice". "He needs a high level of understanding to find the real meaning of the word 'high'". With all the possible uses for the words 'high' and 'low', it can be seen where the confusion lies in the use of these terms for pitch discrimination. It has been noted that "children's difficulty in naming pitch elements might be the result of the cognitive processes involved when disassociating the multiple connotations of the terms 'high' and 'low' and selecting the appropriate ones related to pitch" (Costa-Giomi & Descombes, 1996:206).
Costa-Giomi & Descombes’ study of pitch labels used French speaking students due to the fact that there are two pairs of pitch labels for ‘high’ and ‘low’. (Aigu and grave are the correct musical terms for ‘high’ and ‘low’ and haut and bas literally mean ‘high’ and ‘low’.) Children were given a pre-test to determine the ways in which everyday language was used to describe ‘high’ and ‘low’ sounds. Confusion with loud and low and high and soft was noted by the researchers, as was the fact that the word haut was not used at all. (The confusion between pitch and volume corresponds to this researcher’s experience of teaching young children the concept of pitch. I have often found that young children confuse loud and low, slow and low, soft and high and fast and high. This could be directly attributed to Western musical patterns where often the above pairs are combined and heard by children in a non-educational setting.) Following the pre-test subjects were assigned to either an aigu/grave or an haut/bas group. These groups were given fifteen minutes instruction on the use of these terms in a musical sense. After instruction the test was re-administered and the results were analysed.

Findings showed that children who were to use the single meaning terms of aigu and grave performed better overall than the haut/bas group. Whilst the aigu/grave group performed better, the haut/bas group were still able to discriminate between differences in pitch. Further results showed that children were able to learn new pitch labels and use them spontaneously. Costa-Giomi & Descombes, (1996: 212-213) also noted that young children “do not need training to perceive pitch changes; what they need is instruction in pitch terminology”. Mills (1996), who notes that children who receive clear instructions on pitch tests are able to apply the terms used
throughout the tests, shares this belief. Pitch discrimination tests, such as Bentley’s Measures of Musical Ability (1966), include clear instructions and aural examples that demonstrate the use of the words ‘higher’ and ‘lower’.

RHYTHM

The ability to feel rhythms is innate in children. Children naturally respond to the pulse of music and will clap series of long and short sounds without prompting. Researchers have found that rhythm is developmental in nature with a child’s ability to understand and use rhythm increasing with age (Pflederer-Zimmerman, 1964; Bentley, 1966; Demorest & Serlin, 1997). The ability to discriminate between different rhythms can be studied in two main ways. Researchers will usually test a child’s aural recognition of rhythm or their ability to read and write rhythms. Both types of research have found that the ability to recognise various rhythmic figures increases with age. Bentley (1966) found that the scores for rhythm increased at each year level in his subjects. He also found that children’s ability to recognise differing rhythmic figures was much more highly developed than in any of the other areas tested.

Demorest & Serlin (1997:68) undertook a study concerned with both rhythm and pitch with the following goals:

To identify and describe differences in
(a) the integration of pitch and rhythm in musical judgement,
(b) the perceptual influence of changes in pitch and rhythm, whether they occur separately or simultaneously, and,
(c) how those perceptions change with age and experience.
The researchers used 60 subjects, all musical novices from grades 1, 5 and 9 as well as adults. The subjects had to rate the degree of difference between a four measure theme played in its original form and then with eight variations in pitch and rhythm. Demorest and Serlin found that there was an age-related increase in the perceptual influence of rhythm changes but no difference between age groups in the perceptual influence of pitch changes. From these results they concluded that rhythm plays a significant role in novice perceptions of musical structure and that introducing rhythmic variation to melodies may alter a subject’s perception of pitch. As all subjects in the study had completed some form of music education, usually from prep to year 5, the researchers also believe that the ability to recognise new rhythmic elements continues to develop through informal activity, whereas this is not the case for pitch. Demorest & Serlin also raise the influence of language on testing procedure and note that the meaning of the words ‘same’ and ‘different’ may have multiple meanings for children in grades 1 and 5 and that this must be considered when undertaking further research. According to Demorest and Serlin future research in this area should focus on the types of musical activities that lead to more expert perception of musical variation and structure including timbre and harmony and how they interact with pitch and rhythm.

**RHYTHM AND NOTATION**

One particularly large study undertaken in the area of written rhythm was by Rena Upitis (1987). This study investigated development in notated
rhythm in two different rhythmic forms, those of 'figural' and 'metric. As Upitis noted, “it is indisputable that rhythm plays a fundamental role in the organisation, understanding, and enjoyment of music (1987:55). She states that there are two forms of rhythmic structure which are central to rhythmic development, those of figural and metric organisation. Figural organisation is the ability to naturally organise sounds into 'chunks' of meaningful groups or figures. These chunks are usually small clusters of notes (five notes or less) that are perceived as belonging together (Upitis, 1987). The listener graphically bases figural notation with symbols representing the musical chunks identified. Metric organisation, on the other hand, refers to the basic underlying beat of the music, the pulse a listener feels when hearing music that allows her to tap along. It also refers to the standard musical notation used where notes have set durations and have set symbols to represent this. Music that is transcribed using the metric mode is recognisable as standard musical notation or as graphic notation where the symbols used are consistent. Figure 2.2 (reproduced from Toward a Model for Rhythm Development by Upitis, 1987) shows the relationship between figural and metric modes.

Upitis (1987:55) argues that to explain rhythmic development in children, “one needs to take a close look at children’s responses in terms of figural-metric distinction.” She also argues that previous attempts to describe rhythmic development have fallen short due to lack of attention to “psychological processes across different response domains” and to the
“figural and metric structures in the context of a musically derived model”.

![Standard musical notation.](image)

**Music notation.**

**Figural Groups**

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**Metric Units**

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**Figural Drawings** (corresponding to groupings identified above)

- Figural notation:
  - ![Figural notation image]

**Metric Drawing**

- Metric notation:
  - ![Metric notation image]

**Figure 2.2 Figural and metric descriptions of a simple rhythm.**

Upitis found that the ability to make and read figural and metric forms was a direct function of age, whether or not children had engaged in musical training additional to that provided in a classroom music program. Musically
trained students, however, were found to be more fluent readers and were better at keeping time. Musically trained students were also more likely to integrate figural and metric forms, describe rhythms both figural and metrically and were more likely to change from figural drawing to metric. Children with extra training had better aural and motor scores up to the age of ten, but after this time almost all children had similar abilities. All ages tested were able to grasp the figural system of rhythm.

**TONALITY**

Tonality within a melodic framework is another concept area that has been explored by researchers. Hargreaves (1986) asserts that school age children are able to ‘conserve’ familiar, tonal melodies much more easily than unfamiliar atonal, statistical approximations to music. Five year olds can detect changes in key signature but not in intervals whereas eight year olds are able to detect changes in both key signatures and intervals. Tonality emerges around the age of six years and in Western music tunes are considered correct when they end with tonal cadences. Exposure to Western music is enough for someone to know, when they hear a melodic phrase played, how it should end (Koopman, 1995). Other researchers (Brehmer, 1925; Reimers, 1927 and Teplov, 1966 in Hargreaves, 1986) have also found that children as young as eight have a good grasp of the idea of tonality.

Evidence is based on a diatonic system of Western music. Radocy & Boyle (1997:132) assert that “for most listeners to Western music, melody is inseparable from harmony and rhythm” and that “we tend to remember melodies rather than rhythms or harmonies”. They further note that in
Western music, people are used to hearing musical tones within given “scale and tonal harmonic frameworks” (Radocy & Boyle, 1997:133). Experience with melodies in a given scale system, for example those heard in Western music, will enable the individual to develop tonal expectations (Radocy & Boyle, 1997). This assertion is supported by Lamont & Cross (1994:28) who note that “through exposure to Western music, a listener acquires a sensitivity to the hierarchy and uses it to understand and structure future input”. When individuals hear new melodies they will either recognise them as conforming to, or not fitting, their previous musical experience. This expectation has been referred to as a melodic schema which is “developed through immersion in one’s musical culture from early childhood” (Radocy & Boyle, 1997:137). Researchers who ask subjects to find differences between two melodies will find that this melodic schema will be reflected in results.

Research by Lamont & Cross (1994) concluded that children’s early internalization of the diatonic scale is significant in the way that children interpret music they encounter. They found that, in a melodic context, children seven years old demonstrated a sensitivity to the diatonic collection with children of eight and nine years showing more specific sensitivity to scalarity and children, by the age of eleven, clearly internalising these functions. Children under the age of seven were the only ones in the study who did not show a specific sensitivity to the diatonic scale, which directly relates to the notion of experience playing an important role in musical development. These findings show that children, with regards to the concept of melody and its related tonality, make clear developmental progress and that the Western diatonic scale plays a significant role in their musical understanding. Lamont & Cross (1994:53) conclude by noting that:
it appears ...that young children may begin with a fairly abstracted, time-independent, alphabetical representation of musical pitch relations and, in the course of development, become increasingly sensitive to the properties of the musical surface and the characteristics of tonal hierarchy.

Bentley (1966) tested memory for tunes by asking his subjects to decide whether two five-note tunes were same or different and if a difference was detected subjects then had to identify the changed note. He found that the mean score on the tests of tonal memory increased with age with the yearly mean increase being around eight percent. The most errors were found to occur when the first note in a sequence was changed and the least errors occurred when the last note was changed. Semitone differences in the pitch of the changed note were easier for children to identify than pitch differences of a whole tone. Bentley (1966: 114) concluded that “when attention was concentrated entirely on the tonal aspect of melody, chromatic changes of a semitone were more prominent than changes of a whole tone within the established diatonic framework of the key”.

Zenatti (1983 in Hargreaves, 1986) completed similar studies to those of Bentley in that children were played tunes and asked to find the changed note on the second listening. Five year old children were correct mainly by chance, six and seven year olds showed much better results in three-note sequences and the improvement continued until children reached the age of thirteen.

A study by Radvansky, Fleming and Simmons (1995) investigated the difference in musicians’ and non-musicians’ memory for melodies in an
attempt to find out which features in music each group perceives. They hypothesised that musicians would attend to the *structural features* of melody, such as the key (tonality) and harmonic progression, which are based on a fairly in-depth musical knowledge and understanding. Non-musicians, on the other hand, would be more likely to attend to *surface features*, such as timbre and pitch height.

Subjects in this study listened to a melody, then undertook a distracter activity, in this case counting backwards, for 30 seconds. After this time interval two melodies were played to the subjects – one which was exactly the same as the first one with a surface change such as timbre, and a similar melody which had the same key signature, time signature and tempo as the original melody. Both melodies were of equal length. The subjects had to indicate whether the first or second melody was the same as the original melody. Overall musicians performed better than non-musicians on the memory for melody tasks. It was found that musicians relied on *structural features* to find the matching melody while non-musicians relied on *surface features* for their responses (Radvansky *et al.*, 1995). This study showed that having a higher level of musical understanding assisted in matching and remembering melodies. As Hargreaves noted:

> The acquisition of tonality is thus comparable with language acquisition, in that the general capacity to master a language is a maturational one that is independent of exposure to training in the particular language acquired”.

(1986:92)

The acquisition of melody, therefore, can be described in the following way:

"Melody is a function of both a listener’s previous experience and certain
sequential characteristics...” (Radocy & Boyle, 1997:139). Musical development further allows an individual to recognise that melodies “must incorporate some unifying structural attributes that will enable listeners to perceive and remember them” (Radocy & Boyle, 1997:139). These structural attributes include tonality, that is, a melody fitting within a known scale system, in order for an individual to recognise it as a melody. Past research has found that children begin to develop this awareness of tonality in the early primary school years, especially as their exposure to their dominant musical culture increases. Familiarity with an individual’s cultural musical idioms provides a basis for developing structural attributes which will in turn lead to a melodic schema being created. When children listen to melodies they bring their melodic schema with them and use it to identify, as correct, music that follows the tonality of a known scale system or that ends with a cadence. As Radocy & Boyle (1997:139) noted that ultimately, only the listener can “judge whether a tonal sequence functions as a melody: If it does, it is a melody”.

HARMONY

The acquisition of the concept of harmony is one of the least researched areas of development. Radocy & Boyle (1997:143) report that a recent study of articles about harmony found that there was a “virtual void of information on harmonic perception”. This is probably because of the different ways in which harmonic awareness can be defined. The age at which an ability to hear harmony in music is disputed by researchers with some believing that harmonic awareness does not occur until the age of eight or more (Bentley, 1966; Zenatti, 1971 & Hustfader, 1975 in Hargreaves, 1986). Other researchers believe that junior primary children
are able to "distinguish harmonic changes in songs with a simple harmonic structure" (Bridges, 1965 & Hair, 1973 in Morrisroe, 1982: 25). Moore (1994) found that when singing in harmony, children had most difficulty matching the middle pitch of triads and found music moving in parallel thirds confusing. Children also found it hard to hear tones of a major and minor second (Moore, 1994). However, it can be argued that the extent to which children hear harmony in music depends upon the type of test used.

According to Radocy & Boyle, (1997:139) "the development of harmony is a particular achievement of Western music" and therefore the ability to recognise harmonic structure in music can said to be culturally conditioned. Harmony refers to the vertical pitch of music and the ways in which this vertical pitch is organised. The main type of harmony used in Western music is tertian harmony which is based on triads, especially the tonic, subdominant and dominant. Music in late baroque and classical periods used these as a basis for composition, with chromatic alterations and distant modulations of triads appearing in the late baroque and classical periods (Radocy & Boyle, 1997). Twentieth century music show a predilection for post-tertian harmony that deliberately violates the triadic harmony system (Radocy & Boyle, 1997).

Bentley (1966) found that on his chordal memory test, the mean scores increased with each age group. For this test, each chord had either two, three or four notes in it and the children were asked to identify how many notes they could hear when each chord was played to them. Bentley found that the ability to analyse chords developed more slowly than any of the other areas he tested (rhythm, pitch and melody). In Bentley’s test the
mean score did not exceed the theoretical guessing score of 6.7 until children reached the age of eleven and he concluded that children may not be developmentally ready for chord analysis before this age.

2.5 SUMMARY

The following quote by Morrisroe (1982) is a good summary of what the above research has shown. Although it was written before some of the studies referred to in this section, the overall findings from these studies align with what she has written.

The critical period for commencing music education lies between the ages of four and nine years.

Children by the age of six have more highly developed concepts of volume and timbre than that of rhythm and melody.

Concepts of rhythm and melody develop more rapidly between the ages of six and eight years than at any other stage, with concepts of harmony being more easily acquired after the age of nine.

Auditory perception of short musical passages (patterns) precedes that of large musical units.

The ability to conserve musical characteristics develops in relation to the development of memory and concentration.

Young children’s auditory perception is attracted to isolated sounds or dominating musical features.

The ability to perceive the formal structure of, and tonal relations within, music develops much later than other abilities, usually during the late primary and early post-primary years. (Morrisroe, 1982: 27)
Researchers do not dispute that development occurs, rather it is that different studies show different findings based on methodologies used and subjects used. Theories of musical development provide a useful starting point when looking at the development of aesthetics in children but current developmental theories do not explore musical concepts in detail. The learning of concepts is an important part of the musical experience and further enriches an individual’s musical understanding.

The next section of this study discusses the necessity of concepts in the music curriculum and how an understanding of the development of these can lead to a more fulfilling musical education for school students.
CHAPTER THREE

MUSIC DEVELOPMENT AND CURRICULUM.

We cannot predict what may influence the child as he grows – how he may develop – what the world will be like when he reaches adulthood.... The special challenge for music teachers is to provide opportunities for the child to develop all kinds of ways of dealing with himself and his world without sacrificing the quality of music education” (Aronoff, 1988:18).

3.1 INTRODUCTION

According to Koopman, (1995:64), “theories of musical development can be of great benefit to music education because they open up opportunities for systematic curriculum construction”. Indeed most music educators would probably agree with the above statement. Understanding how a child develops musically is an integral part of the music teaching process. Choosing musical activities that are suitable for a child’s development is of the utmost importance, as is choosing developmentally appropriate literacy and numeracy tasks. It has been established, through the discussion on developmental research, that children move through stages in a fairly logical sequence. Not all researchers agree about what these stages are but none disputes the fact that they exist. A teacher’s personal thoughts about the merits of one theory over another will influence her teaching and guide the types of activities that are taught. So how does this knowledge benefit curriculum designers and how does this knowledge influence this study? The remainder of this chapter will attempt to answer these questions through a review of literature based on the provision of music curricula for children.
The chapter will therefore include a discussion about why music should be taught as well as what should be in a music curriculum. The ways in which teacher expectations and training affect a child’s musical development will also be considered. A review of a paper by Swanwick (1991), which discusses the merits of an aesthetic-based curriculum compared with a concept-based curriculum, will be attempted. Finally a short history of Victorian music education will be provided.

3.2 MUSIC EDUCATION AND CURRICULUM

Music in the curriculum should be a balance of activities in which both concepts and aesthetics are taught. One should not exclude the other. It can be argued that the drawback of current forms of music curriculum in both Australia and the United Kingdom is that concepts are not always perceived to be as important as the aesthetic experience. Review of the current Victorian Curriculum and Standards Framework (CSF) is being undertaken in conjunction with the Board of Studies and decisions regarding the effectiveness of this curriculum in the Arts, specifically music, are yet to be formulated.

The National Curriculum in the United Kingdom, however, has come under scrutiny by teachers and researchers and recommendations as to ways of improving the music curriculum are currently being discussed. Major (1996) advocates a change to the way concepts are taught through the National Curriculum. She believes that the current basis on which music programs are built, “that of selecting material to fit the purposes of learning a musical concept or device, is flawed” (Major, 1996:183). It is proposed that the curriculum design be refocused towards skill learning and affective,
imaginative responses. This is a broader program design that treats concepts and aesthetics equally—both must be experienced in a holistic fashion to be learnt. Central to this learning is also teachers’ knowledge of the conceptual level of understanding of their students and the “kind of adult conceptualisation that is aimed for” (Major, 1996: 184). When teachers are aware of the conceptual level of understanding that their students can achieve, then they are able to plan units of work to cater for each student’s needs. This researcher is advocating a greater need in our current curriculum framework for an understanding of the levels of achievement possible in the area of musical concepts.

Another researcher who advocates the need to make sure that the learning of concepts is an integral part of the music making process is Olin Parker. Parker’s research comes from the belief that “society is best understood through its arts, of which music plays a prominent role in every society” (1990:23) and that teaching music in the curriculum is a way of instilling inherent cultural values in children. This value system which can be found through a society’s music is based on finding aesthetic sensitivity in music. This aesthetic sensitivity however, needs to be based on intelligence and musical ability, so that knowledge can be synthesised and used effectively. The aesthetic sensitivity Parker speaks about directly relates to listening to and finding cultural ideals and values through music. To enrich the listening experience, that is, understanding how to find the elements that are important to a particular piece of music, children need the concept knowledge that has been written about throughout this study. This also allies with the creative experience of aesthetics, that is the creation of music—improvising, composing and performing. For children to reflect values and
beliefs in music they need these tools. In order to portray the complexities of their feelings they need a curriculum that guides them and teaches them ways of expressing themselves. It is this researcher’s belief that concepts must be formally taught to children. Children can then use this knowledge to extend their musical experience.

The conceptual knowledge children acquire directly relates to aesthetic sensitivity. Parker (1990) notes that the psychological determinants of intelligence and musical ability are directly influenced by and related to the aesthetic sensitivity that is part of the psychological determinant of musical perception. Parker has stated that “Cognitive learning is a necessary and legitimate part of the aesthetic development process” (1990:26). Aesthetic sensitivity is influenced by how well children’s concept knowledge permits them to solve musical problems. The use of such basic tools as pitch, duration and intensity are intrinsic to this experience (Parker, 1990).

To this end, children must be prepared for aesthetic understanding in music by engaging in musical experiences which use concept learning and which also follow a developmental pathway. When teaching concepts and aesthetics to children, learning sequences must be used effectively in order to maximise a child’s ability to gain knowledge and understanding about music. Parker (1990) suggests following Gagne’s phases of learning – apprehending phase, acquisition phase, storage phase and retrieval phase. These phases of learning can be directly related to the definition of musical understanding discussed in Chapter Two.

Parker (1990:27) also asserts that “only after students have received
concentrated training in aurally perceiving and conceptualising music can they respond significantly to and synthesise the elements of music”. Gordon (in Parker, 1990:27) also emphasises that

without appropriate preparation it is frivolous to expect a very young child to conceptualise with aesthetic sophistication, the major works of Bach, Beethoven, Mozart and Bartok, or the improvisations of progressive jazz artists.

Parker and Major both acknowledge the fact that concepts are an integral part of the music experience and are the precursors to aesthetics in music. Children need to understand concepts to make judgements about music which go purely beyond the feeling they have about the music. The recognition of patterns, styles and forms are inherent to truly understanding music in a deeper sense.

In opposition to these ideas Swanwick (1991:153) argues that working from concepts signals “that music is merely an illustration of something else and not a significant experience of its own accord”. Swanwick (1991) also states (from the work of Croce) that aesthetic knowledge is more fundamental than conceptual or intellectual knowledge and that aesthetic knowledge can stand alone but conceptual knowledge depends upon a basis of intuitive knowledge. It may be argued that this line of thought may render the aesthetic experience superficial in nature and that to make the aesthetic experience more than this, a greater theoretical understanding is required. If this thought is carried through to another art form such as the visual arts it is similar to arguing that anyone can be an artist by creating a work of art
in some form of media. Although this is true, in that an artwork has been created and the person who created it has been able to express some of her own values and feelings through the art work, learning new techniques to manipulate a particular media and experimenting with this conceptual knowledge can enrich the artistic experience. It is the same with music. A child can create a piece of music that matches a thought or mood. It is this researcher’s experience as a music teacher that has led to the conclusion that children, can at times, become frustrated when confronted with a musical problem that requires a greater understanding of concepts than the child currently has. An example of this is when a child wishes to notate their work for another performer. Whether using graphic or conventional notation, the child wants to write an accurate reflection of her work so that it sounds ‘right’. This can lead to the child asking her teacher for suggestions, such as using sections or bars and using symbols to represent notes, in order to assist the writing process. It is this researcher’s experience that children will ask for more information or tools in order to enrich their musical efforts. This is when conceptual knowledge becomes an intrinsic part of aesthetic knowledge. The curriculum must reflect this and both areas must be treated with equal importance.

3.3 MUSIC TEACHERS AND CURRICULUM

Music curriculum in schools must be sufficiently detailed so that those who teach it understand the requirements at each level. As mentioned earlier in this chapter the Victorian CSF provides learning outcomes in music but
allows the teacher to set the degree at which children achieve these outcomes. Demonstrating the knowledge of musical concepts is important, but how can a teacher know without specific guidelines just how far a child’s knowledge will stretch? The following quote from Lawson, Plummeridge and Swanwick (1994: 6) outlines those qualities curriculum designers in the United Kingdom would like a teacher of music to have acquired:

Teachers’ attitudes towards pupils, and to their musical interests and abilities, will do much to determine the quality of their musical response. The teacher should fulfil a number of roles to promote pupils’ learning in music: encourager, adviser, instructor, facilitator, mediator, assessor and partner. This is a demanding task, calling for skill and judgement, together with an understanding both of children’s development and of the nature of music.

Researchers in the United Kingdom have discussed the same problem to be found in Australian primary school music, that “there may be insufficient teachers in primary schools with the necessary confidence and expertise to fully implement the music program” (Lawson et al, 1994:3). In order to teach the music curriculum effectively teachers “need a sound basis of both musical experience and teaching expertise in order to function adequately as musical models, sensitive critics and course developers” (Lawson et al, 1994:8). Teachers who provide music programs in schools need particular expertise in music in order to provide musical experiences that will inform and challenge. However, teachers must not only provide musical experiences that will inform and challenge but must also foster a love of and an enjoyment of music in children. Music teachers must have the skills to
enable this. This researcher has often heard the phrase “but I only need to keep one step ahead of the grade” when asking primary school music teachers how they plan a comprehensive music program. This ‘one step ahead’ notion of curriculum does not allow teachers to cater for individual differences and puts pressure on them to learn quickly, but perhaps not thoroughly, the material they intend using in their music class.

The inquiry conducted by Lawson et al (1994) considered how music teachers taught different aspects of the music curriculum with specialist training compared with those teachers without specialist musical training. The researchers analysed the range and types of activities taught in primary schools in the United Kingdom by both specialist and non-specialist music teachers. Discussions, which took place in the selected schools before beginning the analysis of activities, noted that schools believed that in order to teach a program with ‘quality’ and ‘depth’ teachers should have specialist training. The analysis of activities undertaken found that “the content of the music teaching and the quality of the musical achievements of the children varied considerably within and between schools” (Lawson et al, 1994:11).

Both specialist and non-specialist teachers provided activities that focused on singing and playing instruments at each of the levels studied. Teachers who were non-specialists, however, were more reluctant to provide activities where the children had to either write or read notation. These teachers also found the history component difficult and activities, which involved listening to music and discussing its features, were often neglected.
3.4 TYPES OF MUSIC EDUCATION IN SCHOOLS

Some discussion has already occurred regarding the types of curriculum that can be found in schools and that at present the teaching of music concepts is not as emphasised in the curriculum as this researcher believes it should be. The following section will outline the different ways curricula can be planned, from the point of view of teaching from a concept-based curriculum as well as an aesthetically based curriculum. An example of a concept-based curriculum is one that uses the concepts of music as its starting point for music teaching. Music and music activities are chosen to fit a given concept and the concept is used as a starting point for creating music. An aesthetically based curriculum uses the music as a starting point for study and the features that are studied are found within this. Concepts are not taught in isolation, they are experiences through composition and listening. Swanwick (1991) discusses both types of curriculum and concludes that one that is aesthetically based is the preferred option. Parker (1990) on the other hand believes that while aesthetics are an integral part of the music curriculum it takes a strong concept-based curriculum to achieve a depth of aesthetic understanding. It is this researcher’s belief that both areas are important and there are times when both approaches are valid and necessary.

The article by Swanwick (1991) discusses the reasons for choosing different curriculum theories in music education. Swanwick (1991) believes that guidelines should be in place to assist schools with their choice of curriculum content in music. He asserts that due to the cultural significance of music, care should be taken when selecting content and that music is inherently aesthetic in nature. Using a conceptual map originally developed by
Bernstein (in Swanwick, 1991), Swanwick refers to the concepts of classification and framing in order to explain different types of curriculum content. Classification, a term that he uses, refers to the "exercise of selection over curriculum content" (Swanwick, 1991:148). Curriculum that has a strong classification is a fairly bounded one with prescriptive programs. On the other hand, curriculum, which has wide curriculum boundaries can be said to have a weak classification. The other concept that Swanwick refers to is framing a concept, which is described in the following quotation:

Framing, ... has essentially to do with pedagogy or teaching style; with the degree of control that a teacher or student possesses over the structuring, organisation, and pacing of what is to be learned (Swanwick, 1991:148).

Strong framing is a teacher-directed style of instruction, whereas weak framing leaves more scope for decision making by the student (Swanwick, 1991). Both strong and weak framing are essential components for a successful curriculum where children can learn through both experiencing teacher-directed, and student-directed activities.

Using classification and framing it is possible to decide the type of music curriculum that is used by different countries. In his paper Swanwick compares curriculum in the United Kingdom and the United States of America. The United Kingdom has a composition-driven curriculum, which has weaker classification and weaker framing. This manifests itself in a curriculum that allows the student to learn music through composition and experimentation and exposes them to wide ranging musical idioms. The United States has a more performance-driven curriculum where band and
choir programs are an integral part of the curriculum. They are teacher-directed activities and music is often chosen from repertoire lists (Swanwick, 1991). Swanwick categorizes this curriculum as having strong classification and strong framing.

In Victoria, schools are responsible for using curriculum guidelines developed by educational authorities and how they develop programs for their students is a matter left to each school. Thus music education in primary schools differs in its classification and framing from school to school. Teachers have sole control over the content of their music curriculum as well as the way in which it is taught. As a result, a comprehensive music curriculum will gravitate between weak and strong classification and weak and strong framing depending on the chosen learning outcome.

Swanwick (1991) believes that the most important plight facing music educators is not whether musical knowledge is classified and framed, but how it is classified and framed. He identified two types of music education – the cognitive-based/concept-based curriculum and the aesthetically based curriculum. In the discussion which takes place, concepts are regarded as important but not the sum of musical experience. Concepts, it is stated, only pick up fragments of the total musical experience and detract from the overall music making experience. Swanwick sees personal knowing as more important than gaining the skills and information provided by the learning of concepts and that aesthetic knowledge is important in order to gain the personal expression of music.
Swanwick then goes on to discuss what he sees as two prerequisites for curriculum making. Firstly it is suggested that music educators "find an alternative concept to 'concepts'" and secondly "analyse the essential characteristics of musical knowing" (Swanwick, 1991:153). Further to this, Swanwick discusses the need to find features in music rather than using concepts to explain musical works. His definition of a feature is a characteristic in the music that is unique to that particular piece. He also sees features as items that can be built up over a series of time and can have a degree of developmental progression. He believes that musical features are more valuable than concepts as they demonstrate the illustration of a concept. Using the spiral of development discussed in the previous chapter, Swanwick (1991:154) explains the four elements of musical experience as "response to the properties of sound; perception of expressive characterisation; awareness of structural speculation; and, experience of symbolic meaning as personal value".

As mentioned earlier, Parker believes that aesthetics in music education must be taught alongside conceptual understanding, that is the understanding of concepts is integral to an aesthetic experience. Further to this, Parker advocates the types of program content and program of studies required in order to present a successful music curriculum. A music education program should be one which:

provides for breadth and depth of study... is based on all appropriate objectives... provides for differences of students... reflects the needs and interests of students and, relates to the environmental society (Parker, 1990:28)
The curriculum program should also be designed to include:

- great variability to quantity and quality of musical offerings...
- continuity through grade and age levels...
- contemporary musical content...
- suitable multi-ethnic content...
- attention to music as a field of knowledge and activity and many opportunities for performances of music (Parker, 1990:26)

Although Swanwick (1991) feels that one cannot devise a curriculum which guarantees encounters based on all the above, this researcher disagrees. She believes that a good curriculum must take into account all that has been discussed above and that music teachers must try to develop musical experiences that encompass these. Concepts must be included in the curriculum just as aesthetic experiences must. This researcher feels that the idea of features is too narrow and that features, whilst important to the specifics of particular works, are only a small part of the overall cognitive process in music.

The educational theory discussed in Swanwick (1991) is a good analysis of what makes an effective music curriculum. Unlike Swanwick, however, this researcher believes that understanding concepts is very necessary in helping a student to explore music and whilst it is agreed that concepts should be learnt within a framework of musical expression, there are also times when concepts need to be taught in isolation. Features of music, which can be explored and developed through composition and performance, are not enough to adequately incorporate all the nuances children will uncover in music. This researcher’s experience as a music teacher has led to the belief that children also like to have a knowledge base to assist them when exploring and creating music.
This researcher argues that we need more than a 'process' approach to music, where children spend the majority of their time listening to and creating music and only learn about features that are particular to the works being heard and performed. This researcher also contends that it is important to find a middle ground between the two curriculum styles mentioned earlier. This is especially important in the Victorian primary system where teachers who teach music need specific direction as many of them are not specialists and need a specific course outline to follow. Non-specialists may be uncomfortable with the mainly compositional style advocated by Swanwick, especially if they feel that they are unqualified to judge the musical product, let alone find features in work which can be described and then extended into further learning. Although this researcher maintains that qualified, specialist music teachers are important, the current educational climate will probably not allow for this.

3.5 A HISTORY OF VICTORIAN MUSIC EDUCATION

(1981-1998)

There have been many changes to Victorian music education over the past 17 years. In 1981 A Guide to Music in the Primary School was published and used as the curriculum guide for music teaching in schools. Seven years later, in 1988, new curriculum guidelines for music were published and The Arts Framework: Music Statement became the latest document from which to work. In 1995 the current music curriculum document, Curriculum and Standards Framework: The Arts was published. Each of these documents has different theoretical underpinnings and each treats provision for music in
primary schools in different ways. A brief outline of each document’s recommendations for curriculum design in music follows as well as a discussion of how each fits into the curriculum types as presented by Swanwick in the previous section.

A GUIDE TO MUSIC IN THE PRIMARY SCHOOL – 1981

A Guide to Music in the Primary School was published in 1981 to help provide a comprehensive curriculum in music for primary schools. It was intended to assist in the establishment of "a sequential development of musical skills and understandings" (A Guide to Music in the Primary School, 1981:5). It then states that “this Guide provides teachers with a basis for their own music programs without prescribing any particular methodology or approach” (A Guide to Music in the Primary School, 1981:5). The scope and sequence of the Guide is divided into two areas: musical experience, which includes listening, singing, playing, moving and creating, and musical knowledge, which includes rhythm, melody, tone colour, style, harmony and form. The Guide contains seven stages that are based on the developmental sequence of the acquisition of music concepts. For each stage expected outcomes are listed, as are suggested activities to help guide the teacher. These stages did not necessarily match primary school grade levels, rather, children should be started on the stage that corresponded to their skill level. It was intended however, that if children began at the preliminary stage in prep, by the time they were in grade six they should have reached stage six.
A Guide to Music in the Primary School was intended to be used as a framework for devising music programs and units should be planned so that activities included both musical experience and knowledge. Teaching strategies would include allowing children to explore musical experiences whilst incorporating musical knowledge and include many opportunities for consolidation and revision. These last two ideas fit directly into the important developmental dimensions of musical understanding and memory, both of which were discussed in Chapter Two. The Guide further states that a “music education program should stimulate the children to enjoy music; develop an understanding of music; acquire knowledge and skills” and “realise and express their feelings” (A Guide to Music in the Primary School, 1981:25).

The Guide provided music educators with a detailed curriculum that clearly outlined expected achievement levels for concepts. It demonstrated a curriculum document that was both strongly classified and framed. One drawback to this method was the large number of outcomes set for each stage. In order to complete each stage, the Guide to Music in the Primary School was more suited to a specialist music program than a classroom program. Stage six was also quite complex for non-specialists to teach. It included complex rhythmic figures and time signatures, major and minor tonality and major, minor and dominant seventh chords, concepts which needed an understanding by the teacher in order to assist their students. Whilst the program encouraged teachers to use activities which incorporated
singing, listening, moving, playing and creating, not all of these areas could be covered easily, especially for the non-specialist. The Guide relied on the fact that a teacher would be able to identify concepts being used by the children so that clarification and teaching could take place. This would not always be the case in a primary school, which is where the Guide becomes a little too prescriptive. Swanwick (1991) would consider this curriculum document to be cognitive/conceptual driven and therefore not an effective way to teach music. It was a curriculum document that was quite strongly classified and framed. It is important to remember, however, that this document was being used in schools during a time when research into music concepts and their development in children was at its peak. It is true that *A Guide to Music in the Primary School* was not as detailed in the aesthetic experience, but this was also due to the lack of research in this area at that time.

**THE ARTS FRAMEWORK: P-10 – 1988**

*The Arts Framework* (1988) was the successor to *A Guide to Music in the Primary School*. It was introduced to provide “greater consistency to ...teaching programs, ...school policies, programs and organisational arrangements” (1988:3). This curriculum document is centred in the belief that the arts are unique for aesthetic awareness. Aesthetic awareness can be defined as the “heightened quality of awareness that one experiences of the world – its sound, sights, movements, experiences and processes” (*The Arts Framework*, 1988:12). The fundamental assumption is that “arts
provide a range of unique experience for all students and are essential for their total development” (The Arts Framework, 1988:12). The main philosophy behind the document is based on the theories of Elliot Eisner whose work is based on the aesthetics of education in the arts. The Arts Framework was the first document produced in Victoria that viewed the arts as a whole, with each arts discipline having similar characteristics in providing unique experiences for children. The arts that comprise The Arts Framework are art/craft, dance, drama, graphic communication, media and music.

The Arts Framework is based on the premise that an arts curriculum should be based on student-centred learning that is experiential, creative and encourages risk-taking. Experiences in the arts should progressively develop and extend artistic knowledge and skills. The Arts Framework states that learning processes in the arts should be about perceiving, transforming, expressing and appreciating. An example of the way that these processes can be used for music is described in the following quote (1988:14):

When listening to a recording of a musical work, a student is hearing and absorbing the sounds (perceiving); interpreting the sounds (transforming); and reflecting, criticising and valuing the sounds and the work as a whole (appreciating). This may lead to increased musical knowledge and understanding, for example, in areas relating to the expressive abilities of an instrument, instrumental playing techniques, or the compositional style and techniques of a particular composer or historic period. The student may, at a later stage, utilise the expressive ideas achieved through this listening (expressing).
The teaching role to be undertaken when using this document is to plan programs, develop artistic skills, broaden the experience and range of arts experience and knowledge of the students and maintain a high profile of the arts in the school and wider community. Teachers must also take pride in their own abilities and should increase and improve their own knowledge and skills within their selected art form.

*The Arts Framework* states that the starting point for the teaching of units should come from a variety of sources. These sources include “skill, technique or process development; exploration of media; themes, topics or subject matter; events; anticipated outcomes; and environmental or imaginative stimulus” (1988:22).

The music section of *The Arts Framework* follows on from the introductory section and emphasises that a music curriculum should benefit and prepare all students for a life-long involvement in music. This document stresses that the curriculum must include activities that are based on composing, performing and listening. It is noted that the goals of a music program should develop:

- insights into how music functions, and the ability to apply these to new musical experiences;
- concepts of the elements of music (melody, rhythm, expression, tone colour, harmony and form);
- understandings of musical style as it relates to culture, period and composer;
• music skills which arise out of, and increase the quality of, musical experiences (*The Arts Framework*, 1988:207)

*The Arts Framework* also discusses the need for a varied and balanced program, which caters for individual differences and develops knowledge and skills in music. The section of the document that describes the ways in which activities can be planned to encompass composing, performing and listening could be more detailed and developmental considerations need to be addressed.

*The Arts Framework* leaves the designing of curriculum to individual schools and therefore allows a school to set its own levels of achievement. This researcher believes that the goals listed are thorough and can lead to developing both musical understandings and aesthetics in children. It has weak classification and weak framing, according to Swanwick’s definition of types of curriculum. The document acknowledges that teacher expertise will affect the way that a program is designed and taught and firmly states that some exposure to music is better than none at all. This researcher agrees that in many cases any musical experience is better than none at all, however, teachers must be mindful of providing experiences that the children enjoy and which provide some challenge. Unfortunately children can be ‘turned off’ music through teachers who are given no choice but to teach ‘music’ by their school and who have neither the skills nor confidence to provide an enjoyable program. Therefore, it is this researcher’s contention, after having used this document in schools, that it did not provide the
support necessary for non-specialists in schools and did not assist in helping specialist and non-specialist music teachers to plan programs to help all children reach their potential.

**THE CURRICULUM AND STANDARDS FRAMEWORK (1995)**

The *Curriculum and Standards Framework* (CSF)(1995) is the curriculum document currently being used in Victorian schools. It is based on the national *Statement and Profile for the Arts in Australian Schools* and provides a set of standards for student to achieve at different stages in their schooling. Like *The Arts Framework*, the CSF - Arts is intended to be used as a framework for curriculum planning. "It provides the means for schools to place their work within a structured Statewide context, and provides a common basis for reporting student achievement" (CSF, 1995:1). Standards are set for each level and are referred to as learning outcomes.

Within each curriculum area (called Key Learning Areas or KLAs) there are a number of strands particular to each KLA. The Arts CSF contains the following strands: dance, drama, graphic communication, media, music and visual arts. With the exception of graphic communication (which begins at secondary school), each of the other strands covers the preparatory years through to Year Ten. The years of schooling are divided into seven levels:

- Level One - end of Preparatory Year
- Level Two - end of Grade Two
- Level Three - end of Grade Four
Level Four - end of Grade Six
Level Five - end of Year Eight
Level Six - end of Year Ten and,
Level Seven - enrichment for those exceeding level Six.

Each strand contains curriculum foci, which describe intended content, and
learning outcomes, which describe the standard to be attained and activity
eamples. The CSF states that the learning outcomes relate to typical
current levels of performance and schools are responsible for planning their
curriculum to assist children achieve these standards.

There are four main goals specific to the arts:

- To develop the intellectual and expressive potential of students through
  aural, spatial, kinaesthetic, interpersonal and visual experiences.

- To equip students to use and understand the arts forms as symbolic
  languages by:
  - developing skills, techniques and processes that form the structure for
    exploration and development of ideas as a basis for their personal
    expression.
  - developing abilities to perform or present arts works.
  - exploring how different social and cultural groups engage in, and
    convey meaning through, the arts.

- To develop skills in arts criticism and aesthetics through describing,
  analysing, interpreting and evaluating their own and others’ arts works.

- To develop students’ understanding that the arts evolve within particular
  social and cultural contexts by:
  - developing understanding of how the arts reflect, construct, reinforce
    and challenge values in different cultures.
  - studying the arts from both historical and contemporary perspectives.
    (CSF, 1991:)

These goals are similar to those listed in *The Arts Framework* and reflect the
swing of the arts pendulum from concept-based to aesthetically-based
curriculum guidelines. The five learning outcomes in the music strand all refer to concept use, within the context of creating and performing. Teachers are able to interpret the learning outcomes to suit their school and pupils, as specific levels of achievement for music concepts are not mentioned in the document.

Using Swanwick’s (1991) curriculum framework discussed earlier in this chapter the CSF can be seen as a document that has both weak classification and framing. The curriculum content has wide boundaries because the learning outcomes are open to individual interpretation by schools and teachers, with different schools having different levels of attainment. The advocated style within which teachers must try to work is one of allowing the children to explore music with minimal guidance from them, almost the ‘process approach’ to music mentioned earlier. Music teachers who are able to provide suitable musical experiences, which are well structured and developmentally appropriate, may find this type of curriculum document useful. For those teachers who do not have the musical background to use a document that is weakly framed and classified, then planning and executing suitable activities can be difficult.

3.6 SUMMARY
Finding a music curriculum that covers all areas and suits all teachers is a difficult task. It is important for music curriculum writers to produce a useful and worthwhile document that assists teachers to plan programs that will
allow each child to reach their potential. Finding a curriculum that balances weak and strong classification and framing is something for which curriculum designers should be striving. It should take into account acknowledged levels of conceptual development for all students whilst providing aesthetic enrichment. The following chapters will attempt to show developmental progress which can be made in the areas of pitch, rhythm, melody and harmony as well as providing indicators for each age group. Factors which may influence this development will also be discussed.
CHAPTER FOUR.

METHODOLOGY.

4.1 INTRODUCTION

Quantitative research in music education is becoming less prominent today as more effective qualitative methodologies are developed. Qualitative methodologies are becoming much more accepted as legitimate ways to conduct research, especially now that aesthetics in the Arts are being studied more fully. This study, however, as stated earlier, is concerned with the development of music concepts in primary school aged children in Victoria. This aim is linked to the measurement (that is the pinpointing of when developmental changes occur) of these concepts, so a broad range of quantitative methodologies was considered. Nevertheless, qualitative methodologies were also investigated although they were less suitable for this study. Variables needed to be controlled to the extent that results excluded anything that was not concept-based. This study focuses purely on the acquisition of concepts and is not concerned with studying emotional or aesthetic responses to music.

In order that an appropriate methodology could be chosen, the following research questions needed to be answered:

1. To what extent can music skills and concepts be measured in the primary school child?

2. Can these results be interpreted so as to align with established developmental stages?
3. Can these developmental stages lead to a better understanding of what is required in a primary school music curriculum?

Persson & Robson (1995:42) assert that "research questions should feasibly pose as an arbiter as to what methodology or what combination of methodologies need to be employed". The key word in the above research questions is 'measured'. This study is aiming to measure children's abilities in understanding music concepts and using these measurements to enlarge upon developmental stages. To this researcher the word 'measure' leads naturally towards some form of quantitative methodologies, but before a final decision could be made both qualitative and quantitative methodologies needed to be considered.

4.2 TYPES OF MUSIC RESEARCH METHODOLOGIES

In order to choose an appropriate methodology for this study, both traditional and ethnographic methodologies were researched. Contained under the heading of traditional methodologies are conceptual clarification, historical scholarship, experimental designs and survey techniques. Ethnographic methodologies include product evaluation, systematic observation, case studies and participant observation. Swanwick (1996: 258) asserts that "many researchers have turned to ethnographic methodologies" in order to try and "capture the complex richness of the educational transaction". Ethnographic methodologies allow for more natural interaction between the researcher and subject, a fieldwork situation where subjects are observed in everyday situations.
Current research in music cognition has focussed on more qualitative methods. Researchers such as Swanwick (1996) and Eisner (1985) extol the virtues of qualitative research and evaluation as beneficial to the study of music and cognition. Others such as Persson and Robson (1995) state that both qualitative and quantitative methodologies are equally valid and that these often work well together. All good research helps to add to the body of knowledge and understandings, whether it be in a "limited context where two isolated variables interact, or a more global context where variables are not so easily defined or controlled" (Persson & Robson, 1995: 41).

Quantitative methodologies measure specific outcomes and allow us to translate these results to broader populations. Often quantitative testing and analysis allows the researcher to work with larger numbers of subjects over shorter periods of time. Whilst it can be argued that qualitative research can achieve similar results with regards to transference to populations (Swanwick & Tillman 1986) these studies take on a longitudinal aspect and may not be suitable for the time frames that researchers must meet. This study required a methodology which would allow the researcher to measure music concepts in primary school children, while providing results which could be analysed to show developmental progress. The objective of this study is also aiming to produce a profile of developmental stages for the State of Victoria based on musical concepts and discussing how this knowledge can be used to assist music educators when planning a comprehensive music curriculum. Therefore, in order to fully address these issues while focussing specifically on the concepts identified, a quantitative methodology became a more suitable choice.
For this study a cross-sectional research design was chosen. This type of design is different from a longitudinal one where one group of subjects is followed over a long period of time, sometimes for years or decades. Cross-sectional research allows the researcher to apply the same procedure to subjects crossing different age groups at the same time. When using cross-sectional research, however, the researcher must be careful to take into account all factors that may affect the results, such as teacher expertise and educational differences. Part of the discussion for this study will reflect on these differences and the effect they may have had on the results described.

The next step was to decide specifically which type of methodology to choose. As Swanwick (1996) states there are four main types of methodologies which may be considered. These are conceptual clarification, historical scholarship, experimental designs and survey techniques. Conceptual clarification is a "reasoned and structured argument based on the process of deduction" (Swanwick, 1996:257). Conceptual clarification is required for all good research but can be used as a stand-alone methodology. Its drawback is that it is difficult to do well and can lead to a piece of research which is not reliable. Historical scholarship uses documentation from the past to form research questions for the present or future. This can be a valuable tool when comparing past and present situations and is best suited to comparative studies. Experimental designs come from the scientific community and allow a researcher to structure specific research questions and tasks to exclude outside variables. Experimental designs are used when an item to be tested can be isolated and other variables affecting this item can be manipulated. To make experimental designs effective, however, the researcher must begin by
asking the right questions. Survey techniques use questioning to uncover certain types of information and also allow researchers to examine a large representative population (Swanwick, 1996). Questionnaires used must be very carefully designed so that they truly reflect what the researcher is trying to find out. Badly designed surveys may lead a researcher to make assumptions that are not actually in evidence, thus, while surveys are a valid form of quantitative methodology they must be used correctly.

After examining these four methodologies, an experimental design seemed most appropriate, specifically focusing on a test which encompasses music concepts. An experimental design allowed an ability to control variables. The variables that needed to be controlled in this study were the concepts. The concepts were the focus of this study and what needed to be tested. An experimental methodology allows us to provide a testing situation where all other musical variables such as tempo, dynamics and other aesthetic components can be excluded. An experimental design where children are objectively tested on their ability to aurally determine their understandings in the areas of pitch, rhythm, harmony and melody is most suitable for this study.

In conclusion, after evaluating the merits of quantitative and qualitative methodologies coupled with the research questions put forward by this study it was decided to use an experimental design. The next question to consider was, what is an appropriate test?
4.3 CHOOSING AN APPROPRIATE TEST

The aim of this study is to investigate whether the acquisition of concepts, particularly rhythm, pitch, harmony and tonality (melody), are developmental in nature. Because of this aim, a test was chosen which focussed specifically on musical concepts. An experimental design was chosen because it allowed the researcher to ensure that the musical concepts selected were tested - variables could be controlled. To this end, the subjects involved were tested in their grades using the internationally recognised music test *Measures of Musical Ability*, developed by Arnold Bentley in 1966 (Appendix A). Boyle and Radocy noted that "Bentley claims that the tests measure basic judgments which are part of music making" (1987:148) and it is this concentration on the basics concepts required for music making which makes this test suitable. Other factors, which recommend this test as suitable for this study, are that

1. this test has been developed with the young child in mind.
2. it is short - no more than 20 test items are ever presented in one sitting
3. the instructions are clear and unambiguous.
4. it is suitable for group testing situations.

The specific advantages of a group testing situation have been outlined by Bentley (1966) including testing many children in a short space of time, the larger numbers allowing for population trends to be established and conditions to be made constant for all subjects. Other recommendations include the test having only right and wrong answers and the ability to establish trends, all of which are important for this study. For each section of the test the children are played a short musical item and then circle a response on their answer sheet. Areas covered are pitch discrimination,
tonal memory, chord analysis and rhythmic memory.

In order to choose this test, criteria were needed by which tests of this type could be judged. Colwell (1970) outlines four criteria that can be used to choose an appropriate test and it was these criteria which were used to choose the Bentley test for this study. The four criteria identified by Colwell are useability, validity, reliability and usefulness.

USEABILITY
Colwell has noted that "useability is the common sense consideration of ease in the administering and scoring an evaluation device" (1970: 27). As this test was to be administered to a total of 943 students from which a random sample would be taken, useability was an important factor. Each of the four Bentley tests is short and a single test can be easily administered in a music lesson. The materials needed are straightforward, consisting of a tape recorder, audiocassettes, answer sheets and writing implements, all of which are found in a school music room. The tests also suited a group testing arrangement. The Bentley tests are easy to score, with a template being placed over each answer sheet and the test hand marked. Each series of four tests takes approximately one minute to mark and the score is determined by how many correct answers are on each test. Although local norms (that is norms which relate specifically to Australian school children) are not available on this test it was not a serious problem as the reason for using this test was to establish a set of norms reflecting schoolchildren of Victoria.
VALIDITY

Validity was an extremely important consideration when choosing a test for this research study. A test must be valid so that one can be sure, firstly, that it tests what it purports to test and secondly, that results generated reflect the objectives set. Colwell (1970:30) states that "validity refers to the test results, that is, how closely the results mirror that real achievement of the class". Bentley's test (1966) is designed to measure aural skills in recognising specific musical concepts, namely pitch, melody, rhythm and harmony. However, not only must the test measure what it purports to measure, but it must also be valued for the situation and the purpose, thus, it is the role of the researcher to be certain that the test chosen measures the correct aspect of music.

There are three main types of validity which are used to assess the effectiveness and rightness of a chosen test. These are content validity, criterion-related validity and construct validity.

CONTENT VALIDITY

Content validity determines how well a test represents the material it presents. Content validity can be defined as "the extent to which the items on a test, sample the skills or knowledge needed for achievement in a given field or task" (Baron, 1989:541). In this case, for the chosen test to have content validity, items on the test must reflect knowledge of music concepts. Content validity relies partially on expert judgment of the researcher, that is the researcher must have good reason for finding the test valid for its required use. The objectives set by the researcher must also be met by the test. Taking these two criteria into account, it can be
concluded that the broad goals of the Bentley test fit within the parameters of this study and *Measures of Musical Ability* (Bentley, 1966) directly tests the areas of interest to this study, namely music concepts.

**CRITERION-RELATED VALIDITY**

When test scores measure what they are designed to measure then it can be said that they have a criterion-related or predictive validity. Criterion-related validity is often related to predictive testing, that is the test tries to predict how well a subject will do in the future in a specific area. This type of validity is often assessed by giving tests to subjects who are accomplished, that is experts, within the specific field that is being tested and also to subjects who are not experts in the selected field. If a test has criterion-related validity the subjects in the expert group should do better than those in the non-expert group (Colwell, 1970).

The criterion-related validity for *Measures of Musical Ability* (Bentley, 1966) was established by comparing test scores with teacher assessments of student musical capacity, progress in a branch of musical activity, test results of highly skilled musicians and comparison with other established examination techniques. The correlation which measures this validity was rated by Bentley (1966) as $r = 0.94$, a high degree of correspondence considering 1.00 is a perfect correlation. The criterion-validity coefficient, for which .60 is a good score and lower than .40 is an excellent score (Colwell, 1970), was also found to be significant when correlated with Gordon Musical Aptitude Profile, rated at .26 for chord analysis to .58 for composite Bentley and Gordon scores (Boyle & Radocy, 1987). Looking at these results it can be said that *Measures of Musical Ability* "accomplishes that for which it was
devised - namely, the measurement of some aspects of musical ability" (Bentley 1966:88).

**CONSTRUCT VALIDITY**

"Construct validity has to do with how closely the test material matches a construct it purports to measure" (Colwell, 1970:33). The test being considered must measure something identified by a specific theory as important or worthy of attention (Baron, 1989). The construct or the 'thing' being identified as important or worthy of attention, in *Measures of Musical Ability* is aptitude. An aptitude test, such as Bentley's, should yield high scores for subjects who show characteristics of a high aptitude for music and these scores should be transferable to other tests that have the same definition of aptitude (Colwell, 1970). Construct validity can be shown for Bentley's test, as tests given to students and musicians with high musical aptitude yielded high results. Construct validity is, however, less important than content or criterion-related validity in the measurement of musical behaviour (Boyle & Radocy, 1987).

**RELIABILITY**

For a test to be reliable it “must show same or closely comparable results if given to the same subjects on subsequent occasions” (Bentley, 1966:32). The test results must be a true indicator of a child's ability and not subject to chance or guessing. The most common method of measuring reliability is the test-retest method and this is the one used by Bentley to show his test is reliable. Using the test-retest method a group of subjects was given the test twice with a four-month interval between sittings. As a result, the reliability of the test was measured at $r = 0.84$ which is highly satisfactory
when used in-group measurement situation (Colwell, 1970). Further testing for reliability by Young (1973) found reliability to be $r = 0.83$ for the total test results. Individual test reliability was found to be $r = 0.65$ for pitch discrimination, $r = 0.83$ for tonal memory, $r = 0.74$ for chord analysis and $r = 0.61$ for rhythm memory (Young, 1973). Although individual test results are lower in reliability score than the total test score all are still adequate when used in a group measurement situation.

**USEFULNESS**

A test must be useful if it is to have any value. The Bentley test is a useful method of evaluation as it is specific and focuses on musical concepts. Although it was not intended as a predictor of suitability for specialised instruction, the results were expected to indicate those areas within a concept that children of specific ages understand. The first research question asked in this study: “To what extent can music skills and concepts be measured in the primary school child?” will be answered through the use of *Measures of Musical Ability*.

**4.4 ETHICAL CONSIDERATIONS**

The methodology for this study included using human subjects, namely children from ages six to twelve in two schools in the State of Victoria. Before any data collection was begun an application for the approval of a project involving human subjects was made to the Ethics Committee of the University department in which this study was undertaken. It was stated that the participants would give their consent to be included as subjects and
that no procedures would be used beyond already established and accepted research techniques. Permission to undertake this study was also provided by the Department of Education in Victoria and the Principals of the two schools involved.

4.5 EXPERIMENTAL DESIGN

SUBJECTS

The subjects chosen for this study were primary school children aged six to twelve years. Two state primary schools were used for the testing, the total number of students originally involved in the study being 943. After discarding tests that were incomplete (due to factors such as absences and some very young children’s inability to complete the tests), a sample of 662 children was left from the total population of both schools. This sample represented a cross section of the seven age groups being used in this study. Each child chosen for the study had completed all four tests, those of pitch discrimination, tonal memory, chord analysis and rhythmic memory.

School A is a large rural primary school of 528 students. The children in the school are from mainly middle class Anglo Saxon farming and local business families. Other ethnic groups represent a very small minority of the total student population. The school prides itself on its extensive music program and has a classroom music program, instrumental program, school concert bands and choirs. All children in the school receive forty-five minutes of classroom music taught by a teacher who had completed a major study in music. This music teacher has taught the program since 1994. Staff
interested in music (though not necessarily qualified) taught prior to this. The school provides private tuition for students in piano, strings, woodwind, brass, percussion and guitar and approximately 115 students access this program. Therefore, within the school population there are children who have had extra musical training and these are included in the study.

School B was chosen as it is demographically opposite to School A. School B is an urban school of 413 children situated in a rapidly expanding outer Melbourne suburb. The ethnic mix is considerable with many children who speak English as a second language. Two staff members who have an interest in music teach the school's current music program. This, however, has not always been the case. The program was begun in 1994 and the children were taught by a teacher who had undertaken major study in music until the end of the 1995 school year, when this teacher left the school. In 1996 the children were taught by a teacher with an interest in music and in 1997 the two teachers mentioned above took over the program. The children receive a forty-five minute music lesson each week and children in grades five and six have the opportunity to join the school choir. The school produces a musical each year in which the majority of students in grade five and six perform. Children in this school have not had access to private instrumental teachers during this time.

These two very different schools were chosen for the following reasons:

1. A representative sample of students can be taken from these two groups due to the large number of subjects involved.

2. The representative sample taken is large enough to translate results, by way of statistical tests, to a population.
3. There is a broad cross-section of socio-economic and cultural groups represented, including both urban and rural students.

4. Differing experiences in the student's musical education will give more realistic results. There is an extremely broad cross-section of musical education and teacher expertise.

MATERIALS

The materials used for testing were based on the test articles devised and used by Bentley in his *Measures of Musical Ability* (1966). In the original test phonogram recordings of test items were used, as was a one-page answer sheet consisting of question numbers grouped under each test heading, with boxes next to these numbers for answers. This study followed a similar procedure but minor changes were introduced in order to make the test easier to administer.

As with Bentley (1966) all test items were recorded. Using modern recording equipment all test items were recorded onto audiocassette so that all subjects heard each test played exactly the same way. This consistency meant that any variables that might have affected validity, such as tempo change or emphasis on specific sounds, were removed. The tests were recorded at the same volume level and played to each group of subjects at the same volume. Bentley (1966) encountered problems when recording instrument sounds because subharmonics were difficult to remove and synthesised sounds were much less sophisticated than they are now. For this study, sounds were played on a modern synthesiser and were free from subharmonics that may have altered the subjects' responses.
The answer sheets were modified to make them more 'user-friendly' for the subjects involved. In Bentley's (1966) test, subjects were asked to fill in the letter or number that corresponded to the correct answer. For example in the pitch test if the subject thought the two sounds heard were the same they were asked to write the letter 'S' on the answer sheet, if the pitch went up the letter 'U' was written down and if the pitch went down the letter 'D' was written. On the rhythmic and tonal memory tests, where the subject had to identify the beat number that had been changed, the number of the changed beat had to be written on the answer sheet. For the chordal memory test subjects had to write down the number of notes heard in the chord.

In this study the answer sheet contained all possible responses and children were asked to circle or colour in (subjects chose their own method) the correct response. A smiling face 😊 was used in all tests to indicate 'same'. In the pitch test an arrow pointing up ↑ indicated the pitch of the second sound went up (higher) and an arrow pointing down ↓ indicated that the pitch of the second sound went down (lower). For all other tests numbers were printed on the answer sheet, referring to the beat number or, in the case of the chordal memory test, the number of notes in a chord. All four tests were printed on a double-sided sheet of paper (See Appendix B).

These changes were made for the following reasons:

1. The answer sheets used by Bentley (1966) are difficult for young subjects to use. Having to listen and respond to test questions whilst remembering what to write in the answer boxes is confusing for some. This format not
only tests the children's musical ability but also their ability to remember instructions. This new answer sheet allowed subjects to concentrate on listening, as they only had to circle the correct response. This type of user-friendly answer sheet is also familiar to children as they are often used across different curriculum areas.

2. Changing the answer sheets to a 'friendlier' format helped to minimise test anxiety. The test sheet had a familiarity about it and young subjects enjoyed colouring in and circling their answers.

3. The new answer sheet made the instructions more easily understood because the pictures and numbers plainly indicated what was required of the subjects. 'Up' and 'down' arrows clearly indicated pitch direction and beat numbers allowed the children to follow the rhythms and tunes as they were being played.

**PROCEDURE**

The procedure outlined below was repeated for each group of subjects to whom the test was administered. The tests were carried out over a four-week period with a new concept tested each week. Steps 1 and 2 were only used for the first test. Children were tested in class groups and tests were sorted into ages after the completion of the test battery. Any child who had a birthday during the testing period were placed in the age group originally marked on the answer sheet.

1. The purpose of the test was explained to the subjects. The subjects were told that they were about to complete a series of four listening exercises
that were going to help the researcher to devise a developmental profile for music concepts. This explanation was simplified for younger subjects and a developmental profile expressed in language suitable for each age group.

2. The subjects were told that they would only be identified by age and grade and that the results would be expressed as groups of ages.

3. The subjects were given the answer sheet and the first test was explained to them. The researcher answered any questions regarding the administering of the test. When all subjects indicated that they had understood the instruction the testing commenced.

4. The test was played to the subjects, which included the practice examples used by Bentley (1966). For the six, seven and eight year old subjects the tape was stopped, for 6 seconds, between each item to allow the children time to finish their answer. For the older subjects the tape was played straight through, as they were able to make their selections more rapidly.

5. At the end of the test all answer sheets were collected by the researcher and stored until they were needed for the next test.

This procedure was successful in that each group received the same treatment so extraneous variables were minimal.
4.6 SUMMARY

The research questions put forward by this study are:

1. To what extent can music skills and concepts be measured in the primary school child?

2. Can these results be interpreted so as to align with established developmental stages?

3. Can these developmental stages lead to a better understanding of what is required in a primary school music curriculum?

By considering these research questions whilst examining different methodologies an experimental design was decided upon. The test, Measures of Musical Ability, was chosen and found to be useable, valid, reliable and useful. An experimental design was created which allowed for a true representative sample of subjects, an ability to keep conditions constant and a modified answer sheet to make administration and understanding of the procedures simpler. The tests were administered over a four week period and the researcher collated results. The following chapter shows the analysis and interpretation of these results.
CHAPTER FIVE

RESULTS

5.1 INTRODUCTION

In the previous chapter methodologies were investigated and a quantitative methodology was chosen to fulfil the aims of the study. The test used was Bentley’s *Measures of Musical Ability*, which focused on the four concept areas chosen in Chapter Two. In total 662 children provided useable results from the testing. Due to the fact that the testing took place over a four-week period, absences affected the ability to collect completed test results from the initial sample of 943 children. Another factor affecting the final number of completed tests was mistakes made by children, the main type being circling more than one answer for a given question number. Further discussion of the possible changes that could be made to the testing format will be explored in the following chapter. The completed tests were corrected by the researcher and scored accordingly. The original test by Bentley was scored as follows: the rhythmic memory and the tonal memory tests were scored out of a possible ten and the pitch discrimination and chordal memory tests were scored out of a possible 20.

The children’s scores on each of the four tests in the battery (pitch discrimination, tonal memory, chordal memory and rhythmic memory) were analysed as School A (the rural school with a specialist teacher), School B (the urban school with non-specialist teachers) and combined (all four test) scores. Tables 5.1 through to 5.4 show the means, standard deviations and
score ranges for each age level and each test. Table 5.5 shows the means, standard deviations and score ranges at each age level for the four tests combined.

Overall an improvement in mean scores was demonstrated by the majority of age groups from both schools on all four tests. The chordal memory test showed the smallest range of mean scores while the pitch discrimination test displayed the greatest range of mean scores.

5.2 MEAN SCORES, STANDARD DEVIATIONS AND SCORE RANGES

RHYTHMIC MEMORY

Table 5.1 Mean scores, standard deviations and score ranges for rhythmic memory - School A, School B and combined scores.

<table>
<thead>
<tr>
<th>Age</th>
<th>School A n = 349</th>
<th>School B n = 313</th>
<th>Combined scores n = 662</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean $\bar{X}$</td>
<td>SD</td>
<td>Score Range</td>
</tr>
<tr>
<td>6</td>
<td>3.349</td>
<td>1.617</td>
<td>0-7</td>
</tr>
<tr>
<td>7</td>
<td>4.120</td>
<td>1.825</td>
<td>1-8</td>
</tr>
<tr>
<td>8</td>
<td>4.776</td>
<td>2.232</td>
<td>1-9</td>
</tr>
<tr>
<td>9</td>
<td>5.550</td>
<td>2.182</td>
<td>1-9</td>
</tr>
<tr>
<td>10</td>
<td>6.300</td>
<td>2.204</td>
<td>2-10</td>
</tr>
<tr>
<td>11</td>
<td>6.817</td>
<td>2.318</td>
<td>1-10</td>
</tr>
<tr>
<td>12</td>
<td>6.387</td>
<td>2.431</td>
<td>1-10</td>
</tr>
</tbody>
</table>

School A showed a steady increase in mean scores across all age groups, except twelve year olds, in the area of rhythmic memory. The twelve year old group ($\bar{X} = 6.387$) recorded a slight decrease in mean score from that of the eleven year olds ($\bar{X} = 6.817$). School B also showed an increase in
scores over all age groups except the ten year olds ($\bar{X} = 5.259$) whose mean score was lower than that of the nine year olds ($\bar{X} = 5.860$). The combined scores from both schools yielded an increase in scores at each year level from six year olds through to eleven year olds. The scores from the eleven and twelve year old groups did not increase in a linear fashion, with eleven year olds scoring higher results than the twelve year olds. When comparing School A with School B the six, eight and twelve year olds scored similarly. The greatest difference in scores was between the seven, ten and eleven year olds, with School A scoring at least 0.6 higher in those three age groups. The range of scores for all age groups were similar indicating that there were children in each school who had an excellent understanding of the concept of rhythm.

CHORDAL MEMORY

Table 5.2 Mean scores, standard deviations and score ranges for chordal memory - School A, School B and combined scores.

<table>
<thead>
<tr>
<th>Age</th>
<th>School A n = 349</th>
<th>School B n = 313</th>
<th>Combined scores n = 662</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean $\bar{X}$</td>
<td>SD</td>
<td>Score Range</td>
</tr>
<tr>
<td>6</td>
<td>7.558</td>
<td>1.765</td>
<td>4-11</td>
</tr>
<tr>
<td>7</td>
<td>8.900</td>
<td>2.697</td>
<td>3-15</td>
</tr>
<tr>
<td>8</td>
<td>9.191</td>
<td>2.635</td>
<td>3-16</td>
</tr>
<tr>
<td>10</td>
<td>9.650</td>
<td>2.261</td>
<td>4-16</td>
</tr>
<tr>
<td>11</td>
<td>9.550</td>
<td>2.664</td>
<td>1-17</td>
</tr>
<tr>
<td>12</td>
<td>10.71</td>
<td>2.355</td>
<td>6-16</td>
</tr>
</tbody>
</table>

Chordal memory provided the most randomised test results when comparing
mean score results. School A scores showed a slight increase at each age level, with the exception of eleven year olds, whose score was marginally below that of the ten year olds. This school’s results showed little variance considering the test itself was scored out of 20. School B’s results were more inconsistent, with ages not appearing to be a factor in results. Combined scores also presented a more random pattern due largely to the results of School B. All mean scores were above the theoretical guessing score of 6.7 which indicates that the children were, on the whole, making considered choices when answering each question in the test.

Tonal Memory

Table 5.3 Mean scores, standard deviations and score ranges for tonal memory - School A, School B and combined scores.

<table>
<thead>
<tr>
<th>Age</th>
<th>School A n = 349</th>
<th>School B n = 313</th>
<th>Combined scores n =662</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Score Range</td>
</tr>
<tr>
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<td>2.744</td>
<td>1.956</td>
<td>0-9</td>
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<tr>
<td>7</td>
<td>3.920</td>
<td>2.398</td>
<td>1-8</td>
</tr>
<tr>
<td>8</td>
<td>4.586</td>
<td>2.310</td>
<td>1-9</td>
</tr>
<tr>
<td>9</td>
<td>5.133</td>
<td>2.418</td>
<td>0-10</td>
</tr>
<tr>
<td>10</td>
<td>5.383</td>
<td>1.967</td>
<td>1-9</td>
</tr>
<tr>
<td>11</td>
<td>6.000</td>
<td>2.209</td>
<td>1-10</td>
</tr>
<tr>
<td>12</td>
<td>6.806</td>
<td>2.056</td>
<td>2-10</td>
</tr>
</tbody>
</table>

Mean scores for tonal memory showed an increase at all age levels (with the exception of School B ten year olds) for both schools. It was the only single test where it can be seen, through the means, that children scored on average, higher results at each year level. The combined schools’ scores also showed increased results for each age group ($\bar{X} = 2.446$ to $\bar{X} = 6.135$). The range of difference in mean scores for School A was 4.062 ($\bar{X} = 2.744$
to $\bar{X} = 6.806$) which was greater than the range for School B of 3.321 ($\bar{X} = 2.143$ to $\bar{X} = 5.464$). Score ranges indicated that there were children in School A who were capable of scoring slightly higher than children of the same age in School B. From these results it could be inferred that age is directly related to the ability to hear tonal changes in music and that children at School A showed a more noticeable development in the understanding of this concept than the children at School B.

**PITCH DISCRIMINATION**

Table 5.4 Mean scores, standard deviations and score ranges for pitch discrimination - School A, School B and combined scores.

<table>
<thead>
<tr>
<th>Age</th>
<th>School A n = 349</th>
<th>School B n = 313</th>
<th>Combined scores n = 662</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean $\uparrow$</td>
<td>SD $\uparrow$</td>
<td>Score Range</td>
</tr>
<tr>
<td>6</td>
<td>12.98</td>
<td>4.491</td>
<td>5-20</td>
</tr>
<tr>
<td>7</td>
<td>14.20</td>
<td>4.030</td>
<td>3-20</td>
</tr>
<tr>
<td>8</td>
<td>15.45</td>
<td>4.151</td>
<td>6-20</td>
</tr>
<tr>
<td>9</td>
<td>16.45</td>
<td>3.447</td>
<td>9-20</td>
</tr>
<tr>
<td>10</td>
<td>17.03</td>
<td>3.827</td>
<td>7-20</td>
</tr>
<tr>
<td>11</td>
<td>17.00</td>
<td>3.664</td>
<td>8-20</td>
</tr>
<tr>
<td>12</td>
<td>17.81</td>
<td>3.049</td>
<td>8-20</td>
</tr>
</tbody>
</table>

Pitch discrimination showed a steady increase in mean scores over all age groups for School A with the exception of the eleven year olds whose results were on par with those of the ten year olds ($\bar{X} = 17.00$ and $\bar{X} = 17.03$). The mean score of the School B ten year olds ($\bar{X} = 14.29$) was lower than the score for the nine year olds ($\bar{X} = 15.10$). School A’s scores were higher overall when compared with School B’s, with School A’s six year olds having a significantly higher score than School B’s six year olds. The combined scores showed a steady linear increase from age six through to age twelve.
The high scores at the eleven and twelve year old level, particularly in School A, for the pitch discrimination section indicated that children had a very good understanding of pitch. This included the ability to hear differences in the pitch of two notes, both inside and outside that which is considered to be a normal vocal range, as well as directional changes in pitch.

The results of the four separate tests showed that by the end of primary schooling, pitch discrimination is the most developed of concepts, with tonal and rhythm concepts being the next most developed and the concept of harmony (chords) being the slowest to develop.

**COMBINED SCORES**

Table 5.5 Mean scores, standard deviations and score ranges for combined pitch, tonal, rhythm and chord scores - School A, School B and combined scores.

<table>
<thead>
<tr>
<th>Age</th>
<th>School A n = 349</th>
<th>School B n = 313</th>
<th>Combined scores n = 662</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean $\bar{x}$</td>
<td>SD</td>
<td>Score Range</td>
</tr>
<tr>
<td>7</td>
<td>31.14</td>
<td>7.21</td>
<td>16-45</td>
</tr>
<tr>
<td>8</td>
<td>34.00</td>
<td>7.31</td>
<td>19-46</td>
</tr>
<tr>
<td>9</td>
<td>36.47</td>
<td>7.40</td>
<td>20-49</td>
</tr>
<tr>
<td>10</td>
<td>38.37</td>
<td>7.03</td>
<td>18-50</td>
</tr>
<tr>
<td>11</td>
<td>39.37</td>
<td>6.82</td>
<td>24-53</td>
</tr>
<tr>
<td>12</td>
<td>41.71</td>
<td>7.49</td>
<td>19-56</td>
</tr>
</tbody>
</table>

Comparison of mean combined scores showed an overall increase in scores at each age level, with the exception of School B ten year olds. School A and School B also showed differences in results with School A scoring higher in
all test batteries. The range of mean scores for School A ranged from $\bar{X} = 26.63$ to $\bar{X} = 41.71$, School B $\bar{X} = 21.50$ to $\bar{X} = 36.54$ and combined schools $\bar{X} = 24.06$ to $\bar{X} = 39.13$. This resulting difference in school scores was not anticipated, so it then became necessary to analyse the difference in means between School A and School B to ascertain whether these differences were significant. If these differences were found to be significant then the factors influencing these, such as teacher expertise, would be important in the maximising the development of musical concepts in children.

5.3 FURTHER ANALYSIS

Independent samples t-tests were used to analyse the differences between the school and age means. The alpha level for the null hypothesis, following standard statistical procedure, was set at $\alpha = <0.05$. Table 5.6 shows a comparison of School A and School B’s scores, tables 5.7 and 5.8 display a comparison between age groups of Schools A and B respectively.

<table>
<thead>
<tr>
<th>Age</th>
<th>Rhythm</th>
<th>Chords</th>
<th>Tonal</th>
<th>Pitch</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t$</td>
<td>$df$</td>
<td>$p$</td>
<td>$t$</td>
<td>$df$</td>
</tr>
<tr>
<td>6</td>
<td>-0.33</td>
<td>70</td>
<td>ns</td>
<td>1.41</td>
<td>70</td>
</tr>
<tr>
<td>7</td>
<td>1.05</td>
<td>82</td>
<td>ns</td>
<td>2.55</td>
<td>82</td>
</tr>
<tr>
<td>8</td>
<td>0.10</td>
<td>113</td>
<td>ns</td>
<td>1.36</td>
<td>113</td>
</tr>
<tr>
<td>9</td>
<td>-0.69</td>
<td>109</td>
<td>ns</td>
<td>0.55</td>
<td>109</td>
</tr>
<tr>
<td>10</td>
<td>2.58</td>
<td>117</td>
<td>&lt;0.01</td>
<td>1.97</td>
<td>117</td>
</tr>
<tr>
<td>11</td>
<td>2.79</td>
<td>118</td>
<td>&lt;0.01</td>
<td>2.45</td>
<td>118</td>
</tr>
<tr>
<td>12</td>
<td>0.64</td>
<td>57</td>
<td>ns</td>
<td>2.35</td>
<td>57</td>
</tr>
</tbody>
</table>

These tests of significance were undertaken so that it could be ascertained whether or not the differences in mean scores came from different populations, that is different groups of school children. Significance at the alpha level showed that there were factors that led to one school scoring
significantly higher on some of the tests.

Analysis of scores showed that in the areas of rhythmic memory, tonal memory, pitch discrimination and combined scores, different age groups showed differing levels of significance. The six year olds tested showed significant difference in the scores of the pitch discrimination and combined scores only, with School A achieving the higher scores. The seven year olds at School A scored significantly better than School B in all areas except rhythmic memory. The eight and nine year olds were the most even scoring groups with all areas (except pitch discrimination and combined scores for the 8 year olds) showing no significance in the score difference. This was an interesting finding given the differences in all other age groups. The fact that the students at both schools had a specialist music teacher for their first two years of schooling may have been an important factor in their early musical development.

The area of chordal memory was the only one in which the ten year old age group showed no significance in score difference. The eleven year olds at School A scored significantly higher results than eleven year olds at School B, with chordal memory being the only area where score differences were not significant. Twelve year olds at School A scored significantly higher scores on all tests excepting that of rhythmic memory.

Although in the majority of cases the mean scores showed that results increased with age it was necessary to substantiate this increase as statistically significant. Preliminary analysis of year by year results (six to seven years, seven to eight years, eight to nine years, etc.) yielded
statistical significance in the six to nine years age groups in all concept areas except chords. These results are in keeping with the dramatic development found in children of these ages in all facets of learning. Results in the ten to twelve years age group were not as marked, indicating that a plateau in a child’s development may be occurring at these ages. It was decided then, in keeping with current curriculum practice of taking two years to complete levels two, three and four of the Curriculum and Standards Frameworks in primary schools, to compare the results of age groups two years apart.

**Table 5.7 Independent samples t-test between age groups – School A.**

<table>
<thead>
<tr>
<th>Age</th>
<th>Rhythm</th>
<th>Chords</th>
<th>Tonal</th>
<th>Pitch</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t</td>
<td>df</td>
<td>p</td>
<td>t</td>
<td>df</td>
</tr>
<tr>
<td>8-6</td>
<td>3.93</td>
<td>92</td>
<td>&lt;0.001</td>
<td>3.72</td>
<td>92</td>
</tr>
<tr>
<td>9-7</td>
<td>3.74</td>
<td>108</td>
<td>&lt;0.001</td>
<td>0.89</td>
<td>108</td>
</tr>
<tr>
<td>10-8</td>
<td>3.77</td>
<td>118</td>
<td>&lt;0.001</td>
<td>1.02</td>
<td>118</td>
</tr>
<tr>
<td>11-9</td>
<td>3.09</td>
<td>118</td>
<td>&lt;0.01</td>
<td>0.48</td>
<td>118</td>
</tr>
<tr>
<td>12-10</td>
<td>1.67</td>
<td>87</td>
<td>ns</td>
<td>2.07</td>
<td>87</td>
</tr>
</tbody>
</table>

The comparison of eight and six year olds t-test scores revealed significant differences to \( p = <0.001 \) in all concept areas except pitch discrimination where \( p = <0.01 \). The comparison of scores between nine and seven year olds and between ten and eight year olds showed significant differences in the means for rhythmic memory \( (p = <0.001) \), tonal memory \( (p = <0.02 \) and \( p = <0.05 \) respectively), pitch discrimination \( (p = <0.01 \) and \( p = <0.05 \)) and combined scores \( (p = <0.001) \). These two age groups showed no notable difference in chordal memory mean scores. The difference in eleven and nine year old scores was significant in the areas of rhythmic memory \( (p = <0.01) \), tonal memory \( (p = <0.05) \) and combined scores \( (p = <0.02) \). There was no significant difference in the chordal memory and
pitch discrimination scores. When comparing twelve year olds' with ten year olds' mean scores, significant differences were found in the areas of chordal memory ($p < 0.05$), tonal memory ($p < 0.01$) and combined scores ($p < 0.05$). The areas of rhythmic memory and pitch discrimination showed no notable differences.

**Table 5.8 Independent samples t-test between age groups – School B.**

<table>
<thead>
<tr>
<th>Age</th>
<th>Rhythm</th>
<th>Chords</th>
<th>Tonal</th>
<th>Pitch</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t$</td>
<td>$df$</td>
<td>$p$</td>
<td>$t$</td>
<td>$df$</td>
</tr>
<tr>
<td>8-6</td>
<td>2.81</td>
<td>92</td>
<td>&lt;0.05</td>
<td>1.25</td>
<td>92</td>
</tr>
<tr>
<td>9-7</td>
<td>4.63</td>
<td>108</td>
<td>&lt;0.001</td>
<td>3.07</td>
<td>108</td>
</tr>
<tr>
<td>10-8</td>
<td>0.99</td>
<td>115</td>
<td>ns</td>
<td>2.28</td>
<td>115</td>
</tr>
<tr>
<td>11-9</td>
<td>-0.18</td>
<td>109</td>
<td>ns</td>
<td>1.97</td>
<td>109</td>
</tr>
<tr>
<td>12-10</td>
<td>1.76</td>
<td>85</td>
<td>ns</td>
<td>-0.08</td>
<td>85</td>
</tr>
</tbody>
</table>

The independent samples t-test for School B showed a slightly different pattern with regards to musical development when compared with School A. The biggest area of difference was the ten to eight, eleven to nine and the twelve to ten age groups. School A showed a fairly steady increase in scores with the age group two years ahead scoring, in the majority of tests, significantly higher than the group below it. In the case of School B, the ten, eleven and twelve year olds did not score significantly better than the eight, nine and ten year olds. This could be directly attributed to the fact that the ten, eleven and twelve years olds from School B did not begin a formal classroom music program until they were in grades one, two and three respectively. This could lead to the assumption that having formal music training in the first year of primary school is a contributing factor in a child's musical development. The six, seven and eight year olds at School B have all had some form of musical training in their preparatory grade year.
5.4 ERROR ANALYSIS

Children’s scores were not the only aspects of the tests to be studied. The errors children made in their answers were also analysed. This analysis was needed so that it could be ascertained whether or not there were error patterns to that could be related to age. It could then be assumed that if a large percentage of students at a specific age made errors on the same test question, then perhaps those children may not have reached a level of development that enabled them to hear the particular aspect of a concept. It was also important to discover whether the children from School A and School B were different in the type of development that occurred.

The errors were analysed as percentages, so that it could be ascertained what percentage of children answered a question incorrectly. The question by question analysis of errors appears in Appendix C and the following is a summary of these findings for School A and School B.

RHYTHMIC MEMORY

The error patterns for rhythmic memory were analysed in two ways. Firstly the questions that had the highest error rate were examined then the serial position of the rhythm change heard was calculated to ascertain whether the position of the rhythm change had any significance. The most significant level of error for all age groups were questions seven and ten with mean percentage errors of 70.27 and 74.77 respectively. For question seven children in School A had an error rate of 65.5 percent and children in School B had an error rate of 74.9 percent. For question ten the error rate for School A was 72.9 percent and for School B 76.6 percent. Both these questions had rhythmic features that are introduced later in a child’s musical
education, those of semiquaver and triplet figures. Question seven had the following rhythmic differences: the first play through the children heard \( \text{\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet} \) compared with \( \text{\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet} \) which was heard the second time. Question 10 heard \( \text{\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet} \) the first time, compared with \( \text{\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet\textbullet} \) the second time. Younger children, particularly those in the six, seven and eight years age groups, also had difficulty with dotted quaver/semiquaver rhythms and syncopated semiquaver/ quaver/ semiquaver rhythms. It could be inferred, therefore, that these rhythmic figures are those in which children need specific training and experience in order to distinguish between them.

The following table shows the mean percentage errors for all age groups when considering the serial position of the rhythmic change. These results are shown for School A, School B and combined scores.

**Table 5.9 Mean percentage errors for different serial positions of changed notes for rhythmic memory.**

<table>
<thead>
<tr>
<th>Serial position of changed note</th>
<th>School A</th>
<th>School B</th>
<th>Combined Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36.35</td>
<td>40.28</td>
<td>38.31</td>
</tr>
<tr>
<td>2</td>
<td>44.7</td>
<td>50.85</td>
<td>47.77</td>
</tr>
<tr>
<td>3</td>
<td>43.5</td>
<td>42.32</td>
<td>42.91</td>
</tr>
<tr>
<td>4</td>
<td>53.02</td>
<td>56.42</td>
<td>54.72</td>
</tr>
</tbody>
</table>

The errors expressed in this table follow the pattern of weight given to notes in quadruple time in Western music, that is the first beat is strongest, followed by the third beat then the second beat and finally the fourth beat. This infers that children are best at noticing rhythmic change when it occurs.
on the first beat of the bar and find it hardest to recognise change when it
occurs on the last beat of the bar. On the whole children, as has been
shown by other results in this section, improve in their ability to recognise
rhythmic change as they get older.

CHORDAL MEMORY

The chordal memory test produced the largest level of error out of the four
tests presented. Children found that four note chords were the easiest to
identify with only a 33.14 percent error in answering. Two note chords were
the next easiest to identify with an overall 52.9 percent error in answering
and three note chords were the most difficult to distinguish with a 60.41
percent error in answering. The most significant errors occurred in questions
two (91.6%), seven (73.27%), 14 (72.5%), 18 (74.6%) and 20 (68.96%).
Questions two and 18 were both two notes chords with the interval of a
major seventh. Question seven was a second inversion major triad, question
14 was a first inversion minor triad and question 20 was a root position
triad, which omitted the fifth note and included the octave.

On the whole children found it easier to identify the correct number of notes
in a triads when these chords were played in a major key. First inversion
chords were heard more easily than those in a root position or second
inversion. Minor triads were more difficult to hear. Children found two note
chords with a major sixth interval harder to hear than two note chords with
a minor sixth interval and two note chords with a perfect fourth interval
were also difficult to hear. Overall the error rate for chordal memory
lessened as children got older, indicating that the ability to hear chords may
be partly attributable to age.
TONAL MEMORY

The tonal memory error rates did not follow any specific patterns of improvement for single questions, which is different to each of the other tests. The results in this analysis were quite inconsistent with the development shown in the tonal memory mean scores shown in Table 5.3. The contributing factor to this is the large range of errors over the ten questions within each age group, in fact, some questions elicited very low error rates while others elicited very high error rates. The only age groups that did not follow this pattern were the six and seven year olds at School B whose error rates were high for all questions. School A showed lower error rates overall when compared with School B, which supports the findings in Table 5.3 that the children at School A scored higher mean scores at each age level when compared with the children at School B.

The most significant errors occurred in questions six (68.2%), nine (69.1%) and ten (74.25%). School B’s error rate was higher than that of School A for each of these questions as follows:

<table>
<thead>
<tr>
<th>Question</th>
<th>School A</th>
<th>School B</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>64.8 percent</td>
<td>71.7 percent</td>
</tr>
<tr>
<td>9</td>
<td>64.6 percent</td>
<td>73.6 percent</td>
</tr>
<tr>
<td>10</td>
<td>69.7 percent</td>
<td>83.5 percent</td>
</tr>
</tbody>
</table>

For each of these questions the changed note was different from the original note by the interval of a tone. In questions six and nine the changed note was a tone lower than the original note and in question ten the changed note was a tone higher than the original note. Children were much more
readily able to identify a changed note when there was only a semitone
difference within the context of a melody. The most noticeable feature of
the questions that had the highest error rate was that the second time the
melody was played it sounded more ‘tonally correct’ than the first time it
was played. The changed note altered the tonality of the melody played and
this tonality was more familiar to the children in the context of Western
music. It is probable that children hearing the ‘tonally correct’ melody the
second time forgot that the first sounded different because the second one
sounded more ‘right’. Question one also had a high error rate for the
children at School B, that of 69.9 percent. This melody had a changed note,
which was a semitone higher the second time it was played. This changed
note altered the tonality of the piece from a minor sound to a major sound.
Again major tonality is often more familiar to young children and when
hearing the major tonality second they assumed the first melody played was
the same. This concept will be discussed further in the following chapter.

The mean percentage errors for the different serial positions of the changed
notes were different for each school. As shown by the Table 5.10 below, the
children at School A found it hardest to identify changed notes when they
were in the first and last positions, while the children at School B found it
hardest to identify changed notes when they were in the first and second
positions. Because of the lack of uniformity in these results compared with
serial position notes in the rhythmic memory test, this researcher feels it
may be more valuable to concentrate on the tonality issue raised earlier.
Table 5.10 Mean percentage errors for different serial positions of changed notes for tonal memory.

<table>
<thead>
<tr>
<th>Serial position of changed note</th>
<th>School A</th>
<th>School B</th>
<th>Combined Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50.60</td>
<td>66.31</td>
<td>58.45</td>
</tr>
<tr>
<td>2</td>
<td>47.72</td>
<td>61.50</td>
<td>54.61</td>
</tr>
<tr>
<td>3</td>
<td>48.58</td>
<td>59.05</td>
<td>53.81</td>
</tr>
<tr>
<td>4</td>
<td>45.26</td>
<td>55.33</td>
<td>50.29</td>
</tr>
<tr>
<td>5</td>
<td>51.90</td>
<td>56.03</td>
<td>53.96</td>
</tr>
</tbody>
</table>

PITCH DISCRIMINATION

The pitch discrimination test had the lowest overall error rate of the four tests. As was reflected in the mean and t-test scores, School A scored better than School B in all age groups. The questions that had the greatest error rate were numbers eight, nine, 13, 14, 17 and 18. These questions related to changes in pitch of a minor second and a minor third. Questions 14 and 17 demonstrated a pitch change of an ascending minor second, questions eight, 13 and 18 demonstrated a pitch change of a descending minor second and question nine demonstrated a pitch change of an ascending minor third.

The following table illustrates the percentage errors for each question type for each school as well as combined error rates.

Table 5.11 Mean percentage errors for different serial positions of changed notes for pitch discrimination.

<table>
<thead>
<tr>
<th>Pitch Difference</th>
<th>School A</th>
<th>School B</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ascending semitone</td>
<td>42.51</td>
<td>52.60</td>
<td>47.55</td>
</tr>
<tr>
<td>Descending semitone</td>
<td>30.92</td>
<td>50.99</td>
<td>40.95</td>
</tr>
<tr>
<td>Ascending minor 3rd</td>
<td>36.70</td>
<td>56.80</td>
<td>46.75</td>
</tr>
</tbody>
</table>
Overall, the children at School A found ascending minor second intervals the hardest to distinguish, followed by the ascending minor third and descending semitones. School B followed a slightly different pattern with the ascending minor third being the most difficult to distinguish, followed by ascending semitones and descending semitones. Combined scores indicate that ascending semitones and ascending minor thirds are hardest to hear followed by descending semitones. The notes played to the children in the ascending semitone questions were outside that which is regarded as a child’s normal vocal range, which may explain why the errors were greater here. The notes heard for the descending semitones and the minor third were within a child’s normal vocal range. Overall, notes played to children outside a child’s normal vocal range elicited slightly higher error rates in all categories of pitch change compared with similar questions that fell within the vocal range. The other categories of pitch change tested were ascending and descending tones, intervals of a major third to a major seventh and notes of the same pitch. Notes of the same pitch were more easily recognised than any other interval.

5.5 SUMMARY
In conclusion, using Bentley’s Measures of Musical Ability to test children’s ability to hear the concepts of pitch, rhythm, melody and harmony has led this researcher to conclude that there is evidence to support the hypothesis that development in musical understanding can be related to age. Age, however, is not the only contributing factor to musical development and it is these factors which must be discussed further. The tests of significance undertaken indicated that whilst nine year olds from both schools had very similar levels of achievement, all other age groups had at least two areas
where there was a significant difference in their results. It is these results which indicate the need to explore factors which may lead to these differences. The factors that need to be considered are those of teacher expertise, curriculum design and presentation, the initial age of the commencement of a musical education and the effect of Western music on the ability to hear change in music. The following is a summary of findings.

The test results showed an increase in mean scores over the majority of age groups on all four tests. The development of concepts follows the pattern of pitch discrimination being the most developed, followed by rhythm and melody with the slowest area to develop being harmony. The rhythmic memory test showed an overall increase in scores for the majority of age groups. Children were able to achieve high scores for each age group represented. The errors made related to more difficult rhythmic figures including triplet figures and syncopated rhythms. The ability to learn complex rhythmic figures will be addressed in the discussion on curriculum design. The serial position of the changed note also played a part, with the ability to correctly identify the changed note directly related to the pulse strength denoted in Western music.

Chordal memory provided the most difficult test for all children. Inconsistent results were the norm here and no child was able to gain a result of one hundred percent. A slight increase in results was observed at the majority of age levels for School A, but the improvement demonstrated was small. The results from the children at School B were more irregular with seven year olds scoring lower than six year olds and eleven and twelve year olds scoring lower than ten year olds. Children were making considered choices,
however, with the average score for each age group higher than the theoretical guessing score of 6.7. Children had most difficulty hearing two note chords with a major seventh interval, triads in a minor key and second inversion triads in a major key. In the following chapter the possible significance of these results will be discussed.

The test for tonality showed that the results achieved improved with age. Children were better at hearing changes in melody as they grew older, which indicates that success in this type of test improves with musical experience. Semitone changes, within a melody were more obvious to children than changes of a tone. Melodies played in major tonality were also more likely to be thought of as correct as were melodies that made more ‘sense’ tonally. It could be assumed that the exposure to Western music has led to these results. This factor will be discussed in the next chapter. Children in both schools also found it more difficult to hear a changed note when it was the first note played.

Pitch discrimination allowed for the greatest improvement in scores for both schools, however, less improvement was shown at the older age levels. This result may have something to do with the plateau in development that other studies have indicated. Children at all ages were able to achieve a perfect score of twenty out of twenty, which indicates that younger children are also capable of high level pitch discrimination. Children found it hardest to hear pitch changes of a semitone and of a minor third, when hearing the interval in isolation. The ability to hear high and low pitches (outside a child’s normal vocal range) will be discussed in the next chapter, as these seem to have influenced some of the results. It will also be important to explore a child’s
ability to hear minor keys due to the results found in the tonal memory, chordal memory and pitch discrimination tests.

This chapter has answered the first research question relating to the study's aim in relation to the extent that music concepts be measured. The results from this chapter show that aspects of these concepts can be measured and that valuable results can be inferred. These results confirm previous research that has shown that the acquisition of music concepts is developmental in nature. These results also raise questions as to other factors that may influence the way in which concepts are acquired. The next chapter will discuss these results in more detail, focussing specifically on their ability to fit within a developmental framework and the implications these findings have in planning an effective music education program.
CHAPTER SIX

DISCUSSION

Music is a cooperation of head and heart of feeling and thinking.

Charles Seeger.

6.1 INTRODUCTION

This study has, so far, considered definitions and theories of development, past research in the development of musical concepts, the need for a comprehensive music curriculum, types of music curriculum and past and present music curriculum. Extensive testing of children in the concept areas of pitch, tonality (melody), rhythm and harmony has been undertaken and the analysed results have shown a noticeable development at each age level for most concepts.

The Measures of Musical Ability tests were comprehensive measures of the types of concept knowledge that this researcher would expect most children to experience in a broad music curriculum. The following outline shows the components of the concept areas that were tested:

Rhythm: the rhythm test included the following rhythmic figures.

\[ \text{\includegraphics[width=\textwidth]{rhythm-figures.png}} \]
Harmony: Two, three and four note chords were played to the children, including chords in major and minor keys, and in root position, first and second inversion. Seventh chords were also played to the children.

Pitch: The children heard the following intervals: same, ascending and descending semitones (minor second), ascending and descending tones (major second), major and minor thirds, perfect fifths, minor sixths, and major and minor sevenths.

Tonality: The children heard two five note melodies, the second of each having a change of a tone or semitone in one note. Each melody was in the key of D major, however, the tonality did not always remain in D due to the starting notes and cadential endings employed. The overall framework was diatonic in nature. The changed note, at times, altered the tonality of the piece from major to minor and the cadential endings, at times, differed. The serial position of the changed note was also altered.

This chapter will discuss in detail the research findings from the previous chapter and will link them to the need for a comprehensive music curriculum.

6.2 AGE RELATED FINDINGS

SIX YEAR OLDS

The six year old students in this study were, on the whole, at the end of their first year of schooling. Their results are those of children with a limited
formal musical education. It can be presumed that part of a six year old's ability to hear differences in rhythm, harmony, pitch, and tonality, comes from prior informal musical experiences gained in the pre-school years.

For the rhythmic memory section, School A (the rural school with a specialist teacher), scored slightly lower than School B (the urban school with non-specialist teachers). The mean scores were quite low for both schools and score ranges were from zero to eight out of a possible ten. The overall error rate for children in School A was 59 percent compared with School B's error rate of 60 percent. The scores for these two schools showed no significant statistical difference, therefore, it could be argued that rhythm is a fairly innate quality all children experience quite naturally in their everyday lives and that this may influence scores. Another factor that may have influenced the scores here was the difficulty of the test for the children. Although the answer sheets were designed with young children in mind, some were unable to grasp the idea of circling the answer and moving down to the next question. A large percentage of discarded tests from this age group were caused not by students being absent during the four-week testing period, as was the case with older students, but were due to the children making the circling errors described above. It would be valuable to re-test these children either individually or in small group to gauge their responses. More discussion about this will take place later in this chapter.
Chordal memory was another area in which the children tested showed no significant difference between the scores of the two schools involved. The score range for the two schools saw children scoring from four to thirteen correct answers out of a possible 20. As was discussed previously, all mean scores were higher than the theoretical guessing mean, which indicates that a high percentage of children were trying to choose the correct answer from the choices available. This test may have also been easier for these children as they had only three answers from which to make their choice. This is unlike the rhythm and tonal memory tests in which children had to select their answer out of a possible five or six choices.

The pitch discrimination mean scores from School A and School B, showed the biggest difference between the children. The six year old children at School A were much more able to hear changes in pitch when compared to the School B six year olds. These differences in scores were very significant and demonstrated that the children at School A had a more developed ability in pitch discrimination. A large majority of School B six year olds were unable to detect a directional change in pitch for minor seconds, major and minor thirds and a perfect fifth. The majority of School A children, on the other hand, were able to identify pitch change in all intervals tested with the exception of minor seconds.

These differences, it could be argued, were a direct reflection of teacher expertise and curriculum planning. Demorest & Serlin (1997) have noted
that pitch is one particular area in music education that needs formal training in order for children to reach their developmental potential. The strong Kodaly based program at School A focuses on pitch and has both a visual and aural component which suits the learning styles of young children. These children are exposed to this methodology from their first music lesson and it can be hypothesised, from the results, that these children have already moved ahead of the children at School B in their ability to recognise pitch change. One example of this ability to recognise pitch change is that the children at School A could more readily identify the direction of change of a minor third interval when compared with the School B children. The Kodaly program advocates that the first interval to be taught to children should be ‘soh’ – ‘me’. This is a minor third interval and the children gain experience in singing it ascending and descending. This would, therefore, predispose these children to recognise this interval in an aural test. For the majority of children this has to be taught, it is not innate. Children from both schools found it more difficult to detect pitch changes outside a normal vocal range suggesting that maturational factors may also be involved.

In the tonal memory test the children at School A scored better than the children at School B did, but not significantly so. This test, however, provided the study with the biggest difference in score ranges for children of this age. Both schools had children who scored zero but at the upper range some children at School A scored nine out of a possible ten, while the
highest any child from School B scored was six. The children at School A also had a better grasp of tonality. This was identified due to the much lower overall error rate of the children at School A compared with the children at School B.

It may be argued, therefore, that previous experience and curriculum design will have an effect on the acquisition on tonality. School A’s program has a strong Kodaly and world music component and children are used to hearing both major and minor tonality in music, even at the age of six. The experience of children from School A encompasses listening to, singing and playing music from other cultures. This program begins to develop, in children, a sound knowledge of music which is based on different scale systems and which has varying tonality. The program at School B was more firmly based on Western music, where the diatonic scale was the one most often used and heard by the children. The difference in teacher expertise at School B meant that music which used unfamiliar scales was less likely to be explored.

SEVEN YEAR OLDS

The seven year old children were for the most part at the end of their second year of schooling. For children at School A, this meant that they were in their second year of music with the same teacher, children at School B, however, had a different music teacher for this school year. The results
achieved by children at School A and School B reflected the differences in having the same teacher for their initial musical education.

The test of rhythmic memory showed that the seven year old children from School A scored higher than the seven year old children from School B. Although the mean scores differed, the results were not statistically significant. School A had an overall error rate of 60 percent while the children from School B had an error rate of 61 percent. The children at School A showed a much better understanding of crotchets and quavers when compared with the School B children. This is important to note, as it is these two rhythmic figures which provide a basis for further rhythmic learning. Children in this age group were less likely to make circling errors, that is circling more than one answer, on their answer sheet. They had more experience than that of the six year olds at circling answers on test sheets.

The chordal memory test showed that the children from School A had a more sound grasp of this area than the children at School B. School A children scored significantly higher when compared to the children from School B. The children from School A were more readily able to identify two note chords (65 percent compared with 51 percent), but both groups of children found they were successful at detecting four note chords. Triads proved difficult for all children and there was a high rate of error when identifying three notes being played at the same time. Sixty-six percent of School A children and 63 percent of School B children were unable to
Identify when chords contained three notes. School A children had a slightly greater score range, with some children scoring 15 out of a possible 20. The highest score for School B children was 13. The ability of School A children to identify two note chords may be related to the fact that the Kodaly methodology used by the music teacher at this school encourages simple two part singing. The difference in results may also be accounted for due to the difference in teacher from their preparatory grade year to their grade one year.

The area of pitch discrimination also showed significant differences between the scores of School A and School B children. School A children had lower error rates when compared to children from School B for all questions except for those when the pitch of the notes fell outside what would be considered a normal vocal range. The ability of children from School A to hear directional changes in pitch inside the vocal range suggested that the large amount of singing done at this school assisted with the acquisition of pitch. It could be suggested that the children from both schools need more experience with music that uses high and low frequency pitch. Another argument could be that children of this age have an underdeveloped sensitivity to extremes of pitch due to maturation factors. School B children had the most difficulty recognising pitch changes of a minor second, a minor sixth, a major seventh and a minor seventh. This may be due to a lack of experience with songs which use these particular intervals, or again, the effect of having different teachers for the first two years of schooling.
The tonality results also showed a significant difference in scores between the two schools tested, with School A children scoring significantly better than School B children. School A seven year olds had difficulty hearing when the changed note was a tone higher or lower than the original or when the changed note was a semitone higher and created a leading note to tonic ending to the melody. The children at School B showed no specific pattern and had equal difficulty identifying tone and semitone alterations to the changed note. Neither of the two schools showed any noticeable error pattern when comparing the position of the changed note. School A children were able to detect an altered note when it changed the tonality of the tune from major to minor, while the School B children were not able to hear this difference. It can be assumed that the statements made for the six year olds regarding musical experience may also be relevant here.

**EIGHT YEAR OLDS**

The results of the eight year olds were very uniform with significant differences occurring only for pitch and combined scores. This commonality of results could be due to the fact that children from both School A and School B had a teacher who specialised in music for their first year of schooling. These teachers both based the music curriculum taught on Kodaly and Orff methodologies. This had the effect of providing a sound basis in their preparatory year, which could be built on in ensuing years. Although the children at School B had different teachers in their subsequent years,
they have only fallen marginally behind the children from School A at this point in time. The eight year old group also provided a large sample size, which made a very reliable translation of their results to a population.

The difference in mean scores for School A and School B in the area of rhythm was only 0.1. This makes these two groups almost identical in their results. The difference came in the types of rhythmic figures each group was able to identify. The children at School A had difficulty recognising rhythm patterns containing the following rhythmic figures, \( \begin{align*}
\frac{3}{4} & \quad \frac{5}{4} & \quad \frac{7}{4} \\
\end{align*} \) while the children at School B had difficulty recognising rhythm patterns containing \( \begin{align*}
\frac{1}{3} & \quad \frac{1}{2} & \quad \frac{2}{3} \\
\end{align*} \). School A children had more difficulty finding differences in syncopated rhythms, whereas, School B children found dotted rhythm patterns harder to hear. This discrepancy between the two schools can probably be related to the curriculum content, which was school specific and the type of music the children had experience with.

The chordal memory test produced similar mean scores in both groups with School A scoring slightly higher than School B. Both schools scored very similar error rates for two, three and four note chords. The only large discrepancies in error rates occurred in six specific questions. The children at School A found it more difficult than the children at School B to identify two note chords with either a major sixth or a minor seventh interval as well as first inversion triads in a minor key with a diminished fifth. The children at
School B found it more difficult to identify two note chords with intervals of a minor third and a minor sixth and first inversion triads in a minor key. It can be assumed from these results that children at this age have difficulty hearing harmony when it has a minor tonality. This is a tonality that children may have less experience with, especially when part-singing and playing in ensembles.

Pitch discrimination was the only area where the schools' scores differed significantly. The children from School A again showed themselves to have a greater ability to recognise pitch differences than School B children. The most difficult interval to recognise, for children at both schools was a minor second. Children at School B found it easier to identify pitch changes outside a normal vocal range when compared with the children at School A, continuing the pattern of results established by School B seven year olds. This suggests that whilst School A children have a more developed sense of pitch overall, these children need more experience with music outside the normal vocal range.

Tonal memory, as with each of the previous tests, showed no significant difference in the scores of School A and School B children. The children at School A scored marginally higher, their mean score was 0.5 above that of School B children. The questions which produced the highest amount of error for School A were ones where the changed note was altered by a tone, or when the changed note was a semitone higher and created a leading note
to tonic ending to the melody. This follows the same pattern as that of School A seven year olds. The children from School B also followed this pattern, and had difficulty recognising a change when the altered note changed the tonality of the melody from minor to major.

NINE YEAR OLDS

The children in the nine year old age group produced the most consistent results when comparing both schools. Neither school produced test results, which were significantly higher in any of the tested areas. It can be speculated that this lack of significant difference in any of the results may be attributed to the fact that both groups of children had qualified music specialists for their first two years of schooling, who used similar methodologies in their teaching. This basic grounding seems to have helped them to achieve similar results. This is especially noticeable in the area of pitch discrimination, as this is the only age group in which similar results were achieved. Children’s natural musical development may also be a factor, in that it has been hypothesised that children reach a musical plateau at age nine or so (Hargreaves, 1986). If this is the case, then this may explain why these children, who had similar starts to their music education, have now leveled off closely together.

There were not many differences to be found in the results for this age group. School A achieved higher mean scores in all areas except that of rhythm. This is the same scoring pattern, which has been found in both the
six and eight year old age groups. The only noticeable difference in rhythm was that children at School B found it more difficult to identify triplet and semiquaver rhythms. This may suggest that the children at this school have had less experience with more complex rhythmic patterns their past two years of schooling. Both groups found it difficult to identify \( \text{\texttt{i}} \) and \( \text{\texttt{i}} \).

When analysing harmony results, children at School A scored lower than School B children, when it came to their ability to recognise triads in minor keys. School B children were less likely to be able to identify most two note chords and triads in major keys. Both groups of children had little difficulty identifying chords which contained four notes.

In the area of pitch the children from School B found identifying minor second and minor third intervals more difficult than School A children did. The children from School A were more able to recognise all intervals played, with the exception of a major second. The nine year olds from School A also showed a marked improvement in their ability to hear pitch changes outside what is considered a normal vocal range.

In the area of tonality School B children were more likely to make an error if the first note in a melody was changed or if the changed note was a semitone different from the first. This compares to School B’s pitch results where they found minor second pitch differences harder to hear. Pitch and
melody are intrinsically related and this is good example of that. School A children again showed greater error when a leading note to tonic change occurred, or if the changed note was a tone different. These results again relate to pitch and melody because children in this age group at School A were more likely to make an error if the interval played was a major second.

TEN AND ELEVEN YEAR OLDS

It is at this stage that the results of the two schools begin to differ significantly again. However, due to the similarity in results for both schools for the ten and eleven years age groups, it has been decided to discuss them together. For all areas, except chords, the children at School A scored significantly higher than the children at School B. This researcher believes that this difference in results can be related to both teacher expertise and past music education. Both School A and School B children had little musical education for their first year of schooling (in the case of the ten and eleven year olds) and their second year of schooling (in the case if the eleven year olds). School A children had formal music lessons taken by a teacher with an interest in music, while the only musical education School B children had was taken informally by the class teachers. Both groups of children had qualified specialist music teachers for grades one and two (ten year olds) and grades two and three (eleven year olds). School A children continued with this teacher for the next two years, while School B children had different teachers for each of the subsequent years. As mentioned earlier, these teachers were interested in, though not necessarily qualified to teach
music. The following results can be seen to be a reflection of these music education environments.

In the area of rhythm School A children scored significantly higher than did the children at School B. The error rate for School B children was considerably higher than that of School A children for the following rhythmic figures: \[\ldots\]. The error rate for the ten year olds was higher than that of the nine year olds from School B. The eleven year olds from School B had a lower error rate to that of the ten year olds. The rhythmic figures School A children found it most difficult to distinguish between were triplet and quaver/semiquaver figures. Lack of experience with these rhythms may have contributed to these results, and this may be related to the way rhythm has been taught in the curriculum.

As noted earlier, chords again provided no significant difference in scores. Error rates for both groups were very similar for all questions. School A ten year olds scored fractionally higher than eleven year olds, whereas School B eleven year olds scored marginally higher than their ten year olds. Two note chords containing major sixths and sevenths continued to be difficult to distinguish, as were major triads. Children in these age groups improved in their ability to hear minor triads in all but first inversions. School A children in these age groups found two note chords with a perfect fourth interval more difficult to hear than School B children, and School B children in the ten years age group found four note chords more difficult to distinguish. The
continuing changes in children’s ability to hear different harmonic variations, supports past research which states that harmony is the slowest concept to develop.

The pitch discrimination test continued to show that School A children had a more developed perception of pitch and pitch change. The results were significantly different. School B children in both age groups had much greater difficulty identifying pitch change for intervals of a minor second or third. The number of children identifying these intervals correctly differed greatly between schools with 75 percent of School A ten year old children being able to identify a minor second compared with 54 percent of School B children. Seventy-nine percent of School A eleven year olds could identify pitch change of a minor second compared with 56 percent of School B children. The difference in the ability of ten year old children to hear a minor third interval was 74 percent for School A children compared to 49 percent for School B children. The results for eleven year olds’ ability to hear a minor third interval were, 72 percent of School A children and 50 percent of School B children able to hear this pitch change. School A children still continued to find minor second and third intervals slightly more difficult to recognise compared to the other interval tested, however as can be seen above, a large majority of children were able to hear this pitch change. It could be suggested that the type of singing and listening activities presented to School A children assisted their pitch development. These children began
learning solfa in grade one and two, which helped to develop the acuity in pitch evident here.

The tonal memory results proved to once again be significantly different with School A scoring higher results overall. School B children continue to follow the pattern established by the nine year olds, that of finding it more difficult to identify a changed note when the difference was a semitone. This relates back to the difficulty these children had identifying minor second pitch changes. Children from School A continued to have difficulty identifying a change of a tone in the melodies heard, as well as when the altered note created a leading note to tonic ending. Eleven year olds from both schools did, however, show overall improvement in their results for individual questions, suggesting that their understanding of tonality was continuing to develop.

TWELVE YEAR OLDS

The twelve year old children from School A and School B achieved, for the most part, the highest mean scores of all age groups. The only exception to this was the twelve year old children from School A who scored marginally lower than the eleven year olds from the same school in the area of rhythm. School A achieved significantly better results in all areas with the exception of rhythm where the scores did not differ significantly. The children from School A and School B began music education with a qualified specialist in
grade three and had only received more informal music classes described previously before this time.

The difficulty children in earlier years experienced with rhythms containing triplets and quaver/semiquaver patterns continued for the twelve year olds and in some cases their results were poorer. This was most noticeable for the following rhythmic figures: \(\text{\begin{align*} &\text{\textbullet\textbullet\textbullet}\quad\text{\textbullet\textbullet}\quad\text{\textbullet\textbullet}\quad\text{\textbullet\textbullet}\quad\text{\textbullet}\quad\text{\textbullet}\quad\text{\textbullet} \end{align*}}\). This researcher believes that this may be due to the age at which these children began more specialised music education. As was noted by Lawson, Plummeridge & Swanwick (1994), non-specialists are less likely to teach music reading and notation skills when compared with specialists. If this assertion is applied to this situation then it can be assumed that, on the whole, these children were less likely to experience the above rhythmic figures early in their music education. This may have led to them not achieving the same level of understanding as children who began specialist music education at younger ages.

Although continuing to improve in their ability to distinguish the number of notes in chords, the same type of chords continued to cause problems for the twelve year olds. Two note chords which used large intervals, such as major sixths and major and minor sevenths were difficult to hear. Root and second inversion chords proved difficult for both groups and School B children had a problem with triads in a minor key. Four note chords were
easily heard by both groups with over 80 percent of School A and 75 percent of School B children choosing correctly.

The scores in the pitch discrimination test were significantly different, with School A children achieving better results. The biggest discrepancy between the two schools was again in the children’s ability to hear minor seconds and thirds. Eighty percent of School A children could recognise pitch changes of a minor second compared with 59 percent of School B children. Eighty-seven percent of School A children could hear a minor third compared with 61 percent of School B children. The large differences in these results for most age groups warrant further study to ascertain if factors other than teacher expertise and curriculum design are involved.

6.3 CONCEPT DEVELOPMENT IN CHILDREN.

The aim of this study was to discover whether or not the acquisition of concepts was developmental in nature. To this point, the discussion has focussed on general analysis of what each age group in each school was able to understand. This section looks at the overall picture of development and attempts to put these findings into a developmental outline. The developmental outline is presented as a series of summaries, one for each concept area. This developmental outline includes all concept areas tested and shows what the children know as well as what they don’t know.
These outlines reflect the combined results from both schools and represent what the majority (over 50 percent) of children can and can not identify. Although it is important to remember that there are individual school differences that have been previously discussed, each of the following summaries refers to overall concept development, that is, a profile of primary school aged children in the State of Victoria.

**RHYTHM**

There was an increase in mean scores over the majority of age groups in the area of rhythm. The only exceptions to this were School A twelve year olds and School B ten year olds. For all age groups up to age eleven, the difference in rhythm scores when compared with the age group two years below showed a significant increase in scores. The only group, which did not follow this pattern, was the twelve year old group when comparing them with the ten year olds from the same school. Significant differences in scores for School B children were only apparent up to age nine. Although children aged ten through to twelve achieved greater mean scores than the age group below, after age nine these children were not scoring significantly higher than the age group two years below. The reasons for this were discussed in the previous section.

The majority of six year old children were able to recognise crotchets and quavers. The majority of children, however, found it extremely difficult to identify differences between rhythms containing ‏️/‏️, ‏️/‏️, ‏️/‏️, ‏️/‏️, ‏️/‏️, ‏️/‏️
These children also found it difficult to remember the longer patterns especially when they contained unfamiliar notes. Six year olds had some difficulty recognising when the two rhythms played were the same.

The seven year old children achieved similar results to those of the six year olds. They were able to recognise the same rhythmic figures as the six year olds and had difficulty identifying the more complex rhythmic combinations. The seven year olds’ error rate was lower, which suggests that more children were beginning to grasp some of the rhythmic figures shown above, including same patterns. Their improvement, however, is not so great as to suggest that the majority of children can recognise these figures.

The majority of eight year old children were able to recognise crotchets, quavers and semiquavers. The majority of children had difficulty identifying the difference between rhythm patterns containing \( \text{\textbullet\textbullet\textbullet} \), \( \text{\textbullet\textbullet\textbullet} \), \( \text{\textbullet\textbullet\textbullet} \), \( \text{\textbullet\textbullet} \) and \( \text{\textbullet\textbullet} \). At age eight, children’s memories are continuing to develop and they are more able to remember more complex four beat rhythm patterns. The majority of these children were also able to identify same rhythm patterns.

The majority of nine year old children were able to identify rhythmic figures containing crotchets, quavers and semiquavers, including \( \text{\textbullet\textbullet} \) and \( \text{\textbullet\textbullet} \).
The majority of nine year old children found it difficult to identify
the following rhythmic figures when part of a longer pattern:
\( \frac{1}{2} \), \( \frac{2}{3} \), \( \frac{3}{4} \), \( \frac{4}{4} \) and \( \frac{5}{4} \). The majority of nine year old children
were able to recognise rhythm patterns which were the same.

The ten year old children in this study followed the same pattern with
regards to recognising rhythm patterns as the nine year olds, with the
exception of a same rhythm pattern containing \( \frac{2}{2} \) and \( \frac{3}{2} \). The
majority of children in this age group thought that the semiquaver pattern,
which was on the first beat of the bar, became part of the second beat the
next time it was played. Only 25 percent of students were able to recognise
\( \frac{1}{4} \) and \( \frac{3}{4} \). Twenty-seven percent could recognise \( \frac{2}{2} \) and \( \frac{3}{2} \).

The eleven year old children in this study followed the same pattern with
regards to recognising rhythmic figures as the nine year olds. Forty-six
percent of students were able to recognise \( \frac{2}{2} \) and \( \frac{3}{2} \). Thirty-nine
percent of eleven year olds could recognise \( \frac{2}{2} \) and \( \frac{3}{2} \). These
increases in the understanding of the above rhythmic figures illustrated a
developmental progression in the concept area of rhythm. This improvement
was reflected in the mean scores of eleven year olds’ in general when
comparing them with those of the ten year olds’.

The twelve year old children in this study continued to follow the same
pattern with regards to recognising rhythm patterns described previously.
The twelve year olds, however, showed a decrease in the percentage of children able to recognise $\text{\textcopyright} \text{\textcopyright}$ and $\text{\textcopyright} \text{\textcopyright} \text{\textcopyright}$. Only thirty-five percent of twelve year old children were able to recognise this difference. Forty-six percent of twelve year olds could recognise $\text{\textcopyright}$ and $\text{\textcopyright}$ which showed an improvement on the score of the eleven year olds.

**HARMONY**

As has been mentioned previously, chordal memory produced the most inconsistent results. Mean scores did not necessarily increase at each age level for either school and mean scores were quite low. The only age groups to score significantly different results at School A were the eight to six year olds and the twelve to ten year olds. At School B the only groups to score a significant difference in results were children from the nine to seven and the ten to eight age group. These results show the area of harmony to be the slowest to develop and is the one in which it is the most difficult to predict development.

The majority of six year old children were able to hear chords when only two notes were played together, with the exception of chords which contained a perfect fourth, a minor, or major seventh interval. The easiest chords for them to recognise were played as major seconds, minor thirds, and major and minor sixths. Chords containing three notes were the hardest to recognise, the next most difficult being four notes chords.
The majority of seven year old children were able to hear chords when either two notes (especially, major seconds, minor thirds and minor sixths) or four notes were played together. Two note chords containing a perfect fourth, a major or a minor seventh continued to be difficult to recognise. Three note chords these children found easier to hear, were ones that were first inversion tonic triads, in major or minor keys, which omitted the fifth note of the scale. As was shown with the six year olds, chords containing three notes were the most difficult to recognise, followed by four note chords, with two note chords being the easiest to hear.

The majority of eight year old children were able to hear chords containing two notes with all intervals except for a perfect fourth, and a major or a minor seventh. These children did, however show improvement when compared with previous age groups. Four note chords were also easier for the majority of eight year old children to recognise. Three note chords were apparent to these children when they were first inversion tonic triads in major and minor keys, however, other variations on three note chords continued to be difficult for children to detect.

Nine year old children achieved similar results to those of the eight year olds with two and four note chords being the easiest to recognise. Fifty-eight percent of children in this age group, were able to recognise two note chords with the exception of a perfect fourth, and major and minor sevenths. Seventy seven percent of children were able to identify chords when they
contained four notes. The types of three note chords that these children were able to recognise followed the same pattern as previous age groups. Triads, which were in a minor key in root position or first inversion, and major triads in first inversion were the easiest for children to identify. Other arrangements of three note chords proved to be difficult to hear.

Ten year old children were most able to identify chords containing two or four notes. In this age group children showed the ability to recognise a two note chord containing a perfect fourth interval. There was still an extremely high error rate (81 percent) for major and minor seventh two note chords. Overall, 60 percent of children were able to identify two note chords and 75 percent could recognise four note chords when played. Three note chords followed the same pattern as the seven and eight year olds, with first inversion major and minor triads being the easiest to detect.

Eleven and twelve year old children followed the same pattern as the ten year olds for two and four note chord recognition. The error rate for major and minor seventh two note chords was 77 percent for eleven year olds and 87 percent for the twelve year old children. Forty four percent of eleven year olds and 42 percent of twelve year olds were able to detect two note chords. The ability of these children to identify four note chords continued to be very sound with 75 percent of eleven year olds, and 79 percent of twelve year olds recognising these. Three note chords continued to be the most difficult to identify and in this age group followed the same pattern as the previous
age groups. The only addition to the group of chords these children could
detect was a tonic seventh triad in root position, which omitted the fifth note
of the chord.

Overall, the chords which caused most difficulty for children were three note
chords, especially major and minor root position, second inversion, minor
first inversion with a diminished fifth and root position omitting the fifth, and
adding a diminished seventh. Nine year old children were the only students
who were able to identify root position chords in a minor key.

**PITCH**

Pitch was the most developed of concepts with good increases in mean
scores over most age levels. High scores were also a characteristic of this
concept area. For School A children there was a significant difference in
scores for all age groups up to ten years. The eleven to nine and the twelve
to ten year’s age groups did not score notable differences. For School B,
children up to age nine scored significant differences when compared with
the age groups below, however, the ten to eight, eleven to nine and the
twelve to ten years age groups show a significant increase in scores.

The majority of six year old children were able to hear pitch differences
containing major second, major third, perfect fifth, minor sixth, and major
and minor seventh intervals, but not minor thirds and minor seconds. The
intervals easiest to hear a change of direction in were minor sevenths and
major seconds. The majority of children could distinguish when the two notes played were the same when they were inside that which is regarded as a child’s normal vocal range.

The majority of seven year old children were able to hear all intervals listed for the six year olds, with the exception of minor thirds, and minor seconds. The intervals easiest to hear were major seconds. The majority of children could distinguish when the two notes played were the same when they were inside that which is regarded as a child’s normal vocal range.

The majority of eight year old children followed the same pattern with regards to the intervals which could and could not be recognised by the previous two groups. The majority of children could distinguish when the two notes played were the same whether they were inside or outside that which is regarded as a child’s normal vocal range.

The majority of nine year old children were able to hear all intervals listed previously with the exception of minor third, and minor second intervals. Thirty-two percent of nine year olds were not able to recognise pitch change for a minor second and 45 percent were unable to recognise a pitch change of a minor third. The majority of children could distinguish when the two notes played were the same whether they were inside or outside that which is regarded as a child’s normal vocal range.
The majority of ten year old children were able to hear all listed intervals, however the error rate was still high for minor second and third intervals. Of this group, 35 percent could not hear pitch change of a minor second, while 38 percent could not recognise a pitch change of a minor third. The majority of children could distinguish when the two notes played were the same whether they were inside or outside that which is regarded as a child’s normal vocal range. Twenty-five percent of children in this age group scored a perfect 20.

The majority of eleven year old children were able to hear all intervals tested. Of this majority, 68 percent could hear pitch change of a minor second, while 61 percent could recognise a pitch change of a minor third. The majority of children could distinguish when the two notes played were the same whether they were inside or outside that which is regarded as a child’s normal vocal range. Eleven year olds’ scores improved upon those of ten year olds’, with 29 percent achieving a perfect score.

The majority of twelve year old children were able to hear all listed intervals. The number of children being able to identify pitch change of a minor second or a minor third continued to improve with 70 percent of children able to hear pitch change of a minor second, while 74 percent could recognise pitch change of a minor third. Twelve year olds’ scores improved upon those of ten year olds’, with 31 percent of children scoring 20 out of 20.
TONALITY

The area of tonality showed the good overall development for both schools. The children from School A showed the most marked improvement with each age group scoring significantly higher than the one, two years prior. The children from School B continued to demonstrate the same pattern as they did for rhythm and pitch with children up to age nine being the only ones to score significantly different scores when compared with the age group two years below. Tonality was the most difficult area to summarise according to age due to the very different error patterns shown by children at the two schools. The following summary is, therefore, more general in nature than any of the preceding sections.

Overall six year old children were more able to identify a change in a melody if that difference was of a semitone. This indicates that when the changed note fell outside the diatonic framework of the melody the children were more able to identify it. The error rate for six year olds was high, with 64 percent of children unable to hear a change of a semitone and 76 percent of children unable to hear the change of a tone. The questions that elicited the highest error for six year olds were ones related to a tonal change, that is the changed note changed the melody to a more 'correct' tonality. For example, in one case, the changed note produced a leading note to tonic ending which the children noticed and, therefore, it can be argued was familiar to them. This familiarity may have led them to forgetting that the first tune had a different ending. The experience of Western music directly
influenced their decision making processes. Their experience with major and minor tonality also played a part in error rates as children in this age group were unable to hear a difference in a melody when the changed note altered the tonality from minor to major, even when this note fell outside the diatonic framework. Again it can be argued that unfamiliarity with major and minor modes at this age may have influenced these results.

The seven year olds in this study achieved very similar results when comparing their ability to identify changes in melody of a tone and a semitone. Sixty seven percent of children were unable to identify a change of a semitone and 69 percent of children were unable to recognise a change of a tone. The questions which produced the highest error rate were again those where the ending became a leading note to tonic one or the overall tonality was ‘corrected’, or ‘Westernized’ by the changed note. Again note differences which produced a change in tonality from minor to major elicited high error rates.

The eight year olds showed a marked improvement in their ability to recognise change of a semitone, with 50 percent of children choosing the correct answer, overall. Identifying changes of a tone was still more difficult with 64 percent of children unable to identify this change. The questions that elicited the highest error rate followed the same pattern as those for the previous two age groups. There was however an improvement in this area with approximately 30 percent of children being able to recognise the
tonality changes discussed previously compared with approximately 20 percent in the preceding age groups. The eight year olds are the first group to begin to show a better understanding of major and minor tonality due to a lower error rate for the questions relating to this type of tonality.

Nine year old children showed improvement in their ability to recognise both tone and semitone changes to a melody. Fifty-eight percent of nine year olds could identify change of a semitone and 46 percent could identify change of a tone. The ability to recognise the tonality changes discussed previously continued to improve with approximately 40 percent of students able to identify a note change even though it produced a cadential ending or a more ‘correct’ tonality. Their ability to recognise minor to major tonality change was slightly better than for those children in the eight year old group. This age group was also the first to have children who scored a perfect ten out of ten for this test. These results show that a child’s discrimination becomes more acute as they mature and participate in a wider range of musical activities. These particular groups of children are also the ones who had a specialist music teacher for their first two years of schooling, which may also be an important factor to consider.

Ten year olds scored very similar results, overall, when compared to the nine year olds. The mean scores of these two groups differed by only 0.03. Fifty-eight percent of children were able to recognise changes of a semitone and 41 percent were able to recognise changes of a tone. The ability of ten
year olds to recognise differences when confronted with changes to cadential endings and ‘correct’ tonality worsened, with around 30 percent being able to recognise changed notes in these instances. In contrast to the above worsening of results, the ability of these children to identify a changed note when related to minor/major tonality improved. It should also be noted that not one of the 119 children included in this study, who completed the tonality test, was able to score ten out of ten.

The eleven year olds in this study showed very good improvement in their ability to identify change of a semitone in melody when compared with the ten year olds. Sixty four percent of children were able to identify changes of a semitone and 45 percent were able to identify changes of a tone. Approximately 40 percent of children were able to recognise a note change when it related to a new cadential ending or a change in the tonal framework. The score range for this group was from one to ten which is also an improvement. This is the first age group in which no child scored zero.

Twelve year olds continued to show very good improvement in their ability to identify change in melody with 74 percent of children being able to recognise a semitone change and 54 percent being able to identify tone change. The majority of children in this age group have begun to develop a good understanding of tonality and are able to hear melodic changes in music. The children in this age group are able to remember the way that each melody sounded and identify any changes made. They are less
confused by changes to the cadential ending and can readily identify notes which, when changed, fall outside the diatonic framework of the melody. Twelve year old children also have a very good grasp of the difference between minor and major tonality, which can probably be related to both maturational and experiential factors.

6.4 DEVELOPMENTAL PROFILE.

The results from this study have shown that the acquisition of musical concepts are related to development in children. The above findings can be directly related to the definition of development discussed earlier in this study. The first part of the definition stated that “development is the acquisition of new understandings at different ages” (p.12). The results in this study have shown, through the overall increase of scores, that children do acquire new understandings of musical concepts as they mature.

The definition continues with “this type of development is fairly sequential with one stage of understanding preceding the next. This development is inclusive with each stage complementing the other and providing a basis of knowledge on which to build understandings”. This type of development is shown in the way that children begin by showing an understanding of a component of a concept and then continue to build upon this knowledge base. One example of this type of development can be demonstrated in the concept area of rhythm. Children begin by showing an understanding of simple rhythmic figures such as a quaver and a crotchet.
They use this knowledge base to build up their understanding of rhythm and as they gain experience in the use of these figures they start to add more complex ones to their ever increasing rhythm vocabulary.

The final part of the definition states that "development is not uniform and takes place according to individual patterns in each child". This statement is demonstrated by the score ranges shown for each concept area. Within each age group there was a large range of scores, with some children having a very sound understanding of a concept and others having little understanding.

The following table illustrates the order in which this study has found that children develop musical concepts in rhythm, harmony, pitch and tonality. The ages at which the majority of children understand various components of each concept area has been discussed previously. This discussion has noted differences between schools and has also provided an overall picture of concept development. Table 6.1 shows the order in which children seem to acquire the different components of these concepts. These results are based solely on the evidence collected during this study and provide a developmental outline for these subjects. As noted in the methodology chapter, it is hypothesised that the large number of subjects used for this study allows this researcher to put forward the presumption that these results can be translated to a larger population, that of primary aged children in the State School system in Victoria.
The table below only refers to the components of the concept areas that were tested by Bentley's *Measures of Musical Ability*. Analysis of other components of concept areas is not within the scope of this study. It is the researcher’s belief, however, that Table 6.1 gives a very comprehensive view of a large number of elements that are important parts of a primary school curriculum. These elements should be included in all music education curriculums, and teachers should be made aware of developmental aspects of these.

**Table 6.1 Developmental profile for the concept areas of rhythm, harmony, pitch and tonality.**

<table>
<thead>
<tr>
<th>CONCEPT AREA</th>
<th>DEVELOPMENTAL PROFILE</th>
</tr>
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| RHYTHM       | Children are able to show an understanding of rhythmic figures in the following order: 
|              | ![Rhythmic Figures]     |
| HARMONY      | Children seem to acquire the ability to recognise certain two note and most four note chords at around age eight. Chords most easily identified as containing two notes include: intervals of a minor third, major second, perfect fifth and minor second. More difficult two note chords include ones with an interval of an augmented fourth, perfect fourth, major sixth, minor seventh and major seventh. The order of recognising triads includes: first inversion minor, first inversion major, second inversion major, second inversion minor, root position major and root position minor. |
| PITCH        | Children are able to recognise pitch in the following developmental order: same pitch, major third, major second, minor sixth, minor seventh, major seventh, perfect fifth, minor second, minor third. (The intervals of a major sixth and perfect fourth were not tested for this study due to the design of the Bentley tests. It is reasonable to postulate that these intervals are acquired prior to those of the minor second and third). |
| TONALITY     | Children are first able to hear changed notes when they fall outside of the diatonic framework of a melody. Children then develop the ability to hear changed notes that stay within the diatonic framework. An understanding of major tonality develops before minor tonality. This understanding of tonality is firmly grounded in a Western musical idiom. |
6.5 FACTORS INFLUENCING DEVELOPMENT

A large part of a child’s musical development is maturational. The results have shown that even with varied music education experiences, children still show an accumulative development in their acquisition of musical concepts. The results, however, have also indicated that other factors assist with a child’s ability to progress through developmental stages and that these factors will help children to acquire knowledge at an increased rate. The two main factors, which will be considered in this section, are those of teacher experience and expertise, including the age of commencement of musical education, and curriculum.

TEACHER EXPERTISE

The results discussed previously definitely indicate that children who have had the experience of learning music from a specialist (i.e. qualified) music teacher had a better grasp of concepts than those children who did not. The overall better results of the children from School A indicated that having a teacher who was a music specialist increased their ability to understand the concepts that were tested. This better understanding of concepts was especially noticeable in areas such as pitch and tonality, where specific teaching must be undertaken to improve these areas. Pitch improves with exposure to singing and exploring tuned instruments, noticing high and low sounds both in a music room and the environment. Pitch and tonality are also related. Children need to learn how melodies move, the shapes they make and their relationship to pitch. Learning about scale systems also
exposes children to different tonal modes. A teacher needs technical expertise in these areas to help children to fully utilise and understand them. The technical side of music can be daunting for a teacher who has not had exposure to it, just as it can be daunting for their students. Aesthetic experience is equally as important, but as this researcher has argued previously, both concepts and aesthetics need to be taught. It can be contended that a teacher with this background would have the necessary skills to optimise musical development.

The results also indicated that children who began their music education in their preparatory year or in first grade had a better grasp of concepts than those children who began later. The only time when the two schools’ results truly converged were in those age groups where the children both had a music specialist in their initial years of schooling. This factor was also a consideration in the seven year olds’ results. The seven year old children at School A scored significantly better than the children at School B in all areas except rhythm. This could be attributable to the fact the School A children had a specialist in their preparatory year, whereas the children at School B did not. These results again point to the fact that children who have a music specialist for their first year of schooling showed greater levels of development than those whom did not.

Teacher expertise is a difficult issue to address in the State School system, because music is not being given the importance that it should, therefore
having specialised teachers is not seen as a priority. A recent newspaper article reporting on a joint project *The Place of Literacy and Numeracy in the School Curriculum* noted that “reduced hours allocated to teaching the arts... over the past three years is a cause for concern” (Jones, 1999:6). This lack of importance being placed on the arts means that often the role is given to a teacher with little or no expertise on a part-time basis. Continued teacher reductions in the State system, throughout the writing of this study has meant that schools are choosing to close down or reduce specialist areas in order to decrease class sizes. Considering that music is important due to its ability to significantly impact on personal and social growth (Jones, 1999:6), it is a failure of the system to, firstly, provide enough human resources to teach this area and secondly to fail to attract specialised staff.

Comparing the State and Independent system’s job descriptions for music positions, it can be seen that Independent schools only employ music teachers who have formal qualifications in music, whereas State schools will employ, as a music teacher, a person who may not have formal qualifications in music. Paynter (1997) states that “what we teach we must be able to do” (p.18), in other words music educators must also be musicians, so that they are able to impart knowledge about all facets of music, whether concept based or aesthetic to their students. The study by Lawson, Plummeridge & Swanwick (1994), mentioned earlier, noted that teachers without specific expertise in music were reluctant to teach the reading and notation of music, listening to and discussing music, as well as
the exploration of a wide range of sound sources. It is therefore this researcher's assertion that children who are taught by a specialist music teacher will achieve a better understanding of music and all its parts. It is also this researcher's contention that children should begin their music education in their preparatory year of school, if not earlier.

**CURRICULUM DESIGN**

Curriculum design also influences a child's musical development. The current Department of Education CSF document allows schools to plan and implement their own curriculum. In music, as with all other subject areas, this differs from school to school. Music, however, is one subject area where effective methodologies have been designed in order to fully develop musical ability in children. The Kodaly and Orff methodologies mentioned previously, are just two of these and they are probably the most widely used by music teachers. It can be hypothesised that the similarity in results of the eight and nine year old children from both schools is related to the similar methodologies used by the music teachers.

Both of these qualified music specialists used the Kodaly and Orff methodologies as the basis for their programs. Although there would have been differences in teaching style and curriculum content, both groups of children were receiving a very similar grounding in the basic concepts of rhythm, pitch and melody. Orff methodology "is based on rhythmic and melodic improvisation" (Hargreaves, 1986:221), while Kodaly methodology
emphasises the voice, as well as learning to “read and write music notation from the earliest years” (Hargreaves, 1986:222). By combining these two methodologies, children are being exposed to all of the basic concepts required to develop as musicians. These methodologies also combine concepts and aesthetics in their approaches.

The children at School A continued to benefit from these methodologies as they moved into the subsequent age groups, whereas the children from School B were taught using curriculums which were based on the teachers’ strengths and did not necessarily provide a comprehensive curriculum in music. The results reflect this difference in curriculum and teacher expertise in the ten, eleven and twelve year’s age groups, where the children at School A began showing significantly better results in all areas, with the exception of chordal memory.

A comprehensive music curriculum must take concept development into account. Even whilst schools develop their own curriculums, they should be made aware of the developmental capabilities of each age group. Children are expected to achieve benchmarks in literacy and numeracy, so why not music? It is possible to develop indicators for music concepts to which teachers can refer. This researcher is not advocating that these indicators be prescriptive nor should children be tested on a statewide basis, however, as pieces of information, they could be invaluable to music educators who are looking for curriculum direction. Aesthetic experiences are also important to
music education, however, this area is covered quite extensively in the current curriculum guidelines.

6.6 FACTORS AFFECTING RESULTS

TEST DESIGN

The overall test design worked well for children aged eight and over. There were only a very small number of children in these age groups who had difficulty using the answer sheets. Children in the six and seven year old age groups found the test design more difficult and a number of children were unable to grasp the concept of circling an answer and moving down to the next question. Absences also affected results, in that as the tests were given over a number of weeks, if a child was absent for one of the tests then that child’s set of tests were discarded. Children aged eight years and above found the test sheets easy to use and they had a high successful completion rate. If ever revising this testing procedure, this researcher would use small group or one-to-one testing with the younger children in order to get a larger number of useable tests.

The tests themselves were easy to administer and children understood what was required of them. It would be interesting to extend the tests into other music concept areas, such as expression (tempo and dynamics) and analyse these results. This researcher believes that redesigning the chordal memory and tonal memory tests would be of benefit and would more accurately pinpoint stages in development.
6.7 SUMMARY

The aim of this study was to investigate whether the acquisition of music concepts was developmental in nature. This study has shown that music concepts are developmental in nature and focusing on elements such as teacher expertise and curriculum design can enhance that development. The following summary outlines the findings of this study:

1. The acquisition of music concepts is developmental in nature and as children mature they gain a greater understanding of these concepts.

2. The acquisition of concepts can be placed into a developmental framework.

3. Teacher expertise and curriculum design, affects a child’s musical development.

4. The initial years of schooling are critical to a child’s musical development.

5. Concepts develop in the following order: pitch, rhythm, melody, harmony.

The following chapter summarises the study to date and lists recommendations for further study.
CHAPTER SEVEN

CONCLUSION

Nothing is more characteristic of human nature than to be soothed by sweet modes and stirred up by their opposites. Infants, youths, and old people as well are so naturally attuned to musical modes by a kind of spontaneous feeling that no age is without delight in sweet song.
Boethius

7.1 INTRODUCTION

The aim of this study was to find out whether the acquisition of concepts, particularly rhythm, pitch, harmony and melody, can be directly related to development in children, specifically primary aged children in State school system in Victoria. A review of the literature available outlined the meaning of development and this researcher developed a definition for use in this study. Developmental theories and their use in music, including those of Piaget, Gardner, Gardner, Phelps & Wolf and Swanwick & Tillman, were discussed. Past research in the development of concepts in children was then reviewed and a summary of this development was presented. The effect of teacher expertise and curriculum on music education was examined and an analysis of past and present curriculum documents used in the Victorian Government School system occurred. An outline of methodological approaches to music education was then presented and the reasons for choosing an experimental design were explained. The reasons for the selection of the test Measures of Musical Ability, and the procedure used to administer it was also described. The results showed that development in the acquisition of concepts did indeed occur in all age groups in both
schools. The previous chapter discussed in detail these findings and the reasons for them. Finally the conclusions drawn were related directly to the stated aim. It was found that the acquisition of music concepts in children is developmental in nature and that this development can be influenced by other factors, such as teacher expertise and curriculum design.

7.2 FINDINGS RELATED TO PREVIOUS RESEARCH

In Chapter Two developmental theories which related to music were discussed. These theories were written by Gardner (1973), Gardner, Phelps & Wolf (1990) and Swanwick & Tillman (1986). As this study has also put forward a developmental profile based on the results gained from children, it is important to relate these findings to previous research. This study differed from those listed above as it was based on results of children’s tests and concerned only with the musical concepts of pitch, rhythm, tonality and harmony. The developmental profile was designed to show the path children use as they develop further understandings of music concepts. It is not meant to be prescriptive, but offers an indication of one possible developmental route for children.

Gardner’s (1973) theory concentrated on musical understandings in a similar way to this study, even though he states that it is based on making, feeling and perceiving systems of aesthetics. However, as noted previously, this theory actually describes music in cognitive terms. Gardner’s theory did not focus specifically on concept areas, rather he suggested that children are aware of musical concepts as early as two months of age. Gardner also states that by the age of six there is little further musical development. This study although concept based in nature, disagrees with this statement as it
has been argued that a large amount of development in the understanding of concepts takes place between the ages of six and twelve.

The developmental theory of Gardner, Phelps & Wolf (1990) concentrates more on the dimension of creativity rather than that of musical understanding. However, when reviewing the three stages of the theory, it can be suggested that the importance of the dominant musical code, that is the type of music to which children are most exposed, is a significant feature of this theory. This current study supports the idea of development related to the dominant musical code, that is the music a child is exposed to within their culture, especially in the concept areas of harmony and tonality. The exposure to Western musical idioms definitely affected the way children perceived test items in this study. The theory by Gardner, Phelps & Wolf also notes that development is based on internalising previous understandings and this aligns with the findings in this current study.

The developmental theory of Swanwick & Tillman (1986) is based wholly on musical development. Their theory also acknowledges the need to take previous learning into the next stages of development. Swanwick & Tillman discuss the concept knowledge referred to in this current study as part of conventional music making and note that it emerges around the age of four years and continues to develop from there. They focus mainly on the child’s use of melody and rhythm from the ages of four to eight years, but do not go into detail regarding the parts of melody and rhythm most used. This current study is more detailed in its discussion of the parts of concepts that children acquire at specific ages when compared with Swanwick & Tillman’s theory.
As well as relating this study to past developmental theories, it was also important for this researcher to compare findings from previous concept based research. This study found that pitch and rhythm were the first concepts to develop followed by tonality and harmony. This order of development is supported by the research quoted in *A Guide to Music in the Primary School* on page 29 of this study.

Cooper (1994) found that children were more able to detect difference in pitch but not necessarily the direction of pitch change. This was supported by this study with younger children acknowledging differences in pitch but finding direction of change more difficult to identify, especially with intervals of a minor second and third. Although this study did not analyse confusion with tonal direction due to use of the words *higher* and *lower*, and *up* and *down* in the instructions, it is suggested that using visual cues for direction, in the form of arrows, was less confusing for children when choosing their answers. All studies referred to agreed that the ability to recognise pitch change improved with age, a finding supported by this study.

The studies referred to relating to rhythm did not specifically investigate children's perception of rhythmic figures. This study did, however, concur with the findings of researchers such as Pflederer-Zimmerman (1964), Bentley (1966) and Demorest & Serlin (1997) who found that a child's general ability to understand rhythm increases with age.

The test of tonality used in this study supported Lamont and Cross' (1994) assertion that the diatonic scale plays an important part in the recognition of
tonality for children exposed to Western music. This study also supported Bentley’s (1966) findings, that notes outside the diatonic scale were the most easily recognised by children. Bentley also noted that the serial position of the changed note was influential, something that was not supported by this study.

In the current study, the concept area of harmony was found to be the slowest to develop with triads in root position being the hardest chords for children to identify. This result is supported by the work of Moore (1994) who indicated that children find the middle pitch of triads the most difficult to hear. The confusion children face when hearing triads in root position is thought to be due to the closeness of the three pitches. Certainly children in this study did find it easier to detect three note chords when in first or second inversion.

Therefore, after comparing findings from this study with previous research, it can be seen that there have been some similarities in the research. This study has also put forward some new ideas with regards to specific components of musical concepts and how they relate to development in children. It is now important to look at limitations to this research and to put forward suggestions as to future research.

7.3 LIMITATIONS OF THIS STUDY AND THOUGHTS FOR FURTHER RESEARCH.

This study was limited to two schools in the State of Victoria. These schools were quite different, in that one was situated in a rural area and the other in a fast growing urban area. The socio-economic status of students, the
multicultural background of students and the educational programs provided in music education also differed. This therefore limited the study to these particular students, with their specific backgrounds and experiences. Although this provided a good cross-section of students for the testing used, an extension of this would be to include students from schools with different characteristics. Future research could include students from small rural schools, less multiculturally diverse urban schools and multiculturally diverse rural schools in the State system. Comparing Independent schools could also further the understanding of the type of development which takes place in students in their acquisition of music concepts.

This study tested a large number of students and statistically the results that were achieved could be translated to a population of State school students. However, broadening the study in the future to include more students from diverse backgrounds would increase the accuracy of the overall picture of development. While this study provides a good snapshot of development, this understanding would be further enhanced through a larger study.

This study was undertaken in a short time frame and the students were tested once only. This gave a good overall outline of the development of students at different ages within a school. In order to gain a fuller understanding of the development of the acquisition of music concepts a longitudinal study would be beneficial. This type of study would track the development of students over a number of years and the type of development each group of students experienced could be measured.
The previous chapter discussed the factors which influenced the test results, specifically that of test appropriateness. It was concluded that young children would produce more useable results with a change in the test design, that is moving away from group testing to more individualised testing. In addition, it would be beneficial to enlarge the terms of reference of the study and include more concept areas. This study focused on only four music concepts. To link in with the suggestion of a more longitudinal study, an enlarged test battery to include other concept areas while studying the use of concepts in children’s compositions would also be useful in documenting a more detailed picture of the musical development of a child.

In conclusion, the results in this study illustrated development in the area of music concepts. This indicates that the design of the study achieved its aim - to measure development in music concepts in primary aged children. However, in order to achieve a more comprehensive and detailed picture of development, further research along the lines suggested above should be undertaken.

7.4 RECOMMENDATIONS

The following section outlines recommendations which this researcher believes have arisen from the conclusions drawn in the preceding chapter.

1. Music should be seen as an area of profound value in the educational system, and State schools should be encouraged to maintain music as an important subject area.

2. Curriculum guidelines should include information about the development of concepts in children.
3. Concepts should be given the same importance as aesthetics in a music curriculum.

4. Teachers who teach music should be given support and training (especially non-specialists) and where possible qualified music specialists should be employed by State schools.

5. Significant resources must be allocated to State schools to employ suitably qualified music teachers, that is those with a major study in music and also to the Universities who train teachers.

6. All children should begin formal music education in their preparatory year at school in order to give them the best possible developmental start.

7.5 SUMMARY

Music is an art through which children communicate and explore their feelings. Helping children to explore to the best of their ability means finding a balance between concepts and aesthetics and teaching both effectively. Understanding how children acquire concepts will assist music educators to promote this balance. With the tools at hand, children can continually break boundaries which may have held back their expression and fully explore their musical expression and ability.

Like everything else in nature, music is a becoming, and it becomes its full self, when its sounds and laws are used by intelligent man for the production of harmony, and so made the vehicle of emotion and thought.

Theodore Mungers
REFERENCES


Jones, C. Call for more Arts and Science at School. In *The Age,* April 13th, 1999.


APPENDIX A:
MEASURES OF MUSICAL ABILITY TEST ITEMS

A.1 RHYTHMIC MEMORY TEST.

A.2 CHORDAL MEMORY TEST.

Chord Analysis Test
A.3 PITCH DISCRIMINATION TEST.

A.4 TONAL MEMORY TEST.
## APPENDIX B:
### TEST ANSWER SHEETS

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# Appendix C: Percentage Errors for Each Test by School

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Author/s:
MCKAY-BROWN, LISA

Title:
The development of music concepts in the primary school aged child: a Victorian profile

Date:
1999

Citation:

Publication Status:
Unpublished

Persistent Link:
http://hdl.handle.net/11343/39459

File Description:
Text

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