

Music, Learning, Motivation, and Achievement in the Lives of Children and
Adolescents Over 10 Years

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ABSTRACT

Music is important in the lives of adolescents, and musical skills are highly regarded. However, most people, particularly in Western society, emerge into adulthood with mediocre skills, despite having a mandatory school music education provided to them, and, in many cases, several years of informal learning. Why is it that some people are able to persist through difficult, boring practice and acquire impressive and rewarding musical skills, while others do not, but wish they had? This thesis examines some of the major explanations for sustained motivation in music, as well as providing empirical foundations for a theoretical framework based in self-determination theory. The studies took advantage of an opportunity that arose to examine participants involved in a previous 3-year longitudinal study, to find out about their music learning experiences and motivation over a ten-year period. The approach to the study was pragmatic, taking data that had previously been gathered, studying the potential to explain music education further, and developing research questions according to the kind of data that could be gathered from the sample. Results supported some of the previous findings in the study, namely that commitment and practice are key ingredients for ongoing success in music learning. The study also found that greater feelings of fulfilling three basic psychological needs—competence, relatedness, and autonomy—appeared to result in ongoing motivation, while participants who ceased experienced less of these feelings and more of the feelings being thwarted around the time they ceased learning.

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1. INTRODUCTION

This thesis is a contribution to knowledge about music learning, motivation, and achievement. Music teachers, learners, and parents all have a vested interest in knowing about these matters because of their awareness of perceived and actual benefits of music education. These benefits range from the personal feelings of accomplishment in developing one's own abilities, to the social benefits of being able to perform and participate in group music making, to the advantages conferred by music learning to general intelligence. However, the ability to initiate and sustain the many hours of practice necessary to acquire an impressive level of skill remains something of a mystery to researchers and lay people alike, and as a result, a rich popular psychology of music education has developed.

Somewhat related to this is the popular psychology maintained by parents and teachers who develop their own theories about the best way to help motivate their children to sustain practice. Literature reviewed in this project shows that some parents believe it is appropriate to reward their children with a monetary allowance based on the amount of musical practice they do, in order to help their child to eventually become a better musician. Others heavily regulate the nature of the practice sessions themselves, instilling principles such as "It is a good idea to do everything *twice*." Some parents, after a period of time in which they believe their children have not achieved much, withdraw their support for the child's music learning completely, believing that the child is simply not gifted enough to become a competent musician. Music teachers have their own theories, too: in New South Wales, for example, in an attempt to draw music learners to classes in year 9 when music becomes an elective course rather than a mandatory course, many teachers focus on *fun*, believing that students will, as a result, be more likely to take up a fun subject as compared to a boring subject. Since these folk theories may or may not be correct, and given that so many people follow them, and that they are diverse and often conflicting, they need to be subject to scrutiny in a more scientific manner.

Beliefs and values, regardless of their validity or truth, have substantial consequences, for they are the basis on which teachers, parents, and even students behave in relation to music education. Unfortunately, music education research has not

yet been able to provide empirically verified theoretical approaches to clarify this popular psychology. While recent findings in music education shed light on the nature of quality music practice, they do little to explain the ‘motivational constraint’ pointed out by Ericsson (1993) as a critical component in the acquisition of expertise. There also remains little knowledge about more common music education outcomes: those who cease learning and playing music within a very short time from commencing, and those who learn for several years and attain some level of competence, but who choose not to continue. While there may be complex genetic factors contributing to levels of sustained motivation or various innate abilities related to the perception and cognition of music and sound, a single explanation focusing on genetic capabilities for innate musical skills is hopelessly inadequate.

Some people go through schooling and initial years of music education and achieve high levels of musical competence which they find very rewarding. Others do not, and cease learning within a few years, or find school music inherently unenjoyable. This would not by itself be a problem, except for the vast number of adults who, reflecting on their childhood, wish they had been exposed to a greater quality music education. Of course, a large proportion of the population will not hone music skills for extended periods to the point where music performance will become a significant part of their adult lives. But it appears that many people believe they deserve a chance to. Focusing on motivation while examining a range of music education outcomes will help to shed more light on the nature of music education, its impact on people’s beliefs and values, and why people are motivated to initiate and sustain music learning.

A project launched in 2007 gave me the opportunity to address some of these as yet unanswered research questions. The project, titled *Music in our Lives*, set out to follow up on 157 students who had commenced learning a musical instrument in a primary school band program and participated in a longitudinal study, called *Child to Musician*, 10 years prior. As a researcher on this project, I saw the opportunity to apply more contemporary theoretical frameworks to the sample. The opportunity involved being able to look at some of the original data alongside current data, and it seemed apparent that this could help to begin addressing some of the research questions outlined above. The approach to the study is therefore based on capitalising on opportunities presented by the existing sample. In developing the study methods and techniques, the main guiding question was, “what can this sample of 157 participants, about whom much is

known of their first 5 years of music learning, tell us about the experience and outcomes of music education?”

To address this question, it was first necessary to assess the current research climate and to be best informed of the constructs worth examining. In this way, the review of literature had a particularly important function. The commencement of the study in 1997 was at a time when music education was undergoing substantial changes, developing theories, and adopting frameworks from other areas of educational psychology. In the subsequent 10 years and since then, developments in the areas of expertise, competence, and motivation have seen sophisticated theories and methodologies develop which are more useful in examining motivation for music learning over a span from childhood through to young adulthood. Chapter 2 reviews the literature broadly related to the areas of the study, including research findings that have been published alongside the development of the project.

Another key step toward developing the research questions was to take stock of the findings from the initial 5-year longitudinal study. Different aspects of that project had been examined by individuals often working separately, and the findings of these analyses were published in various venues. The collected data related to broad-ranging topics, such as cognitive strategy use, parent-child relationships, and motivational commitment. An important part of *Music in our Lives* was therefore to examine and synthesise these findings—to find out what they say about the study itself, and what they say about music education—before proceeding to identify gaps and areas that could be built upon. Such a synthesis of work in this particular project is unprecedented and represents a statement about one of the most significant music education research studies ever undertaken in Australia. This examination of the study forms Chapter 3.

One pathway for students commencing a traditional school band instrument is to continue learning that instrument for several years under the tutelage of a private teacher. Many students from the original sample had continued their music learning in this way. One of the common measures of achievement in this activity is the examination system prescribed by the Australian Music Examinations Board (AMEB), similar to Associated Board or Trinity College systems operating in Australia, England, and other countries. Under these examination systems, students present a performance exam of approximately 30 minutes, consisting of technical work and 4-6 pieces of music selected from an approved list. The examinations system therefore functions to provide the curriculum of many private music learning situations. Many of the findings

of the initial part of the study projected a relationship between music achievement and many motivational and environmental factors. One way of testing these findings is to analyse the original data in relation to students' musical achievement as measured by AMEB grades. This analysis forms the basis of Chapter 4 and provides a case-in-point challenge to some of the claims made by previous research about music achievement.

Considering the findings and the current motivation literature, one theoretical framework was considered particularly important—that of *self-determination theory*. One of the major tenets of self-determination theory posits that the fulfilment of three psychological needs—competence, relatedness, and autonomy—is vital for well-being. Individuals are more likely to pursue activities that fulfil these needs, and avoid activities in which the fulfilment of these needs is thwarted. Chapter 5 outlines a part of the study dedicated to the development of a basic psychological needs scale relevant to music activities, and evaluates the validity of the theory in music activities by comparing the fulfilment of psychological needs in various music education contexts.

The analyses of the data raised many methodological and theoretical issues surrounding the research questions. While some of the findings were unsurprising in the sense that the evidence supported the hypotheses, some of the analyses were not supportive of the findings made by previous examinations of this sample and other music education research studies. Chapter 6 outlines a discussion of the findings and some of the methodological and theoretical issues that they raise, and explains some of the implications they have for future research as well as the practice of music education.

This study is significant because of its rigorous examination of beliefs, values, and experiences that develop over a large and important part of the life span. Beliefs about music education that are held into adulthood are important because they form much of the basis of behaviour. Parents, for example, who do not believe music education to be important or useful, and who have not had a rewarding music education themselves, are unlikely to provide music education opportunities for their own children. Previous research has pointed out that beliefs and values are formed early and are resilient, but there is little explanation or evidence of how they are formed. This study contributes to the research literature by addressing part of this problem. In a society with relatively poor music outcomes (Sloboda, 2005), where the standard of school music education is well below what it could be (Pascoe et al., 2005), and where the writing of a national curriculum (ACARA, 2010) calls into question the nature of a quality music curriculum,

knowledge about what contributes to successful music learning, broadly defined, is vitally important and of national significance.

2. REVIEW OF LITERATURE

This review of literature reflects a range of research approaches and findings relevant to the issues of music learning. It focuses on those studies that have findings related to work that has been completed in the *Child to Musician* and *Music in our Lives* projects, as well as studies of children's motivations to study music, regulation of practice and learning activities, values and attitudes related to musical achievement, and social interactions related to music learning. The scope of this literature review extends to the areas of research in music education and educational, cognitive, and music psychology. Substantial discussion of the *Child to Musician* and *Music in our Lives* projects is omitted from this chapter: a greater focus is given to reviewing those studies in detail in Chapter 3.

The literature review is presented in three sections. In the first section, research is reviewed that relates to initiating and sustaining motivation to play an instrument. The literature is reviewed under the headings of beliefs, strategies, and social interactions, with overlapping areas noted throughout. This overlap reflects the complexity of the social-cognitive model, where bi-directional relationships exist between cognition, environment, and behaviour (Bandura, 1977).

Beliefs and Values Underlying Motivation

Motivation is the explanation for what causes children to initiate and sustain learning on a musical instrument. Sustaining motivation over a long period of time requires a process of moving from a state where activities are determined by others or motivated by extrinsic rewards to a state where goals are self-set (McPherson & Zimmerman, 2002) and activities are pursued for their intrinsic value (Deci & Ryan, 1985). *Beliefs* play a substantial role in this process, reflecting the importance of the cognition element of Bandura's model of triadic reciprocal determinism. They are the focus of this section, which reviews research concerning the way beliefs influence conscious and unconscious decisions to engage in future behaviour.

Students are motivated in part by underlying beliefs about ability in general and about their own ability to perform tasks in a given domain. According to attribution theory (Weiner, 1985), individuals adopt one of two theoretical positions through experiences in learning: an *entity theory*, believing that their ability is determined by fixed, unmalleable factors, or an *incremental theory*, believing that their performance in a task is primarily due to their efforts and their use of strategies in preparing for it. These underlying beliefs about ability influence behaviour in important ways related to learning (Elliot & McGregor, 2001). Entity theorists, for example, are likely to adopt performance goals that are well within reach and result in positive experiences of success. Incremental theorists, on the other hand, are likely to adopt challenging goals, because they believe that they can put effort into achieving them, and in the face of failure, they attribute their performance to poor strategies or misguided efforts which they can adjust in the future. Comparing outcomes between the two theories, it seems that incremental theorists are more likely to have successful outcomes.

In relation to music learning in western school contexts, however, people may be more likely to be entity theorists. In one study of elementary and secondary students, 80% of the reasons cited for success and failure were due to fixed, rather than changeable factors (Asmus, 1986). In a study by Vispoel and Austin (1993), high school children were presented with a description of the failure experience of a fictitious music student and asked about the student's likelihood for success in the future. The researchers observed that incremental theorists were more likely to anticipate future success for the hypothetical student than the entity theorists. Similar results were found when the same investigators studied actual experiences of high school students (Austin & Vispoel, 1998). Smith (2005) studied the attributions of college instrumental music students, and observed that incremental theorists approached their practice with a broader range of practice strategies than entity theorists.

Attributions can have drastic and enduring effects. In a study of adults who referred to themselves as *unmusical*, Ruddock and Leong (2005) found that this label had developed early in life following unsuccessful or embarrassing attempts at learning a musical instrument. The attribution led to these individuals self-imposing bans on future participation in music activities such as singing or playing an instrument. Whidden (2008) investigated similar cases in the narratives of twelve self-declared adult *non-singers*. She found that in all cases, the adults had childhood experiences of being judged as a poor singer by an authoritative figure, usually a music teacher, and that this

experience had emotional consequences throughout childhood and into adulthood. As a result, they felt socially stigmatized and consistently avoided musical activities such as singing *Happy Birthday*. These results highlight the importance of the relationship between experience, beliefs, and behaviour.

One of the cornerstones of social-cognitive research is the concept of *self-efficacy*, which is defined in relation to a performance outcome as “people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (Bandura, 1986, p. 391). Self-efficacy is an important concept when studying behaviour in relation to activity choice, because people tend to choose activities in which they feel competent and confident, and avoid activities in which they do not. Research in music education and self-efficacy is limited to one study of students completing music performance examinations. McCormick and McPherson (2006) administered questionnaires to students who were about to complete music performance examinations and found that levels of self-efficacy were linked to the students’ performance. They also found that self-efficacy was an even better predictor of success than cognitive strategy use, practice regulation, and quantities of formal and informal practice.

A number of studies have shown that *subjective task value*—individual beliefs about the importance of a task—is closely related to achievement-related choices and task performance (Eccles, 2005). This line of research generally identifies four dimensions of subjective task value: interest, importance, usefulness, and enjoyableness (Eccles (Parsons) et al., 1983). In one of the pioneering longitudinal studies investigating subjective task value, Wigfield et al. (1997) found that over a three year period, elementary school students’ valuing of music declined more greatly and more rapidly than for any other subject. Investigating these processes in the context of a music performance examination, McCormick and McPherson (McCormick & McPherson, 2007; McPherson & McCormick, 2000) demonstrated connections between subjective task value, children’s judgments about their likelihood for success in the examination, and their actual performance scores. Although the findings of these studies generally agree that subjective task value is linked to continued motivation to participate in music activities, little is known about the formation of these values and their connections to long-term music learning behaviours.

Cognitive Strategy Use

As well as the extensive quantities of practice undertaken to become experts, substantial qualitative differences exist between the types of practice undertaken by developing musicians, and these are also related to different performance outcomes. These findings on the use of different strategies in practice have come from early research in expertise from the field of educational psychology (Bruning, Schraw, & Ronning, 1999; Chase & Simon, 1973), research on expertise across a range of fields (Ericsson, et al., 1993) as well as biographical studies of expert musicians (e.g., Bloom, 1985; Manturzewska, 1990; Sosniak, 1985). Cognitive strategy use is an important area of research in relation to the development of competence and motivation, because sophisticated strategies increase the efficiency of learning and sustain motivation by providing more rapid and frequent accomplishment of mastery goals. This section reviews research specifically conducted in music education settings.

One way to study practice strategies is to use video to observe musicians using them, and subsequently codify the behaviours exhibited. In one case study, Chaffin and Imreh (2001) observed the structure of a professional pianist's practice. The researchers videotaped practice sessions of one piece of music that was to be played at an upcoming performance. They kept track of when each bar of music was practised, and displayed the use of the pianist's time using a two-dimensional chart with the notated music on the *x*-axis, practice sessions on the *y*-axis, and horizontal lines used to depict the length of each segment of music. By visualizing the practice sessions in this way, the researchers observed a sophisticated time management strategy, where the pianist played through the entire piece in order to understand and identify the difficult sections, focused in on specific problems, and contextualised difficult portions of the music into the whole. The pianist's use of time was strategic and dependent on the specific problems presented by particular technical obstacles, rather than being randomly or equally assigned to various parts of the piece.

In contrast, similar video research of younger, novice learners uncovered less effective strategy use. In a study of three students in their first three years of learning an instrument, Pitts, Davidson and McPherson (2000) found that the young musicians rarely adopted useful practice strategies to help them solve problems, and that their practice sessions were often determined by the parents or by their approach to practice as a chore. In one interaction between a child and her parent, for example, the child had

clearly been instructed in superficial practice strategies by her mother: she was instructed to begin practicing by playing her scales, and she had to do everything twice. Neither the mother nor the daughter in this case seem to consider whether these strategies might be effective—they just seemed like the right thing to do. In all three cases studied, the young musicians seemed to be practicing based on their instructions to do so and their beliefs (and their parents' beliefs) about effective practice strategies, rather than attempting to use auditory feedback to detect errors and adopt strategies to home in and correct them.

Similar findings were made by McPherson and Renwick (2001), who observed video recordings of practice sessions by seven children from the same cohort as the study cited above. They observed that when the children encountered a problem such as an incorrect note when playing through a piece, they would either ignore it, or attempt to solve the problem by playing the correct note, then continuing with the rest of the piece. To an expert or accomplished teacher, this strategy is clearly inefficient compared to, for example, fingering the passage, playing it slower, attempting to integrate the difficult passage of notes within larger phrases, annotating the score with helpful reminders, or a range of other strategies that would attempt to overcome the difficulty and remember how to play the passage correctly the next time it was performed. McPherson and Renwick concluded that while students often possess the *will* to engage in practice, they also need to possess the necessary *skills* to make their practice effective.

The above findings suggest that if students are taught effective practice strategies, they are likely to employ them in their practice. But the same researchers made another research finding that may complicate this conclusion. Through extensive interviews with a 9 year old clarinet student, Renwick and McPherson (2002) found that the student *spontaneously* developed sophisticated problem-solving and monitoring strategies when practicing a piece of her own choosing, compared to unsophisticated strategies typical of novices when practicing a piece designated by her teacher. The researchers knew that the development of these strategies was related to the student's autonomy and not simply as a result of her learning about them, because within the same practice session, she would use the sophisticated strategies on the self-selected piece, and the novice strategies on the teacher-selected piece. The discrepancy in the findings suggests the possibility that when students are exercising autonomy in their learning, they are more likely to spontaneously develop their own effective strategies.

The development from novice to expert and its clear connection to strategy use is therefore a concern of music educators. To investigate how strategy use develops throughout the course of becoming an expert, Hallam (2001) studied a range of string players, from beginners aged around 6 years to college music entrants. These students recorded performances that were evaluated by a panel of judges, and participated in interviews about the nature of their practice. Hallam found evidence to suggest that strategies are gradually developed between novices and experts, concluding that the course of becoming an expert and adopting task strategies is developmental, rather than consisting of a discrete number of qualitatively different stages. As well as finding that the sophistication of strategies increased according to skill level, Hallam made the important implication that the development of strategies was strongly dependent on the acquisition of aural schemata used to identify and correct problems.

Hallam (2001) conducted another study in which she interviewed professional musicians and a group of amateur novice musicians to compare their use of metacognitive strategies. For the professional musicians, she found that even though the specific types of strategies varied considerably, the musicians all demonstrated sophisticated technical and performance skills as well as metacognitive strategies such as planning and evaluating. The novice musicians also used strategies, but Hallam judged these as less sophisticated or effective compared to the professionals. This had consequences for learning, such as with the problem of performance anxiety, which took control of some of the novices during their preparation for a performance. The two studies conducted by Hallam highlight the well-established fact that the strategies used by experts are inappropriate for novices (Bruning, et al., 1999) and demonstrate that these differences occur gradually throughout development.

Specific details of how strategies are implemented in practice may be necessary for a full understanding of their implications. In a study of the practice techniques of university music majors, Byo and Cassidy (2008) reported that many of their subjects appeared to use sophisticated strategies such as slowing tempo, repeating notes or phrases, and devoting large chunks of time to practice, but there were differences in how the participants using these strategies. For example, considering the strategy of using a slower tempo to perfect a difficult passage, some students would simply slow the tempo, play through the difficult passage once, and then resume the rest of the piece at the normal tempo, while others would take care to practice the slow passage several times, integrate it into the connecting phases, and gradually increasing the tempo until

they could play the entire passage successfully. These findings warrant consideration, because while the message from much of the reviewed literature may be to use sophisticated strategies, learners must implement them fully and effectively to capitalize on their benefits. In other words, there may be a difference between using an effective strategy and using a strategy effectively.

Strategy use has been observed in light of self-regulation theory, which posits that monitoring and controlling behaviours are closely linked to the process of acquiring intrinsic motivation (McPherson & Zimmerman, 2002). In case studies of self-regulatory behaviour, Nielsen (2001) observed two conservatoire-level music students engaging in skilful strategic planning, task strategies, and monitoring of their behaviour. In an additional study with a larger cohort (Nielsen, 2004) first-year university music students were found to have employed a broad range of cognitive and metacognitive strategies to make their practice effective. In the latter study, strategy use was related to self-efficacy: The students who had higher levels of self-efficacy employed a greater range of cognitive and metacognitive strategies to improve their practice. Using the theoretical framework of self-regulation, Nielsen made similar findings to the studies cited above.

Although the studies above provide substantial evidence for the differences in cognitive strategy use between novice and expert musicians, an examination of the *implications* of ineffective strategy use in early years of learning is limited to one longitudinal study of the *Child to Musician* project (McPherson, 2005). One hundred and fifty-seven students were studied, and by the end of the third year of learning, vast differences in their abilities were observed. McPherson found that while quantity of accumulated practice “explained between 9 and 32 percent of the variance in their scores on the Perform Rehearsed Music measure, mental strategies was consistently a more powerful predictor for explaining their ability to sight-read, play from memory and play by ear” (p. 27). This study advanced previous research on cognitive strategy use in several important ways: it broadened the examination of ability level to look more finely at gradations within one group of learners, and it also broadened the study of musical skills to extend to playing music by ear, playing from memory, sight-reading, performing rehearsed music, and improvising; and studied specific task-related strategies within each type of activity.

Collectively then, the evidence suggests that more successful learners are the ones who adopt developmentally-appropriate, task-related strategies. Most published studies

conclude by suggesting that teachers should therefore explicitly teach these strategies. However, very little research has specifically investigated teaching interventions in a controlled way, so such conclusions are yet to be subject to falsification. One attempt at such a study was made by Bailey (2006) who examined a group of 29 middle school students and evaluated the effectiveness of an intervention strategy to improve the students' self-regulation. In his statistical analysis, no main effects were found when comparing test performance, strategy use, or motivation. However, the study was limited by a small sample size, and the self-regulation intervention was based on a specific type of self-monitoring strategy, rather than looking at the full range of adaptive, task-related strategies. Clearly, more studies of this type are needed—studies that are longitudinal and observant of the broad range both music performance skills and strategies that can be used (as in McPherson, 2005 described above), as well as controlled by measuring specific types of interventions. Such studies would be better positioned to clarify the *causal* relationships between strategy instruction, implementation, and performance.

Parent-Child Relationships

This section reviews research that has been conducted which clarifies the possible roles parents could have in helping children to sustain ongoing and rewarding engagement in music activities. These include the provision of financial and physical resources, and facilitating an emotional relationship, the nature of which can affect the child's motivation for studying music. Together, these parenting practices have recently been typified in the literature as *parental style*, and several models that attempt to synthesise their influence in music education have been proposed.

Infancy and childhood. Parental influence on children's musical learning begins before the child is born, but its influence appears to be limited. In a review of research relating to prenatal musical development, Parncutt (2006) concluded that since the child has no cognitive capacity for reflection, parental influences on their child's musical development is limited to influencing their preferences (in the sense that children recognise music that they have heard in the womb as familiar after they are born), and the natural health benefits passed on to the fetus as a result of parents enjoying their own music listening. Parncutt also warned of the likely negative effects of measures

such as placing headphones around the abdomen. From birth to preschool age, children have a greater capacity for perception and reflection on musical stimuli and for making music, but the influence of parents during this time appears to be limited to the use of music to create a stimulating home musical environment and an emotional relationship, rather than the ability to influence lasting effects on the child's music learning in any substantial way (Trehub, 2006). Attempts by parents to influence their child's engagement and involvement in music by manipulating their environments before and shortly after birth are therefore largely unsupported by evidence from research.

Involvement in learning. Parental involvement becomes considerably influential when the child begins formal music instruction. The term *involvement* can span a number of concepts, as noted by Creech and Hallam (2003), but a useful starting point is the quantitative studies that have studied the relationship between parental involvement and children's achievement in music learning. In general educational contexts, findings suggest that parental involvement is related to achievement in school (Hoover-Dempsey & Sandler, 1995; Pomerantz, Grolnick, & Price, 2005), but many factors come into play to complicate this relationship. In a controlled experimental study of factors associated with success in instrumental music education, Brokaw (1983) found that above the technical quality of the students' playing and even the amount home practice the students accumulated, parental supervision was most closely associated with performance scores.

In a study of 257 children from two schools in England, Davidson et al. (Davidson, Howe, Moore, & Sloboda, 1996) investigated the role of parental support. The researchers identified five categories of achievement in the children based on their enrolment or audition into a selective music school and their involvement in music learning activities, and compared these with five levels of parental involvement, ranging from the provision of transport to music lessons to attendance and active participation in lessons and practice. They found that overall most students received high levels of parental support. When the researchers studied time as a factor, however, they found an interaction between performance outcomes and parental support: Students who attained higher performance outcomes had received consistent levels of support from their parents, whereas those achieved poorer performance outcomes actually had increasing levels of parental support over time. The interpretation of this result was that early parental involvement and support is necessary.

Some further explanations for parenting outcomes may also come from the qualitative differences in types of parental involvement. In the educational psychology literature related to parental involvement in homework, researchers distinguish between modelling, reinforcement, and direct instruction (Hoover-Dempsey et al., 2001; Hoover-Dempsey & Sandler, 1995). In music, parents are usually able to provide direct instruction in the very early stages of learning an instrument, but if they do not possess musical knowledge or skills themselves, the child may quickly surpass their parents' musical abilities, and the parents will be unable to provide direct instruction. However, these children may not be disadvantaged: In a study by Sloboda and Howe (1991), many of the best students in their sample had parents who were relatively less musically accomplished and therefore unable to provide direct instruction. Early in their learning, these students were encouraged by high levels of praise from their families for relatively mediocre performances. The musical parents, in contrast, were less likely to be impressed by their child's achievements.

The findings of one study (Pitts, et al., 2000) may warn against close involvement. In this case study, the child had been instructed by her mother that her scales were an important part of her practice, and that it was important to do everything in the lesson twice. The student had not received any direct instruction in how to practice other than from her mother. The child's subsequent practice over time proceeded to be dominated by extensive time spent practicing scales, and mindlessly practicing scales and pieces with an emphasis on doing everything *twice*. Therefore the attempt by an inexperienced parent to be directly involved in his or her child's learning backfired, as the resulting practice strategies were inefficient. In the absence of such learning, it is possible that the child's and parent's perceptions of what is important to do in practice are influenced by stereotypes in popular culture or media about how to effectively practice, or the perception that for practice to be effective, it must feel like a difficult chore.

Provision of resources. Aside from instruction, parents can assist their child through the provision of physical resources, financial resources, transport, and an environment conducive to music learning. For children learning a musical instrument in a school band program, for example, the parent is usually required to make some kind of financial investment by purchasing or hiring an instrument and paying for private or group tuition. Research relating socio-economic status to achievement in music education shows a relationship between the two variables (for a review, see Albert, 2006), but has traditionally not attempted to clarify the direct causes. In McPherson and

Davidson's (2006) study, the more successful children were those who had a home environment conducive to practice, such as a separate room with a music stand and a piano, where the child could close the door and be free from distractions and concerns that they were too loud. In comparison to students who did not have such a space, and practiced in their bedrooms or the family room, these students achieved more highly and participated for longer.

The possibilities arising from economic sacrifices made by some parents is exemplified in the case study of a musical prodigy by McPherson (2007). McPherson studied the young pianist from when she was 7 years old, and over several years interviewed her parents and observed her practice. The parents in this case supported the child by providing an instrument, encouraging her special interest in listening to music and playing by ear, and attempting the difficult task of finding a teacher with whom she felt comfortable and could cater for her special learning style. In addition, they invested their limited income in lessons and instruments. At 12 years old, the child was enrolled in an internationally renowned conservatory, and to pursue the opportunity, the mother moved overseas with the child, leaving the father at home to continue working. Without these considerable economic and emotional sacrifices, the child would almost certainly not have had the learning and performance opportunities she has had in recent years, and without the support for her learning in the home environment, she may have found it more difficult to pursue her interests.

Beliefs about ability. Evidence exists to highlight the role of perceptions of competence and autonomy between both parents and children. When asked about their children's performance in school subjects, it is not unusual for parents overestimate young children's competence (Miller, Manhal, & Mee, 1991; Pezdek, Berry, & Renno, 2002). In music, however, parents, particularly those who do not understand the nature of effective musical practice and the lengths of time required to accomplish skill development in the early stages of learning, may not have such a high perception of their child's competence. Researchers observed this happening in young children's music learning: they saw that the parents assumed their children's learning was progressing slowly, and gave up on their own efforts to encourage the children to practice and motivate them for lessons (Howe & Davidson, 2003; McPherson & Davidson, 2006). As noted above, however, the opposite can also occur: parents with limited musical experience can be easily impressed by their children's relatively mediocre accomplishments and provide excessive praise and rewards that have a

positive effect on the child's motivation (Sloboda & Howe, 1991). The range of findings observed here may be one reason why studies have found that parents with more accurate perceptions of their children's performance have children who perform better (Miller & Davis, 1992). Indeed, young children's perceptions of their own ability are so influenced by their parents' perceptions that they rely on them more for indicators of their ability than objective measures such as test results or past performances (Halle, Kurtz-Costes, & Mahoney, 1997; Parsons, Adler, & Kaczula, 1982; Pomerantz & Dong, 2006).

Discrepancies between parents' and children's values and expectations may also be relevant. In a review by Creech and Hallam (2003), several studies provided evidence that agreement between parents and students on expectations, preferences, task values, and objectives related to students considering these on their own. However, the evidence is limited, and specific comparisons between groups (such as differing levels of agreement between parents and their children) have not yet been made. What is already clear is that, in addition to being sources of information about ability, parents are also sources of information about values and beliefs (Eccles (Parsons), et al., 1983; Eccles, 2005; McPherson, 2009; Pomerantz, et al., 2005).

Few studies cited above account for the direction of causation between parental perceptions and children's actions. Although it makes sense that parents influence their children's beliefs and values, Bandura's triadic model (Bandura, 1977), cited earlier, shows that other factors are involved in the formation of beliefs. In a study of the reasons why young students continue or cease involvement in band programs, Corenblum and Marshall (1998) found that ongoing participation was associated with students' beliefs that their parents were supportive and encouraging of their involvement. The researchers noted the possibility that the students were simply reporting beliefs that were more compatible with their subjective reality, without any substantial consideration of the specific ways their parents actually supported them.

Autonomy support in adolescence. Adolescence is a transitional time where the relationship between adolescents and their parents changes. Parents and adolescents during this time need to constantly renegotiate their relationship through the adaptive and developmental process of granting autonomy to the adolescent (Collins & Laursen, 2004). Despite being such a strong influence, few of the studies cited throughout this section have acknowledged the changing relationship between adolescents and parents at the onset of adolescence, or its potential influence on music learning.

One substantial change is in parents' perceptions of their child's development: whereas in early childhood, as noted previously, parents may overestimate their child's competence and autonomy, in adolescence, the reverse may be true. Adolescents typically view themselves to be more autonomous and developmentally advanced than do their parents (Deković, Noom, & Meeus, 1997). It is perhaps not surprising that these discrepancies exist, considering the nature of adolescence, as a time for individuals to strive for autonomy, and the nature of parenting, as protective and conservative. One study of parents and adolescents in the context of managing Type 1 Diabetes showed an inverse relationship between the size of the discrepancy and the adolescents' ability to self-regulate (Butner et al., 2009). This finding suggests that while discrepancies between adolescents' and parents' perceptions of autonomy may naturally differ, attempting to minimize the discrepancy may have beneficial outcomes.

Theoretical models. As with any area of research, disparate research findings eventually become unified under broader theoretical 'umbrellas.' Two such theoretical frameworks provide a summary of this area of the literature: the parental style framework (Spera, 2005) and two models of parental relationships and music education (Creech & Hallam, 2003; McPherson, 2009).

In recent years, the relationships between parental practices and child outcomes have been recognised as simplistic and have recently been understood better under categories of *parental style* (Spera, 2005), although the distinction between the two constructs and their influence on child outcomes should still be upheld (Darling & Steinberg, 1993). Parental style is categorised under three types: authoritarian, authoritative, and permissive. Authoritarian parents typically have high demands of children and are strict; authoritative parents also have high demands for their children but foster development through a responsive, bi-directional relationship; and permissive parents tend to be indulgent and have relaxed expectations of maturity (Baumrind, 1991; Spera, 2005). In educational contexts such as homework involvement, the authoritative style has shown to be most highly associated with positive educational outcomes, because of the motivational benefits associated with autonomy, the emotional benefits of a warmer, more responsive relationship, and the intrinsic motivation encouraged by parents' expectations being justified and reasoned rather than explained with a 'because I said so' approach (Pomerantz, et al., 2005; Spera, 2005).

Within music education, two models related to parent-child interactions have been proposed as ways of encapsulating the theoretical relationships between broad styles of

relationships and how they impact children’s musical outcomes. Creech and Hallam (2003) reviewed literature on parent-child interactions, teacher-student interactions, self-efficacy, and values and attitudes. They proposed that parental influences on student outcomes exist not in isolation, but as “both causing and resulting from a web of complex interaction” (p. 39). Their model proposes bi-directional relationships between the teacher, student, and parent (see Figure 1), and emphasises that each human actor influences outcomes throughout the entire system, rather than just in a specific direction.

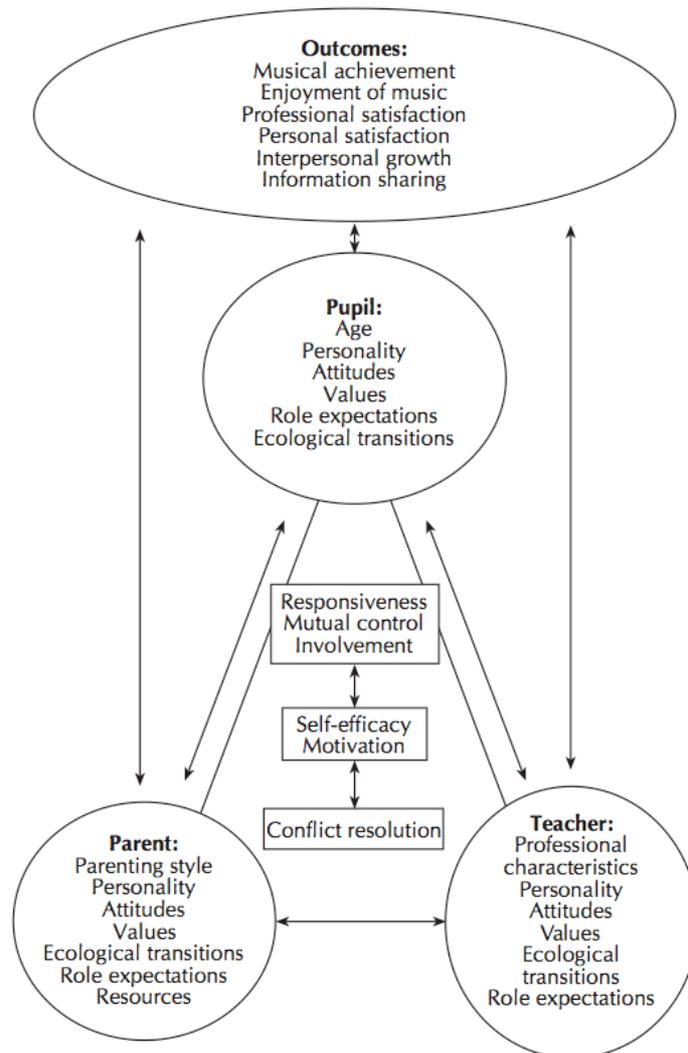


Figure 1: Model of parent, teacher, and student roles in music learning. From “Parent–teacher–pupil interactions in instrumental music tuition: A literature review,” by A. Creech and S. Hallam, 2003, *British Journal of Music Education*, 20, p. 40.

More recently, McPherson (2009) reviewed research in music education associated with parent-child interactions. He related this research to broader conceptions of

parental style, and proposed a model incorporating parental goals and attitudes, the influential and mediating role of parental style on the effects of parental practices, and the student's own learning goals on music learning outcomes. McPherson's model therefore draws heavily on the parental style literature. It indicates a feedback loop from the child and socio-contextual characteristics back to the parental style, suggesting that parental style is responsive to the outcomes of parental practices. This goes slightly further than the Creech and Hallam (2003) model described above, in attempting to describe the nature of the bi-directional relationships.

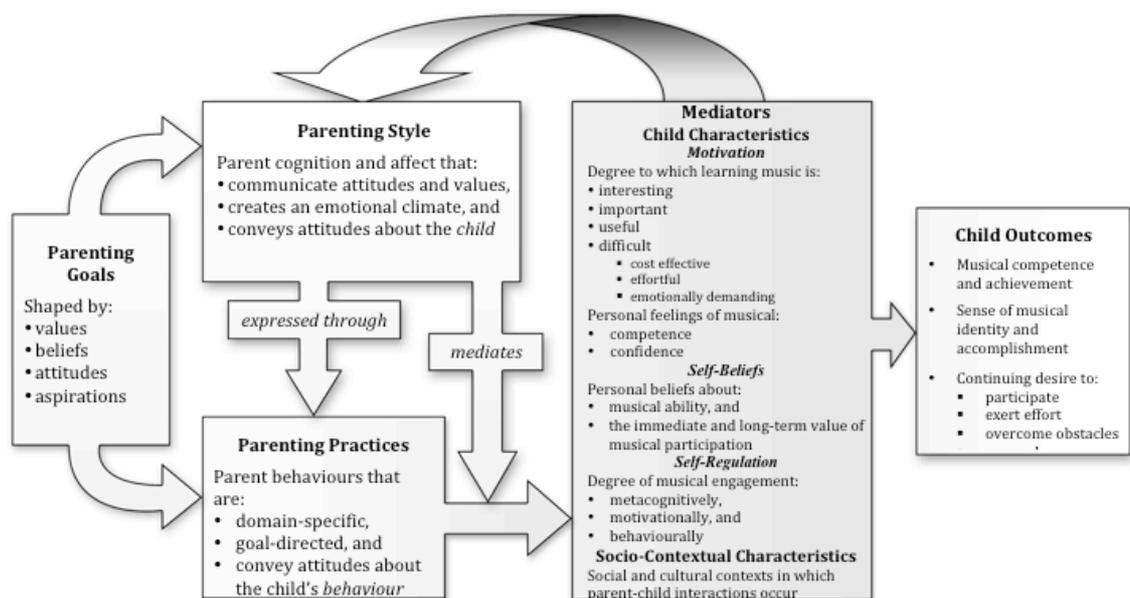


Figure 2: Model of the relationship between parental style, parenting practices, and children's music learning outcomes. From "The role of parents in children's musical development," by G. E. McPherson, 2009, *Psychology of Music*, 37, p. 94.

While literature in psychology demonstrates extensive empirical and theoretical work on parent-child relationships, the proposed theoretical models described above come largely from exploratory studies, and the theoretical literature is speculative, rather than demonstrable. Another shortcoming of the models described above is that they fail to acknowledge the dramatic changes in the relationships between children and their parents as children progress through adolescence, and which surely have an impact on the nature of parenting and autonomy support (Steinberg, 2001).

Summary and Conclusion

Music education research, although still in its infancy, has proceeded in a swift and sophisticated way towards answering many important research questions. A substantial literature covers biographical analyses of performing musicians, the development of expertise in music, and the cognitive self-regulatory strategies used by music learners to develop skills. It does, however, have some shortcomings. One, for example, is the small number of studies conducted on any given phenomenon. In other fields of research, a large number of studies with similar outcomes would be expected to confirm findings, unless strict experimental controls were in place to ensure the validity and reliability of the results. In music education, such strict experimental approaches are difficult, yet in their absence, often one or two studies are relied upon as the basis for facts.

A related problem is that emerging theories and frameworks seem to receive acceptance in the literature even though there is little empirical support offered. One example is the conclusions made by the literature about cognitive strategy use. Although the results from individual studies are strong, for each strategy use only one or two studies can be cited, and the evidence is not conclusive enough. Another example is the parent-child relationships theories outlined toward the end of the chapter. The first theory (Creech & Hallam, 2003) has so many factors and so many indicative relationships between those factors that it is unlikely to be incorrect in stating that each of the factors listed has *some* relationship with another factor. In other words, in any empirical study, influences could be attributed to any other factor indicated in the diagram and researchers could possibly be none the wiser as to the actual source of the influence, its relative strength, consistency between subjects, or its causal direction. In this way, the Creech and Hallam theory does not offer a substantial account of the phenomena it attempts to explain. The McPherson model is more confident about the direction of the causal relationships and influences, but the problem with this model is that there is simply no strong evidence for many of the proposed relationships.

For the research questions identified in Chapter 1, the main areas of music education research identified in this chapter offer only some of the solution. For example, it is clear in the literature that self-regulation and cognitive strategy use are important and necessary for skill development. However, it is clear that something is missing from the picture. In terms of evidence, there is no study in the literature, that I am aware of, that

observes students who had high levels of self-regulation and cognitive strategy use, but who ceased their engagement in learning because they were not motivated. There may be many such students, and a comprehensive explanation of motivation necessitates studying them. In the absence of such evidence, the literature currently implies that motivation and self-regulation are related, but the nature of the relationship is poorly understood. The studies described in the following chapters explored a rich set of existing data, and investigated retrospective accounts of a sample of young adults' music learning experiences. The study aims to provide some exploratory data and seeks evidence of a more comprehensive explanation of motivation to play a musical instrument. The following chapter first outlines the *Child to Musician* study as a background to the sample and to the findings that have already been made in relation to the issues at hand.

3. *FROM CHILD TO MUSICIAN: A REVIEW OF THE FINDINGS*

Background

In 1997, a major longitudinal research project, *From Child to Musician*, began investigating a cohort of children as they began learning music in primary school band programs in Sydney, Australia. In what was originally envisaged as a three-year project, the researchers, Gary McPherson and Jane Davidson, focussed closely on the participants' music learning, with particular attention given to their beliefs and attitudes, the way music was supported in the home, their interactions with parents, and the nature of their practice. The researchers monitored the participants' musical attainments through various measures of performance ability, and tracked the extent to which they continued participating in the band programs in which they began. This research was, and remains, important in answering fundamental questions about the nature of musical development and music learning, such as, why do some children progress with relative ease while others engaged in similar activities give up? How do some children, when faced with difficulties associated with learning music, maintain high levels of motivation, while others quit early on? And to what extent does the home environment and other social factors such as interactions with parents and peers influence children's motivation and progression in music learning? After three years, the researchers had gathered extensive data to begin to address some of these questions.

Five years after the research began, the researchers took the opportunity to follow up the participants from the original cohort, investigating similar phenomena. At this stage, most of the children had made the transition from primary school to high school, itself an important influential factor on their motivation to continue playing an instrument.

Ten years since the initial research began, the researchers embarked on another project titled *Music in our Lives*, where they again tracked down the participants from the original study. The focus of this project was on the role of music in the participants' lives, as well as some additional retrospective data based on their musical engagement and activities as children and adolescents. In addition, some of the participants participated in detailed qualitative research interviews, discussing the role of music in

their lives and providing important illustrative explanations for some of the findings that had been made from previous stages of the project.

Since the projects began in 1997, many individual findings about various specific subjects of investigation have been published. Each of these publications, however, has been presented in isolation, so the findings have not been considered in the context of the other analyses that have been made. This review of the research synthesises the findings of the *Child to Musician* project so that they can be better contextualised, and broader methodological and theoretical conclusions can be drawn more clearly and accurately. It also considers these findings alongside other emergent research that has been carried out since the projects began. Reviewing the findings in this way, generalizations can also be made about the methods that generated the most useful data and results, and since a range of technical, social, and environmental factors was examined, a comprehensive review sheds light on the kinds of factors that are proving to be the most influential. Finally, a review of the projects enables historical commentary on the methodological and theoretical aspects of one of the largest music education research endeavours that has ever been undertaken with Australian children.

This review of the research is based on previous publications cited throughout this chapter, extensive personal communications with the researchers, and my own work on the *Music in our Lives* project. The extensive data collection procedures for both projects are detailed in the next section, followed by a review of the findings, structured according to several major thematic groupings. The chapter concludes with a discussion of the major findings from the projects and the implications for the practice of music education and for my own further research.

Methodology and Procedures

Description of the Sample

The sample was initially recruited by contacting teachers from government and independent primary schools around Sydney. Eight schools were chosen, and information sessions for parents, children, and teachers were presented by a researcher (McPherson). As a result of this session, a positive response was received from parents and children, and 157 children agreed to take part in the study. The sample consisted of

87 (55%) girls and 70 (45%) boys from grades 3 to 9. The eight schools chosen represented regions characterised by a range of socio-economic backgrounds.

The children were all about to commence learning in an extracurricular band program at their school. Eighty-one students (52%) were ‘novices,’ who had never had formal instruction on a musical instrument before. The band program took the form of regular (usually weekly) rehearsals, as well as small group and individual lessons. The bands followed popular method books such as *Standard of Excellence* and *Essential Elements*.

Child to Musician

The *Child to Musician* study was essentially exploratory, but related to emerging theories in the fields of music education, educational psychology, and motivation.

Performance Measures

The approach undertaken for the performance measures was underpinned by “an unease with conceptions of musical achievement that focus on children’s ability to perform repertoire from notation which they have practiced at home” (McPherson, 2005). This approach reflects McPherson’s (1994) previous research into musical skill, where he broadened music performance measures to five fundamentally important skills: performing rehearsed music, sight-reading, playing from memory, playing by ear, and improvising.

Performing rehearsed music is using notation to provide a faithful reproduction of a pre-existing piece of music that has been practised over multiple rehearsals. To measure the children’s ability to perform rehearsed music, their parents were instructed before the research sessions began to help the child select their best piece of music to showcase their ability. The performances were judged on a scale of 0 to 10, and each year the scale was adjusted to allow for increases in the children’s abilities during subsequent years.

Sight-reading is accurately reproducing music from notation that has not been previously seen or heard. The widely-used Watkins Farnum Performance Scale (WFPS; Watkins & Farnum, 1954) was employed in this study. The WFPS uses a series of short pieces of music that increase in difficulty, and a judge scores the performances by indicating errors in pitch, rhythm, articulation, tempo, and expression.

Playing from memory is providing a faithful reproduction of a pre-existing piece of music that was learned from notation but performed without notation. The children were shown the notation of a short melody for 30 seconds, then asked to perform the piece twice after the notation had been removed. The recordings were judged by the researchers with two scores from 0 to 10 for pitch and rhythm, which were summed to provide an aggregate score.

Playing by ear is defined as reproducing a pre-existing piece of music that was learned aurally without the aid of notation. To measure the children's ability to play by ear, short melodies were played to them from a CD. They were given the starting note of the melody and asked to perform the melody twice. The recordings were judged by the researchers with two scores from 0 to 10 for pitch and rhythm, which were summed to provide an aggregate score.

Improvising is creating music aurally without the aid of notation. The children in the study were given two tasks: in the first, they were provided with the opening of a phrase and asked to continue the phrase by making up a melody. In the second, they were asked to improvise a piece of their own with a beginning, middle, and end. Each task was judged on a scale from 0 to 10, and in a similar way to the measure for performing rehearsed music, the scales were adjusted each year to allow for progression in the children's abilities.

The performance measures were administered by McPherson during visits to the schools involved in the study. The performances were all recorded, and two other researchers scored them independently. Interjudge reliability for the measures was high, based on 50 randomly selected performances of each task (McPherson, 2005).

Questionnaires

A large, structured questionnaire was designed to be administered at several points throughout the duration of the project. The questions were written with a view to gaining the largest possible breadth of themes and issues concerning the children's music learning. The questions were organized under the following areas:

1. Practice habits: frequency and length of practice sessions, location of practice sessions in the home, and whether the participant believed they were doing adequate practice to continue improving.
2. Family influences: parental reminders to practice, incentives for practice, parental involvement in practice.

3. Teaching environment: whether the participant liked the teacher his or her instrument.

4. Self-perceptions: Interest and enjoyment of learning, perceptions of ability, degree of confidence in improving and being successful on the instrument.

5. Perceptions about practice: enjoyment of practice sessions, beliefs about what should be done in practice sessions, sequence and composition of practice sessions.

6. Notation: participant's ability to recognise line drawings of well-known melodies.

The same questionnaire was used each time the participants were interviewed, with some minor changes and developments to refine the data. Several types of data were gathered, with most of the data being categorical, some interval data, and open verbal responses, depending on the question being asked.

Video Research

Some participants who had access to a video camera participated in a part of the study where their practice sessions were monitored. They used a video camera to record a small number of their practice sessions. The recorded practice sessions were analysed to determine the time spent on various practice and non-practice activities during practice sessions. One participant was also selected for a case study on the differences in practice strategies adopted when playing self-selected repertoire compared with repertoire selected by the teacher.

Interviews

Interviews were held with a small number of participants based on points of interest that emerged from the researchers' examinations of preliminary data and from informal interactions with the participants and their parents. In one part of the study, interview data were analysed by Davidson using interpretive phenomenological analysis (IPA). Other interview data were used to illustrate and exemplify some of the findings made in the quantitative components of the study.

Music in our Lives Study

The Music in our Lives study aimed to follow up the original research to provide a longitudinal picture of the children's music learning and other relevant information over the 10 years since they commenced learning. At the outset of the 2007 project, however, the researchers soon realised that many aspects of the original study became irrelevant after 10 years. For example, the students in the original study were asked how often

their mothers reminded them to practice. It was unlikely that any of them were even continuing to play their instrument, let alone requiring reminders from their parents to practice. Similarly, it would be possible to administer the same music performance measures as in the original study, but it seemed that after 10 years, there were more important things to focus on, and that the music performance measures would be irrelevant if the participant had taken up a second instrument, or inaccurate in gauging the highest level of acquisition by the participant if he or she had ceased playing their instrument in recent years. While retaining some important factors from the original study, the rest of the investigation shifted to a broader outlook on the role that music played, both currently and retrospectively, in the formation of the participants' motivations to engage in musical activities, beliefs about music and music education, and the role music played in their personal identities. The changing focus is reflected on the title that emerged for the current phase of the study: *Music in our Lives*.

The participants were all contacted to re-establish their connection to the study and to informally gauge their willingness to participate further in the research. They were told what the next phases of the study entailed, and offered a \$20 gift card for Coles Myer (a large chain of retail stores) as a token of appreciation. *Music in our Lives* consisted of two major phases: a broad questionnaire study based on current and retrospective beliefs, attitudes, and values, and a subsequent interview study of selected participants.

Questionnaire Phase

Through a collaborative approach based on broadly identifying factors and issues of interest, the researchers developed a range of possible areas of questioning for the participants. As this was seen to be an emerging area of research, and a unique study in that no research to our knowledge had examined the role of music in the lives of individuals who had a common music education in their childhood, many of the areas of questioning evolved from brainstorming, with the individual researchers' areas of expertise coming into play to identify possible relationships. The aim was to identify individuals' listening patterns, including how, when, where, and why they listened to or played music in their everyday lives, and to examine whether there were any relationships with their music education since they were children, and other data that had been recorded in previous studies. For much of the data in this exploratory approach, no formal hypotheses were identified, and the research questions remained

broad: What role does music currently play in the participants' lives? How does this relate to their identity as musicians and as individuals? What roles have their previous experiences in music and music education had in forming their identities and motivations for music activities?

Within this approach, one formal hypothesis was developed, based on self-determination theory and emergent research in the related area of psychological needs. According to self-determination theory, individuals are motivated to pursue activities that give them a sense of being effective in the tasks they engage in (competence), foster a sense of integration within social settings (relatedness), and are self-endorsed and self-governed (autonomy). When these psychological needs are met, individuals are more likely to be intrinsically motivated and self-determined (Deci & Ryan, 2000, 2002).

Interview Phase

An interview phase was planned at the outset of the *Music in our Lives* project in order to provide rich case study examples of the findings made by the quantitative phase, as well as to allow further findings and theories to emerge. Only selected candidates would be interviewed, based on several factors. The questionnaire data were used to identify participants of interest based on their listening habits or notable comments they made in response to open-ended questions. In addition, participants who were of interest in the *Child to Musician* study were interviewed to further expand on the detailed findings from that study. Participants were also selected for interviews if their individual psychological needs data either exemplified or contradicted the hypothesis.

Preparation of Data for Current Analyses

Analyses in the initial studies were undertaken by McPherson and Davidson, using data they and their research assistants collected in the first five years of the study. In order to use that data for further original analysis work, I had to become familiar with the initial data set. Much of my initial work in this project therefore involved gathering previously used data files, determining their organization, and converting them to formats in which they could be analysed alongside the *Music in our Lives* data using current software.

In the *Child to Musician* study, the questionnaires were administered by research assistants over the phone. The research assistants used hard copy templates to write the answers to the questions, which were then transferred to electronic tabular forms (except in one case where a computer interface was designed to enter the information directly). For the purposes of the current study, the archived questionnaire templates and corresponding raw data files were obtained from the original researchers, as they had been entered by research assistants in the previous phases of the study. Variables stored in a way that was unusable by current statistical software were manually recoded. Finally, some mathematical transformations of data were required so they could conform to the assumptions of statistical analysis techniques that were to be used.

In total, a set of 67 files were obtained for the *Child to Musician* data, consisting of the following:

- Four questionnaires administered to the students involved in the study along with corresponding data files in three versions (one complete, one containing open verbal responses, and one containing numerical responses).
- Four questionnaires administered to the mothers of the students involved in the study along with corresponding data files (organised in a similar way to the student questionnaires, and with one questionnaire split across three files due to the large number of variables).
- One data file containing results of music performance tests administered to the students in each year from 1997 to 1999
- Transcripts of interviews with the eight band directors of the primary school band programs involved in the study, along with an interview guide and a file that contained tabulated information about students referred to in the interviews.
- Several files that I determined were duplicates of the questionnaire information or subsets of the information from other files which were likely to have been used for previous data analyses.
- Several inaccessible files that were made with the now obsolete software package *HyperCard*, which was used to create a computer interface for the research assistants to directly enter the information. I was able to ascertain from the researchers and the author that this information was the original version of the data for one of the questionnaires for mothers described above, so these files were unnecessary.

For the *Music in our Lives* phase of the study, the following data were obtained:

- Results of the online questionnaire administered to students in September to December, 2007.
- Transcripts of interviews conducted with selected students in January to April, 2009.
- Updated personal information including full names, dates of birth, parents' names and contact details.

The files were all updated to a format that could be read by current versions of Microsoft Excel, then converted for recoding and eventual statistical analysis in SPSS. The timeline of each data collection is depicted in Figure 3 and summarises the main body of data that was referred to in this study.

The data files were coded using SPSS. Variable coding is necessary for SPSS to apply the correct treatment to the different forms of variables (nominal, scale, or ordinal) and to produce interpretable statistical reports and graphs. Each group or level of response for nominal variables (e.g., instrument choice, gender) and ordinal variables (e.g., agreement with statements with responses such as 'not at all,' 'sometimes,' 'often,' and 'all the time') also needed to be specified.

Review of Findings

The findings of the *Child to Musician* have been published in various academic journals, conferences, and book chapters. The exploratory nature of the research resulted in a range of findings, which are reviewed throughout this section under the themes of commitment, the nature of practice, and parent-child interactions.

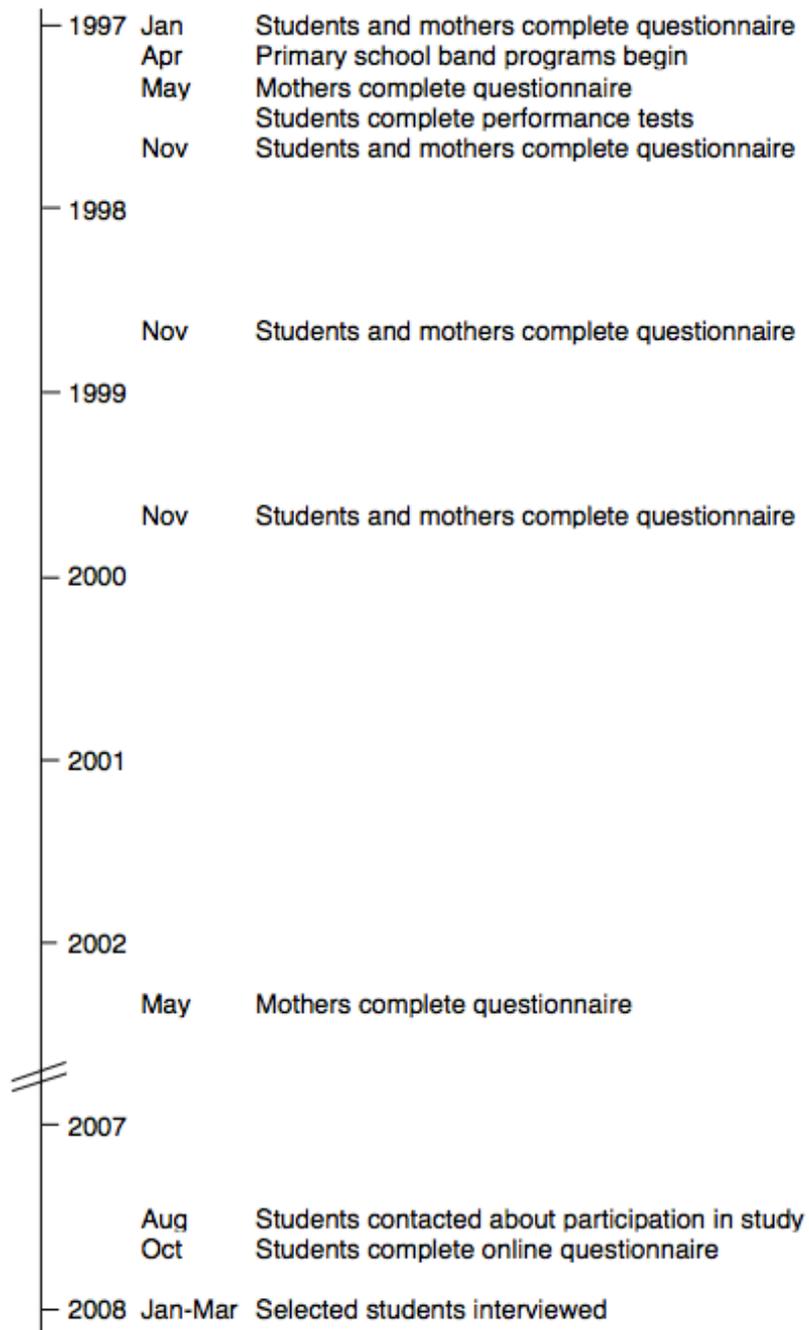


Figure 3: Timeline of data collection for *Child to Musician* and *Music in our Lives*.

Commitment

Using performance data from the Watkins-Farnum Performance Scale as an indicator of performance ability, McPherson (2001) compared the influences of practice quantity and commitment to learning. Commitment was measured in the *Child to Musician* questionnaire using the question, “how long do you think you will continue to

play your instrument?” Participants were divided into three groups: short-term commitment (those who stated they would only play their instrument until the end of primary school), medium-term commitment (those who thought they would continue playing their instrument into high school), and long-term commitment (those who thought they would continue to play their instrument into adult life).

The analysis showed not only main effects of average weekly practice and commitment, but an interaction between the two (see Figure 4). The result suggests that while practice quantity is important (a result demonstrated extensively in the literature), it seems that a long-term commitment is also necessary.

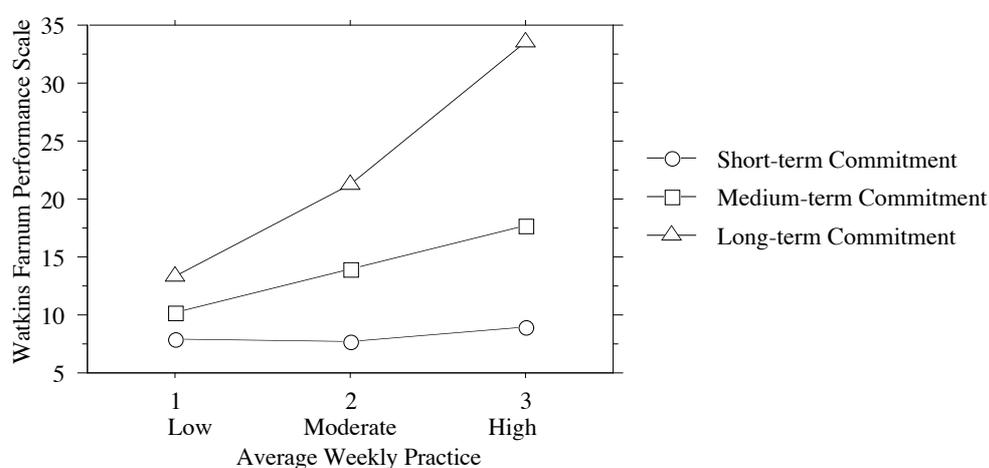


Figure 4: Influence of commitment and practice on performance. From G. E. McPherson (2001), Commitment and practice: Key ingredients for achievement during the early stages of learning a musical instrument. *Bulletin of the Council for Research in Music Education*, 147, 122-127.

Motivation and Quantity of Practice

In studying the quantity of practice undertaken by children, issues with the children’s reporting of practice time emerged which led to an interesting finding. It appeared that the children were not able to accurately or realistically estimate the amount of time they would practice each week. One child, for example, reported that he would practice every day of the week for three hours. In addition, there were enormous discrepancies in average daily practice reported between children and their parents, even after one year of playing their instrument. McPherson and Davidson (2002) interpreted this as a shortcoming in the children’s ability to estimate time more

generally. They used the child's predictions of how much they would practice from before they began, but for the reports of how much average daily practice the participants were actually undertaking, the researchers used data from the mothers' reports.

Within the first year of learning, the reports of average daily practice decreased. However, a trend with the practice schedule emerged. Over the first year of learning, the average number of days per week the children practiced actually decreased, while the length of the practice sessions increased (McPherson and Davidson, 2002).

By the end of the first year of learning, 24 of the 157 children who began learning an instrument had ceased playing. Differences in average daily practice were observed by the researchers between the students who ceased by the end of the first year ($M = 3.49$, $SD = 4.52$) and the students who were continuing ($M = 8.02$, $SD = 4.52$). The difference was statistically significant ($p < 0.01$).

McPherson and Davidson (2002) sought differences in the amount of average daily practice undertaken between children who had previous experience of learning an instrument and those who did not. No statistically significant differences were to be found, and within the groups, there was a large variance in the amount of average daily practice undertaken by the children.

An analysis of average daily practice with the other variables of whether the children continued or ceased playing after one year, and whether the children had previous experience of learning an instrument, revealed an interesting potential finding. Previous experience did not seem to be a factor in the child's predictions of average daily practice for those children who eventually continued to play after one year. But for the children who ceased, an interaction was observed. The novice players and those who were ceasing another instrument to undertake this one had unrealistically high expectations of how much they would practice. Those who were continuing another instrument while learning this one had low expectations of their average daily practice—in fact, it might be interpreted as a 'realistically low' expectation given that they eventually ceased. Evidence of statistical significance was not found. While there appears to be a trend when studying the mean figures alone (Figure 5), huge variances in the amount of average daily practice undertaken by the children in each group were observed (Table 1). Another limitation of the finding is that it depends on the child's predictions of average daily practice from before they began learning, but, by the

authors' own admission, the child's ability to predict and report time seems to be limited at this age.

A number of qualitative themes emerged between these groups when analysing the interview data, including the children's initial enthusiasm, naiveté, physical differences between the new instrument and the instrument the child had experience in playing, and the mother's own musical experiences. These qualitative themes warrant further research in this area.

Table 1: Average daily practice based on previous exposure to learning an instrument. From G. E. McPherson and J. W. Davidson (2002), *Musical Practice: mother and child interactions during the first year of learning an instrument*, *Music Education Research*, 4, 141-156.

	Novices N = 81		Ceased other instrument N = 43		Continuing other instrument N = 33		Sig
	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Average daily practice							
Child Report: Predicted before commencing instrument	17.29	23.41	14.96	11.98	11.67	9.31	NS
Mother report: After one month of learning	9.06	4.91	9.44	6.28	7.97	3.62	NS
Mother report: After three months of learning	8.06	5.33	8.72	5.65	8.20	5.91	NS
Mother report: After eight-nine months of learning	7.16	7.39	5.96	4.50	5.96	4.13	NS
Mother report: Average over year based on mother's reports at one, three and eight-nine months of learning	7.74	5.35	7.02	4.46	6.75	3.13	NS

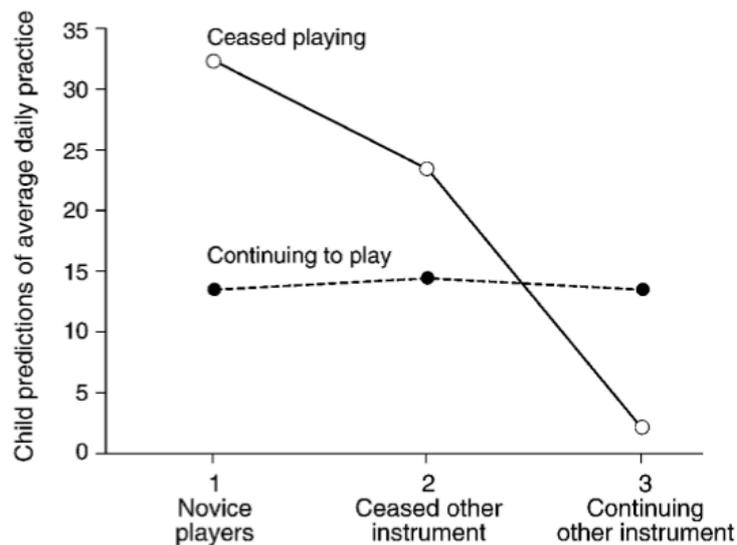


Figure 5: Mean average predictions of average daily practice. From G. E. McPherson and J. W. Davidson (2002), *Musical Practice: Mother and child interactions during the first year of learning an instrument*, *Music Education Research*, 4, 141-156.

A case study was undertaken by Renwick and McPherson (2002) on one of the participants under the pseudonym 'Clarissa.' Through analysing videos of her practice while engaged in learning different pieces, the researchers found critical differences between Clarissa's practice behaviour when she was practicing a piece she had chosen herself and when she was practicing a piece that had been designated by her teacher. When practising the self-selected repertoire, Clarissa engaged in substantially more frequent and longer practice sessions than when she was practicing the teacher-selected repertoire. This practice was also observed to be more efficient. Figure 6 shows an excerpt from one of Clarissa's practice sessions when playing the piece she chose. The excerpt shows evidence of Clarissa stopping at problematic points throughout the piece, correcting mistakes, then rehearsing the corrected passage before continuing. Her behaviour was goal-directed and strategic. This contrasted with her behaviour while practicing the piece chosen by her teacher, during which she tended to play through the piece, ignoring mistakes, and not stopping to make improvements. This finding supports the common folk-psychological view that when students are engaged in tasks they like and enjoy, they are more likely to engage in those tasks with greater interest and for longer periods of time.

The finding highlights important motivational influences operating on children's willingness to engage in practice and the total amount of practice they will undertake. This finding is supported by a recent controlled experiment in homework in which children were either assigned homework tasks or given a choice of homework tasks (Patall, Cooper, & Wynn, 2010). The results suggested that the children who were given a choice of homework tasks had enhanced homework completion rates and higher intrinsic motivation for completing the tasks.

Cognitive Strategy Use

While expertise may be predicted based on accumulated hours of deliberate practice (Ericsson, et al., 1993), such an approach may be inadequate to account for progress in the early stages of learning. To address this issue and provide a more meaningful account of children's progress within the first three years of music learning, McPherson (2005) took a cognitive approach and studied the various strategies used by children to perform musical tasks. The participants were interviewed and asked to think aloud as

they performed various tasks based on the five performance measures used in other parts of the study.

The figure consists of seven staves of musical notation, each with annotations above it. The annotations describe various practice strategies used during a session. The strategies include:

- Staff 1:** Pitch error: Repeat 2 notes; Pitch error: Repeat phrase; Note inserted; Note inserted; THINK
- Staff 2:** Pitch error: Repeat phrase; Pitch error: Repeat 2 notes; Note omitted; Pitch error: Repeat phrase; HUM
- Staff 3:** Pitch error: Repeat phrase; THINK; Repeat correct notes; THINK
- Staff 4:** Repeat correct phrase; Pitch error: Repeat phrase; Pitch error: Repeat phrase; Repeat correct phrase
- Staff 5:** Repeat correct phrase; Repeat correct notes; Pitch error: Repeat phrase
- Staff 6:** Pitch error: Repeat 3 notes; HUM; Repeat correct phrase; SLOWER; Pitch error: Repeat phrase; SLOWER
- Staff 7:** Pitch error: Repeat several notes; SLOWER; Repeat correct phrase; FASTER; Repeat correct phrase; FASTER

Figure 6: Transcript of a practice session showing sophisticated practice strategies when working on self-selected repertoire. From J. M. Renwick and G. E. McPherson, Interest and choice: Student-selected repertoire and its effect on practising behaviour. *British Journal of Music Education*, 19, 173-188.

The participants' qualitative responses were systematically organized into a hierarchy of strategy categories within each skill measure. For performing rehearsed music, McPherson and his colleagues, in consultation with the research literature, quantified organizational strategies, priorities within practice sessions, improvement strategies, and self-correction strategies to create a combined strategy use scale. For sight-reading, McPherson developed a similar scale based on the strategies of studying the first measure, identifying the key and time signatures, establishing a tempo before

commencing, and scanning the music to identify obstacles. For the skills of playing from memory or playing by ear, McPherson identified a hierarchy of conceptual, kinaesthetic, and musical strategies, where musical strategies scored the highest on the rating scale.

The analyses compared the influences of strategy use and total accumulated practice on performance in the five measures. In a regression analysis, practice explained a substantial portion of variance in the Perform Rehearsed Music measure. However, in the other measures—sight-reading, playing from memory, and playing by ear—practice was either not significant or accounted for a relatively small amount of the variance in scores. For these measures, cognitive strategy use was a much more powerful predictor of performance.

Family Interactions

Some parental influences were examined to see whether there were potential influences that parents were having on their children's music learning. A number of factors from the home environment were studied, such as the degree to which parents were involved in lessons, whether they issued reminders to practice, whether they used rewards as a way of enticing their children to practice, and the nature of the space provided for the children to practice. Evidence was found for relationships between some of these factors and children's maintenance of practice and ongoing learning.

One revealing result emerged from an examination of both the children's and mothers' explanations of the children's practice schedules. McPherson and Davidson (2002) described a statistically significant difference between estimates made by the children and their mothers of how long the children regularly practiced. This important difference in perception led the researchers to realise both that children's perception of time was underdeveloped at the age that was being studied and that their estimates involved ancillary activities that their mothers' did not, such as setting up and cleaning the instrument. Examination of the mothers' more accurate estimates revealed that the children who ceased learning after 12 months were doing significantly less practice than those who were continuing, and that those who eventually ceased had initially had unrealistically high expectations about the amount of practice they would do. Such differences in practice behaviour were also associated with mothers' comments: A non-parametric analysis indicated that the mothers who were worried about how much their

child would practice had children who were more likely to cease learning within 12 months.

The children from one family involved in the study provided an illuminating case study of the ways in which the children viewed the notions of ability, talent, and heredity (Davidson & Pitts, 2001). Three adopted children aged 16, 12, and 10 all learned music in the same band program that was the subject of the *Child to Musician* study. The themes that emerged from the interview study centred on music learning, the role of music in their lives, and the sources of their ability. Discussions of adoption were open and unthreatening in the family dialogue; the family unit was observed to be strong, with the parents creating a nurturing and caring home environment. The children reported “tangled” (p. 167) views on their connections with their parents, using the language of heredity to describe the sources of their abilities and traits, despite knowing that they were not genetically connected to their parents. Music played a large role in many sibling interactions: one of the children took on a teaching role for his younger sister, who eventually gave up. The case study provided unique insights into the perceptions of other family members and their beliefs about the nature of ability.

Discussion

The *Child to Musician* and *Music in our Lives* studies offer potential to respond to some pressing issues in music education research. Few studies exist that examine children’s music learning over a 10-year period, so the studies are uniquely positioned to address questions related to:

- Patterns of motivation, including attrition and increased involvement, over an extended period of time.
- The influences on motivation that occur at major transition points such as entering high school.
- The lasting influence that a common experience of the primary school band program had on a number of students, if any.
- The role of cognitive strategy use and self-regulatory behaviour in skill acquisition, and their potential relationships with motivation.

Some results of the *Music in our Lives* study, relating to some of the above points, are covered in the next two chapters. The approach to the current *Music in our Lives*

study was to examine the previous findings and determine what program of research with the sample might provide the most fruitful contributions to understanding how children are motivated over a long period of time to sustain learning and involvement with a musical instrument. With a comprehensive background to the sample provided by the *Child to Musician* data, the following chapters describe analyses that used retrospective data gathered in the *Music in our Lives* study to explore possible explanations for these pressing research questions. The *Child to Musician* and *Music in our Lives* studies are discussed and synthesised more fully in the Discussion chapter (Chapter 6).

4. PREDICTING AMEB ATTAINMENT

Introduction

The aim of a substantial body of music education and music psychology research is to elucidate the environmental factors that are influential on children's motivations to pursue and succeed in music learning. Knowledge of such factors is necessary to improve music education and provide access to experiences of success for more people. Within this approach, there is also an attempt to explain individual differences in the attainment of varying degrees of musical ability. An understanding of the necessary elements of attaining success is helpful for students to monitor and self-regulate their own progress, teachers to provide students with an appropriate quality of instruction, and parents to provide a suitable home environment and supports for effective learning. Social-cognitive factors are complex, interdependent, and variable over time, so precise and accurate research is difficult.

I approached this problem by taking data from the *Child to Musician* study, and using information from the *Music in our Lives* study about students' eventual progression and achievement, to analyse factors that have, in recent years, shown to be important in helping children to sustain engagement in music learning. Having synthesised the findings of the *Child to Musician* study, I wanted to see whether some of the factors that were shown to be robust in the first three years of learning, could extend to a more long-term measure of music attainment.

In the *Music in our Lives* project, 31 students were found to have participated in Australian Music Examinations Board (AMEB) examinations, a nationally recognised standard of grading musical performance. These students are the focus of the study outlined in this chapter, because their music learning was similar (studying a set repertoire on a traditional instrument) and they had measurement and attainment targets in common. Data were combined from all stages of the study in an attempt to uncover relationships between the constructs of interest and the students' participation in AMEB exams.

The following sections review previous research, including findings made so far from the *Child to Musician* and *Music in our Lives* projects, as a preface to outlining the scope and limitations of the current study.

Social-Cognitive Factors in Music Achievement

In studying the effects of environment on music education, researchers attempt to discern the factors that may have an influence on shaping motivation and interest in sustaining music activities. The environmental factors examined are encapsulated in Bandura's (1977) social-cognitive model, which pervades recent decades of research in several areas relevant to this study. Bandura's model proposes bi-directional, causal relationships between persons, their behaviours, and their social environments. These factors are important because according to the social-cognitive model, they are sources of motivation. In music, sustained engagement in deliberate practice over a long period of time is the strongest contributor to the possibility of a high level of achievement in music performance, so it is necessary to understand what influences motivation for such behaviour. Research has examined constructs under several of these factors in ways relevant to music education, some of which is reviewed here as a preface to the study.

Extensive research on the relationship between subjective task values, expectations for success, and behaviour have shown positive results in music. According to expectancy-value theory, students who value a task as being interesting, useful, enjoyable, and important are more likely to experience success and achieve more highly than students who do not. This was demonstrated in Wigfield et al's (1997) investigation comparing elementary students' valuing of several school subjects. Interestingly, that study also found that within three years of elementary school, students' valuing of music dropped more dramatically than any other subject. These results have been demonstrated in several other studies related to music (Ghazali, 2006; McCormick & McPherson, 2007; McPherson & McCormick, 2000) and are proposed by McPherson and Davidson (2006) as being core values associated with success in instrumental learning. In a related study by Jorgensen (1998), students were found to perform better when their expectations and preferences were closely aligned with that of their parents, suggesting that this may also apply specifically to subjective task value dimensions.

Scope and Validity of Music Performance Measures

One difficulty with conducting research on music achievement is that of defining the scope of the dependent variable. Since music is carried out in so many ways across different cultures, school education systems, and local communities, a single measure of music performance ability that applies to all contexts is difficult to define. For example, performance tests that are based on the ability to read excerpts of notated music and perform them accurately, such as the widely-used Watkins-Farnum Performance Scale (Watkins & Farnum, 1954), are unsuitable for oral music traditions that are not based on Western music notation. Similarly, tests that are based on the ability to recreate previously composed music are unsuitable for traditions in which most elements of music are created or improvised at the time of performance. The problem, therefore, is finding a measure that is both ecologically valid and universally applicable.

For the study described here, this problem was overcome by imposing a limitation on the generality of a music performance measure, while maintaining the ecological validity of the instrument used. Participants were selected from a sample of 157 students who began learning music on instruments in school band programs in Sydney in 1997. Thirty-one of these students went on to undertake performance assessments under the Australian Music Examinations Board, which conducts systematic music examinations according to syllabuses in music, speech, dance, and drama.

AMEB examinations are a measure of music performance in a traditional Western cultural context. They assess students' abilities to perform on a solo instrument, based heavily on performing set pieces from a mostly classical repertoire, but also extending to studies, rudimentary technical exercises such as scales, basic musicological knowledge about the pieces performed, and some aural skills. AMEB examinations are structured according to eight grades, after which there are several diploma opportunities named associate, fellow, and licentiate. As a guide, performance at a sixth grade standard is regarded a minimum standard for university entrance, but in conservatory environments, for example, it would not be unusual for many students beginning programs to already have attained associate level. The AMEB also has accreditation programs for music instructors and alternative syllabuses for contemporary popular music.

In Australia, few other recognized opportunities exist, besides eisteddfods (local community music competitions), to measure solo performance on traditional Western classical instruments. Solo performance in any sustained and developed way lies outside

the mandates of school curricula except in the upper levels of high school, and performance more generally takes up a small portion of the music curriculum (alongside listening, musicology, and composition) in most Australian states. Since the AMEB is the most widely recognised and used system of assessment for music performance in Australia, most students taking formal lessons on a traditional Western instrument know about AMEB examinations and after playing for several years are highly likely to undertake them.

Purpose of the Study

This study is based on data that were available on the highest AMEB grade attained by students who began learning in 1997, along with a broad range of information pertaining to their home practice, parental supervision of learning, confidence levels, commitment, and subjective task values. Additionally, data were collected from the same students who, in 2007, retrospectively reported on their primary school experiences in terms of their psychological needs and subjective task value.

Having explored the data set from the original studies, and collected new, retrospective data, I saw an opportunity to examine whether some of the robust findings that applied to the initial three years of the *Child to Musician* study could be applied to long-term engagement in a different measure of music achievement. Given the availability of such data and the need presented by the literature to further refine and clarify the influence of such factors on music education, I aimed in the following analyses to determine to what extent these variables could predict whether the students eventually participated in AMEB examination, what was the highest grade they attained.

Procedure

Data from the *Child as Musician* longitudinal study (see Chapter 3) were used in conjunction with *Music in our lives* data to examine whether any relationships existed that might suggest predictive power for whether the students continued to achieve highly in AMEB examinations. Variables were selected according to the quality of the data collected in the initial study and their relative importance as suggested by previous theoretical and empirical research. Responses to the following questions asked in the *Child to Musician* project in 1997-99 were used:

1. How long do you think you will continue playing your instrument? (Options: just this year, until the end of primary school, until the end of high school, until I'm an adult, for the rest of my life). Participants were also asked to explain their response. The data were collapsed by to assign the participants to categories of short-term commitment, medium-term commitment, and long-term commitment (McPherson, 2001), which were used in this study.
2. How confident are you that you will become a good musician? (Options: Not very, unsure, somewhat confident, very confident)
3. Are you happy with your choice of instrument? (yes, no)
4. How often and for how long do you practice your instrument? (Responses were used to calculate average daily practice values for each year from 1997 to 1999 and to create an average daily practice value for all three years).
5. Do you think you are doing enough practice to continue improving on your instrument? (yes, no)

The participants were also asked several questions to assess their subjective task value (Eccles (Parsons), et al., 1983; Eccles, 2005) of music. In a similar way to previous research studies in subjective task value and expectancy-value theory (Ghazali, 2006; McCormick & McPherson, 2007; Wigfield, et al., 1997), participants were asked about the degree to which they found their musical activities important, useful, interesting, and enjoyable on Likert scales.

The factors above were analysed in relation to whether the students took AMEB exams at all, to examine differences between these participants and the rest of the group. Additionally, the factors were examined within the group of students who undertook AMEB exams to explore whether they predicted the highest grade that participants would go on to achieve.

Results

Description of the Sample

Thirty-one (30%) of the 104 students who responded to the *Music in our Lives* online survey reported completing AMEB exams. Of these, 22 (71%) were female and 9 (29%) were male. The distribution of the highest the students achieved in AMEB exams is shown in Table 2.

Table 2: Highest AMEB grade attained

Grade	<i>f</i>
1	1
2	2
3	3
4	5
5	4
6	5
7	4
8	7
Total	31

Commitment

Participants who undertook AMEB exams were compared to those who did not undertake AMEB exams according to the three levels of commitment (short, medium, and long term) reported in their initial years of learning an instrument. The distribution of these participants is shown in Table 3. A chi-square test of independence indicated no significant relationship between initial commitment level and whether the participants eventually undertook AMEB exams, $\chi^2(2, N=152) = 1.181, p = .554$.

Table 3: Percentage of participants who undertook AMEB exams at each commitment level.

Commitment	Did AMEB Exams?		Total
	Yes (n = 33)	No (n = 119)	
Short (n=43)	30%	21%	28%
Medium (n=68)	43%	52%	45%
Long (n=41)	27%	27%	27%

Within the group of students who undertook AMEB examinations, the highest grade attained by the participants was studied according to their initial commitment level. The mean highest AMEB grade attained by each commitment level are shown in Figure 7. A one-way ANOVA indicated that the mean AMEB grade attained and the initial length of commitment was significantly different, $F(3, 32) = 3.561, p = .041$. The size of this effect was moderate ($\eta_p^2 = .241$). Post-hoc comparisons using the Tukey HSD method showed significant differences between the short and long term commitment groups (Table 4).

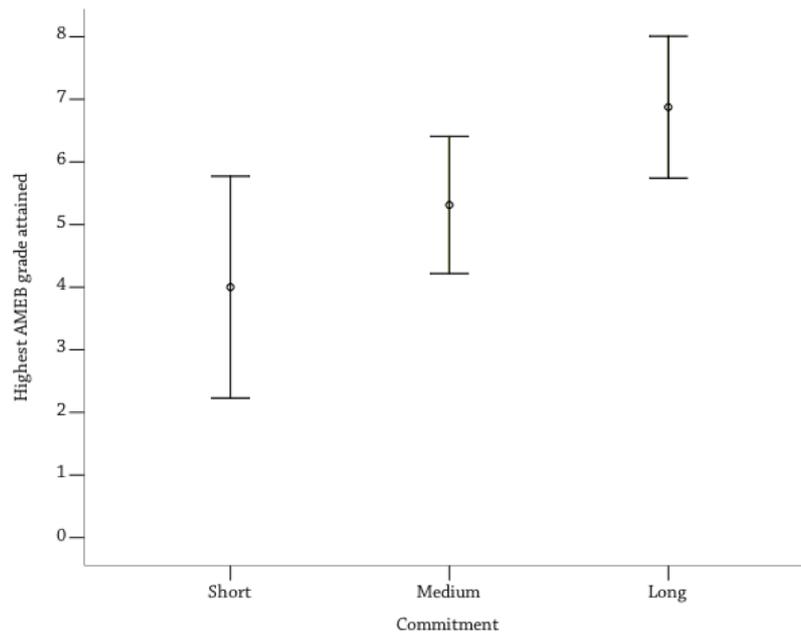


Figure 7: Highest AMEB grade attained by commitment level (error bars show 95% CI).

Table 4: Significance levels of post-hoc comparisons (Tukey's HSD) of highest AMEB grade attained by commitment level.

Commitment		<i>p</i>
Short	Medium	0.286
	Long	0.016
Medium	Short	0.286
	Long	0.150
Long	Short	0.016
	Medium	0.150

Subjective Task Value

A multivariate ANOVA was conducted using importance, usefulness, interest, and enjoyableness as dependent variables, and whether the students did or did not undertake AMEB exams as the between-subjects factor. There was no significant difference between the levels of subjective task value reported by the participants and whether they undertook AMEB exams, $F(4, 95) = 1.206, p = 0.314$.

The students who undertook AMEB exams were examined to find whether a relationship existed between subjective task value and the highest grade attained in

AMEB exams. No correlations existed between the highest AMEB grade attained and any of the subjective task value dimensions reported from primary school (Table 5).

Table 5: Pearson correlations of subjective task values in primary school with highest AMEB grade attained

Variable	<i>r</i>	<i>p</i>
Highest AMEB grade	1	
Importance	.230	.213
Usefulness	.169	.364
Interest	.025	.895
Enjoyment	.037	.842

Confidence

Responses to the question, “How confident are you that you will become a good musician?” were analysed to examine whether differences existed between students who undertook AMEB exams and those who did not. The responses to the confidence question were collapsed into three levels (low, medium, and high). Chi-square analyses were conducted comparing responses to the confidence question for each year with the variable of whether the students did or did not do AMEB exams. The differences between students who did and did not do AMEB exams were not significant for confidence levels in 1997, $\chi^2 (2, N=135) = 5.309, p = .070$, or 1998, $\chi^2 (2, N=112) = 2.571, p = .276$ but were significant for 1999, $\chi^2 (2, N=108) = 7.914, p = .019$. Further details for this analysis are shown in Table 6.

Table 6: Cell counts for levels of confidence over three years and whether participants undertook AMEB exams.

Year	Confidence	Yes	No	Total
1997	Low	34	5	39
	Medium	38	10	48
	High	32	16	48
	Total	104	31	135
1998	Low	33	9	42
	Medium	31	10	41
	High	18	11	29
	Total	82	30	112
1999	Low	37	5	42
	Medium	26	14	40
	High	16	10	26
	Total	79	29	108

The students who undertook AMEB exams were examined to find whether a relationship existed between their levels of confidence in 1997-99 and the highest AMEB grade they attained. ANOVA was conducted using highest AMEB grade attained as the dependent variable and confidence levels for each year in 1997-99 as the within-subjects factors. The model did not indicate any statistically significant effect of confidence levels in any year (Table 7).

Table 7: Analysis of variance for highest AMEB grade attained with confidence levels.

Source	<i>df</i>	<i>F</i>	η^2	<i>p</i>
1997 Confidence	2	0.617	.087	.555
1998 Confidence	2	2.679	.292	.106
1999 Confidence	2	0.357	.052	.706
Within-group error	13	(4.308)*		

* Value represents mean square error.

Average Daily Practice

Statistics from 1997, 1998, and 1999 were used to compute an estimate of the total accumulated practice within the first three years of learning. This statistic was used as the dependent variable in a one-way ANOVA with AMEB grade as the within-subjects factor at three levels: low (preliminary to grade 3), medium (grades 4 to 6), and high (grade 7 or higher). There were approximately equal numbers of participants in each level of this variable. Results of the ANOVA are shown in Table 8. Notably, the students in the high AMEB group had accumulated nearly double the amount of practice than those in the low AMEB group, as depicted in Figure 8.

Table 8: Univariate ANOVA shows significant differences in total practice between AMEB attainment levels. Post-hoc tests (least significant differences method).

Source	<i>df</i>	<i>F</i>	<i>p</i>	η^2
Corrected Model	2	20.694	< .01	0.588
Intercept	1	362.348	< .01	0.926
AMEB level	2	20.694	< .01	0.588
Error	29			
Total	32			
Corrected Total	31			

AMEB level attained		SE	<i>p</i>
Low	Med	17.98042	0.198
	High	19.2437	< .01
Med	Low	17.98042	0.198
	High	16.79728	< .01
High	Low	19.2437	< .01
	Med	16.79728	< .01

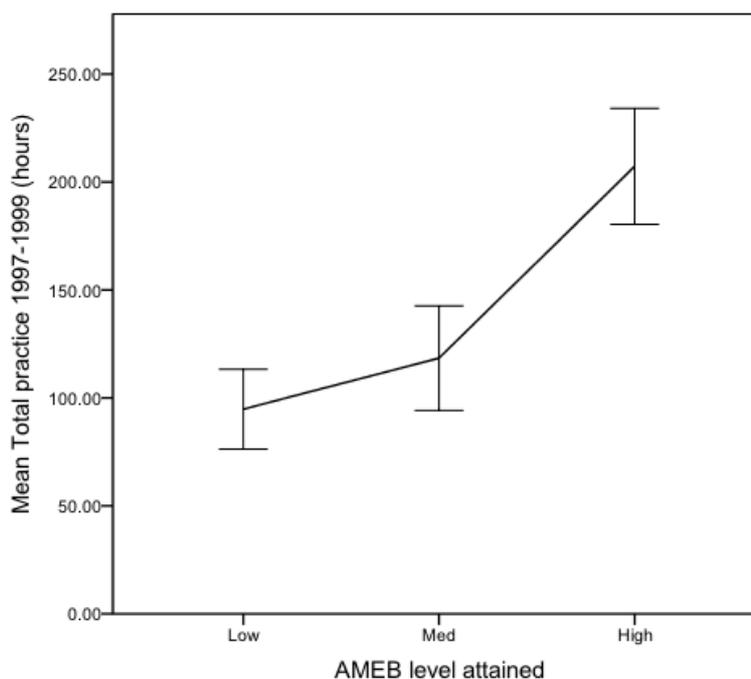


Figure 8: Mean accumulated practice in the first three years of learning by AMEB attainment. (Error bars show +/- 2 S.E.)

Discussion

Can any of the environmental factors examined in the *Child to Musician* project be used to predict whether the children involved in the study eventually undertook AMEB examinations and how many grades they completed? Of all the factors examined in this study—commitment, average daily practice, confidence, satisfaction with instrument choice, and subjective task value—only commitment and practice appeared to distinguish those students who went on to attain a higher grade in AMEB examinations than others. For all of the other factors examined, the statistical tests used failed to reject the null hypothesis that any differences in AMEB achievement were due to chance. These results appear to contradict literature that suggests that such environmental and social-cognitive factors are important influences on long-term music achievement, particularly in the first years of learning a musical instrument. This section discusses the findings in relation to methodological and theoretical issues and posits some of the possible reasons why factors that seem to be theoretically important are not having an effect on this particular measure of achievement.

Methodological

The failure to uncover significant differences where they were theoretically expected may be due to the way the constructs were measured. This section discusses methodological issues that may have been the reason why such differences were not found.

Much of the data was collected as categorical data using questions with options such as “never, rarely, sometimes, often, always.” These options assume that the data for questions such as “How often does your mother or father remind you to practice” fall meaningfully into these categories, which would qualitatively distinguish different levels of frequency for parental reminders. In other words, it assumes that there is a qualitative difference between, for example, ‘sometimes’ and ‘often’ which is accurately obtained from the participant answering the question. If this is not the case, a more meaningful way of measuring parental involvement of this type would be to have the participants report on the number of reminders received each week or the number of reminders that were required for each practice session. This would also solve the problem of participants’ interpretations of the categories being different, as one person’s understanding of “often” might mean once per week, while another takes it to mean

every other day. If appropriate, the data could later be collapsed into categories for non-parametric tests if meaningful categories were observed.

For several of the constructs, data were collected as continuous data on 7 point Likert scales. It may be the case that these scales need to be further refined so that there are more points to finely discriminate different levels. They may also need to be calibrated so that the words placed at each pole are more indicative of specific levels rather than vague impressions which are open to interpretation in a similar way to the categorical questions described above. In analyses of these data conducted previously, no pilot questionnaire was administered. Note, however, that for the subjective task value items, the same questions have been used in other similar research (Wigfield, 1997) with demonstrated validity and reliability.

Finally, the sample chosen for this aspect of the study was limited to 30 participants. Although this number is generally adequate for many of the tests that compare means (e.g., ANOVA) and permitted adequate cell sized in non-parametric tests (e.g., chi-square tests), the differences in the dependent variables may occur on a finer level which would be clarified with a much larger sample size.

Some of the methodological issues noted above apply to many research studies in the literature, and they reflect the difficult nature of accurately and precisely measuring certain constructs that are of interest to music educators. To overcome them, studies can be done in the lab which compromises ecological validity, or great expense and effort has to be expended to accurately measure the constructs. Regardless of expense or difficulty, these methodological issues limit the validity of the data in ways worth noting. For music education research to ultimately clarify how these constructs are related, if at all, these methodological issues may need to be addressed despite their practical difficulty.

Theoretical

The results observed in the study seem to contradict theoretical relationships suggested by the literature. This section calls into question the assumptions of this study, which were based on findings of previous research studies, and examines the validity of the dependent measures in order to identify an explanation for the unexpected findings.

Of all the psychological constructs investigated, one of the most encompassing is the psychological needs theory, which posits that feelings of competence, relatedness, and

autonomy are closely linked to continued persistence in an activity. In this study, students who did AMEB examinations did not have a greater level of psychological needs satisfaction in early years, suggesting that while psychological needs satisfaction might be associated with ongoing involvement, it was not able to differentiate students who chose this form of formal learning and assessment. Within the group of students who did AMEB exams, psychological needs were not associated with higher levels of attainment. This may be because psychological needs were only evaluated for the context of primary school, rather than in an ongoing way. More precise research, which gathered data on a regular basis on both psychological needs and performance level attainment would clarify whether this finding is an accurate reflection of the link between psychological needs satisfaction and music achievement.

In a similar way, data on subjective task value was compared to whether students did AMEB exams with similar results: no relationship was found. Again, because both sets of data were gathered based on the perspective of having played primary school band for just under one year, so to uncover the relationships suggested by this literature may have required ongoing measurements more closely associated with the time the students were participating in AMEB exams.

At the most basic level, this research is based on an environmentalist approach—a study of the participants' environments with the assumption that individual differences in achievement and engagement behaviours is caused largely by influences in the person's social-cognitive environment, rather than innate qualities determined by fixed characteristics of the person. While this view is strongly supported in the literature (Ericsson, et al., 1993; Howe, Davidson, & Sloboda, 1998; Sloboda & Howe, 1991), there is also a case for innate abilities, which, although dependent on environmental variables to be made apparent, are necessary (F. Gagné, 1999; Pinker, 2003; Simonton, 1999). However, research is as yet unable to explain what those innate qualities are or how they might be measured. In the future, a more comprehensive approach that incorporates both perspectives may be necessary.

5. PSYCHOLOGICAL NEEDS

Factors that influence children's motivations to learn and play music are of great interest and debate to music educators and researchers. School curriculums in western societies aim to foster the ability to engage in active, ongoing, and rewarding participation in music activities through adult life (e.g., Board of Studies NSW, 2003), yet relatively few students elect music through to the end of high school. In adulthood, very few individuals reflect that they have experienced a music education that was personally satisfying to them, and many wish they had learned to play a musical instrument early in life (Crowther, 2007; Wilson, 2006). Ongoing commitment to continue learning a musical instrument in childhood is difficult, and the motivational processes that sustain an ongoing commitment are poorly understood, despite their obvious importance to parents and teachers (McPherson & Davidson, 2006). In this chapter, I describe analyses of the *Music in our Lives* data that attempted to address this problem. First I provide a brief overview of a psychological needs perspective on children's motivation to engage in music activities, then describe some evidence I found for supporting this more theoretical approach to understanding both the *Child to Musician* and *Music in our Lives* data.

Several studies have examined the characteristics of students who cease learning (or 'drop out'), but few offer psychological or motivational explanations for the behaviour. Corenblum and Marshall (1998) found socio-economic status (SES) to be an effective predictor of achievement (higher SES) and dropout (lower SES) in a high school band program. They interpreted SES as a proxy variable for certain beliefs, values, and physical environment that are conducive to music learning. Similar SES trends were found by Klinedinst (1991), who also found links between retention in an instrumental music program and scholastic ability, reading achievement, and maths achievement. The conclusions demonstrate links between these constructs and retention in music programs, but they are limited to a particular type of school band program, leaving few theoretical implications for other types of music education programs and music behaviour more generally.

In a study by Costa-Giomi, Flowers, and Sasaki (2005), behavioural differences were observed between beginning pianists who ceased learning within three years and

those who continued. The pianists who ceased learning within three years tended to seek approval from their teachers more frequently, accomplished fewer tasks, and received fewer actual approval comments from their teachers than those who continued learning. Hallam (1998) also found that students' intentions and attitudes towards practice were predictive of dropout. Again, however, while these results have useful predictive power for identifying likely dropouts, they tell little about the underlying psychological mechanisms influencing the students' motivations, and are related only to one-on-one instrumental instruction.

To address these issues more theoretically, and to overcome the limitations of an 'innate talent' approach (Howe, et al., 1998), researchers have adopted an *environmental* perspective to explain why students engage in music activities and how they attain success. In extensive biographical research on experts in music and in other areas, distinct phases of learning have been identified (Bloom, 1985; Manturzewska, 1990; Sloboda & Howe, 1991; Sosniak, 1985). These phases seem to be characterised by qualitative differences in the social environment, such as relationships with parents, peers and teachers, to accommodate the needs of each phase. In a landmark study, Ericsson, Krampe, and Tesch-Romer (Ericsson, et al., 1993) examined experts across a range of fields and identified the common attainment of 10,000 hours of deliberate practice which they believe is a necessary condition for expertise. However, these areas of research are limited in addressing the current issues in two critical ways. First, whilst the researchers acknowledge the need for extensive motivational resources to negotiate the difficult transitions between each phase and to sustain extensive amounts of deliberate practice that is often difficult and lonely, the source of these motivational resources is not examined within this explanation. Second, the research focuses mainly on expert performance, which may represent qualitatively different motivational needs from normal populations, and especially young developing musicians (McPherson & Zimmerman, 2002).

Research within the *Child to Musician* program (see Chapter 3) examined a broad range of factors associated a group of children's personal beliefs and values, their home environment, relationships with parents, peers, and teachers, and the strategies and techniques undertaken by the students to practice and perform on their instruments. Children's expectations about their learning certainly played a role in their achievement levels, with children who had a long-term commitment and realistic (rather than unattainably high) expectations about how much practice they should engage in

achieving much higher on performance measures (McPherson, 2001). The students who ceased playing within nine months of learning undertook considerably less practice than those who continued (McPherson & Davidson, 2002). Cognitive strategy use was also found to be connected with achievement and continuing to learn, and appeared to be an even better predictor of success than total hours of accumulated practice time (McPherson, 2005). Children who use sophisticated strategies perform better than those who do not, and they are more likely to sustain involvement with their instrument for a longer period of time. Studies examining the home environment have made similar findings: children achieve more highly when they experience an unthreatening home environment where they can experiment and practice freely, study with teachers from whom they enjoy learning, and develop a sense of intrinsic motivation early in their learning (Davidson & Burland, 2006; Davidson, et al., 1996; McPherson & Zimmerman, 2002). In sum, these findings are close to demonstrating empirically that there are links between an ideal social environment, the development of intrinsic motivation and cognitive strategy use, and ongoing participation in music activities. However, there is still no theoretical framework that explains why these links exist.

Over 10 years after the student in the *Child to Musician* study commenced learning, they were targeted again to participate in the *Music in our Lives* project, which aimed to extend the findings of the initial project and to study more broadly the role of music in the lives of the participants. The current study sought to fill the theoretical gaps cited above by examining the participants' experiences retrospectively; Self-determination theory (SDT) was used as the theoretical framework. More specifically, the concept of psychological needs was used to examine how individuals move into or out of music activities. Ryan and Deci (2000) suggest that humans are continually motivated to pursue activities that satisfy basic human needs, and move away from activities or situations in which they feel those needs are thwarted. Humans have evolved a motivation to pursue these kinds of activities because they contribute to psychological health and guide individuals "toward more competent, vital, and socially integrated forms of behaviour" (Deci & Ryan, 2002). They therefore guide a substantial amount of everyday behaviour. The three psychological needs proposed by Ryan and Deci (2000) are:

- *Competence*, the need to feel effective in one's efforts and successful in the acquisition and execution of skills;
- *Relatedness*, the need to feel socially connected and integrated; and

- *Autonomy*, the need to feel that one's activities or pursuits are self-endorsed and self-governed.

This particular psychological needs theory explains why humans evolved adaptive behaviours that guide them towards healthy and functional behaviours, and is backed by extensive empirical evidence (Sheldon, Elliot, Kim, & Kasser, 2001) and applied studies in a range of domains such as work, interpersonal relationships, and sports (e.g., Deci et al., 2001; Patrick, Knee, Canevello, & Lonsbary, 2007; Sheldon, et al., 2001), setting it apart from other needs-based theories of motivation (Maslow, 1954) as a more parsimonious theoretical explanation. Given the extensive empirical evidence for the theory itself, as well as demonstrated validity in a number of settings, the psychological needs theory offers potential explanation for why individuals are motivated to continue or move away from music activities.

Both statistical and qualitative data collected from *Music in our Lives* were investigated to examine the extent to which these types of data supported the hypothesis that greater levels of psychological needs satisfaction in music activities results in continuing motivation to play an instrument, and thwarting or inhibiting the psychological needs results in ceasing musical engagement.

Method

The methods used in the *Music in our Lives* study are broadly described in Chapter 3. The following sections describe those methods that are directly relevant to this analysis of the psychological needs relationships.

Participants

At the time the data for *Music in our Lives* were collected, the students had finished high school and they were 18-20 years old. There were 87 (55%) females and 70 (45%) males. The participants were contacted for the *Music in our Lives* study using a range of methods including the most recent contact information (which was over five years old), social networking websites, phone directories, electoral roles (publicly available information about citizens who are enrolled to vote), and snowballing techniques such as asking friends who had studied at the same school. Eleven participants could not be contacted using these methods, and 43 were contacted but did not complete the online questionnaire. The sample for the current investigation consisted of 104 participants (58

female, 45 male, 1 did not specify sex). The response rate was therefore approximately 66%. Using data from previous years of the study, we were able to compare the respondents of the current survey to the non-respondents based several variables: music performance ability measures, reported average daily practice, autonomy as measured by the participants' need for reminders to practice, and the length of time the participants thought they would continue playing an instrument. No significant differences could be found between respondents and non-respondents using parametric and non-parametric statistical analysis of these data.

Procedure

The main dataset comes from responses to an online questionnaire designed to gather a broad range of data, including those on psychological needs, which are the subject of analysis for this paper. After being contacted and asked if they would like to participate, the participants were sent an email with a link to the online questionnaire and a unique access code. Participants responded to the questionnaire between November 2007 and January 2008. The respondents were sent a gift certificate to the value of AUD\$20 as a token of appreciation for their participation in the project. For all phases of the projects described here, formal ethics approval was gained from the institutions employing the researchers at that time. For the initial studies that took place in 1997-2001, the procedures were approved by the University of New South Wales Human Research Ethics Committee. For the current data collection, the procedures were approved by the University of Western Australia Human Research Ethics Committee and the University of Illinois at Urbana-Champaign Institutional Review Board.

Measures

Psychological Needs Scale

The Psychological Needs Scale (Deci & Ryan, 2007), designed to measure the satisfaction of the three basic psychological needs of competence, relatedness, and autonomy, was adapted for use in this music context. In line with recommendations made by Deci and Ryan, the questions from the original scale were used as a basis for constructing items that related to music learning. The adapted version of the scale presented 24 statements, each associated with one of the psychological needs, to which participants respond on a 7-point scale from "not true" to "very true." Some of the

statements are presented to correspond with the need being satisfied (e.g., “I was good at playing my instrument” to assess competence), while others were presented to correspond with the need being inhibited or thwarted (e.g., “I could rarely make my instrument sound good” to assess whether competence was being thwarted). For each psychological need, the scores for the positive statements are summed, then the scores for the negative statements are subtracted. The statements used for each psychological need are presented in Table 9.

Table 9: Items used for the adapted Psychological Needs Scale

Competence
<i>Positively scored items</i>
I was good at playing my instrument
I would play my favourite pieces for fun
I developed a sense of pride in my abilities
People told me I was good at music
<i>Negatively scored items</i>
I could not keep up with the other kids
I could rarely make my instrument sound good
I couldn't be bothered most of the time
Relatedness
<i>Positively scored items</i>
I made new friends who did the same activities
I got along well with others who were involved
I really connected with my music teacher
It was a way I could be with friends
I had friends with similar interests
<i>Negatively scored items</i>
I felt out of place, like I didn't belong there
It took me away from spending time with friends
It often caused arguments or conflict with my family
Autonomy
<i>Positively scored items</i>
It was totally up to me whether to continue or not
I decided on my own what and how to practice
I could have stopped if I wanted to
I was excited when I first started
<i>Negatively scored items</i>
I felt forced or pressured to learn music
My parents always reminded me to practice
I didn't feel like it was my thing

The adapted Psychological Needs Scale was presented three times throughout the questionnaire with other questions intervening. The questions within the scale were presented in an order determined randomly for each participant in order to eliminate any effects that the order of questions would have on the participants' responses. The participants were asked to consider the time they were most engaged in music during high school, the weeks leading up to when they decided to cease playing their instrument, and the time during which they played in the primary school band. These data were used as a basis for comparing the degree to which the participants felt competent, related, and autonomous between each of the three contexts.

Ceasing Musical Engagement

Within the online questionnaire, participants were asked if they had ever ceased playing a musical instrument since they began learning in the primary school band program, whether it was the instrument they played in primary school or another instrument they had learned to play since. Eighty-seven participants (84%) responded that they had ceased playing an instrument, and 75 of these answered the open-ended question asking them to briefly describe the reasons for their decision to cease playing. The text responses ranged from a few words (e.g., "no time," "I got braces") to several sentences with precise details about the reasons why the participant ceased playing. The median number of words used was 31. The answers to the question were studied to examine common themes, and to see whether references to the psychological needs constructs of competence, relatedness, and autonomy emerged.

Results

Quantitative Psychological Needs Data

A repeated measures analysis of variance (ANOVA) was conducted on the psychological needs data. Time (primary school, high school, and the time of ceasing to play) was the within-subjects factor and the psychological needs of competence, relatedness, and autonomy were the measures. Mauchly's test indicated that the assumption of sphericity was violated for competence, $\chi^2(2) = 6.961, p < .05$, and relatedness, $\chi^2(2) = 7.094, p < .05$, so the degrees of freedom were corrected using the Huynh-Feldt estimates of sphericity (competence $\epsilon = .926$, relatedness $\epsilon = .924$). There was a significant effect of timepoint, $p < .05$, for each measure (see Table 10). Pairwise

comparisons of the psychological needs between each timepoint are shown in Table 11. Responses to other questions in the survey indicated that five participants had responded to the question about their high school engagement based only on music classes in high school or some very brief attempts at learning another instrument. Since these responses were inconsistent with the aim of this analysis in comparing high levels of engagement with the decision to cease learning, these responses were excluded from further analysis.

Table 10: Repeated Measures ANOVA for Psychological Needs

Source	Measure	<i>df</i>	<i>F</i>	η^2	<i>p</i>
Time	Competence	1.85*	17.54	.23	< .01
	Relatedness	1.85*	19.61	.25	< .01
	Autonomy	2	4.27	.07	.02
Error	Competence	111.12*	(48.50)		
	Relatedness	110.91*	(56.11)		
	Autonomy	120	(26.37)		

* Corrected using Huynh-Feldt estimate of sphericity.

Note. Values in parentheses represent mean square errors.

Table 11: Pairwise Comparisons of Psychological Needs Between Timepoints

Measure	Time (I)	Time (J)	Mean Difference (I-J)	<i>p</i>
Competence	PS	HS	4.74	< .01*
		Quit	7.05	< .01*
	HS	PS	-4.74	< .01*
		Quit	2.31	.04*
	Quit	PS	-7.05	< .01*
		HS	-2.31	.04*
Relatedness	PS	HS	3.95	< .01*
		Quit	8.16	< .01*
	HS	PS	-3.95	< .01*
		Quit	4.21	< .01*
	Quit	PS	-8.16	< .01*
		HS	-4.21	< .01*
Autonomy	PS	HS	-1.80	.07
		Quit	0.84	.33
	HS	PS	1.82	.07
		Quit	2.66	< .01*
	Quit	PS	-0.84	.33
		HS	-2.66	< .01*

Note. PS = primary school; HS = highest level of engagement during high school; Quit = the time at which the participant ceased learning a musical instrument; * denotes $p < .05$

Self-reported Reasons for Ceasing to Play

The responses were tagged with phrases or words in order to categorise the reasons why the participants ceased learning as a basis for comparison. Responses that were functionally similar were tagged in the same category. For example, the response “I changed school in Year 5 and didn’t continue playing” was tagged with “school change,” and the response, “I felt like I was forced to play in the first place and then forced to practice” was tagged with “under pressure / forced.” Many responses indicated several qualitatively different reasons, so they were tagged with several categories. A large number of specific tags was used, rather than collapsing the data into a small number of broad reasons. This method had the advantage of grouping like responses together into a manageable number of categories while still preserving the differences between reasons. However, it also meant that there were several categories with few responses. Eighteen reasons were identified and are listed in Table 12 alongside the number of responses that contained each reason.

Table 12: Categories of self-reported responses to the statement, “Describe why did you quit playing your instrument.”

Category	Frequency	Responses Cited
Other things	22	29%
Unenjoyable	17	23%
Uninteresting	12	16%
Lack of time	12	16%
Teacher relationship	9	12%
School change	8	11%
Lack of ability	8	11%
Impedes social life	6	8%
Not socially relevant	5	7%
Unchallenging	4	5%
Did not own an instrument	4	5%
Not improving	4	5%
Did not want to continue	4	5%
Under pressure / forced	3	4%
Activities not serious enough	3	4%
Braces	3	4%
Change of instrument	3	4%
Activities too serious	2	3%

Common Responses

The most common response was categorised using the term “other things” and included responses such as:

I became more interested in playing sport.

I guess I had more prominent passions to dedicate my time to.

I had too many activities; it was simply a process of elimination.

I just had too much going on with other sporting commitments.

Another common response category was tagged with “lack of time.” This category included responses such as:

No time

Eventually time was lacking to devote any meaningful amount to my instrument.

It was too hard to fit in to high school

It took too much time away from my schoolwork and classes.

Although the comments for both of these categories may seem to be valid reasons, the fact that they are among the most common responses is a clue that perhaps they should not be taken entirely at face value. Bearing in mind the nature of the responses as part of a 30-minute web-based survey, it is likely that the participants wanted to complete the responses as quickly as possible, and many of them may not have taken the time to complete these answers fully. In the indicative comments above for “other things” and “lack of time” for example, the lack of detail in the responses suggests that the participants may have responded with the first plausible reason that came to mind, rather than carefully reflecting on the range of factors that influenced their learning. In an interview situation, the interviewer would be able to ask the participant to expand on the reasons why, and would be likely to uncover further reasons. For example, a participant who chose other sporting commitments at the expense of his or her music activities may have done so for any of several reasons: he or she valued the sporting activities as more useful, the sporting activities provided a more vibrant social setting, the sporting activities were more in line with the person’s sense of identity, or the person felt they had more natural talent for the sporting activities. These reasons exert qualitatively different influences on the decision to cease playing, but with a lack of probing and detail, they are likely to manifest in the same shallow response of “I had

too many other things to choose from.” These responses therefore reveal little about the participant’s motivations to cease playing their instrument, besides that it is likely that for them, music was less valued than other activities.

“Unenjoyable” and “uninteresting” were others among the most highly cited categories, and these relate to Eccles and Wigfield’s subjective task value theory (Eccles, 2005). Examples of responses that were given these tags include the following:

I quit clarinet because I didn’t find it relaxing or that enjoyable.

I quit because I had a lot of other schoolwork to concentrate on and I found that at my school, music was less interesting than at primary school. I also enjoyed other out-of-school activities more than playing my instrument.

At the time I felt like it was a chore, not something I was doing for enjoyment.

There is an established body of evidence supporting the notion that individuals continue with activities that they feel are enjoyable, interesting, important, and useful, but few studies in music looking specifically at cessation are able to confirm the opposite: that individuals cease music activities because they feel unenjoyable, uninteresting, unimportant, and useless. The evidence presented here supports this case. But although a theoretical explanation exists, these responses exhibit a similar problem to those cited above. These responses still lack the explanatory depth to explain how the participants came to value playing their instrument as unenjoyable, uninteresting, and so on.

Psychological Needs

Many of the remaining categories provide explanations relevant to the theoretical constructs under analysis in the previous section. The psychological need of competence, which suggests that individuals initiate and sustain activities that give them feelings of being able to execute skills effectively, account for the following illustrative examples which were categorised under “lack of ability:”

I love music but I did not feel as though I had the best skills to perform. I had a good friend who was amazing at the drum kit and I guess that made me feel ashamed of my ability.

I didn’t enjoy my private lessons as I didn’t feel I was any good/progressing.

I have a sister who is extremely musical and was very into it and that made me realise I was not.

And, also in line with the concept of competence, one participant reported that her band program was not challenging enough, possibly because she needed it to provide

her with a greater sense of competence. This example was placed under the category “unchallenging:”

When I joined the high school band, they were behind the level that I was at and I found it most boring and frustrating.

The construct of relatedness—the need to feel connected in and endorsed by one’s social network—was represented by several reasons, including difficulties in relationships with teachers and peers. The categories are indicated in parentheses:

The conductor was pretty much a bastard and I just started to hate it so I stopped. (teacher relationship).

I was not enjoying the musical experience at my primary school, predominantly due to the band conductor. (teacher relationship).

I wasn’t playing it often anymore. It didn’t seem ‘cool’ at the time. (impedes social life).

I continued to play the clarinet in high school but felt it isolated me socially. (impedes social life).

The quality of the teacher relationship seemed important in eight participants’ responses, while their judgments of the teacher’s ability as a musician came into play in only one response.

Finally, several of the following quotations relate to the construct of autonomy, the need to feel that one’s activities are volitional, self-endorsed and self-governed, including one example that was classified as “unenjoyable” but alluded to feelings of engaging in an activity which is not wholly self-endorsed:

I quit bassoon following the Higher School Certificate. At the time, it was feeling like a chore—not something I was doing for enjoyment. (unenjoyable)

I felt like I was forced to play it in the first place and then forced to practice music that was not of my choosing so I felt restricted and oppressed. (under pressure / forced)

My mother only required that I learn up until Year 6 so after this I stopped. (Did not want to continue).

Some of the more detailed examples were those that cited reasons that related to combinations of several of the psychological needs. These quotations often contain emotive language, and perhaps illustrate the particularly negative effects of participating in an activity in which several psychological needs are being violated. All three of the following responses indicate that this combination resulted in a more certain decision to stop playing music:

I was made to learn an instrument for the first two years of high school. My skills deteriorated and the experience tore from me any love that I had left for playing music. (Under pressure / forced, lack of ability)

I quit playing my instrument because I felt pressured into practising my instrument by my family and my instrument teacher and I felt my teacher was harsh and we didn't get along so I lost all enjoyment. (under pressure / forced, teacher relationship)

I quit the trombone in Year 8 because the music we were playing was not challenging and crap, along with the fact that I wasn't noticed for my skill, didn't have many friends doing it, and the instrument wasn't used in the music I listened to at my leisure. (not socially relevant, impedes social life, lack of ability)

In sum, the construct relating to psychological needs were more detailed and seemed to better account for underlying reasons why participants ceased the activity. Categories that related to psychological needs were cited in 51% of the responses, excluding the responses that also alluded to psychological needs that were placed in other categories

Practical and Environmental Limitations

Most of the remaining responses were related to practical aspects of the environment that are likely to have made it either impossible to continue pursuing the activity, or excessively difficult for the participant to pursue compared to their enjoyment or ability. A lack of motivation is not the primary reason for the participant ceasing in most of these responses:

High school started teaching from the recorder, then I ended up leaving high school for home schooling. I never tried to do music outside the school environment.

I had my instrument stolen in the last weeks of primary school, which became an excuse to quit when I got to high school.

I was forced to quit the French horn when I moved to a new school in Year 8, because they lacked the facilities and general interest in providing me with an instrument or tutor. Although I could have tried to continue learning it outside of school I was at an age when I wasn't passionate or diligent enough to do so. At that time I was more interested in pursuing my singing.

It was too expensive and inconvenient to continue considering the level of enthusiasm I had (low).

Length of Time Playing

When the total length of time the participants played was taken into account, the results showed considerable variation. The set of responses was divided into two categories: participants who ceased playing an instrument within three years, and those who ceased at some point after three years. A much greater proportion of responses of participants who ceased in the first three years were categorised as "uninteresting" (21%

of responses compared to 14%), and, as might be expected, “school change” (21% compared to 7%). The responses made by participants after three years included more references to the reason labelled “unenjoyable” (21% compared to 7%). It was the participants who ceased after three years who accounted for many more of the responses citing psychological needs. Such categories were only referred to five times by participants who ceased within the first three years, compared with 32 times by those who ceased after three years. However, although some of these numbers may indicate large differences, further investigation by statistical testing is limited by the sample size. The division made here, for example, required splitting the sample of 75 into two groups of $n = 19$ and $n = 56$. With groups of this size, just one or two responses in a similar category results in several percentage points’ difference between the groups.

Discussion

Many studies have been conducted in the past that attempt to explain the reasons why students cease music learning, but few acknowledge the theoretical structure of motivation or take into account basic human psychological functions such as affect, the role of beliefs, and psychological needs. The study reported here involved a quantitative data analysis, the results of which indicated that participants felt more competence, relatedness, and autonomy when they were most engaged in an instrument than at the time they ceased learning. The study also compared responses to an open-ended, retrospective, self-report question that asked participants to describe why they ceased learning an instrument, many of which provided important details relating to one or more of the psychological needs of competence, relatedness, and autonomy. The major contribution that these findings make to the literature is that they shed light on how students come to form values and beliefs about music education, which themselves are already shown by extensive research to play an important role in motivation (Eccles, 2005; McPherson & Davidson, 2006)

One limitation of the data might be the narrow range of music learning experiences demonstrated by the sample. The participants were young children who were all enrolled in a school music program playing brass and woodwind instruments, so it would seem that further research is needed in other types of music learning to examine whether the theory applies, for example, to private instrumental lessons on piano,

playing guitar in a rock band, or singing in a vocal ensemble. However, it is likely that similar results would be found in other types of music learning for two reasons: (1) the theoretical framework provides comprehensive explanations for human behaviour at an organismic level, and (2) the theory has extensive empirical support from areas unrelated to music education, such as work, sports, and interpersonal relationships.

In the quantitative data, the result for autonomy was not as clear as for the other needs categories. Two interpretations for this result are plausible. Much of younger children's behaviour is guided and initiated by their parents, and it is not until adolescence that individuals begin to continually renegotiate relationships with their parents and acquire a sense of autonomy (Collins & Laursen, 2004). The initiation of music learning at age 8-10 was likely to be either caused by or accompanied by a significant amount of parent and or teacher encouragement, rather than the self-initiation and endorsement that characterise an act of autonomy, thereby raising the threshold of what would be considered an autonomous activity in high school compared with primary school. The other possible interpretation of the statistic is that it measured autonomy in relation to the weeks leading up to when they ceased learning. During this time, these individuals would be reflecting on the activity and developing a sense of control for whether they want to continue engaging in it. In other words, choosing to move away from the activity is itself an autonomous act, and the decision to cease learning, rather than the feelings of autonomy within the activity, may be represented in the data. More precise wordings of questionnaire items or detailed interview questions would be able to clarify this issue.

One of the illuminating aspects of the qualitative analysis was the difference in reasons for ceasing when taking into account how long the participants played before ceasing. Participants who played their instrument for more than three years cited reasons relating to psychological needs more than players who ceased within three years. This finding may indicate qualitatively different types of motivation operating at different stages of learning. Davidson et al. (1996) found that students required levels of parental support that were tailored according to their stage of learning, with the more successful players those who were provided with high levels of initial parental support that was gradually withdrawn as they became more independent. Research on phases of learning (Manturzewska, 1990; Sosniak, 1985) also indicates fundamental changes in the nature of social relationships and learning environments that are necessary for eventual success. The findings may also be a function of age, since all of the

participants were aged 8-10 when they began learning their band instruments. While these interpretations are based on a tentative finding, it suggests that future research may clarify differences in motivations according to time spent learning.

The findings made here have implications extending to future research and to the practice of music education. Music teachers seeking to understand why students cease learning in a band program, elective music class, instrumental tuition or other musical activity can use the psychological needs framework as a range of possible reasons. In addition, music teachers recognize that the transition times where students move from primary school to high school, elect school subjects at the end of Year 8, and again at the end of Year 10, are particularly vulnerable decision-making times, and often have to engage in marketing operations to sustain a viable music program. These findings suggest that when music activities provide the deeply satisfying experiences of competence, relatedness, and autonomy, students are likely to form values and beliefs about the music program that influence their decisions and guide them towards these enriching forms of behaviour.

6. GENERAL DISCUSSION

What motivates children to undertake learning a musical instrument, and sustain engagement in music learning throughout many hours of difficult and unenjoyable practice to eventually acquire a level of competence that is rewarding and which sustains continued enjoyable involvement in music activities into adult life? Conducted over a period of more than 10 years, this study is well-positioned to comment on the nature of music learning over this significant portion of the life span, from childhood to the transition to young adulthood. This thesis contains my own original contributions to this ongoing research project: a review and synthesis of the findings of the two projects as a whole, an analysis of factors shown previously to be important in motivation and music education, and the groundwork for a more theoretical approach that can be applied to the lifespan.

As a researcher, this study presented a unique opportunity to me, so the procedures I used were guided by a pragmatic approach—to take advantage of the opportunity to join a team of researchers and access data from over 10 years' worth of research, and to be a part of further data collection on the same individuals. As such I was able to approach the research with a fresh pair of eyes, and a perspective that enabled me to be more critical of previous findings. This pragmatic approach even guided the identification of the research questions. With a rich set of data and the possibility of interviewing a cohort of students with a common background, I approached the research by asking what kind of music education research questions this study could possibly answer. The result was a new phase of data collection that aimed to analyse the underlying reasons why students continue to engage in learning and playing a musical instrument.

Given this approach, the results described in this study are perhaps not surprising: Overall, some of the findings of previous studies were confirmed, while others, when placed under critical examination, were shown to require further research. In addition, new findings were made which capitalised on the opportunity of a broader 10-year perspective on music learning.

This chapter reviews the context and approach used in the *Child to Musician* and *Music in our Lives* studies, discusses the evidence found, and outlines key implications for stakeholders in music education, such as teachers, parents, and students.

Summary and Synthesis of the Findings

The 1990s witnessed a shift in the research climate for music education. Before that time, research had focussed on detecting early signs of natural talent or ability (termed *musical aptitude*), with varying degrees of success, but this approach was being increasingly seen as deterministic and inequitable. Rising interest in the social-cognitive model was influencing music education research. The perspective of the ‘environmental’ approach was argued extensively, culminating in a publication entitled “Innate talents: Reality or myth” by a team of music psychologists, providing strong evidence that individuals’ environments and efforts, not innate, predetermined factors, form the best explanations for their eventual achievement (Howe, et al., 1998). The article is still highly cited by published music education research. Much of this research was propelled by intense interest in the benefits of music and music learning to other areas of life, most notably in the results of a study that became known as the Mozart effect, the effects of which were later found to be more limited than initial reports implied (Schellenberg, 2006; Waterhouse, 2006). Models focusing on cognitive factors such as beliefs, attitudes, and values, parental influences on their development, and their implications for motivation, were being developed and extensively researched in other areas of education, and they were beginning to be applied to music education.

Thus, when the *Child to Musician* project began in 1997, it was only logical that the factors that had shown so much explanatory power in other areas of education should be subject to substantial longitudinal investigation in children’s music learning. For the first five years, longitudinal data were gathered on the children’s practice habits, home environment, and attitudes and beliefs relating to music learning. The students were contacted again 10 years after they began learning, to gather more retrospective data on their music learning and to examine their current beliefs, attitudes, and activities. The beginning of this study, as with other music education research, was backgrounded by a theoretical assumption that cognitive factors such as attitudes and beliefs, as well as influences in the home environment such as parenting practices, played a significant

role in sustaining young children's motivation to persist with learning a musical instrument.

The researchers saw that these factors may be able to fill a substantial gap in music education research. They therefore investigated the following areas:

- Parenting practices (e.g., the nature and frequency of reminding children to practice, assigning children a private space in the home to practice, providing incentives for children to continue learning, being involved in practice and lessons).
- Children's attitudes and beliefs towards music learning (e.g., beliefs about how long they would continue learning and playing their instrument, whether they valued playing a musical instrument, reasons for choosing the instrument in the first place).
- Practice activities (e.g., the frequency and duration of practice sessions, the order of activities such as technical work and rehearsing prepared music, and the use of cognitive self-regulatory strategies to facilitate skill acquisition).

Underlying the investigation of these factors was an implicit hypothesis that these factors impacted the level of acquired music performance ability and continued motivation for music learning. The significant results of these statistical analyses led the researchers to the following findings:

- Commitment and practice: Children who expressed a view that they would probably be playing a musical instrument 'to the end of high school' or 'all my life,'—referred to as long-term 'commitment'—were more likely to be still learning the instrument after three years. Those children who had realistic expectations about how much they would practice were more likely to sustain actual regular practice, and were also more likely to still be learning an instrument after three years.
- Cognitive strategy use: Children who employed a range of sophisticated mental strategies for practice and performing musical tasks such as sight-reading performed better on those tasks than children who employed ineffective strategies.
- Parental influences. Parents have a key role in facilitating motivation by instilling beliefs and values about music education, according to a preliminary theoretical model proposed by McPherson.

The current study took a retrospective look at the research project itself, and gathered together all of the findings made since the *Child to Musician* study began. This is an important contribution to the project in and of itself, because a critical examination of the previous findings and evidence allows researchers and the community to see more holistically what the research and findings say about music education, particularly in the lives of these individuals. In addition to threading the previous analyses and findings in the *Child to Musician* study, the current study examined data to find out which of the findings from *Child to Musician* would continue to be applicable throughout adolescence and into adulthood. The follow-up study made the following findings:

- Psychological needs were more fulfilled when students were more highly engaged in music activities, and less fulfilled and even thwarted around the time that they ceased.
- The formation of beliefs and values relating to music and music learning were related to early experiences of psychological needs, but not later ones.
- Among the variables examined, commitment and practice remain the strongest associated variables with the highest AMEB grade level attained by participants.

The following sections of this discussion chapter explain several possible interpretations of the data, including theoretical limitations or factors which may be important in interpreting the data, and alternative explanations for these and other previous findings.

Methodological Limitations

Much of the data in this study, and indeed much of data collected in music education research, comes from participant self-report. Self-report data are relatively easy to gather and analyse, but they are subject to a number of limitations, so researchers should not assume that responses to questionnaires or interview questions are objective truths for a number of reasons. When responding to questions, for example, people often provide the first generic or plausible response that comes to mind (Schwartz & Oyserman, 2001). I examined whether participants' responses to "why did you cease playing your instrument?" may be symptomatic of this phenomenon. When comparing responses that provided more detail and meaning to those that were shorter, I observed

substantial, meaningful differences in the content of the responses. I attribute these differences to the assumption that the more detailed, longer responses demonstrate more carefully thought-through responses. The finding has strong implications for further research, suggesting that researchers should be very discerning when gathering qualitative data with a retrospective approach. In addition, further research is needed to more precisely discern the size of this effect. Although this is a fundamental technique of qualitative research methodology (Kvale, 1996), it is seldom explicitly acknowledged in music education research and there may be good reason to suspect that occasionally, interview and survey responses are given more credibility than warranted.

Retrospective self-report also relies on memory. Over time, memories are distilled and changed to become idealised versions of the truth that better conform to the respondent's current self identity (Tourangeau, 2000). Furthermore, when these memories are recalled and relayed to researchers, they are influenced by the way the respondents want to portray themselves and what they believe the researchers want to hear. Questions about significant events are not as vulnerable to these kinds of errors as questions about more frequent, unimportant events (Means & Loftus, 1991; Schwarz & Oyserman, 2001). The finding described in the previous paragraph—that the responses shallow in detail appeared to be the more obvious responses to the question—may be explained further by this phenomenon regarding memory recall. The level of detail in these responses was analysed according to how long the students had played their instruments for. Those who had been playing for less than three years cited more obvious reasons, such as “I didn't have time” or “it was too difficult,” while those playing for longer than three years cited more detailed, personal reasons. It is entirely plausible that in response to this question, at least, a combination of these two phenomena is occurring: that (a) participants are answering the question using the first plausible, generic explanation that comes to mind, and (b) participants for whom music learning was not significant responded according to a better portrayal of their own self-identity or according to what they thought the researchers would want to hear.

If the quantitative data in this study were influenced by these phenomena, the likely impact would be to inflate the effect size of the differences between when the students were engaged in music in high school and when they ceased learning. The results of interest here are the psychological needs data, which form a major component. However, internal consistency of the psychological needs data suggests that this was not the case, and this is supported by the corroboration of the data with qualitative

responses. Schwarcz and Oyserman (2001) suggest that random ordering of the questions within the survey would also mitigate such effects, as was the case in this survey.

According to the sources cited here, these effects would be mitigated for those participants who (a) answered questions after pausing to personally reflect on their actual experience in more detail, and (b) had played music for a longer period of time, and were therefore considering events that were more significant and meaningful in their lives. The differences cited in the data are only one limited way of examining whether these phenomena occurred here, so the results should be interpreted with caution before further research on these effects is undertaken.

Finally, some discussion of the psychological needs scale is warranted here. Usually it would make sense to directly apply a set of questions whose validity and psychometric properties had been confirmed by previous research. In this case, however, there was no such pre-existing scale for psychological needs in music education. Although a Basic Psychological Needs Scale did exist prior to this research being carried out (M. Gagné, 2003), it is only in a 'general' form and not applied to a particular domain. Furthermore, it has poor psychometric properties. There exist some instances of the scale being adapted to other areas such as work and interpersonal relationships (Baard, Deci, & Ryan, 2004; La Guardia, Ryan, Couchman, & Deci, 2000), and the scale used in this study followed a similar practice. Since the research in this thesis was carried out, some work has been done to improve the Basic Psychological Needs Scale (Johnston & Finney, 2010) but there are still some psychometric problems. As noted by Skinner (2011) and Sheldon (2011), developing a scale to measure three intercorrelated variables that also has good psychometric properties is difficult, so a scientifically conservative approach to this topic should consider the results with caution. The study reported in this thesis outlined the use of an original scale that provides a balance between psychometric validity and conceptual validity, and given the above, the interpretation of the data is that it is good evidence for supporting a meaningful difference in psychological needs influencing motivation to learn music, and it warrants further research to continually refine the measurement instrument and to more deeply and subtly explain the phenomena at hand. In addition to the work cited above on the general scale, empirical work is being done in music on self-determination theory more broadly (Renwick, 2008; Troum, 2010), demonstrating

that it is among the most contemporary of theories of motivation and that substantial supportive evidence is being found to justify ongoing work.

Transition from Childhood to Adolescence

The initial *Child to Musician* study was planned as a three-year longitudinal study, commencing with students aged up to 9 years. Had the authors anticipated that the study would eventually have been extended, they may have been likely to approach the issues slightly differently, as they would have anticipated the onset of adolescence. Many cognitive, physical, and emotional changes occur during adolescence that are likely to impact heavily on many of the phenomena examined in these studies. Some constructs could be examined retrospectively in the *Music in our Lives* study, but these findings only justify further, ‘real-time’ data collection that more fully incorporates changes that occur during adolescence. Adolescent changes may help to explain why, for example, some findings from the *Child to Musician* study are robust when studied from a three-year perspective, but not from a 10-year perspective. This section overviews some of the changes that occur throughout adolescence, particularly those relevant to the themes of competence, autonomy, and relatedness, and those that might explain some of the unusual and unexpected findings.

Much of the music education research literature has involved adolescent participants, but few if any attempts have been made to draw from the literature of developmental psychology and adolescence in order to account for the special social, biological, and emotional changes that occur in this period. There is substantial research on adolescents’ use of music to regulate their mood as well as musical preference and taste (Hargreaves & Marshall, 2003; North & Hargreaves, 1999), but not from an educational perspective. Sloboda (2001) has described the transition between primary school and high school as a key “parting of the ways” (p. 243) between young people and their music teachers. The extensive literature on the social, emotional, and biological changes during adolescence warrants further investigation into music education from this perspective.

“A consistent finding with respect to certain kinds of competence-related beliefs is that they decline during early adolescence and adolescence” (Wigfield & Wagner, 2005, p. 225). In a longitudinal study of children’s subjective task value in various domains, a

decrease was observed across time (Wigfield, et al., 1997). Within that study, the domain of music experienced a significantly larger decrease than other domains such as sport and mathematics. In a study of 761 adolescents, Jacobs et al (2002) found that the participants' competence beliefs declined for all of the domains observed—language arts, math, and sports—but music was not included in the analysis. Since cross-cultural studies have not been conducted, it is unclear whether this is a function of adolescent development or a function of the school environments common to most children in Western countries (specifically the US in the case of the Jacobs et al. study).

The results in this study suggested a similar finding, with the participants' mean experiences of competence declining during adolescence. But when placed in a developmental context, this result may not necessarily mean a bleak outcome for music educators. Because changes in competence-related beliefs are observable in all subjects, any study attempting to examine children's competence experiences in music should attempt to compare this effect to changing competence beliefs about other subjects. No study, to my knowledge, on psychological needs throughout adolescence and in a number of different domains has been conducted, so the finding is difficult to interpret. This is, however, an important task for future research, because experiences of competence and competence-related beliefs impact other achievement-related motivational factors such as subjective task value and self-efficacy (Wigfield & Wagner, 2005).

The literature review chapter characterised adolescence as a time when children gradually acquire autonomy from their parents through a sometimes difficult developmental period, requiring them to constantly renegotiate parent-child relationships. In the *Child to Musician* study, some measures of autonomy were included, such as parental supervision of practice, and the requirement of parents that children practice at certain times, as opposed to parents allowing their children to practice as much and whenever they want to. It makes sense that these factors might have a bearing on children's success in music learning in the first few years—children require various forms of assistance from their parents, from the most basic aspects of day-to-day life such as being fed and sheltered, to attending school on time, and assigning time to practice the development of skills and abilities such as music.

Although the idea behind *Music in our Lives* was, in part, to follow up on as many of the phenomena investigated in *Child to Musician* as possible, it was deemed inappropriate to continue looking at some. Consider the example of parents reminding

their children to practice, and imagine a mother reminding her 20-year-old daughter that before she goes to school, she has to do 20 minutes of practice on her instrument, otherwise she would not receive her weekly allowance. This scenario simply does not make sense for a number of reasons: it seems odd that a 20-year-old would allow her mother to tell her what to do; if the student has been playing for over 10 years, she is likely to have developed practice strategies of her own; and even if a weekly allowance were still offered by the parents at this stage of the child's life, it is unlikely to be in exchange for practicing.

Finally, Adolescents' social lives change markedly from childhood: they begin to spend much more time with their own friends and alone, and much less time with their parents (Steinberg & Morris, 2001). Presumably, this increasingly peer-oriented environment has some influence on the development of adolescents' beliefs and values, which have already demonstrated considerable importance in adolescents' achievement-related choices (Eccles, 2005). Although this work has demonstrated relatedness as an important construct associated with adolescents' motivation to continue learning a musical instrument, it highlights a substantial gap in the research literature associated with the nature of peer relationships and *how* they exert an influence on adolescents' decision-making processes.

In sum, previous research has failed to adequately acknowledge the changes that occur throughout adolescence, and how they influence motivation to continue undertaking difficult and unenjoyable practice on a musical instrument for sustained periods of time. This project has gone some of the way to providing groundwork for this investigation to begin, in that it highlighted a general decline in competence beliefs during adolescence and relatedness as a key aspect of the decision to cease learning a musical instrument.

Directions for Future Research

As a pragmatic opportunity to conduct exploratory research using methods and theoretical approaches that are innovative and original, this project had the potential to provide some supportive evidence for previous research, as well as some results that might warrant future research in the area. The project delivered on this potential, and

the discussion above clearly implies several implications for further research that could continue to provide informative results.

McPherson's (2001) contention that commitment and practice are "key ingredients" (p. 122) of success and ongoing motivation was supported and extended by this study. The finding highlighted the importance of accumulating hours of practice within the first three years of learning a musical instrument, with those who attained higher AMEB grade levels having had a greater level of commitment and accumulating more hours of practice than others. But these quantitative results lend little to explaining the phenomena aside from demonstrating it. What is the nature of commitment? Would it help if all children who were commencing learning on a musical instrument were inspired by long- and medium-term goals and were able to form a firm long-term vision of themselves playing a musical instrument? Or is there something else about those students that affected their long-term commitment? Further qualitative work on the nature of long-term commitment and vision may help to explain this phenomenon.

One of the most promising findings of this research is in the area of psychological needs. Even with an instrument that had never before been used, applied retrospectively, and to participants from a broad range of musical outcomes, the psychological needs scale used in this study still produced a result that demonstrated a significant difference, suggesting that the finding is robust. It suggests that as a long-term motivation strategy, teachers should look beyond simplistic approaches to making music 'fun' or containing expansive informal learning experiences, to being aware that music is likely to be more motivating when people engaging in it feel competent, related, and autonomous. Research focusing on strategies to do so could vastly improve understandings of motivation for music activities and improve the quality of music education.

This leads to perhaps the most striking of shortcomings in music education research in recent decades. The studies cited have gathered a range of evidence from observations about different types of learners so it eventually becomes theoretically possible to look at a learner and predict what their likelihood of success for that learner is, based on a number of personal and environmental variables. The implication is that educators change music education so that all of the learners have the right configurations of support, strategies, environment, and learning. However, little research has been done on specific interventions in, for example, attempting to change children's attributions of success and failure, teaching parents better mechanisms for

supporting their children's learning, or teaching students how to use effective and adaptive strategies in their practice. Intervention-based experimental research would provide highly reliable and valid insights into specific changes to music education compared to the bulk of observational research conducted to date. There are obvious inherent difficulties with this kind of research in terms of eliminating experimenter effects in the classroom, equity demands of applying equally effective treatments to different groups of students within one setting, costs involved in gathering large sample sizes, and the difficulties in developing effective dependent measures. The difficulty in conducting controlled experimental research in music education compared to other areas of psychology does not bolster the reliability or applicability of research conducted so far, so the limitations of the literature must be taken into account before making strong conclusions. For music education research to ultimately be able to support the hypothesis that, for example, teachers can improve their own music education techniques to make music more psychologically rewarding, experimental research is a critical step.

This thesis has reviewed aspects of a relatively young music education research literature, a body of work which has achieved outstanding successes in elucidating some of the most complex of emotive and cognitive facets associated with learning a musical instrument. The data analyses extended the longitudinal findings of a previous study and applied a theoretical framework which has never before been addressed in music education and which shows potential that has already been demonstrated in other domains. With future work these findings contribute to a fuller understanding of motivation to learn a musical instrument, and have the potential to improve the quality of music education.

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