Age-Related Differences in Musical Self-Regulation Among Canadian Music Learners

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Abstract

Age-Related Differences in Musical Self-Regulation Among Canadian Music Learners

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This thesis examined age-related differences in the self-regulation of Canadian music learners based on extensive secondary analyses of survey data collected in 2014. Respondents involved 3,920 music students from across Canada, with stated ages of 7 to 78 years old. First, MANOVA analyses were conducted to determine the presence of age-related differences in musical self-regulation, with dependent variables comprising 18 factors previously derived from responses to the survey's closed-ended questions. Next, to better understand how the seven age groups differed, Discriminant Function Analyses (DFA) were performed, yielding weighted linear combinations of those factors which might best predict age groups. Finally, to shed further light on age-related differences, 1,184 responses to the survey's open-ended question were thematically coded. Findings from the quantitative data confirmed hypothesised age-related differences, with improvements across age groups for planning strategies, persistence in practising, intrinsic motivation to learn music and to practise, reflecting on progress, and motivation to practise. However, physical and mental reactions to performance, the perception of aural abilities, and the use of aural skills were found to deteriorate across age groups. The DFA yielded two functions accounting for 95% of the variance between age groups, but with moderate-to-weak effect sizes. The first of these held greater explanatory power and revealed that what best predicted membership in younger age groups was a combination of extrinsic motivation to practise, enjoying performing for others, a strong perception of aural skills, and a

low tendency to reflect on practice strategies. The second function suggested that while extrinsic motivation continued to be one of the predictive factors, lack of enjoyment of music learning, poor motivation to practise well, and an avoidance of technical work and exam skills may also be critical. However, the model's overall classification rate (44.8%) suggested both functions should be interpreted with caution. Findings from the qualitative data further highlighted age-related differences and showed that the most frequently mentioned theme among the open-ended comments was self-regulation. Also notable were music learning, co-regulation, survey-related comments, socio-contextual factors, and comments about the conservatory system. The dissertation closes with a discussion of implications for education and further research.

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Dedication

Para mis padres, María y Armando.

A quienes les debo todo.

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Chapter 1: Introduction

Over the last two decades, music education researchers have shown an interest in self-regulation as a way to explain musical development. Much of this interest has been spearheaded by Gary McPherson and other collaborators, operating at the interface between music psychology and educational psychology (e.g., McPherson, Davidson, & Faulkner, 2012; McPherson & McCormick, 2000; McPherson & Renwick, 2011). Although there are several competing theories of self-regulation, it is Zimmerman's (1990, 2000, 2011) that has held sway within the sphere of music education. There are several possible reasons for this: its complementarity to existing research on how musicians should practice (Hallam, 1997; Jørgensen, 2004), extensive support in formal education research (Dignath, Büttner, & Langfeldt, 2008; Wolters, Benzon, & Arroyo-Giner, 2011), its applicability across a range of cultural groups (McInerney, 2011), ages and academic domains (Dignath-van Ewijk, 2011; Wang, Lo, Xu, Wang, & Porfeli, 2007), and the fact that it is the most heavily cited self-regulation theory in the general education literature (Alexander, Dinsmore, Parkinson, & Winters, 2011).

Zimmerman's self-regulation theory maintains that individuals attain their goals by controlling their behaviour, environment, and cognitive/affective states. Furthermore, self-regulation represents the final stage of a process whereby individuals initially observe and emulate expert, context-specific models of self-regulation, after which self-regulatory scaffolding is gradually removed (Zimmerman, 1998, 2000, 2011). Within the learning context, self-regulated learners activate specific processes before, during, and after each learning activity (Zimmerman, 2000). During the first phase (forethought), they perform a preliminary task analysis (goal setting and strategic planning) and demonstrate appropriate self-motivation beliefs (self-efficacy; outcome expectations; intrinsic interest/value; goal orientation). In the

performance phase, they apply methods of self-control (self-instruction; imagery; attention focusing; task strategies) and self-observation (self-recording; self-experimentation). Meanwhile, in the final self-reflection phase, they judge (self-evaluation; causal attribution) and react to the learning outcome (self-satisfaction/affect; adaptive/defensive responses).

For individuals engaged in musical learning, self-regulation translates into highly music-specific thoughts, feelings, and actions. Thus, before they even sit down to practise, self-regulated learners may set themselves goals such as winning a competition (Chung, 2006), or passing the next grade of a music exam (Brook, Troop, & Upitis, 2011), perhaps using an electronic portfolio to plan their practice (Upitis, Brook, Abrami, Varela, & Elster, 2012). Ideally, they will feel confident in their ability to achieve their practice goals, even if their musical self-efficacy fluctuates because of time constraints or poor concentration levels (Kim, 2008). They will be intrinsically interested in improving as musicians (Oare, 2007), be task-driven (Bartolome, 2009), and perhaps be motivated by the possibility of eventually becoming good musicians as a result of their hard work (Miksza, 2012). During practice, they may self-instruct by talking to themselves through procedures, perhaps to make certain that they are doing what they think they are doing (Nielsen, 2001). They may also resort to using visual images to help shape interpretation (Kim, 2008) and practise away from external distractions, such as the TV, in order to focus their attention better (Austin & Berg, 2006). To break down complex tasks, they will use a range of task strategies, such as identifying difficult passages, taking them apart, and eventually reintegrating them into the whole piece (Nielsen, 2001). They will also monitor themselves closely, perhaps by marking their score to record wrong notes or identify problematic passages (Nielsen, 2001), and experiment with different practice approaches, such as changing the rhythm of a specific passage or using trial and error to achieve a musical skill they have not

yet been taught (Renwick & McPherson, 2002). Finally, self-regulated music learners will reflect upon the quality of their practice, in some instances awarding themselves grades for their sound, intonation, technique, or concentration (Kim, 2008). They will attribute their practice outcomes to causes they can somehow influence, such as the choice of task strategies (McPherson & McCormick, 2000). Ideally, they will feel satisfied with what they have achieved (Oare, 2007), but even if this is not the case, they will choose to continue practising, possibly adapting their practice strategies in future sessions (Nielsen, 2001).

According to a recent systematic review of the musical self-regulation literature (Varela, Abrami, & Upitis, 2016), musical self-regulation has a positive, but weak, relationship with the following variables of interest: musical attainment, amount of practice, persistence, practice content, and practice efficiency. Among these, it is mostly closely related to musical attainment and persistence. However, it is least closely related to amount of practice, which may speak to a trade-off between quality and quantity of practice. Interestingly, musical self-regulation is more associated with informal rather than formal practice, possibly due to the higher levels of intrinsic motivation that typically accompany informal practice. With respect to specific self-regulatory processes, goal setting and self-evaluation appear to be the most strongly linked to the variables of interest, in marked contrast to self-satisfaction, especially among advanced students. Task strategies are most associated with higher levels of expertise, whereas intrinsic interest and self-experimentation are most related to novices. Furthermore, self-efficacy is the most closely related process to performance scores and amount of practice. Unsurprisingly, perhaps, the review identified a far stronger relationship between music-specific self-regulation instruction and self-regulated behaviour than was the case with general music instruction.

Statement of the Problem

To date, the above-mentioned systematic review constitutes the most comprehensive study of its kind within the field of musical self-regulation, summarising findings for 25 studies published between 1999 and 2011, and comprising approximately 3,470 music learners in Australia, Norway, the USA, South Korea, Slovenia, Canada, and Brazil. The findings are therefore likely to be of interest to researchers, even though the above-mentioned relationships were found to be somewhat weak. Nevertheless, the generalisability of these findings is problematic due to a clear bias in the studies towards learners studying classical (or most probably classical) Western music and individuals under the age of 18. Furthermore, even in the four studies including 'older' students, no details are provided concerning self-regulatory differences across age groups.

Up until 2011, musical self-regulation studies had focused almost exclusively on school-age children. At first glance, this might appear justifiable. After all, schools offer concentrated populations of individuals who potentially take instrumental lessons, whereas more dispersed adult music learners may seem more challenging to reach. Also, despite the extensive empirical evidence supporting the benefits of active musical engagement among children and young people (Hallam, 2010), the rate of individuals who continue school-based instrumental lessons into adolescence and beyond is believed to be relatively low (e.g., Lamont, Hargreaves, Marshall, & Tarrant, 2003; McPherson et al., 2012; O'Neill, Sloboda, Boulton, & Ryan, 2002; Sloboda, 2001). Nevertheless, quite besides the existence of literature on adult learning, adult self-regulation, and adult music learning, any bias against adult musical self-regulation remains questionable.

First of all, self-regulation is arguably indispensable to learners of all ages despite researchers' tendency to focus upon K–12 and college students. Indeed, early theoretical discussions of self-regulation do not explicitly restrict its relevance to school-age learning. For example, in his sociocognitive model of self-regulation, Bandura (1991) frequently alludes to the construct's universal application, postulating its importance to referents as all-encompassing as 'humans', 'people', or 'one'. Similarly, while both Butler and Winne (1995) and Zimmerman (1998) relate self-regulation to 'students', 'classmates', and 'teachers', the latter also stresses that highly functioning "just plain folks" transfer self-regulatory skills to their daily life.

Second, if musical self-regulation has a positive impact on younger learners, it behoves researchers and music educators to know whether the same is true of older adult learners, particularly given the size of this demographic. In the North American context alone, nationwide surveys suggest the number of adults taking classes in the performing arts, and music in particular, is steadily rising (National Endowment for the Arts, 2004), and this holds true for all ethnic and racial groups (National Endowment for the Arts, 2012). Although it is worth bearing in mind that exactly what respondents of large-scale national surveys understand by 'playing a musical instrument' or 'taking music classes' is open to debate (Cope, 2005), over ten years ago it was reported that 33.9% of adults in the USA had taken music lessons at some point in their lives, with 1.4% doing so in the last 12 months (National Endowment for the Arts, 2004). This small portion of the adult population represents 2.89 million individuals. The full report for the latest National Endowment for the Arts survey (Iyengar, Grantham, Nichols, Menzer, & Shingler, 2012) confirms that the number of adult music learners has risen as the ageing population continues to increase, and support for the benefits of music learning throughout the lifespan continues to accrue.

As we shall see, however, more recent studies of musical self-regulation have started to redress the balance regarding younger versus older populations. This is to be welcomed, not least because of the presumed upward trajectory of self-regulatory skills over time and the widening age spectrum among music learners. As such, this broadening of scope provides the impetus for further research into possible musical self-regulation differences across age groups.

Research Questions

Considering the importance of musical self-regulation and limited research on musical self-regulation among diverse age groups, this study attempts to answer the following questions:

1. How do age groupings differ with regard to self-regulatory processes and associated constructs among Canadian music learners?
2. Which combination of self-regulatory processes and associated constructs best predict age groupings?
3. How do open-ended responses of music students differ by age groupings?

Significance of the Study

Since the data in the surveys used for this study included responses from an uncommonly large age demographic, the findings may shed light on whether musical self-regulation differs significantly across age groups and which variables are associated with observed differences. Furthermore, this study represents the largest ever investigation in the field, using data from 3,920 music learners: more than the total number of individuals contained in the previously mentioned systematic literature review (Varela et al., 2016).

Outline of Remaining Chapters

Chapter 2 provides an overview of research on adult learners and musical self-regulation. Chapter 3 offers a description of the methodology employed to address the research questions, including a detailed description of how the data were collected and analysed. In Chapter 4, the results of the closed-ended questions, addressing the first two research questions, are presented. The open-ended survey question results are presented in Chapter 5. The final chapter outlines the conclusions and implications of the study as a whole.

Chapter 2: Literature Review

There are several bodies of literature germane to the present study that encompass learners of various age groups as they relate to musical self-regulation. Since the literature on musical self-regulation tends to target younger learners, the review opens with a discussion of adult learners, thereby highlighting some of the unique characteristics of these learners and the challenges they face in music learning. Against this foil, the remainder of the literature review is focussed on musical self-regulation. The major portion of the literature reviewed on musical self-regulation was based on the systematic literature review of musical self-regulation carried out as part of the research process (Varela et al., 2016). This systematic review is presented in the current chapter. It is then applied to the current study in particular, and supplemented with additional research published after the systematic review was completed.

Adult Learners and Music Study

Learning itself, of course, has never been solely the preserve of children and young adults. Nonetheless, almost thirty years have passed since UNESCO felt compelled to set forth a resolution advocating the recognition and promotion of lifelong learning, an inclusive conceptualisation comprising '[activities] designed to promote cultural development and artistic creation' (UNESCO, 1976, Annex I, p. 7). Although philosophical debates surrounding the nature and supposedly legitimate purpose of adult education remain ever lively (Chapman & Aspin, 2013; Gouthro, 2010), an increasing number of governments around the world have started to champion the notion of lifelong learning (Aspin & Chapman, 2000). At the same time, university students aged over 25 represent a burgeoning population (Jamieson, 2007; Schütze & Slowey, 2012), and the number of senior citizens engaged in learning programmes in Canada and

Australia, for example, has continued to grow apace (Bolton-Lewis, Buys, & Lovie-Kitchin, 2006; Nui, 2006).

An ERIC database search using the subject "adult learning" and related terms provided by the ERIC thesaurus yielded 50,989 journal articles and 1,205 dissertations and theses, among which by far the best-represented categories were 'adult education', 'higher education', and 'postsecondary education', with research interest beginning in the 1970s and peaking at the start of the new millennium. Since a comprehensive review of this sizeable literature lies beyond the scope of the current study, and in order to allow for a more in-depth treatment of the literature on adult self-regulation and adult music learning in particular, only key points are presented below.

First of all, adult learners are believed to be highly heterogeneous and pursue lifelong learning for highly diverse reasons (Holyoke & Larsen, 2009; Knowles, Holton & Swanson, 2005). Research is unclear about whether lifelong learning tendencies are more prevalent for men or women. In a recent survey of young Turkish undergraduates (n = 375), for instance, males reported significantly higher lifelong learning tendency scores than females, while educational science students scored significantly lower than computer and instructional technology students (Beytekin & Kadi, 2014). Among older students, however, cluster analysis of data from 2,645 Australians aged between 50 and 74 found that lifelong learning was significantly associated with being female, in good health, younger, wealthier, and still in employment (Bolton-Lewis, Buys, & Lovie-Kitchin, 2006).

Many adults return to education in order to further their intellectual development. For example, in Dench and Regan's (2000) study of adult learners aged 50 and above (n = 336), the three most commonly reported reasons for studying, in decreasing order of importance, were intellectual, personal, and instrumental in nature. Similarly, factor analysis of the responses of

321 seniors enrolled at the National Open University of Taiwan revealed that intellectual stimulation was the most important reason for studying, whereas other hypothesised factors such as a desire for social contact proved to be of minimal importance (Mulenga & Liang, 2008).

Another reason working-age adults return to education is to improve their job prospects. Bolton-Lewis, Buys, & Lovie-Kitchin (2006), for instance, found that individuals in the under-65 group were more likely to want to upgrade their technology skills. Meanwhile, in Jamieson's (2007) longitudinal investigation of mature part-time students at two UK universities (n = 3,072), older adults were less likely to cite wanting to obtain a work-related qualification as a reason for returning to education. While younger adults may engage in learning activities for work-related purposes, older adults may do so for entirely different reasons. For example, in Withnall's (2006) study of 98 retired adult learners in the UK, social interaction and the desire to adapt to major situational changes and even discover a new sense of purpose were all important motivators, especially for learners in retirement homes.

Not surprisingly, the reasons for *not* participating in adult education are equally varied. For instance, some adult learners may harbour suspicion towards anticipated pedagogical practices, or face logistical and/or financial constraints (McGrath, 2009). In Canadian universities, for example, seniors are currently less likely to receive support through tuition-waiver and/or fee reduction programmes than they would have been 40 years ago (Nui, 2006). Some researchers are particularly disturbed by what they see as a waning interest in critical adult education, teacher training, and research (Gouthro, 2010). Furthermore, the complex array of emotions that certain adult learners might experience if they *do* return to education can represent a challenge for their teachers, however critically informed they may be (McCormack, 2009).

Regardless of the impetus for adults engaging in learning, there is abundant literature to support the perceived positive impact of learning on cognitive functioning, general well-being, and levels of happiness (Gouthro, 2010; Nui, 2006). For instance, Dench and Regan (2000) found that most adult learners believe learning has a positive impact on one or more of the following: life enjoyment, self-confidence, self-perception, life satisfaction, and everyday coping abilities. It has been argued, however, that at present much of the evidence stems from non-randomly controlled studies and it, therefore, cannot lay claim to clear causal mechanisms (Dolan, Fujiwara, & Metcalfe, 2012). Nevertheless, Dolan et al.'s (2012) regression analyses of data gathered from over 10,000 British household members since 1991 serve not only to reinforce implied assertions of causality but also point to other statistically significant, if less pronounced, benefits adult learning has on job-seeking attitudes, financial expectations, and even civic participation.

Finally, a realm of research that exclusively targets adult learning is andragogy. Popularised by Knowles' (1995) assumptions about the characteristics of adult learners and how they can be helped to learn, andragogy is argued to have influenced domains as diverse as nursing, law, religion, and teacher development (Davenport, 1987; Davenport & Davenport, 1985; Taylor & Kroth, 2009). According to Knowles, some of the key aspects in which adult learners distinguish themselves from children are that adults have a potentially vast resource of life experience to draw upon when learning, need to be convinced of the practical value of whatever they are learning, are self-directed rather than teacher-dependent, problem-centred rather than subject-centred, and are intrinsically motivated (Knowles, Holton, & Swanson, 2005). Moreover, adult learners need to be actively involved throughout the instructional process: during planning, needs analysis, setting of learning objectives and learning plans, and assessment

(Knowles, 1995). Over the years, however, andragogy has met with some stiff opposition, not least because of its lack of convincing empirical support and non-theoretical basis (Holton, Swanson, & Naquin, 2001; Taylor & Kroth, 2009).

Self-regulation among adult learners. Adult self-regulation has been studied in a wide range of non-educational settings, exploring how individuals present themselves socially to others (Vohs, Baumeister, & Ciarocco, 2005), manage chronic disease (Clark, 2013), put an end to addictions (Sayette, 2004), control their emotions (Ochsner & Gross, 2004), overcome negative affect (Larsen & Prizmic, 2004), maintain desired patterns of behaviour (Rothman, Baldwin, & Hertel, 2004), and learn work-related skills (Sitzmann & Ely, 2011). There is also a significant amount of research into the self-regulation of ageing adults, not unwarranted given global increases in this demographic and that age-related changes in the frontal region of the brain responsible for executive functioning are believed to impair self-regulation (Von Hippel & Henry, 2011).

Nonetheless, the lion's share of educational research of adult self-regulation relates to college students, individuals about whom the literature suggests it would be wrong to presume are *de facto* self-regulators. A recent systematic review of academic self-regulation (n = 77) found that most studies (n = 24) do not restrict their focus to students of any one academic domain or curricular area (Alexander, Dinsmore, Parkinson, & Winters, 2011). Furthermore, studies draw on a range of theoretical frameworks, but by far the most popular are those of Zimmerman (2000), Pintrich (2000), and Winne (2001). To date, there are no meta-analyses to complement that of Dignath and Büttner's (2008) review of self-regulation interventions among children. Nevertheless, there is ample evidence supporting the beneficial effect of individual self-regulatory processes on adult students.

Although college students who set clear learning goals may achieve greater academic success (Ridley, Schutz, Glanz, & Weinstein, 1992; Schwartz & Gredler, 1998), the literature indicates that other interrelated processes are also involved. In a meta-analytic review of 109 studies, Robbins, Lauver, Davis, Langley, & Carlstrom (2004) found that the most powerful predictors of cumulative grade point average were academic self-efficacy and achievement motivation. Moreover, college students' academic self-efficacy has been linked to a diverse range of important outcomes, including academic performance, deep learning approaches, perseverance, aspirational level, and socio-emotional wellbeing (Turan, Valcke, Aper, Koole, & Derese, 2013). Strong relationships have similarly been documented between self-efficacy and classroom performance (Chemers, Hu, & Garcia, 2001), persistence among ethnic minority groups (Torres & Solberg, 2001), adjustment to college life for first-generation college students (Ramos-Sanchez & Nichols, 2007), and the ability to regulate one's emotional states while studying (Hen & Goroshit, 2014). Researchers have furthermore determined models that predict direct paths between self-efficacy and achievement outcomes (e.g., Woode & Locke, 1987; Yusuf, 2011; Zimmerman & Bandura, 1994).

Given the particular importance of motivation in self-regulation (e.g., Zimmerman, 2000; Pintrich, 2000), college students need to be able to regulate their motivational level should it ever wane. Analysing the survey responses of 215 American college students, Wolters and Benson (2013) found that students typically did so by temporarily reverting to performance goal orientations and managing their study environments, rather than by relying on intrinsic motivation. Nevertheless, research suggests that high-achieving college students are generally more intrinsically motivated than their peers (Simons, Dewitte, & Lens, 2004). They also report

higher levels of academic self-efficacy and employ a broader range of appropriate learning strategies (VanderStoep, Pintrich, & Fagerlin, 1996).

Upon entering college, students can perhaps no longer be reasonably expected to rely on their parents or teachers to monitor their studying, and therefore it is vital that students have learned to self-monitor by this stage (Zimmerman & Paulsen, 1995). The self-monitoring and assessment of level of understanding, for example, has been found to be strongly associated to college students' academic performance and the accuracy ratings of self-predicted test scores (Hacker & Bol, 2000; Schraw, 1994; Thiede, Anderson, & Therriault, 2003). However, although self-monitoring is believed to enable the assessment and use of appropriate learning strategies, students may not always be able to accurately recall which learning strategies they have just used (Jamieson-Noel & Winne, 2003).

Differences in self-regulatory level have been associated with pre-existing epistemological and motivational beliefs (Pieschl, Stahl, & Bromme, 2008; Wolters & Benson, 2013; Zimmerman, 1995). Fortunately, however, research indicates that college students are still likely to benefit from teacher support with regard to their self-regulatory development. For example, repeated practice of self-monitoring has been shown to be amenable to improvement (Nietfeld, Li, & Osborne, 2005). Formative assessment and feedback may also provide valuable opportunities for college professors and students to discuss the importance of self-regulation and how students are faring in this regard (Nicol & MacFarlane-Dick, 2006). Similarly, college teachers may be able to influence their students' intrinsic motivation by granting them a larger say in course content design (Garcia & Pintrich, 1996; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004).

A frequently voiced concern of educators, however, is that self-regulation training is time-consuming and may negatively impact achievement if accompanied by a reduction in course content coverage (Boekaerts & Cascallar, 2006). Nonetheless, evidence also suggests that time devoted to self-regulated learning (SRL) interventions is time well spent, even at the postsecondary level. For example, in a quasi-experimental study of undergraduate students, novice learners who were trained to use an organisational aid as a schema-building support scored significantly higher on course content examinations (Becker, 2013). Similarly, university students who received SRL training and kept daily learning diaries, significantly outperformed students in a control group with respect to time management, planning, procrastination, and concentration (Schmitz & Wiese, 2006).

Furthermore, it seems likely that the college teachers' role in supporting self-regulation remains relevant even at the PhD level. Mullen (2011) argues that some PhD supervisors' preference to impart such skills on an ad hoc basis may lie at variance with a perceived need among students for frequent, structured self-regulatory mentoring. Describing Zimmerman's own mentoring of PhD students, DiBenedetto and White (2013) meanwhile suggest that a doctoral mentor's job is not complete until the student has attained the self-regulatory competence required of a fully-fledged academic, and that this may require a considerable degree of observation, emulation, and self-control on the student's part. Consequently, in the observation stage, Zimmerman is said to provide cognitive modelling by allowing students to hear him 'think aloud' while he writes a manuscript, whereas during the self-control stage he will assist students in the construction of hierarchically arranged learning goals (DiBenedetto & White, 2013).

In brief, there is increasingly compelling evidence for the importance of and need to develop self-regulation among college students. It is worth remembering, however, that college students encompass an increasingly broad demographic. In Canada, for example, while more than 75% of college students are currently aged between 17 and 27, almost 10% are over 40 (Hujaleh, Iacampo, & Werkneh, 2009). With the rise of the 'older' student, the demographic can only continue to diversify and with this diversification there is a need to reassess what we mean by self-regulation in postsecondary settings. This seems especially fitting if policymakers and researchers alike intend to repeatedly underscore the importance of self-regulation for effective learning across the lifespan (e.g., Puustinen & Pulkkinen, 2001; The Council of the European Union, 2002, 2011; van Beek, de Jong, Minnaert, & Wubbels, 2014).

Adult music learners. A number of features of adult music learners are discussed in the sections that follow. These include the heterogeneous nature of adult populations, the variety of reasons compelling adults to study music, and teaching considerations particular to the adult population.

A heterogeneous population. Lifespan engagement with music implies the availability of music learning opportunities that extend beyond the confines of formal schooling, providing opportunities irrespective of a learner's age, musical genre, or level of musical development, and in so doing activating the rich network of links that potentially lie within the broader musical community (Myers, 2008). However, much of the literature related to adult music learners deals with individuals on the older end of the spectrum. As in other curricular domains, researchers are typically ambiguous when defining these older students, often presenting arbitrary chronological cut-off points (de Vries, 2012). Music education researchers are sometimes advised to draw distinctions between early old age (65–74) and advanced old age (75 and over), as well as to

differentiate between the “well-elderly” and other individuals whose independence has been undermined by debilitating, age-related challenges (Prickett, 2003). Notwithstanding these useful demarcations, Prickett (2003) cautions against uncritical acceptance of stereotypical perceptions of ‘older’ students, since heterogeneity may ironically be one of their most defining characteristics.

Findings from a cross-sectional study containing over 250,000 participants from the United States and the United Kingdom offer convincing evidence of age trends in musical preference; adults, while considering music to be important, find it less so as they age, as evidenced by the amount of time they spend listening to music, among other factors (Bonneville-Roussy, Rentfrow, Xu, & Potter, 2013). According to a Survey of Public Participation in the Arts (National Endowment of the Arts, 2008), the five most preferred types of music among American adults are rock, country, hymns/gospel, contemporary rock, and classical/chamber music. The enduring popularity of the last genre is noteworthy considering its declining audience numbers, that it is performed by only 3% of the population (i.e., 7 million adults), and the fact that its concert-goers are likely to be college-educated, over 44 years old, and earn an annual income of at least $USD 150,000 (National Endowment for the Arts, 2008). Indeed, compared to audience members for other genres, a higher proportion (20%) are senior citizens over the age of 65. Another finding indicated that the percentage of individuals playing musical instruments falls steadily across age groups. For example, while 19.7% of 18- to 24-year-olds play a musical instrument, the amount drops to 12.4% for 45- to 54-year-olds, and 5.7% for individuals aged 75 and over (National Endowment for the Arts, 2008).

This lop-sided demographic partly explains why music education research has tended to primarily target children, adolescents and young adults, the last of whom typically attend

specialist conservatories or major in music (Prickett, 2003). Although the literature on music education in older age groups has expanded considerably since the 1970s, instruction in non-classical genres has garnered relatively limited attention (Cope, 2005). Nonetheless, extant research on adult learners runs the gamut from age-related changes in practising (Krampe, 1997) to community music, (Coffman, 2006, 2009; Ernst, 2001; Ernst & Emmons, 1992), choral singing (Adams, 2000; Southcott, 2009), fostering of lifetime engagement (Myers, 2007, 2008; Rohwer, 2005), identity formation in band programmes (Dabback, 2008, 2010), piano and keyboard lessons (Cooper, 2001; Jutras, 2006), master classes (Taylor, 2010, Taylor 2011), intergenerational programmes (de Vries, 2012; Jellison, 2000; Perkins & Williamon, 2014; Varvarigou, Creech, Hallam, & McQueen, 2011), relationship to quality of life (Carr, 2006; Hays & Minichiello, 2005), perceptions of instruction (Kruse, 2009), traditional fiddle playing (Cope, 2005), and traditional Irish music-making in online settings (Waldron & Veblen, 2008). While most of these studies have traditionally targeted individuals afflicted by age-related disabilities (Hays & Minichiello, 2005), researchers have recently broadened their scope of interest to include healthy older individuals (Prickett, 2003).

It would appear that despite the much-touted importance of lifelong learning, music education programmes for adults in the English-speaking world are generally geared at older adults, many of whom are not novices (Dabback, 2010). For instance, in a US study of 564 adult piano students, Cooper (2001) found that while 3% had started lessons later in life, 15% had taken lessons their whole life, and 58% had stopped taking lessons during childhood. Even two decades ago, adult learners were so engaged in instrumental music, that a popular program was created for US senior citizens called New Horizons, in which individuals received lessons or instrumental coaching, usually from music majors at nearby universities, as part of their senior

centre's band practice (Coffman & Levy, 1997). This program is still in place and thriving, by all accounts (Dyer, 2016).

As the previous research suggests, adult learners engage in a broad variety of music learning activities. Furthermore, for adults ready and able to embrace the affordances of the Internet and Web 2.0 technologies, music learning is entering unchartered territory as individuals avail themselves of online lessons, instructional videos on YouTube, community wiki websites, and interactive computer-mediated learning options (Waldron & Veblen, 2008).

Reasons for music study. Not surprisingly perhaps, adults take lessons for complex reasons that may overlap and even vary over time (Roulston, 2010). Although some adults may be intrinsically interested in developing their musical skills and/or maintaining musical self-efficacy, the motivation for others may be primarily extrinsic, and they may seek instruction in order to prepare for a forthcoming performance opportunity (Cooper, 2001; Wristen, 2006). While many older adults take lessons to give a sense of structure and purpose to their lives, to construct a new (musical) identity, or to recast a prior one (Dabback, 2008), learning an instrument sometimes represents a form of physical therapy for conditions such as osteoarthritis (Taylor & Hallam, 2008; Zelazny, 2001), or can serve to improve subjective well-being and cognitive functioning (Cohen, 2009; Perkins & Williamon, 2014). However, older learners may just as easily join a music education programme because a friend or relative has encouraged them to do so, entirely fortuitously, or to socialise with others (Coffman & Adamek, 1999; Coffman, 2006; Dyer, 2016). Indeed, in group-learning situations such as choirs and bands, the element of social activity within a designated social context plays an important role in sustained participation (Cope, 2005). Positive group dynamics, which can be affected by factors such as the leader's teaching style, the degree of power-sharing, and the strength of bonds between group

members despite the diversity of levels and musical experience, may be equally crucial (Kruse, 2009). There is also evidence that participation and enjoyment of group music-making activities during one's youth increases the likelihood of taking music lessons later in life (Bowles, 1991). Interestingly, however, particularly positive musical experiences during one's school days may also dissuade some adult learners should the new experience fall short of their expectations (Arasi, 2008).

Where children are concerned, there is research that confirms the importance of parental encouragement, schools that promote music-making, and teachers who inspire students to flourish as musicians (Pitts, 2009). In contrast, little is known about the role(s) partners and relatives play in supporting adult learners, although it seems likely that they serve an important function. According to Taylor's (2011) small-scale study of adult piano students, for example, such individuals frequently act as audience members during practice sessions/performances and attend concerts with the adult learner. At the same time, fellow members of a music-making group can be an important source of motivation, particularly if there are no partners or other family members (Dabback, 2008).

Teaching considerations. There is considerable debate surrounding whether adults should be taught differently from children, and if so, how (Rohwer, 2005). Some researchers argue that regardless of age all novices should be taught the same skills and in the same order of complexity (Coffman, 2009; Merriam, Caffarella, & Baumgartner, 2007). For example, musical notation represents a somewhat challenging semiotic system, and in the early stages adult novices—like children—may benefit from initially focusing on sound production and music-making, eventually using notation to read music they already know (Ernst & Emmons, 1992).

However, adult music learners also differ from children in several important ways, and these are likely to influence how they are taught. Adults have elected to take music lessons of their own free will and will easily feel discouraged if they sense a lack of progress (Hallam, 2005). Unlike children, they typically pay for their own lessons and are consequently more outspoken if the lessons do not match their expectations (Myers, 2007). Furthermore, individuals who have taken lessons as children may be attracted to the possibility of renegotiating their role in the master-apprentice dyad and be especially motivated by being allowed to decide their own repertoire and how they learn it (Taylor, 2011; Taylor & Hallam, 2008). Adult music learners expect their teachers to be understanding, good communicators, encouraging, fun, professional and knowledgeable about music (Wristen, 2006). Within the community band contexts, for example, they typically expect their band directors and instructors to exert firm control over their musical group and the decisions taken (Coffman & Levy, 1997; Dyer, 2016). However, although they may recognise and indeed yield to a teacher's expertise, they are not afraid to ask 'why' (Coffman, 2009). Thus, even within the master-apprentice dyad, adults may expect to be afforded greater latitude when deciding what and how they learn (Taylor & Hallam, 2008). Similarly, in intergenerational music programs, adults value being able to decide the kind of musical activities they engage in (de Vries, 2012). Meanwhile, in master classes, adult learners may envision themselves having more than one role and sharing joint responsibility and power. For example, Taylor (2010) found the participants considered themselves to be the teacher's friend, apprentice, and at times a mixture of the two. Interestingly, adults may differ amongst themselves with regard to their preference for teacher-directedness, with more musically experienced students possibly tending towards greater autonomy (Kruse, 2009), but not if they are switching genre (Sanchez Cantu, 1987), or taking individual piano lessons (Chen, 1996).

Nevertheless, the question of how and why adults differ with respect to autonomy remains somewhat under-researched.

Another obvious difference with children is that adults come to the lesson with a lifetime of experience, a truism that bears repeating since prior experience is not necessarily an asset. For example, if adult learners' childhood musical learning experiences have been negative or resulted in faulty technical or practising habits, teachers will need to adapt their teaching styles accordingly (Roulston, 2010), even if a characteristic of some adult learners is their persistence in the face of negative musical experiences (Taylor, 2011). Furthermore, as lifelong consumers of music, adults may have very clear goals about what they should sound like as 'musicians' (Coffman & Levy, 1997; Green, 2009) but be entirely unprepared for, and therefore disconcerted by, the underlying degree of motor skills and coordination of audio-visual and sensory information required of them (Taylor & Hallam, 2008). The frustration can be particularly pronounced if they have previously excelled in their professional lives and they are anxious about their initial level of musical competence (Kim, 2001; Kruse, 2009). Adult novices are also typically more accustomed to cognitive forms of learning and may consequently find it hard to adapt to the type of embodied learning involved in learning how to play a musical instrument (Roulston, 2010). Moreover, while metaphors may be helpful when teaching playing techniques, it is important these remain age-appropriate, lest adult students find them patronizing (Roulston, 2010). Related to experience are adult learners' family, work, and social responsibilities that may make regular practice unsustainable, and which can, in turn, result in shorter, less frequent, or otherwise suboptimal practice sessions (Cope, 2005; Kruse, 2009).

Another issue to consider is that teachers of older adults have to be particularly sensitive to the limitations imposed by the ageing process (Coffman, 2009). Some degree of hearing

impairment is to be expected (Bingea, Raffin, Aune, Baye, & Shea, 1982), as is a considerable reduction in vocal range in individuals between 65–90 years old (Greenwald & Salzberg, 1979). In Coffman's (2009) study of 62 senior citizens' band directors across the US, directors reportedly felt that older students were not as mentally agile or open to change as children. However, although Coffman viewed them as anxious and perfectionistic, he also believed they were more patient, attentive, and capable of greater reflectivity than children. Hence, without dismissing the serious implications of age-related physical and cognitive decline, it is a disservice to older students to simply accept stereotypical beliefs that they are no longer capable (or interested) in musical development (Dyer, 2009; Gibbons, 1982). Indeed, while research on this topic and age group is rarely conducted, what research can be found suggests that music aptitude (tonal imagery, rhythmic imagery, and musical sensitivity) is highest among non-institutionalised adults aged 71–75 and statistically invariant across age groups within the elderly population (Gibbons, 1979). Although ageing can have a deleterious effect on the cognitive-motor functions of both expert and amateur musicians, experts maintain their level of skill due to a lifetime of deliberate practice (Krampe, 1997; Ragot, Ferrandez, & Pouthas, 2002). Meanwhile, adult music learners typically overcome age-related obstacles by adopting appropriate strategies, such as alphabetising musical scores or purchasing corrective glasses to compensate for deteriorations in visual acuity (Coffman, 2009). Similarly, to circumvent the problem of reduced physical endurance, older adults in amateur brass bands develop coping strategies, such as staggered breathing and sharing what they have to play with their peers (Coffman & Levy, 1997).

Finally, it has been suggested that in the West, school music has become self-serving, with teachers focusing on musical development within K–12 but not necessarily beyond this

parameter (Woody & Parker, 2012). Others point out that currently music education mainly serves the needs of students who go on to study music at university and may therefore be of limited relevance to the majority of students (Woody & Parker, 2012). It has hence been argued that school music programmes would have a greater chance of attaining the purported goal of lifelong learning if they adopted the informal learning procedures used by popular musicians (Green, 2001; 2009). Meanwhile, others maintain that schools would produce more lifelong learners if their music programmes reached out to adult music communities and thus experienced lifelong learning first hand (Jellison, 2000; Myers, 2007; Myers, 2008). These are challenging but perhaps necessary propositions, given that studies suggest that adult music-learning programmes strive to emulate the school-based musical experience, privileging formal instruction and the Western canon (Woody & Parker, 2012). From the standpoint of self-regulated learning, they certainly raise important questions about the role of self-regulation in informal learning, non-Classical music, and lifelong learning.

Musical Self-Regulation

This section of the review is comprised of three sections: a systematic review on musical self-regulation (Varela et al., 2016), the application of the systematic review findings to the current research context, and a discussion of studies on musical self-regulation published after the systematic review was conducted.

Systematic review. The systematic review was completed in 2012, and first published in 2014, with the print version appearing in 2016 (Varela et al., 2016). The systematic review

appears here with the permission of the authors and the publisher.[1] Some minor editorial changes have been made (e.g., tense changes). The published materials appearing in the appendices have been omitted, and the substance of those appendices has been incorporated into the text. In addition, major references have been added to the results section of the text. Readers may access the full version of the original systematic review at doi: 10.1177/0305735614554639.

Introduction to the systematic review. Although the practice habits of musicians have long provided a fertile source of discussion (Zhukov, 2009), missing from this conversation is an underlying educational theory that speaks to the myriad factors implicated in musical learning. Since the publication of a series of studies beginning in the late 1990s by McPherson and his colleagues, attention has increasingly been paid to the educational construct known as self-regulation. Often associated with Zimmerman's model (2000; 2011), self-regulation provides a framework through which to comprehend the various possible trajectories of individual musical development.

Musical educational research tends not to refer to theoretical frameworks but where it does, psychology, music education and general education are typically the preferred go-to fields of academic knowledge (Miksza & Johnson, 2012). Research on practice nevertheless forms an important backdrop to musical self-regulation research. The general practice literature has stressed the importance of effort and time investment regardless of 'talent' (e.g., Ericsson, Krampe, & Tesch-Römer, 1993; McPherson & Renwick, 2011; Sloboda, Davidson, Howe, &

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Moore, 1996) and the need for clear practice session goals, effortful monitoring, feedback, repetition and error correction as found in 'deliberate' practice (Ericsson, 1997; Hyllegard & Bories, 2008; Krampe & Ericsson, 1996; Meinz & Hambrick, 2010)—a type of practice that for some is not always synonymous with 'fun' (Hyllegard & Bories, 2009). Practice researchers have also documented the numerous practice strategies of expert musicians (e.g., Chaffin, Imreh, & Crawford, 2002; Miklaszewski, 1989) and the idiosyncratic application of these strategies (Hallam, 1995). They have observed qualitative differences from early stages (Barry, 1992; Hallam, 1997; Sloboda, 1996), with higher-achieving novices displaying not only greater intrinsic interest (Davidson, Howe, & Sloboda, 1997) but also incorporating informal/creative activities into their regular practice routines (Sloboda & Davidson, 1996). Research has also demonstrated the critical role that parents play in young musicians' development (Davidson, Howe, & Sloboda, 1997), as well as the different influences teachers have on the acquisition of practice strategies among classically-trained musicians (Davidson & Jordan, 2007) and their non-classical counterparts (de Bézenac & Swindells, 2009).

Since music research papers cite psychology theories three times more than general education theories, the input from general education is to be both expected and welcomed (Miksza & Johnson, 2012). Zimmerman's (2000) model of self-regulation theory is, however, of particular interest. It matches general advice teachers give about the need to plan, execute and evaluate one's practice (Jørgensen, 2004). It also resembles Hallam's (1997) review-based (but empirically untested) model of presage, process, and product. More importantly, self-regulation is supported by extensive research in general education (Wolters, Benzon, & Arroyo-Giner, 2011). Meta-analytic research, for instance, has demonstrated that self-regulation instruction improves students' academic performance, use of self-regulatory strategies, and overall

motivation (Dignath, Büttner, & Langfeldt, 2008). Self-regulation can be fostered regardless of age or academic domain (Dignath-van Ewijk, 2011; Wang, Lo, Xu, Wang, & Porfeli, 2007) and this finding has been corroborated across cultural groups (McInerney, 2011). It has inspired the development of technological tools designed to improve how students learn (Azevedo, Johnson, Chauncey, & Graesser, 2011) and such tools have led to significant improvement in the writing skills of elementary school students (Abrami, Venkatesh, Meyer, & Wade, 2013; Meyer, Abrami, Wade, Aslan, & Deault, 2010). Moreover, social-cognitive models of self-regulation, and in particular that of Zimmerman (2011), are the most commonly referred to in the literature, according to a recent comprehensive review of self-regulation studies (Alexander, Dinsmore, Parkinson, & Winters, 2011).

A central tenet of self-regulation theory maintains that for goals to be reached autonomously, individuals must be able to control their behaviour, environment, and cognitive/affective states (Zimmerman, 1990, 2000). Self-regulation represents the culmination of a maturational process involving the observation and emulation of self-regulating exemplars, as well as periods of scaffolded support (Zimmerman, 1998, 2000, 2011). Moreover, it is not a trait but a context-specific process, and the fully autonomous learner is believed to exercise self-regulation before, during, and after any learning activity (Zimmerman, 2000). In the first phase (forethought), effective learners engage in preliminary task analysis (goal setting and strategic planning) and possess desirable self-motivation beliefs (self-efficacy; outcome expectations; intrinsic interest/value; goal orientation). During the performance phase, they exercise self-control (self-instruction; imagery; attention focusing; task strategies) and engage in self-observation (self-recording; self-experimentation). The final phase of self-reflection involves self-judgment (self-evaluation; causal attribution) and self-reaction (self-satisfaction/affect;

adaptive/defensive responses)—thoughts, feelings, and behaviours that determine the next steps an individual takes in the learning process. Zimmerman has furthermore proposed a conceptual framework of six psychological dimensions that determine how well individuals self-regulate: motive, method, time, behaviour, physical environment, and social factors (Zimmerman, 1998).

The work of McPherson and his colleagues has been pivotal in forging links between self-regulation theory and music research. Focusing exclusively on young musicians, these researchers have found that intrinsic interest and increased use of cognitive strategies are positively correlated with time spent on informal/creative activities, repertoire and technical work (McPherson & McCormick, 1999). They have demonstrated that regardless of level, self-efficacy is the strongest predictor of performance scores and that individuals who attribute expected results to causes such as luck or ability are in the minority (McPherson & McCormick, 2000). Students at higher grades, nevertheless, appear to have lower self-efficacy, which is probably due to increased awareness of their stage of development (McCormick & McPherson, 2003). Meanwhile, among very young learners, McPherson's team has observed that despite limited practising strategies, differences in self-regulation levels are apparent very early on and that intrinsic motivation is significantly linked to faster progress (McPherson & Renwick, 2001). Their findings also indicate, however, that if novices are allowed to choose their own repertoire, they may suddenly exhibit sophisticated practising strategies (Renwick & McPherson, 2002). Lastly, their findings suggest that child beginners with high self-reported self-efficacy, parents who encourage them to practise—at least in the initial stages—and self-determined practice slots are more likely to continue playing their instrument twelve years later (Faulkner, Davidson, & McPherson, 2010). These discoveries have helped argue the case for a shift in the way music students are taught (McPherson, Nielsen, & Renwick, 2012). For instance, teachers need to pay

greater attention to expanding students' practice strategies while raising awareness of their appropriate use; they should foster time-management skills while remembering to make room for informal/creative activities, as these sustain motivation levels; and should possibly abdicate a degree of control in their lessons, for example, by granting students greater autonomy in repertoire choices.

Purpose for the systematic review on musical self-regulation. While interest in musical self-regulation has gathered pace (McPherson, Nielsen & Renwick, 2012; McPherson & Renwick, 2011), a systematic review of this literature had not been undertaken until the present research study was instigated. Systematic reviews provide a comprehensive representation of available research, unlike the subjective gestalt found in standard narrative reviews (Peat, Mellis, Williams, & Xuan, 2002). Since systematic reviews explicitly state the procedures followed, they are also considered to be more transparent (Pittaway, 2008). Their protocols comprise a focused review question(s), extensive search of the literature, appraisal of studies' quality, extraction and synthesis of relevant data, and dissemination of results (Pawson, 2006). Conventional systematic reviews target quantitative studies—ideally those containing randomised controlled trials—using effect sizes to calculate the magnitude of results (Petticrew & Roberts, 2006). Due to this methodological bias, some reviewers combine qualitative and quantitative studies, as exemplified by the work of the EPPI-Centre at the University of London. Reviewers have yet to settle on a single best approach to synthesise heterogeneous studies, and the practice remains a moot point (Dixon-Woods et al., 2006). Nevertheless, in the interests of inclusivity, the following review represents the eclectic methodological mix in musical self-regulation studies.

Methodology for the systematic review. Three research questions (RQ) were created to investigate the relationship between students' self-regulatory characteristics and music learning variables of interest, general music instruction, and self-regulation instruction.

RQ1: What is the relationship between music students' self-regulatory characteristics and

a. musical attainment, including (i) *level of expertise* and (ii) *performance scores*;
b. amount of practice;
c. persistence;
d. practice content, including (i) *informal* and (ii) *formal*; and
e. efficiency?

RQ2: What is the relationship between music students' self-regulatory characteristics and general music instruction?

RQ3: What is the relationship between music students' self-regulatory characteristics and musical self-regulation instruction?

'Self-regulatory characteristics' represent any of the sub-processes of Zimmerman's (2000) self-regulation cycle. The 'music learning variables' commonly appear in the literature on musical self-regulation and deliberate practice (e.g., Hyllegard & Bories, 2008) and were operationalised thus:

- *Musical attainment*: (i) level of expertise (beginner, intermediate, or advanced—as determined by the researchers) and (ii) performance scores (scores in formal assessments of musical performance, including exams, competitions, and auditions)
- *Amount of practice*: the length of practice sessions
- *Persistence during practice*: perseverance despite difficulties during practice sessions and/or over time

- *Practice content*: (i) informal (self-selected, improvisation, and/or composition) and (ii) formal (scales, technique, teacher-selected repertoire, and/or exam or competition preparation)
- *Practice efficiency*: structuring time during practice such that greater gains are achieved in less time

The broad term 'general music instruction' describes how teachers typically teach. Finally, 'musical self-regulation instruction' refers to any intervention by teacher(s) and/or researcher(s) specifically designed to foster self-regulatory characteristics in students.

Information retrieval. To locate a comprehensive amount of relevant empirical studies, an iterative process of selection was adopted, as recommended by Hammerstrøm, Wade, and Jørgensen (2010). Studies were searched in bibliographic, non-bibliographic, dissertations and theses, and subject-specific databases, as well as citation indexes. This process was undertaken in the fall of 2011; consequently, studies with later publication dates were not included. Keywords for searching databases comprised the following: *music, musicians, musical* in addition to *self-regulation, self-regulated, self-regulatory, self-regulation, self-regulat**. Search strategies were expanded to contain synonyms for self-regulation and its sub-processes and came from entries on self-regulation in relevant encyclopaedias and available database thesauruses. Also, grey literature (unpublished but nevertheless potentially germane) was searched, using alternative search engines and databases (Table 1). Finally, additional studies were handpicked by scanning the reference sections of included articles and three core texts (McPherson & Renwick, 2011; McPherson & Zimmerman, 2002; Zimmerman, 2000).

Table 1

Sources of Studies for the Systematic Review[2]

Non-grey literature		Grey literature
Academic Search Complete	PsycINFO	Bing
Art Full text	Research Studies in Music	Google
CBCA Education	Education	PAIS International
Education Full Text	RILM – Abstracts of Music	PsycEXTRA
Emerald	Literature	Social Science Research
ERIC: Educational Resources	Science Direct	Network
Information Center	These Canada	
Francis	Web of Science	
PQDT: ProQuest Dissertations and Theses	Wiley Online Library	

Selection procedure. Inclusion/exclusion criteria were set in order to judge whether or not to download articles into an initial database (see Table 2).

Table 2

Inclusion and Exclusion Criteria[3]

Include	Exclude
Language: English	Not in English
Population: All	Not empirical
Musical genre: All	Related to practice but not SRL theory
Levels of expertise: All	Not primarily related to music learning or performance
Setting: School, university, conservatory, music studio	Pre-service music teachers
Study type and design: Empirical – qualitative, quantitative or mixed methodology	Duplicated in another database or source
Relevance: Possibly related to one or more of the research questions	
Date: Any	

[2] A version of this table previously appeared in Varela et al. (2016), p. 59.
[3] This table previously appeared in Varela et al. (2016), p. 60.

Studies were coded according to source of location, availability, duplication, and primary inclusion/exclusion. Having downloaded articles satisfying the primary inclusion criteria (DB1), duplicates were removed, and full-text versions read. Articles meeting all secondary inclusion criteria were retained in a second database (DB2). The final inclusion criteria required affirmative answers to the following: (a) Does the study deal with musical self-regulation as defined by any of the three core texts? and (b) Does it provide answers to one or more of the research questions of this review? From 31,129 hits, 90 abstracts were targeted, of which 56 full-texts were retrieved and the final 25 studies selected.

To appraise the quality of the selected studies as recommended in numerous systematic literature review guides (e.g., Huff, 2009; Petticrew & Roberts, 2006; Ramey & Rao, 2011), studies were evaluated using appraisal checklists appropriate to their design. These covered a range of features including soundness of methodology, study type/design, diversity of perspective, richness of data, and relevance to the research questions. Appraisal scores for each study were then classified as either 'low', 'medium', or 'high', depending on where they had placed on the scoring band. Most selected studies were ranked 'high'.

Study features. The final data set was comprised of 25 studies dating from 1999 to 2011 (see Table 3). While over half were conducted in the USA and Australia, other locations included Norway, Canada, Brazil, Slovenia, and South Korea. Although not always stated explicitly, the studies appear to focus on classically-trained musicians, with only three studies targeting non-classical musicians. Sample sizes ranged from 1 to 463 participants, with an equal proportion of smaller (i.e., 16 individuals or less) and larger (i.e., 130 individuals or more) sample sizes. Participants' ages were diverse and extended from 7 to 45. However, more studies focused on and/or included non-advanced individuals. As Table 3 shows, there was an almost

equal number of quantitative and qualitative studies, with a handful using mixed methodologies. Researchers collected actual practice session data in over half of the studies, and the length of observations varied from individual practice sessions to one semester.

Table 3

Research Designs of the Selected Studies[4]

Qualitative (*n* = 12)	Quantitative (*n* = 10)	Mixed (*n* = 3)
Case Studies	*Survey/Questionnaire*	*Questionnaire with narrative analysis*
Nielsen (1999)	McPherson & McCormick (1999)	
Nielsen (2001)	McPherson & McCormick (2000)	Austin & Berg (2006)
McPherson & Renwick (2001)	McCormick & McPherson (2003)	
Renwick & McPherson (2002)	Nielsen (2004)	*Case study with multidimensional scaling*
Oare (2007)	Miksza (2006)	
Kim (2008)	Martin (2008)	
Leon-Guerrero (2008)	Fritz & Peklaj (2011)	Dos Santos & Gerling (2011)
Bartolome (2009)	Miksza (2012)	
Upitis et al. (2010)		*Case study with questionnaire*
Dos Santos & Hentschke (2011)	*Survey with observational analysis*	
Brook et al. (2011)		Chung (2006)
Upitis et al. (2012)		
	Smith (2002)	
	Quasi-experimental	
	Hewitt (2010)	

Data analysis. Each study was combed for instances of associations between variables identified in the research questions and self-regulatory processes as operationalised in McPherson and Zimmerman (2002), McPherson and Renwick (2011), and Zimmerman (2000)[5]. This involved entering examples of self-regulatory behaviours into a database, from which a list

[4] A version of this table previously appeared in Varela et al. (2016), p. 61.
[5] For dichotomous self-regulatory processes, relationships with the desirable option were charted (e.g., 'adaptive' behaviour).

of musical self-regulatory behaviours was built. Also, evidence of relationships between self-regulated learning (SRL) processes and the research questions' variables of interest were recorded onto Excel spread sheets. The unit of analysis thus consisted of observed relationships, with multiple results extracted from each study. Since both qualitative and quantitative studies were included, effect sizes were not calculated. Instead, a categorisation system (Table 4[6]) was created that required the strength of each association, ranging from -2 to +2, to be charted. This allowed the inclusion of results from methodologically diverse studies and provided the metric by which findings were integrated. Relationships received a graded score, from which averages within individual processes and across the four level groupings (beginner, intermediate, advanced, all-level) were calculated.

[6] This table previously appeared in Varela et al. (2016), p. 62.

Table 4

Categorisation of Relationship Types

	-2	-1	0	+1	+2		?
A	Statistically significant negative difference		No significant difference		Statistically significant positive difference	*i*	Lack of, Insufficient or Unclear data
B	Significant negative correlation ($r \geq -.25$)	Non-significant negative correlation ($r \leq -.24$)	No correlation	Non-significant positive correlation ($r \leq +.24$)	Significant positive correlation ($r \geq +.25$)	*ii*	Self-regulatory process is measured as part of a larger category
C	Negative relationship and explains a significant proportion of variance in a regression analysis ($b \geq -.10$)				Positive relationship and explains a significant proportion of variance in a regression analysis (b ≥ -.10)	*iii*	Measured but results not provided due to removal from questionnaire, analysis or selected model
D	Negative relationship observed in **75%** or more of the sample	Negative relationship observed between **50% and 75%** of the sample	No clear pattern among multiple participants in a qualitative study	Desired relationship observed between **50% and 75%** of sample	Desired relationship observed in 50% or more of sample	*iv*	Can change depending on the person or situation
E	At the extreme end of a negative Likert scale (1 on 5-pt. scale; 1–1.4 on 7-pt. scale)	Below the midpoint (-) of a directional Likert scale (2 on 5-pt. scale, 1.5–2.8 on 7-pt. scale)	Around the midpoint of a directional (+/-) Likert scale (3 on 5-pt. scale, 2.9–4.2 on 7-pt. scale)	Above the midpoint (+) of a directional Likert scale (4 on 5-pt. scale, 4.3–5.6 on 7-pt. scale)	At the extreme positive end of a Likert scale (5 on 5-pt. scale, 5.7–7 on 7-pt. scale)	*v*	Desired relationship observed in less than 50% of the sample
F			No relationship (in a qualitative study)			*vi*	Frequency counts; percentage of time
						vii	(Undesired relationship observed in less than 50% of the sample)

Note. Scores categorised according to data type: **a** = test of difference; **b** = correlation; **c** = regression; **d** = proportion of sample; **e** = Likert scale; and **f** = qualitative statement. Unclear data denoted by '?' and Roman numerals.

Results of the systematic review.

RQ1a(i)—Musical attainment: Level of expertise. RQ1a(*i*) represented the largest data set, with all 25 studies containing findings potentially relevant to SRL as it is related to expertise. Classifiable relationships existed in 19 studies with each self-regulatory process related to musicians' attained level of expertise. The overall average score for SRL processes ($\mu = 0.27$) suggested a weak, positive relationship. Although mostly positive, averages for individual processes were generally low. The findings revealed that level of expertise was most closely related to task strategies ($\mu = 0.64$), but was only weakly associated to outcome expectations and causal attributions ($\mu = 0.08$), in addition to a weak but negative relationship with self-satisfaction ($\mu = -0.04$).

Of the four data sets, advanced ($M = 0.45$) and beginner ($M = 0.38$) level studies had the highest mean SRL scores, with typically low positive scores for individual processes. Nevertheless, for advanced musicians, task strategies ($M = 1.22$) were the most associated with level of expertise, whereas for beginners the closest ties existed with intrinsic interest and self-experimentation ($M = 1.20$). Dos Santos and Hentschke (2011) provided numerous instances of advanced musicians' task strategies, including the harmonic reduction of pieces to better understand a piece's structure, writing in fingerings and intense repetition of motoric patterns. Meanwhile, Bartolome (2009) and Upitis, Abrami, Brook, and Troop (2010) described motivated beginners who incorporated improvisation and composition into their practice schedules.

Nevertheless, weak negative relationships also occurred. Examples included those between beginners and attention focusing ($M = -0.40$), or advanced musicians and self-satisfaction/affect ($M = -0.44$). Few of the specialist-school musicians studied by Chung (2006) appeared to enjoy practising, with high achievers expressing dissatisfaction over their rank and

low achievers voicing discontent about performance scores. By comparison, intermediate (M = 0.09) and all-level (M = 0.05) data sets had markedly lower average scores for SRL processes. For intermediate-level musicians, for example, most expertise-related processes suggested positive but weak associations. Some were also negative: goal setting (M = -0.50) and strategic planning (M = -0.17). The young middle-school musicians in Oare (2007), for instance, set neither proximal nor distal goals. In the all-level studies, meanwhile, only goal-setting and intrinsic value (M = 0.40) seemed in any way related to level of expertise.

Clear patterns across levels were hard to discern due to fluctuations in global SRL mean scores and data points per level-type. However, in processes for which scores existed across levels, scores typically dipped among intermediate-level musicians, particularly with self-satisfaction.

***RQ1a(ii)—Musical attainment: Performance scores*.** RQ1a(ii) comprised a smaller set of studies (n = 5). From the three studies with classifiable data points, six processes appeared to be related to performance scores. Since these relationships were mostly found in a single study of advanced musicians (Chung, 2006), they constituted an undeniably fainter trail of evidence. Correlational findings from this study suggested every SRL sub-category except for self-judgment was strongly related to higher performance scores. However, while these findings contributed to the study's global score for this variable, it was impossible to identify the strength of individual processes situated within sub-categories. The set's resulting mean global score (μ = 0.20) was therefore problematic.

Goal orientation and self-satisfaction had weak, negative relationships (μ = -0.40) with performance scores, and Chung (2006), indeed, reported high-scoring participants with ego approaches to musical learning. However, the lack of data from studies focusing on beginner or

intermediate studies precluded the identification of trends across levels. Nevertheless, the high mean score for self-efficacy ($M = 2.00$) in the all-level studies highlighted the importance of this self-motivational belief, irrespective of level, and explained the set's somewhat strong average relationship between performance scores and self-efficacy ($\mu = 1.20$).

RQ1b—Amount of practice. Although seven studies produced data germane to RQ1b, only three elicit clear relationships emerged. It would appear that two processes are associated to amount of practice: self-efficacy ($\mu = 0.57$) and, to a lesser extent, task strategies ($\mu = 0.14$). The mean global score ($\mu = 0.04$), consequently, implied an especially weak positive relationship between SRL and how much music students practise. Since intermediate-level studies ($\mu = 0.04$) constituted the only homogenous sub-set in terms of level, trends are speculative. Nevertheless, data from all-level studies ($M = 0.06$) underscored the association with self-efficacy ($M = 0.67$). McCormick and McPherson (2003), like Miksza (2006), observed significant positive relationships between perceived efficiency and amount of practice. Meanwhile, McPherson and McCormick (1999) found that technical work significantly predicts amount of weekly practice. Whether task strategies in general are strongly related to how much musicians practise remains to be seen, however.

RQ1c—Persistence. Data regarding the relationship between SRL and persistence appeared in five studies. While six processes, distributed among four of the studies, displayed positive associations, the resulting mean score ($\mu = 0.20$) suggested a weak positive relationship with persistence. Five of the relevant processes were somewhat weakly related ($\mu = 0.40$), but intrinsic interest ($\mu = 1.20$) had the most salient association.

Among beginners, persistence as moderately linked ($M = 1.00$) with just two processes: intrinsic interest and self-recording. Renwick and McPherson's (2002) beginner practised each

note for an average of 9.83 seconds when working on self-selected repertoire, compared with only 0.79 seconds if repertoire had been chosen by her teacher. Meanwhile, Upitis, Abrami, Brook, and Troop (2010) novice participant repeated difficult passages more frequently in order to upload her best performances onto an online portfolio.

Although greater persistence may not have been associated with self-recording among higher-level musicians, it was related to slightly more processes among these musicians, including a particularly strong positive relationship with intrinsic interest ($M = 2.00$). The advanced violinists in Kim's (2008) study, for example, remained intrinsically motivated while persevering through challenges, whether technical, musical or cognitive. Martin's (2008) larger-scale study of advanced-level young musicians, meanwhile, found a significant positive correlation between intrinsic interest and persistence. Consequently, the global mean SRL score for advanced musicians ($M = 0.38$) was almost three times higher than for beginners ($M = 0.13$), implying an increase in the importance of SRL for persistence, and especially intrinsic interest, as musicians grow in expertise.

RQ1d(i)—Practice content: Informal. Five studies contained data relevant to SRL and informal/formal practice, with classifiable relationships present in four studies. Informal practice yielded slightly more relationships and across a larger number of processes. Although eight processes were associated with informal practice, their global mean SRL score ($\mu = 0.15$) indicated only a weak positive relationship. Relationships with individual processes were uniformly weak ($\mu = 0.40$), with goal orientation unique in its negative association.

Despite the similar strength of relationships at the full-sample level, inter-level fluctuations revealed that self-regulatory processes may be more related to informal practice among beginners ($M = 0.63$), than musicians of either diverse ($M = 0.19$) or intermediate levels

(*M* = -0.13). When observing their beginner practise a jazzy piece, Renwick and McPherson (2002) noticed conscious efforts to recall the teacher's demonstrations, as well as a richer than usual palette of task strategies. However, the intermediate and all-level studies showed fewer related processes, and these were only of moderate strength. Among intermediate musicians, goal orientation and adaptive/defensive behaviour had a moderately negative relationship (*M* = -1.00) with informal practice. For instance, Miksza (2006) found significant negative correlations between informal practice and mastery orientation items among junior-high band students. Meanwhile, the all-level studies indicated moderately positive relationships (*M* = 1.00) with intrinsic interest, self-efficacy, and adaptive/defensive behaviour.

RQ1d(ii)—Practice content: Formal. Aggregate scores for RQ1d(*ii*) indicated five processes were linked with formal practice, producing a similarly weak if slightly lower global mean (μ = 0.10) than RQ1d(*i*). Goal orientation, self-efficacy, and task strategies had weak positive relationships (μ = 0.40) with formal practice, whereas intrinsic interest (μ = 0.80) approached moderate strength. Attention focusing, however, displayed a weak negative association (μ = -0.40) with formal practice.

While beginners had a nil global SRL score, musicians in the intermediate and all-level set had identical weak positive scores (*M* = 0.13). Renwick and McPherson (2002) observed strong relationships with formal practice in their beginner musician but these effectively cancelled each other out due to diametrically opposed scores: intrinsic interest and task strategies (*M* = 2.00) versus attention focusing and adaptive behaviour (*M* = -2.00). In contrast, mostly moderately positive relationships were found in the intermediate and all-level sets. For example, Miksza (2006), McPherson and McCormick (1999) and McCormick and McPherson (2003) identified associations with goal orientation, intrinsic value and self-efficacy respectively.

Although these results lent support to the relationship between self-motivation processes and formal practice across levels, it was not otherwise possible to discern inter-level patterns.

RQ1e—Efficiency. While the five studies in RQ1e generated a considerable number of potentially relevant data points, only two studies—both of intermediate-level instrumentalists—demonstrated classifiable relationships. This evidence was limited to three data points, each linked to a different process, constituting only a small portion of the data. The particularly weak positive relationship between SRL processes and practice efficiency ($\mu = 0.08$) was therefore perhaps not particularly surprising. Nonetheless, goal orientation, self-efficacy, and adaptive behaviour all exhibited moderate positive relationships ($M = 1.00$), at least among intermediate-level musicians. Miksza (2006), for instance, found perceived efficiency was significantly correlated with both a commitment to improve and respondents' perceived ability to concentrate when practising. Miksza (2012) also observed a significant positive correlation with self-efficacy items such as confidence in one's ability to achieve one's musical goals.

RQ2—General music instruction and SRL behaviour. Eleven data points described the relationship between SRL and general music instruction, with findings indicating a particularly weak positive relationship ($\mu = 0.02$). Relationships existed for six processes, but these were mixed. Cross-level comparisons revealed slightly higher average SRL scores for beginner ($M = 0.06$) and intermediate ($M = 0.05$) musicians. In contrast, there as a weak negative relationship between instruction and self-regulation among advanced musicians ($M = -0.03$).

While beginners had the highest global mean, due to a moderately high score for adaptive behaviour ($M = 1.00$), only two processes appeared to be related to instruction among intermediate musicians: attention focusing ($M = 0.40$) and task strategies ($M = 0.40$). Teachers who accommodate a student's musical interests might reasonably expect some adaptive

behaviour in return. For example, in Renwick and McPherson's (2002) study, a demonstration of a jazzy version of a piece inspired a beginner to request that the teacher notate the piece for her. Oare (2007), meanwhile, found a high incidence of attention focusing among intermediate band students being tested, as well as the common use of warm-up exercises, even if other strategies were conspicuously absent. In Hewitt's (2010) quasi-experimental study of middle school band musicians, however, instruction in self-evaluation had minimal impact on self-evaluation accuracy.

More relationships were observable among advanced musicians, but several of these were negative: adaptive behaviour, intrinsic interest (M = -0.25), and notably, self-satisfaction (M = -1.00). University-level musicians' expressed negative affect in response to competitive structures within orchestras (Smith, 2002), felt unsupported, confused or held back by teachers (Dos Santos & Hentschke, 2011) and dissatisfied with their ranking at their institutional setting (Chung, 2006). However, general instruction among advanced musicians also seemed to be positively related to strategic planning (M = 0.50) and, in particular, task strategies (M = 0.75); Dos Santos and Hentschke (2011) observed that all members in their study employed 'approaching' and 'deepening' phases when practising, and attributed this to the norms of Western classical music instruction.

RQ3—Self-regulation instruction. Findings for RQ3 were drawn from comparatively few participants, producing a positive average for individual processes of 0.72. While qualitatively weak, this score suggested the strongest relationship in this review. Each self-regulatory process was positively related to self-regulation instruction, with an unusually high number of moderately positive relationships (μ = 1.00) for goal setting, strategic planning, imagery, self-evaluation, and adaptive behaviour. Moreover, the score for intrinsic interest (μ =

1.50) represented the only strong positive relationship for any individual process with a variable of interest in this review. Other processes, for instance self-experimentation ($\mu = 0.25$), were only weakly related to SRL instruction.

While both beginners ($M = 1.00$) and advanced musicians ($M = 1.75$) had positive relationships with self-regulation instruction, the association was stronger with the latter. The beginner in the Upitis, Abrami, Brook, Troop, and Catalano (2010) study used her online portfolio to set goals she had never attempted before and engaged in new discussions about practice strategies. Meanwhile, the conservatory-level participants in Kim's (2008) study reported that keeping a daily self-regulation journal over several weeks enhanced their concentration, boosted confidence about practising independently, helped them structure their practice better and actively encouraged them to evaluate their practice more thoughtfully while considering more effective ways to practise. Inclusion of findings from a study containing musicians of all levels resulted in a dramatic decrease in the strength of this relationship ($M = 0.06$), since only one association existed within the all-level data set (intrinsic interest, $M = 1.00$).

However, considerable caution should be exercised when interpreting RQ3's findings. The results for beginner-level musicians are taken from a study of a single individual and those for advanced musicians pertain to just four individuals. Also, where relationships are identified in these studies, they are almost exclusively strong, positive relationships ($M = 2.00$). Thus, among beginners, nine processes appeared to bear no relationship to self-regulation instruction, whereas for advanced musicians, all processes except self-experimentation, self-recording ($M = 1.00$), and self-satisfaction ($M = 0.00$) were strongly related; this may not be true of the general population.

General summary and discussion of the systematic review. Although most of the valid data points were positive, the findings revealed a weak positive relationship ($\mu = 0.20$) between self-regulatory behaviour and the combined variables of interest. SRL appeared most closely associated with self-regulation instruction (RQ3, $\mu = 0.72$). The relationship was three times that of the next important association (RQ1a(*i*): level of expertise, $\mu = 0.27$) and substantially dwarfed the association with general music instruction (RQ2, $\mu = 0.02$). While the latter is SRL's least closely related variable, amount of practice (RQ1b, $\mu = 0.04$) was also rather weakly related.

It may be premature to extrapolate from these findings. First, the scores were left unweighted in order not to undervalue findings from studies with smaller sample sizes—a double-edged sword since it also inflated their importance. Second, there was considerable variety in the amount of data found per research question: while the relationship between expertise and self-regulation (RQ1a(*i*)) can be observed in data points scattered across 25 studies, other questions relied on 11 studies at most ($M = 5.88$), with RQ3 being addressed by only four. Similarly, the presence of studies from different level groupings also varied, depending on the research question. For example, apart from RQs1a(*i*) and 1e, where all level groupings were represented, data points for research questions were missing from one level in each instance. Meanwhile, advanced-level studies were particularly visible in RQ1a ($n = 9$) but did not contribute to findings for questions 1e and 1b. In contrast, beginner and all-level studies contained data applicable to 7 of the 8 research questions.

Caveats notwithstanding, the review suggested a positive but generally weak relationship between self-regulatory processes and the variables of interest (see Figure 1). While research into the association between music teaching and self-regulated learning (RQ3) remains at an

embryonic stage, some may welcome the possibility that self-regulation instruction has a substantially stronger relationship with SRL behaviour than general music instruction (RQ2). As the results attest, however, there was also considerable evidence of self-regulation even when it was not being explicitly taught. More research in this area is essential, and this dissertation begins to fill that research need.

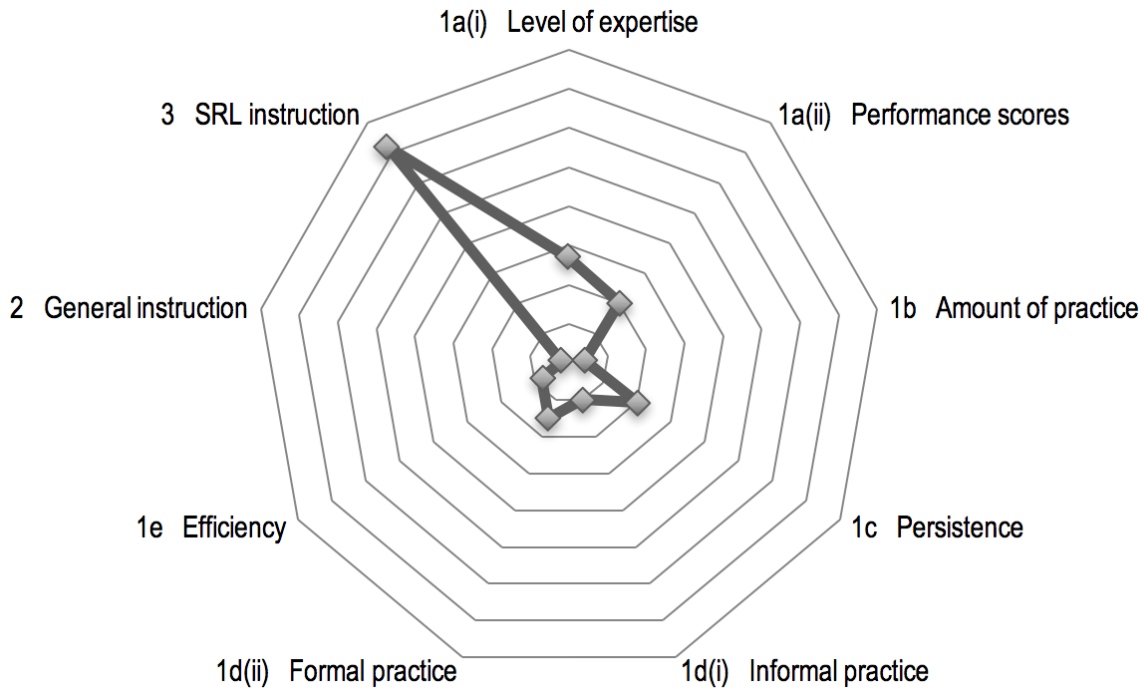

Figure 1. Relative differences of the aggregated average relationships with self-regulatory behaviour for each variable of interest.[7]

Regardless of their apparently weak relationships, it is perhaps not surprising that the two level of attainment variables (RQ1a) and perseverance (RQ1b) enjoyed the next strongest

[7] This figure was previously published in Varela et al. (2016) on p. 68.

associations with self-regulation: ties with level of expertise are supported by SRL theory and it is axiomatic that self-regulating musicians persist when confronted with challenges. The demonstrably weaker relationship with amount of practice (RQ1b) is more likely to raise eyebrows however, given the oft-cited importance of the many hours musicians should practise to attain the highest levels of expertise. Conceivably, not all types of practice require intense levels of self-regulation and the demands of highly self-regulated practice may restrict how long one can practise in this way. Nevertheless, if self-regulated practice somehow militates against lengthy practice sessions, one would expect a relatively strong association with practice efficiency (RQ1e), which did not appear to be the case. It may still be too early to wager whether self-regulation is more related to informal or formal practice, although the data suggest the former has the stronger association. Perhaps when students take autonomous steps to engage in informal practice, they are more intrinsically motivated and therefore more likely to self-regulate to begin with.

The average strength of relationships between the variables of interest and individual self-regulatory processes ranges from very positively weak (self-satisfaction/affect, $\mu = 0.02$) to moderately positively weak (goal setting and self-evaluation, $\mu = 0.68$). The relative importance of the latter speaks to the goal-driven yet iterative nature of self-regulation. Somewhat unsettling is the low relationship score for self-satisfaction, however. As mentioned, this is primarily due to dissatisfaction reported in studies of advanced musicians. Some claim traditional music education systems that restrict autonomy and value deliberate practice over 'playing for fun' or 'pleasure' (de Bézenac & Swindells, 2009) are to blame. However, it is possible that at higher levels, where competition is more intense and standards correspondingly higher, classically trained musicians are simply harder to please. Presumably, they are sufficiently able to evaluate

the results of their own practice efforts, and any instruction that does not successfully address individual learning needs is likely to lead to disappointment. Similarly, while performance scores are typically an integral part of a traditional music education, the review suggests higher scores are not associated with positive self-reactions. Indeed, despite the motivational benefits of progressing through a well-structured curriculum, exams and competitions can be perceived as threats to individuals' musical identities (McPherson et al., 2012).

It is self-efficacy that boasts the most frequent association with each variable of interest. This stands to reason: without the will to practise and the belief in one's ability, why would anyone self-regulate? Other specific relationships are also worth mentioning, however. One is the strong association between intrinsic interest and self-regulation instruction. Another is the apparent lack of association between self-instruction and longer practice sessions (RQ1b). Perhaps cognitive demands during practice hamper efforts to self-verbalise, causing self-instruction to occur only in exceptional circumstances, for example when focusing on a single musical parameter. Alternatively, perhaps musicians are constantly self-instructing but at a subconscious level that is difficult to observe and/or measure.

The association between higher self-regulation and self-selected repertoire is another relationship of interest. Studies show that letting students follow their own interests can have a positive effect on students' engagement and sense of agency (Azevedo, 2006). Therefore, choosing one's own repertoire presupposes the presence of a musical goal and the intrinsic motivation necessary for its attainment.

Finally, the possibility that self-recording can increase perseverance among novice musicians is worth highlighting. If novices are so overwhelmed by the demands of learning a new instrument that they cannot self-monitor effectively (Zimmerman, 2000), retroactive

monitoring via recordings may prove important and also provide a source of mastery evidence needed to bolster self-efficacy beliefs. Modern technology indeed allows musicians to archive and track their progress in an art form whose products are both intangible and ephemeral, and in so doing may provide the motivation needed to persevere long-term.

Limitations of the systematic review. While care was taken to ensure the search for literature was comprehensive, only English-language articles were targeted—excluding research from non-Anglophone scholars. Given the time needed to conduct a systematic review, the very latest research could not be included; but including the very latest research is rarely possible with reviews of this type. Also, in order to pinpoint relationships with specific self-regulatory processes, unmeasurable data points were by necessity excluded. Typically, these were relationships comprising clusters of processes, as a result of factor analysis, for instance.

These findings suggest self-regulation researchers need to continue accumulating cross-sectional data among musicians of all levels and genres. As most studies currently rely on self-reported data and limited numbers and/or lengths of practice sessions, the collection of longitudinal data of observed practice sessions and performances, triangulated with teacher and/or parent perspectives, is also in order. Further development of measures may also help capture processes such as self-instruction or causal attribution, which are currently underrepresented. Similarly, quasi-experimental studies will serve to clarify the impact of musical self-regulation on variables of interest. Self-efficacy, in particular, looms large in many studies' discussion sections, with as-of-yet unanswered questions regarding its origins (McCormick & McPherson, 2003), its relationship to technical work (McPherson & McCormick, 1999), and its interaction with performance outcome attributions and ability (McPherson & McCormick, 2000). Non-musical research suggests perceived mastery experiences contribute

most significantly to self-efficacy (Pajares, Johnson, & Usher, 2007), but as to which factors account for their presence in musical contexts and how these are effectively sustained remains uncharted territory.

There is scope for exploratory research into the relationships among students, teachers, and parents and how these relate to the development of self-regulatory behaviour. Similarly, little is known about the impact of modern technology on musical self-regulation or the link between social support and self-regulation. Perhaps the work of researchers like Hadwin and Oshige (2011) can lead to interesting new discoveries. These researchers describe co-regulated learning and socially shared regulation as forms of self-regulated learning that emphasise collective interactions and collaboration. Moreover, they argue that observations focusing on the frequency and content of interactions are important, and that discourse and content analyses can reveal the interplay among individual, parent, teacher, and cultural influences.

Implications for educators. While music educators are unlikely to challenge the need for self-regulation, what is required is further discussion of how self-regulation instruction can be respectfully integrated into teaching practices. Given the limited evidence, teachers' contributions in future research are crucial. Moreover, what role will technology play as it continues to impact pedagogical norms? Abrami, Bernard, Bures, Borokhovski, and Tamim (2011) argue learning tasks should be novel, complex, and perceived as important; otherwise students become frustrated by technologically-assisted attempts to scaffold self-regulation. How can teachers meet such criteria, while tapping into the power of technology in a way that is simultaneously effective and efficient? Perhaps by disseminating findings from this review at music conservatories and conferences, and providing guidance to teachers via professional development days or online support, answers to some of these questions will unfold.

Application of the systematic review. In this section, the results of the systematic review (Varela et al., 2016) are applied to the current study by categorising the self-regulatory processes and associated constructs by age.

In order to apply the findings of the systematic review by age, it was necessary to create six categories, only one of which corresponded directly to an age group in the present study, namely, 7- to 9-year-old children. Since some of the studies did not specify ages, and others had larger age ranges, it was impossible to make precise correspondences. While it should be remembered that comparisons are somewhat problematic due to the diversity of contexts involved, some differences by age exist.

As evidenced in Table 5, the studies involving children (column 4) show that self-reflection is the least prominent aspect of the three cyclical phases of self-regulation. This is also the case for adults (column five) and combined studies of both children and adults, as shown in the final column. Self-motivation for children is more prominent than for the adults, despite a decrease in intrinsic motivation during the teenage years. In the case of the studies examined in the systematic review, the adults appear to be as engaged with task analysis as with self-motivation, whereas children set practice fewer goals, for example. This finding is congruent with the description of adult learners earlier in the review. There is also a prominent difference between children and adults in the aspect of self-reaction. This would appear to be due to the drop in satisfaction levels among older learners in some of the most important studies in the review (e.g., Chung, 2006) and the fact that the 7- to 9-year-olds likely have higher self-satisfaction scores because they are at the very beginning of their musical journeys.

Table 5

Self-Regulatory Processes by Age

Zimmerman's (2000) self-regulation model	7–9	10–16	9–18	Children	Adults	Mixed
FORETHOUGHT	22	10	16	48	33	19
Task Analysis	8	2	0	10	14	5
Goal-Setting	4	-3	0	1	10	2
Strategic Planning	4	5	0	9	4	3
Self-motivation	14	8	16	38	19	14
Goal-orientation	2	2	0	4	2	4
Intrinsic interest/value	12	-4	6	14	9	6
Outcome expectations	0	0	0	0	4	0
Self-efficacy	0	8	10	18	4	4
PERFORMANCE	24	20	1	45	38	0
Self-observation	14	3	0	17	6	0
Self-experimentation	8	0	0	8	3	0
Self-recording	6	1	0	7	3	0

Table 5 Continued

Zimmerman's (2000) model of self-regulation	7–9	10–16	9–18	Children	Adults	Mixed
Self-control	10	17	1	28	31	0
Self-instruction	0	0	0	0	6	0
Imagery	4	3	0	7	5	0
Attention focusing	0	5	0	5	7	0
Task strategies	6	9	1	16	13	0
SELF-REFLECTION	16	4	2	22	13	3
Self-judgment	4	2	0	6	10	1
Self-evaluation	4	2	0	6	7	0
Causal attribution	0	0	0	0	3	1
Self-reaction	12	2	2	16	3	2
Self-satisfaction/affect	6	-5	0	1	-3	-1
Adaptive/defensive	4	3	2	9	6	3
Total score self-regulation association	62	34	19	115	84	22

Recent research on musical self-regulation. Since the review's completion and publication online in 2014, at least another dozen or so relevant studies have appeared, including the student paper from which the composite factors used in the present study were derived (Upitis, Abrami, Varela, King, & Brook, 2016), as well as the parallel papers reporting on teacher (Upitis, Abrami, Brook, Boese, & King, 2017) and parent data sets (Upitis, Abrami, Brook, & King, 2017). Overwhelmingly, these studies underline the importance of musical self-regulation. It is, nevertheless, useful to present these studies, not only for the sake of providing a more current review, but also to re-visit the key themes related to musical self-regulation by age. These recent studies are grouped according to whether the music students were young, teenaged, or adult learners. However, given that analyses of its participants' open-ended comments revealed a larger age group than any of these other studies and because it yielded the data for the present thesis, Upitis et al.'s student paper (2016) is discussed last.

Young learners. Only one of the recent studies focused on young learners, and this was carried out in the Netherlands with students aged 3 to 11 years (Kupers, van Dijk, van Geert, & McPherson, 2015). All of the 38 students were at the beginner level and were string instrument players involved in the Suzuki program. The researchers analysed the teacher-student interactions during the first 10 minutes of each lesson, and these interactions were coded for instances where the teacher provided support for the student to develop autonomy and the student exhibited expressions of autonomy. Additional data included parent and student practice diaries, teacher interviews, and parent questionnaires. The researchers concluded that teachers are able to enhance the development of student autonomy through the co-regulation of teacher-student interactions. Understandably, they also determined that some students required more

support from the teachers than others. The types of support described by Kupers et al. will also be explored in the current study.

Teenaged learners. A small selection of studies addressed musical self-regulation among teenaged learners. Two of these studies were descriptive in nature, while one implemented an intervention. Miksza, Prichard, and Sorbo (2012) explored goals, strategies, and practice behaviour among 30 middle school band musicians (M_{age} = c.12, SD = 0.91) in a summer music program. Analysing data from 20-minute practice videos and student questionnaire responses, the authors found considerable differences in self-regulation scores. However, they reported a tendency for students to focus on pitch accuracy. Positive, moderate relationships were also observed between reported self-regulation and observed practice behaviour such as writing on the score, tempo variation, and repeating longer passages containing at least four measures. Furthermore, the authors also found a significant negative moderate relationship between self-regulation and practising music that the teacher had not assigned.

Meanwhile, Clark (2012) focused on four advanced-level string instrument players, 14- to 18-years-of-age, who had scored high on a self-efficacy measure. Using data gathered from three 20-minute practice sessions, follow-up interviews, and practice journals, Clark (2012) found that all four musicians benefitted from supportive socio-contextual environments, set specific practice goals, and used a range of practice strategies. However, the most successful student deployed more sophisticated practice strategies, such as attention focusing using a metronome and sectional practice that lead to full play-throughs. This individual also practised the most and played on the highest quality instrument.

Mieder and Bugos (2017) implemented a two-week musical self-regulation intervention involving 30 high school intermediate- to advanced-level woodwind and brass musicians (M_{age} =

15.4, *SD* = 1.3). During two ninety-minute lessons and daily follow-up sessions that contained teacher demonstrations, discussions, and group problem-solving activities, the teenagers covered a range of strategies such as goal setting, mental practice, self-monitoring, and self-evaluation. Although Mieder and Bugos (2017) found no significant differences in performance achievement or practice strategies, they did observe significant improvement in self-efficacy and perceived use of certain strategies, such as breaking down the piece into components of varying lengths and difficulties. These studies of adolescent musicians suggest that intermediate-level learners vary considerably in their self-regulatory abilities and confirm that advanced-level learners are effective self-regulators. The intervention study, meanwhile, highlights the potential malleability of self-regulatory development in adolescent learners.

Adult learners. Most of the more recent studies in the area of musical self-regulation have involved adult learners. Two of these studies represent interventions conducted in the United States. Cremaschi's (2012) quasi-experimental study involved 41 music major students (experimental group of 22, control group 19; age-related data not provided) beginning to study piano as a second instrument. The three-week intervention required the participants in the experimental group to complete a short daily checklist concerning their use of practice and metacognitive strategies, as well as to record the duration of each day's practice session. In addition, both groups completed an adapted version of Pintrich, Smith, Garcia, and McKeachie's (1991) *Motivated Strategies for Learning Questionnaire* pre- and post-intervention. Results demonstrated that the intervention had no significant effect on grade, self-efficacy, practice strategies, or resource management; however, the experimental group reported significantly higher metacognitive self-regulation than the control group. In contrast, Miksza (2015) implemented a five-day intervention in which 28 brass and woodwind music majors (M_{age} = 20,

SD = 1.24) watched 15-minute videos of more advanced musicians instructing them in either practice strategies or a combination of practice strategies and self-regulation. Following analysis of a pre- and post-performance achievement measure, Miksza (2015) concluded that the group receiving combined instruction demonstrated significantly greater improvements in performance scores. Furthermore, the students' practice sessions revealed that while both groups expanded their use of practice strategies, the experimental group set themselves more 'nuanced' objectives, going beyond learning the right notes and rhythms to working on interpretation and dynamics, for example.

Five of the recent self-regulation studies involving adult learners employed large-scale survey data. In a Norwegian study, exploring questionnaire responses of 204 higher music education students (age-related data not provided), Hatfield, Halvari, and Lemyre (2016) used structural equation modelling and multiple regression to confirm that forethought predicts performance and performance predicts self-reflection. The authors also found that forethought is indirectly linked to self-reflection and that self-reflection positively predicts forethought. These findings are especially pertinent to this dissertation because they confirm the cyclical nature of Zimmerman's model of self-regulation, upon which the items in the present study student survey were based.

Miksza and Tan's (2015) study of diverse US collegiate musicians (N = 241; M_{age} = 20.97; SD = 3.39) and their teachers (N = 52) pursued several interrelated objectives, two of which were of interest to this dissertation. The first of these was to examine the students' practice reflection, grit, flow, practice efficiency, and self-efficacy for self-regulation. The second was to compare teachers' descriptions of how they would instruct students to practise a specific etude in order to learn it within 7 days, with students' descriptions of how they would

practise the same etude. The researchers found that the students' grit and reflection were significantly and positively related to their practice efficiency, flow, and self-efficacy for self-regulation. However, they found no significant relationships between reported practice approaches and psychological constructs such as self-evaluation, reflection, and grit. This led Miksza and Tan to suggest that knowing practice strategies does not necessarily guarantee the application of metacognitive processes and psychological engagement. Moreover, the authors observed that both students and teachers emphasised the importance of planning and task strategies, in particular practising isolated chunks, initially at a slower tempo.

The survey respondents in the Ersozlu and Miksza (2015) study represented five age groups, ranging from 17- to 36-years-of-age ($N = 237$). Unlike the current thesis, however, these age groups were not analysed separately but treated as one homogenous group. The main goal of the authors' study was to adapt Miksza's (2012) Self-Regulatory Practice Behaviour scale, which was initially designed for intermediate-level high school musicians, to an older population of advanced musicians in a cross-cultural context. The four factors that emerged through factor analysis were similar to those of McPherson and Zimmerman's (2011) model of Self-Regulation, but slightly different from Miksza's (2012) model. For example, method and behaviour were unique factors in the Turkish adaptation but were merged in the 2012 version involving intermediate high school musicians.

Bonneville-Roussy and Bouffard (2015) conducted a moderately large-scale Canadian survey of classically and jazz trained college music students ($N = 173$, $M_{age} = 17.83$, $SD = 1.51$). The authors concluded that the combination of self-regulation, deliberate practice strategies, and practice time was a better predictor of students' final grade in their music performance course than any of the components individually. Of particular interest to this dissertation, preliminary

analyses revealed a significant age effect for deliberate practice alone, with younger students employing deliberate practice strategies less frequently. Here, deliberate practice strategies comprised rehearsal strategies, strategies to develop expressivity, and technical and warm-up exercises. However, no age-group effects were reported for self-perceptions of musical competence, goal directedness, focused attention, or use of metacognitive self-regulation strategies.

The Araújo (2016) study is especially pertinent to this dissertation because the data was analysed according to five age groups with individuals ranging from 18 to 58 years of age (N = 212, M_{age} = 25.36, SD = 7.87). However, it should be noted that students, teachers, and professional performers were surveyed, instead of only students. The author found significant age group differences in self-regulation through personal resources (i.e., knowledge and regulation of cognition strategies and self-efficacy), increasing from the ages of 21 to above age 40 and remaining stable until 50 years of age, whereupon it decreased marginally. Araújo also found age group differences for self-regulation through external resources (i.e., help-seeking, external causal attributions, and use of resources), decreasing significantly after 50 years of age.

In contrast to these somewhat larger-scale studies, Nielsen (2015) examined the cognitive and metacognitive strategies employed by two conservatory-level jazz musicians. This study constitutes a unique contribution to the literature as classical musicians have tended to be the exclusive focus of investigations. Based on observational data, the author concluded that similar to classical musicians, the participants used a range of cognitive and metacognitive strategies. Within the jazz context, cognitive strategies included establishing an aural outline of a solo part by identifying melody cues on a recording, or else perfecting technically challenging passages by listening to short bursts of relevant segments, practising these slowly, then reintegrating them by

playing in sync with the recording. In contrast, metacognitive strategies for one musician included delaying listening to the recording until they had established their own interpretation.

Upitis et al.'s (2016) student paper

This cross-sectional study of 3,920 Canadian music studio students comprised two broad research aims: one descriptive (due to the under-researched nature of the sample), the other predictive. Under the descriptive findings, the authors reported a high concentration of teenage students, the majority of whom were female and learned piano as a first instrument. A third of the sample had also played an instrument for at least ten years. A defining characteristic was the high level of intrinsic motivation, with most individuals practising a minimum of 5 days per week, for around an hour each session. Furthermore, individuals practised because they wanted to play well, loved their instrument, and valued practice, rather than out of a need to receive rewards from parents and teachers. Most felt supported by their parents and reportedly practised in distraction-free settings, even if other family members also occupied these spaces. While students generally claimed to use effective practice strategies during their practice, they engaged in self-reflection to a lesser degree. Nonetheless, individuals placed particular importance on developing musical skills—notably by learning new repertoire—although this was less true for composing or improvising. Unsurprisingly, they felt more successful at musical activities they spent more time on (e.g., playing known repertoire) than on ear tests, improvising, or composing. Finally, although these individuals enjoyed performing for others—albeit more so in informal settings—and considered themselves successful performers, more than half were reportedly scared of performing.

Building on these descriptive findings, Upitis and her team next identified predictors of (a) music exam results, (b) enjoyment, (c) persistence, (d) perceived performance skills, and (e)

self-efficacy beliefs. Chiefly using composite factors derived from the 145-item survey, regression analyses revealed that less than 5% of the exam score variance was explained by hypothesised predictors, an unexpected finding the authors attributed to the positively skewed exam results. In marked contrast, however, 44% and 38% of the variance for enjoyment and persistence respectively were explained by intrinsic motivation, with other forms of internalised motivation also successfully predicting these outcomes. When it came to predicting perceived performance skills, motivation factors and the use of aural skills played a significant role. In other words, these findings underlined the importance of motivation for music learning outcomes. Acknowledging the key influence of self-efficacy in musical self-regulation, the authors treated this construct as an outcome, partitioning it into personal competency beliefs and externally influenced beliefs. The former were best predicted by a combination of intrinsic and extrinsic motivation, as well as the perceived likelihood of performing well in public, having a parent or guardian that played an instrument, and the belief that musical ability determined the quality of one's playing. Although intrinsic and extrinsic motivation also predicted the perceived importance of externally influenced beliefs, variance for this outcome was partly explained by the likelihood of performing well in public, being poorly motivated to practise, and the deployment of reflection and effective practice strategies.

Summary of Literature Review

The preceding literature review was written with two main goals: to examine how adult music learners might approach their study in ways that complement and differ from younger music learners, and to provide a thorough analysis of musical self-regulation. The systematic review showed a weak but positive relationship between self-regulation processes and associated behaviours with success in learning and enjoyment of music. Recent studies of musical self-

regulation confirmed this relationship, and deepened our understanding of the particular challenges faced by young and adult learners alike.

However, despite a move towards expanding the age demographic of music students in this field of research, studies that focus specifically on age-related differences are lacking. Of the more recent papers, only those by Bonneville-Roussy and Bouffard (2014) and Araújo (2016) include age in their analyses. Both of these found age-related increases in either self-regulation or deliberate practice, albeit in relation to advanced-level adult learners who were studying music at the college or conservatory level. Meanwhile, none of the older studies explicitly compare age groups, preferring to focus on musicians' levels. Although it is axiomatic that higher levels of mastery are linked to greater self-regulation, variability of self-regulation within these levels is rarely a primary concern for researchers. Also, since musical self-regulation studies involving adults tend to be conducted at conservatories or universities, the underlying assumption is that all adult learners are advanced musicians. However, this is not necessarily the case. Furthermore, a surprising number of studies (n = 16) do not provide exact ages, pointing readers' towards descriptions of context instead.

Nonetheless, this lack of serious attention to age is somewhat surprising given the theoretical improvements in self-regulation over time and the reported increase in age-diversity among today's music learners. Since music researchers rarely enjoy access to large intergenerational databases, the participants in the current dissertation represent a unique opportunity to investigate possible age-related differences. The ensuing methodology chapter accordingly describes the sample selection and data collection procedures, summarises the salient features of the musical self-regulation measure, and sets out the statistical and thematic approaches used to understand the cross-sectional nature of the data.

Chapter 3: Methodology

Sample and Participant Selection

The study conducted secondary analyses on survey data previously collected by the Music Education in the Digital Age (MEDA) Project team in August 2014. This research used a non-probabilistic sampling approach with a single unit of analysis: music students who take lessons in private music studios. The target population was comprised of Canadian music studio students in the databases of the Royal Conservatory of Music (RCM) and non-RCM music schools and conservatories. Although the preface of the Music Student Survey on which this research was based states it was aimed at young people taking music lessons, no upper age limits were enforced.

Ethical clearance was obtained for the survey in accordance with the Canadian Tri-Council Policy Statement governing research with human participants (Canadian Tri-Council Policy Statement 2, 2010) and the research ethics policies of Queen's University and Concordia University (see Appendix A). Ethics clearance included passive consent for students under 18 years of age, with the letter of information contained in the survey itself (see Appendix B). Participation in the study was voluntary and for respondents under 18, parents/guardians were informed via e-mail upon receipt of their child's completed survey. The data files used to carry out the analyses were fully anonymised.

Data Collection

The final English and French language versions of the Music Student Survey were deployed in February 2014, and made available in paper and electronic form. The online version was produced using Fluid Surveys while the paper format was created on Word, resulting in slightly different visual layouts, but with identical questions (see Appendix B for the paper

version of the survey). Data from the online version were automatically stored in Fluid Surveys. Responses from the print version were entered manually.

Royal Conservatory of Music students received invitations to participate in the study via two RCM lists. Meanwhile, students attending non-RCM music schools and conservatories were reached in a number of different ways: paper surveys sent by mail; link to online survey with poster, sent by mail; phone calls and paper surveys sent by mail; email invitation and paper surveys sent by mail; and email invitation with a link to the online surveys. After data cleaning, 3,920 surveys remained viable for quantitative analysis of the closed-ended questions.

Measure Used

The final version of the survey contained 38 questions organised within five major sections: *Your background*, *Practising*, *Musical Skills*, *Enjoyment of Music*, and *Musical Achievements*. Sixteen of the questions comprised sub-questions, resulting in a total of 139 items. The survey collected self-reported demographic, behavioural, and attitudinal data. In broad terms, the survey was designed to investigate students' practising habits, their perceived musical skills, what they enjoy about their lessons/music making and their musical achievements. For example, the items on the survey sought to identify where, when, and how often students practise, the role their parents play in their practice, and the factors that they believe help them practise more efficiently.

In addition to demographic and objective outcome variables, such as scores on music exams taken within the last year, the student survey contained variables derived from three fields: educational psychology, educational technology and music psychology. Therefore, items measured a diverse range of variables: self-regulation (Zimmerman, 2000; McPherson & Zimmerman, 2002), deliberate practice (Lehmann & Ericsson, 1997), causal attribution (Weiner,

1985, 1986, 1992), goal orientation (Dweck, 1986), self-determination (Deci & Ryan, 1985; Ryan & Deci, 2000), self-efficacy (Bandura, 1977, 1982, 1997), and expectancy-value (Wigfield & Eccles, 2000; Wozney, Venkatesh, & Abrami, 2006).

Reliability and validity of the closed-ended questions. During the development of the survey, care was taken to ensure items measured the constructs they claimed to measure, thereby corroborating the survey's content validity. Fifty-four items were either directly borrowed or adapted from a pre-existing and validated instrument: the Australian Music Examination Board (AMEB) Student Survey (McPherson & McCormick, 2006; Renwick, 2008). Meanwhile, any items addressing constructs of interest that were not featured in the AMEB were derived from other validated instruments. These included Hallam et al.'s (2012) 12 music practice items and the Students' Learning Strategies Questionnaire (SLSQ) (Venkatesh, Abrami, Zuberi, & Lysenko, 2012).

It should be noted that my own role in the development of the survey was not insignificant, as the Principal Investigator and the Co-Investigator had requested that I identify each of the individual psychological constructs contained within the AMEB, locate and/or write new questions in alternative valid measures where necessary, present these findings to the MEDA project team, and attend regular meetings throughout the 2013–2014 academic year, during which I participated in discussions about how to further fine-tune the measure as well as its factor analytic structure.

In order to improve comprehensibility and item reliability as well as reduce the amount of time required for its completion, the survey underwent seven rounds of pilot testing between August and November 2013. Due to the study's research design and costs involved, however, respondents were not asked to complete additional measures that might target related, identical

or contrasting constructs. As a result, direct empirical assessment of the survey's criterion validity, whether predictive, convergent, or discriminant was not possible.

Since the instrument addressed several interrelated constructs, team leaders of the MEDA project conducted Factor Analyses (using Oblique and Varimax rotation) to cluster highly correlated variables and calculated coefficients of reliability as a further measure of internal consistency. Following missing value imputation, results indicated an 18-factor solution with Cronbach alpha values of between .56 and .86, lying roughly between the recommended .3 to .7 range. These factors were then used in the current study's analyses since they already reflected underlying processes within the survey.

Description and justification of the open-ended question. An important part of the study was the analysis of the open-ended comments provided in response to Item 38 in the student survey: 'Is there anything else that you would like to tell us?'. While properly crafted, closed-ended questions tend to have higher response rates than their open-ended counterparts and are relatively easy to answer as they often require participants to select a single option from a set of predetermined answers, they also arguably steer individuals into providing responses that correspond to the researcher's preconceptions about what is worth analysing (Peterson, 2000). In contrast, open-ended questions offer considerable latitude in terms of potential responses and are therefore less likely to result in respondent bias (Reja, Manfreda, Hlebec, & Vehovar, 2003). Open-ended questions can, moreover, allow respondents to elaborate on responses to closed-ended questions, offering researchers information that is not necessarily captured otherwise, and thereby represent an additional source of insights that may prove useful for subsequent research (Bailou, 2008; Peterson, 2000).

Evidence exists that the size and type of boxes on online questionnaires can influence the length of answers to open-ended questions, particularly among individuals who tend to write lengthy answers (Emde & Fuchs, 2012). It also appears that length of answers to open-ended questions is not significantly influenced by mode of delivery (i.e., paper vs. online) (Denscombe, 2008). With this in mind and considering the length of the student survey, both the paper (see Appendix B) and online versions provided a fair amount of room for additional comments; this was especially true of the online version since the text box was fully expandable.

However, even before data cleaning, the response rate on the open-ended question (N = 1,198) was comparatively low. To some extent, this is not entirely surprising given the non-compulsory nature of the open-ended question and the relatively large number of closed-ended questions preceding it. While data cleaning further reduced the response rate to 1,184 comments, preliminary inspections suggested these represented a viable source of data that could potentially further the researcher's understanding of age-related differences in musical self-regulation and associated process.

Statistical Analyses for the Closed-Ended Questions (Research Questions 1 & 2)

1-way MANOVA. A multivariate analysis of variance (MANOVA) simultaneously tests composite mean differences between groups across several dependent variables (Field, 2009). Thus, in order to determine differences among age groups with regard to underlying constructs in the survey, a one-way between-subjects MANOVA was conducted, treating age range as a grouping variable (i.e., an independent variable with multiple levels), with self-regulation and associated constructs [i.e., the 18 factors extracted in the Upitis, Abrami, Varela, King, et al., (2016) primary student study] as dependent variables.

Checking for 1-way MANOVA assumptions. Adopting the recommendations of Tabachnick and Fidell (2013), the following assumptions were checked prior to conducting the MANOVA: independence of observations, adequate sample size, random sampling, absence of univariate or multivariate outliers, multivariate normality, a linear relationship between the dependent variables for each group of the independent variable, homogeneity of variance-covariance matrices, and absence of multicollinearity.

The statistical independence of observations assumption was not an issue since the survey's cross-sectional data were collected at one point in time. Next, each age group was checked to ensure it contained more cases than dependent variables. Given the size of the sample, this did not present a problem either.

While MANOVA is relatively robust to multivariate outliers, the test was run with and without them to see if their presence substantially affected the results. Similarly, violations to the multivariate normality assumption were ignored since MANOVA is considered somewhat robust in this regard. However, violations are noted in the Results section.

To assess linearity, scatterplot matrices of dependent variables for each of my age groups were inspected. Where non-linearity was a cause for concern, transformations were conducted. However, these did not form part of the final analysis due to the difficulty interpreting the ensuing transformations and the acceptable results obtained with the untransformed variables.

To test the assumption of homogeneity of variance-covariance matrices, Levene's test of equality of variances for nonsignificance was carried out. Box's M was used to test the equality of covariance matrices assumption. Field observes, however, that Box's test is particularly sensitive to violations of the multivariate normality assumption. Tabachnick and Fidell (2013) meanwhile signal that if sample sizes are unequal and Box's M is significant at $p < .001$, its

robustness cannot be assumed. Box's M test results were therefore treated with caution. Lastly, multicollinearity among the dependent variables was assessed by ensuring Pearson correlation coefficients were not excessive (i.e., $r \geq .90$).

Interpreting MANOVA results. After running the MANOVA, the multivariate F-statistic was inspected to see if it revealed a statistically significant difference between the groups. This led to three follow-up tests: univariate 1-way ANOVAs, polynomial contrasts for each dependent variable, and a discriminant analysis. Together with the 1-way MANOVA, each of these tests helped further answer Research Question 1.

1-way ANOVAs. While it is standard practice to follow up MANOVAs with separate 1-way ANOVAs, Field (2009) raises two important issues surrounding this approach. First, multiple ANOVAs are subject to an elevated risk of Type 1 error, making a Bonferroni adjustment advisable. Second, attempting to determine which dependent variable(s) may contribute to the statistically significant MANOVA undermines the possibility that multivariate dimensions may be responsible for group differences. Nevertheless, in combination with discriminant function analysis, Field also argues that 1-way ANOVAs may be useful since they help determine which dependent variables *might* be contributing to the statistically significant MANOVA. Alternatively, non-significant ANOVAs suggest that group differences are best explained in terms of an underlying discriminant function. Keeping these caveats in mind, 1-way ANOVAs were conducted for each of the 18 dependent variables, using a Bonferroni α-level adjustment of .0027 (i.e., 0.05 divided by 18).

Polynomial contrasts: trend analysis. Age-related trends were then analysed among dependent variables with statistically significant ANOVA results. Using the coefficient

weightings shown in Table 6, polynomial contrasts were conducted, with statistically significant t-test results providing confirmation of either linear, quadratic, cubic, or quartic trends.

Table 6

Contrast Coefficients

	Age groups						
Contrasts	7 to 9	10 to 12	13 to 15	16 to 18	19 to 21	22 to 24	25 ≥
Linear	-3	-2	-1	0	1	2	3
Quadratic	5	0	-3	-4	-3	0	5
Cubic	-1	1	1	0	-1	-1	1
Quartic	3	-7	1	6	1	-7	3

Discriminant Function Analysis (DFA). Field (2009) recommends following a MANOVA with a DFA as (a) the latter recognises that the dependent variables are potentially related and (b) it may serve to clarify the relationship between the dependent variables and group membership. In effect, the DFA inverts the MANOVA such that what were independent and dependent variables in the MANOVA become the DFA's criterion and predictor variables. Furthermore, the DFA produces several weighted linear combinations of independent variables (i.e., orthogonal discriminant functions), the first of which most parsimoniously predicts group membership. The actual number of functions, however, is either $N_g - 1$ or p, where N_g = number of groups and p = number of predictors, whichever is the smaller value.

Checking for DFA assumptions. It was not necessary to assess DFA's assumptions (i.e., random sampling, independence of cases, univariate and multivariate normality, linearity, homogeneity of variance-covariance matrices, and absence of multicollinearity) since these had already been met prior to conducting the MANOVA. However, group sizes were inspected to ensure they were not hugely dissimilar and that the smallest group contained more individuals

than the number of predictor variables. As a conservative measure of robustness, the smallest group was also checked to ensure that it contained at least twenty cases.

Interpreting DFA results. Eigenvalues were inspected to determine the amount of variance explained by each discriminant function. Next, each function's respective effect size was obtained by squaring its canonical correlation. The percentage of cases correctly identified by the model was then calculated by subtracting the percentage of correctly classified cases for the Within-groups from the percentage of correctly classified cases for the Separate groups.

To assess the functions' discriminating power, Wilk's lambda values were inspected such that smaller values (i.e., closer to 0) reflect superior discriminating ability. To verify each function's statistical significance, chi-square test results were inspected. Next, to obtain a visual representation of how far the discriminant functions separate the groups, pairwise plots of average discriminant scores for each group on a function (i.e., group centroids) were requested.

Analysis of the Open-Ended Question (Research Question 3)

The coding process comprised three major stages. The first of these entailed transferring the open-ended comments from SPSS files (Version 22.0) onto Excel documents so they could be sorted by age and coded. It also involved preliminary calculations of the data set and initial descriptive coding. The second stage consisted of collaborative coding and inter-rater reliability testing. The final stage involved independent coding by the researcher.

Stage 1: Data transferral, preliminary calculations and initial coding. Open-ended comments were extracted from the cleaned SPSS data set onto an Excel document, along with each respondent's respective age group categorisation, gender, and case number. Preliminary calculations consisted of counting the number of comments per age group, the number of words per comment, and the number of sentences per comment.

The first two calculations were fairly straightforward and were carried out using Excel's COUNTA function and the following formula, respectively:

"=IF(LEN(TRIM(A1))=0,0,LEN(TRIM(A1))-LEN(SUBSTITUTE(A1," ",""))+1)".

Calculating the number of sentences per comment was somewhat more complicated as it was first necessary to identify comments missing a final period. This required another formula, "=If(A1<>"",If(Right(A1,1)=".",A1,A1&"."),"")", which produced an extra column of comments with final periods added where necessary. The extra column also included comments ending with exclamation marks, question marks, or any other punctuation mark signalling closure. By filtering this column for nonblank cells (i.e., those containing amended comments), adjacent cells in the original column were corrected (using "=A1&""). Having completed these steps, it was possible to calculate the number of sentences in each comment by applying the following formula: "=LEN(F2)-LEN(SUBSTITUTE(F2,".",""))".

Prior to preliminary coding, the data set was filtered by identifying irrelevant or otherwise uncodable comments, such as 'No'-type answers or nonsensical remarks. Next, in order to develop a rough sense of the range of topics mentioned, descriptive codes were added to the cell adjacent to each comment. Where multiple codes were deemed appropriate, they were separated by semicolons to facilitate subsequent extraction.

Their extraction involved transferring the column with descriptive codes onto a separate Excel sheet using the Convert Text to Columns Wizard, with semicolons serving as the delimiter. The resulting multiple columns were stacked into a unique column through a combination of Excel's Transpose feature and the following formula:

"=IF(ROW()<=COUNTA(A:A),INDEX(A:A,ROW()),IF(ROW()<=COUNTA(A:B),INDEX(B:B,ROW()-COUNTA(A:A)),IF(ROW()>COUNTA(A:C),"",INDEX(C:C,ROW()-

COUNTA(A:B))))". However, since this new column contained duplicate codes, it was necessary to filter out any duplicates using Excel's "Unique records only" feature, then to paste the filtered codes into a final column. The codes in this column were then transferred onto a mind-mapping software (XMind 8 Plus), where they were organised into a topic inventory by grouping codes into overarching categories until a point of saturation had been reached.

Stage 2. Collaborative coding and inter-rater reliability testing. The second stage of the coding process was a three-day collaborative effort between members of the MEDA project research team, including the author, at Queen's University, Kingston, and was supervised by the project's Principal Investigator. Given the open-ended nature of the data, the data were coded using a blend of *a priori* codes that related to self-regulatory processes and emergent codes from the preliminary coding. Factors derived from the closed-ended comments were not used as codes since by design they comprised a parsimonious selection of items, and therefore would not have captured the full range of self-regulatory processes. This resulted in 18 codes nested within six over-arching themes: (a) Self-regulated learning, (b) Co-regulation, (c) Royal Conservatory of Music, (d) Music learning, (e) Survey, and (f) Socio-contextual factors.

The first theme (i.e., Self-regulated learning) comprised four codes: Task analysis, Motivation, During (referring to the performance phase processes), and Reflection. The second theme (i.e., Co-regulation) also had four codes: Supports: people (positive), Supports: people (negative), Supports: technology (positive), and Supports: technology (negative). The third theme (i.e., Royal Conservatory of Music) only contained two codes: Royal Conservatory of Music (positive) and Royal Conservatory of Music (negative). The fourth theme (i.e., Music learning) included four codes: Persistence, Reasons to Play, Musical accomplishments, and Amount practised. The fifth theme (i.e., Survey) was composed of just two codes: Survey

(positive or neutral) and Survey (negative). Similarly, the sixth theme (i.e., Socio-contextual factors) only had two codes: Socio-contextual factors (positive or neutral) and Socio-contextual factors (negative). For detailed definitions of these themes and their respective codes, please refer to the Codebook (see Appendix C).

For coding training and codebook refinement purposes, the author and two members of the research team first selected five batches of comments (n = 251) to be coded on Days 1 and 2. These batches were culled from the four youngest age groups since they represented the largest share of individuals in the data set and reflected an assumed increase in coding complexity with each passing age group. Accordingly, these were ordered chronologically, with two batches taken from the largest group (i.e., the 13- to 15-year olds). Notably, the batches only contained a header indicating the age group, a 1- to 2.5-page list of comments per batch, and case numbers next to each comment.

After discussing the parameters of the codes, the researchers agreed to simultaneously code one batch at a time then convene after each coding session to compare answers and address any concerns. This allowed the author to make note of any issues when creating the codebook later. Although the comments in these batches were unsegmented, researchers were free to assign multiple codes to any comment. Since the 7- to 9-year-olds' batch was first in line, it was treated as a trial run and Cohen's kappa was not calculated. However, the statistic was obtained for the remaining batches. As shown in Table 7, inter-rater reliability increased from Day 1 to Day 2 but this increase was not linear.

Table 7

Inter-Rater Reliability Results

Day	Age group	Number of comments	% of group	Cohen's kappa
1	7- to 9-year-olds	21	100%	N/A
1	10- to 12-year-olds	35	16%	0.679
1	13- to 15-year-olds	20	7%	0.612
2	13- to 15-year-olds	35	13%	0.789
2	16- to 18-year-olds	50	23%	0.761

One week elapsed between Day 2 and Day 3, during which time the author created the codebook with definitions and examples of codes from the actual data set. In addition, a sixth, larger batch of comments was compiled. This final batch consisted of 90 randomly selected comments, or 10% of the total number of comments, which was achieved by feeding case numbers of not-yet-coded comments from across the data set into Google Sheet's Random Generator Add-on. This yielded a batch with comments from every age group except the 7- to 9-year olds, as these had already been coded on Day 1.

While a reasonable degree of inter-rater reliability had been attained on Days 1 and 2, to ensure greater precision the author decided to further prepare the batch by segmenting comments that contained more than one main idea. To do so, comments with presumed multiple codes were highlighted in grey and their constituent segments placed beneath them on separate rows (see the Codebook in Appendix C for an example). As a last measure, age group identifications were removed, and the finalised batch was emailed to a more experienced research member at Queen's University, along with the finished codebook. After coding the batch separately, the researcher's codes were compared to those of the author. This time a Cohen's kappa of .824 was

obtained. After presenting the results to the full research team, the author was granted permission to code the rest of the comments on his own.

Stage 3: Individual coding. The final stage involved the author coding each comment in the filtered data set, segmenting comments where necessary.

Overview of Results Chapters

In the following two chapters, the results for both the closed-ended and open-ended questions are presented. In Chapter 4, the responses to the closed-ended questions are described through the examination of multivariate analyses, univariate analyses, polynomial contrasts, and discriminant function analyses. In Chapter 5, the responses to the open-ended question are analysed by age group and the relative salience of themes and their constituent categories.

Chapter 4: Results for Closed-Ended Questions

Multivariate Analysis of Variance (MANOVA)

A one-way multivariate analysis of variance was run to determine the effect of age groupings on musical self-regulation. The dependent variables comprised eighteen composite scales developed through factor analyses for the student data (Upitis, Abrami, Varela, King, et al., 2016). These included the following: four factors pertaining to *motivation* (extrinsic motivation, intrinsic motivation, musical skill development, and lifelong music-making skills); two factors relating to use of *practice components* (technical/exam work and aural abilities); five *self-regulation* factors (being motivated to practise well, poor motivation regarding practising, planning combined with effective practice strategies, effective methods for dealing with mistakes, and reflecting with effective practice strategies); *enjoyment* of music learning; *persistence*; three factors dealing with perceptions of *performance skills* (performing for others, aural skills, and practising skills); and two factors relating to *self-efficacy* (personal competency beliefs and externally influenced beliefs). For the list of factors, as well as their constituent items and relevant descriptive statistics, see Table D1 in the Appendix.

Respondents were classified into seven age groupings: 7–9 years old; 10–12 years old; 13–15 years old; 16–18 years old; 19–21 years old; 22–24 years old; and 25-and-over; frequencies are provided in Table 8.

Table 8

Frequencies for Age Groupings

Age groups	Frequency	%	Valid %	Cumulative %
7–9 years old	91	2.3	2.3	2.3
10–12 years old	922	23.5	23.5	25.8
13–15 years old	1,252	31.9	31.9	57.8

Table 8 Continued

Age groups	Frequency	%	Valid %	Cumulative %
16–18 years old	1,021	26.0	26.0	83.8
19–21 years old	260	6.6	6.6	90.5
22–24 years old	84	2.1	2.1	92.6
25-and-over	290	7.4	7.4	100.0
Total	3,920	100.0	100.0	

Preliminary assumption checking revealed that the data was reasonably normally distributed, as assessed by frequency distribution histograms and P-P plots. Although four variables (intrinsic motivation, persistence, personal competency beliefs, and externally influenced beliefs) were flagged as clearly negatively skewed, this was not deemed a major concern since the central limit theorem suggests the sample sizes were large enough that the sampling distributions of means should tend towards normality (Field, 2009; Ghasemi & Zahediasl, 2012; Tabachnick & Fidell, 2013; Urdan, 2011).

Univariate outliers (n = 811, M = 45.06, SD = 51.61) were identified via boxplots and Tukey's definition of outliers whereby values falling beyond the following parameters are classified as (i) outliers and (ii) extreme outliers respectively: (i) 25th percentile – 1.5 × Interquartile range | 75th percentile + 1.5 × Interquartile range and (ii) 25th percentile – 3 × interquartile range | 75th percentile + 3 × interquartile range. Three variables (lifelong music-making skills, poor motivation to practise well, and perception of aural skills) were free from univariate outliers, whereas the relatively large number of outliers were distributed across the 15 remaining variables, were typically non-extreme, and did not represent more than 5.23% of the data set for any one variable. Because the maximum value of any variable was only 49 and rigorous missing data analysis ruled out the likelihood of erroneous data entry or missing values

specification, the decision to include univariate outliers for this analysis was deemed justifiable. Multivariate outliers (n = 64) were identified, as assessed by Mahalanobis distance (p > .001).

Scatterplots revealed reasonably linear relationships between the dependent variables across each level of age grouping. Pearson correlation coefficients were examined and multicollinearity was not considered an issue as the 153 correlations were moderate, with a median correlation of r = .26, p < .05 (interdecile range .0405–.4915). There was homogeneity of variances among 9 variables, as assessed by Levene's Test of Homogeneity of Variance (p > .05), therefore a decision was made to adopt a stricter α level of .01 when interpreting the MANOVA results (Tabachnick & Fidell, 2013). Finally, homogeneity of variance-covariance matrices was assessed by Box's M test. Because Box's M was significant at p < .001, multivariate significance were assessed using Pillai's more stringent criterion rather than Wilks' lambda, which is generally recommended with unequal sample sizes.

In descending order, music students' mean scores were as follows: intrinsic motivation (M = 5.91, SD = 1.11); personal competency beliefs (M = 5.65, SD = 1.07); externally influenced beliefs (M = 5.49, SD = 1.20); musical skill development (M = 5.48, SD = 1.11); practising skills (M = 5.44, SD = 0.85); persistence (M = 5.14, SD = 1.47); enjoyment of music learning (M = 5.04, SD = 1.06); planning combined with effective practice strategies (M = 4.93, SD = 1.09); performing for others (M = 4.80, SD = 1.38); motivated to practise well (M = 4.76, SD = 1.25); effective methods for dealing with mistakes (M = 4.37, SD = 0.96); technical/exam components (M = 4.26, SD = 1.13); lifelong music-making skills (M = 4.25, SD = 1.51); aural abilities (M = 4.20, SD = 1.54); poor motivation regarding practising (M = 4.19, SD = 1.28); extrinsic motivation (M = 4.10, SD = 1.40); employing aural abilities (M = 3.46, SD = 1.44); and reflecting with effective practice strategies (M = 3.46, SD = 1.14).

As shown in Table 9, the differences between the age groupings on the combined dependent variables proved statistically significant, $F(108, 23406) = 18.745$, $p < .001$; Pillai's Trace = .478; $\eta_p^2 = .080$.

Table 9

MANOVA Results for the Original Dependent Variables

Effect		Value	*F*	*df*	Error *df*	*p*	η_p^2
Intercept	Pillai's Trace	0.972	7466.109	18	3896	0.000	0.972
	Wilks' Lambda	0.028	7466.109	18	3896	0.000	0.972
	Hotelling's Trace	34.494	7466.109	18	3896	0.000	0.972
	Roy's Largest Root	34.494	7466.109	18	3896	0.000	0.972
Age_grp_3	Pillai's Trace	0.478	18.745	108	23406	0.000	0.08
	Wilks' Lambda	0.577	20.86	108	22335.393	0.000	0.088
	Hotelling's Trace	0.643	23.189	108	23366	0.000	0.097
	Roy's Largest Root	0.462	100.088	18	3901	0.000	0.316

For comparative purposes, two additional MANOVAs were conducted: one with both univariate and multivariate outliers removed, another with multivariate outliers removed but univariate outliers replaced with scores two standard deviations from their respective age group mean. With outliers removed, the differences between age groupings remained statistically significant, $F(108, 20046) = 18.214$, $p < .001$; Pillai's Trace = .536, $\eta_p^2 = .089$ (see Table 10). Similarly, with univariate outliers adjusted, there were no substantive differences in the results, $F(108, 23136) = 19.706$, $p < .001$; Pillai's Trace = .505, $\eta_p^2 = .084$ (see Table 11).

Table 10

MANOVA Results with Univariate and Multivariate Outliers Removed

Effect		Value	*F*	*df*	Error *df*	*p*	η_p^2
Intercept	Pillai's Trace	0.979	8594.262	18	3336	0.000	0.979
	Wilks' Lambda	0.021	8594.262	18	3336	0.000	0.979
	Hotelling's Trace	46.372	8594.262	18	3336	0.000	0.979
	Roy's Largest Root	46.372	8594.262	18	3336	0.000	0.979
Age_grp_3	Pillai's Trace	0.536	18.214	108	20046	0.000	0.089
	Wilks' Lambda	0.531	20.65	108	19125.999	0.000	0.1
	Hotelling's Trace	0.758	23.397	108	20006	0.000	0.112
	Roy's Largest Root	0.551	102.261	18	3341	0.000	0.355

Table 11

MANOVA Results with Univariate Outliers Changed and Multivariate Outliers Removed

Effect		Value	*F*	*df*	Error *df*	*p*	η_p^2
Intercept	Pillai's Trace	0.975	8369.815	18	3851	0.000	0.975
	Wilks' Lambda	0.025	8369.815	18	3851	0.000	0.975
	Hotelling's Trace	39.121	8369.815	18	3851	0.000	0.975
	Roy's Largest Root	39.121	8369.815	18	3851	0.000	0.975
Age_grp_3	Pillai's Trace	0.505	19.706	108	23136	0.000	0.084
	Wilks' Lambda	0.555	22.13	108	22077.496	0.000	0.094
	Hotelling's Trace	0.697	24.829	108	23096	0.000	0.104
	Roy's Largest Root	0.504	107.887	18	3856	0.000	0.335

Follow-up univariate ANOVAs

Using a Bonferroni α-level adjustment of .0027 and Welch's *F* where the homogeneity of variances assumption had been violated, follow-up univariate ANOVAs on the original dataset showed that differences in scores between age groupings were mostly statistically significant: extrinsic motivation ($F(6, 3913) = 99.866$, $p < .001$, $\eta_p^2 = .133$); intrinsic motivation (*Welch's* $F(6, 550.828) = 37.993$, $p < .001$, est. $\omega^2 = .054$); lifelong music-making skills (*Welch's* $F(6, 528.733) = 4.731$, $p < .001$, est. $\omega^2 = .006$); technical/exam components ($F(6, 3913) = 16.497$, $p < .001$, $\eta_p^2 = .025$); employing aural abilities (*Welch's* $F(6, 533.45) = 18.223$, $p < .001$, est. $\omega^2 = .026$); being motivated to practise well (*Welch's* $F(6, 541.249) = 14.449$, $p < .001$, est. $\omega^2 = .020$); poor motivation regarding practising ($F(6, 3913) = 20.301$, $p < .001$, $\eta_p^2 = .030$); planning combined with effective practice strategies (*Welch's* $F(6, 533.638) = 18.290$, $p < .001$, est. $\omega^2 = .026$); effective methods for dealing with mistakes ($F(6, 3913) = 7.361$, $p < .001$, $\eta_p^2 = .011$); reflecting with effective practice strategies ($F(6, 3913) = 28.810$, $p < .042$, $\eta_p^2 = .041$); enjoyment of music learning (*Welch's* $F(6, 539.556) = 26.793$, $p < .001$, est. $\omega^2 = .038$); persistence (*Welch's* $F(6, 536.826) = 34.944$, $p < .001$, est. $\omega^2 = .049$); performing for others (*Welch's* $F(6, 537.121) = 47.380$, $p < .001$, est. $\omega^2 = .066$); aural skills (*Welch's* $F(6, 531.187) = 29.869$, $p < .001$, est. $\omega^2 = .042$); practising skills ($F(6, 3913) = 5.891$, $p < .001$, $\eta_p^2 = .009$); personal competency beliefs ($F(6, 3913) = 7.515$, $p < .001$, $\eta_p^2 = .011$); and externally influenced beliefs ($F(6, 3913) = 2.369$, $p < .001$, $\eta_p^2 = .004$). Nevertheless, differences in scores between age groupings were not statistically significant for either musical skill development or externally influenced beliefs.

Linear and Non-Linear Trends

Means Across Age Groups. The first method used to determine whether there were any indications of linearity or non-linearity across age groups was the calculation of means and

standard deviations for each of the 18 dependent variables (see Table 12). Five of the 18 dependent variables increased linearly with age, namely, (a) intrinsic motivation, (b) motivated to practise well, (c) planning and effective practising strategies, (d) reflecting and effective practising strategies, and (e) persistence. Of these, the variable 'motivated to practise well' exhibited the most clear and proportionate linear trend. A further five variables decreased with age. These variables were (a) extrinsic motivation, (b) employing aural abilities, (c) effective methods for dealing with mistakes, (d) performing for others, and (e) perception of aural skills. Both extrinsic motivation and employing aural abilities displayed clear and proportionate linear trends. The mapping of the means revealed that the following four variables could be described as non-linear. Both technical/exam components and enjoyment were quadratic, poor motivation regarding practising was cubic, and the personal competency beliefs variable was quartic. The remaining variables did not display clear trends. The implications for these various trends are discussed fully in the final chapter.

Table 12

Means and Standard Deviations for the 18 Dependent Variables

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Extrinsic motivation	7 to 9 years old	91	28.3736	7.67485	.80454	26.7753	29.9720	13.00	42.00
	10 to 12 years old	922	27.0510	8.12956	.26773	26.5255	27.5764	6.00	42.00
	13 to 15 years old	1,252	26.2716	7.55992	.21366	25.8524	26.6907	6.00	42.00
	16 to 18 years old	1,021	23.4564	7.77019	.24317	22.9792	23.9336	6.00	42.00
	19 to 21 years old	260	21.7654	7.90061	.48998	20.8005	22.7302	6.00	42.00
	22 to 24 years old	84	20.7143	8.19281	.89391	18.9363	22.4922	6.00	42.00
	25 years and older	290	15.9862	7.80381	.45826	15.0843	16.8881	6.00	42.00
	Total	3,920	24.5916	8.37881	.13383	24.3292	24.8540	6.00	42.00
Intrinsic motivation	7 to 9 years old	91	27.2308	6.57111	.68884	25.8623	28.5993	5.00	35.00
	10 to 12 years old	922	28.3460	5.85201	.19273	27.9678	28.7242	5.00	35.00
	13 to 15 years old	1,252	29.1653	5.73215	.16200	28.8475	29.4832	5.00	35.00
	16 to 18 years old	1,021	30.1136	5.10563	.15979	29.8001	30.4272	6.00	35.00
	19 to 21 years old	260	30.8692	5.06619	.31419	30.2505	31.4879	5.00	35.00
	22 to 24 years old	84	32.4762	3.05955	.33382	31.8122	33.1402	19.00	35.00
	25 years and older	290	31.7931	4.23431	.24865	31.3037	32.2825	13.00	35.00
	Total	3,920	29.5531	5.54949	.08864	29.3793	29.7268	5.00	35.00

Table 12 Continued

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Internalised motivation: Musical skills	7 to 9 years old	91	31.4615	7.43312	.77920	29.9135	33.0096	6.00	42.00
	10 to 12 years old	922	33.0152	6.90008	.22724	32.5692	33.4612	6.00	42.00
	13 to 15 years old	1,252	32.9297	6.57453	.18581	32.5652	33.2942	6.00	42.00
	16 to 18 years old	1,021	32.4339	6.44561	.20172	32.0381	32.8297	6.00	42.00
	19 to 21 years old	260	33.0308	6.83952	.42417	32.1955	33.8660	6.00	42.00
	22 to 24 years old	84	33.7143	5.58305	.60916	32.5027	34.9259	17.00	42.00
	25 years and older	290	33.9448	6.88339	.40421	33.1493	34.7404	7.00	42.00
	Total	3,920	32.8852	6.67223	.10657	32.6763	33.0941	6.00	42.00
Internalised motivation: Lifelong music-making skills	7 to 9 years old	91	15.8571	6.30797	.66125	14.5434	17.1708	4.00	28.00
	10 to 12 years old	922	17.1725	5.80198	.19108	16.7975	17.5474	4.00	28.00
	13 to 15 years old	1,252	17.0535	5.81182	.16425	16.7313	17.3758	4.00	28.00
	16 to 18 years old	1,021	16.8883	6.00402	.18790	16.5196	17.2571	4.00	28.00
	19 to 21 years old	260	18.2308	6.20193	.38463	17.4734	18.9882	4.00	28.00
	22 to 24 years old	84	18.3333	6.36885	.69490	16.9512	19.7155	5.00	28.00
	25 years and older	290	15.6310	7.17732	.42147	14.8015	16.4606	4.00	28.00
	Total	3,920	17.0110	6.04218	.09651	16.8218	17.2002	4.00	28.00
Practice components: Technical /exam-related	7 to 9 years old	91	9.3626	2.63530	.27625	8.8138	9.9115	3.00	15.00
	10 to 12 years old	922	9.6584	2.43111	.08006	9.5012	9.8155	3.00	15.00
	13 to 15 years old	1,252	9.1046	2.37918	.06724	8.9727	9.2365	3.00	15.00
	16 to 18 years old	1,021	8.7150	2.36893	.07414	8.5695	8.8605	3.00	15.00
	19 to 21 years old	260	8.6385	2.36285	.14654	8.3499	8.9270	3.00	15.00
	22 to 24 years old	84	8.7024	2.23757	.24414	8.2168	9.1880	3.00	15.00
	25 years and older	290	9.5414	2.38798	.14023	9.2654	9.8174	3.00	15.00
	Total	3,920	9.1321	2.41991	.03865	9.0564	9.2079	3.00	15.00

Table 12 Continued

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Practice components: Employing aural abilities	7 to 9 years old	91	5.4945	1.87008	.19604	5.1050	5.8840	2.00	10.00
	10 to 12 years old	922	5.2842	1.96758	.06480	5.1570	5.4113	2.00	10.00
	13 to 15 years old	1,252	5.0775	2.00668	.05671	4.9662	5.1887	2.00	10.00
	16 to 18 years old	1,021	4.7806	2.05962	.06446	4.6541	4.9071	2.00	10.00
	19 to 21 years old	260	4.6846	2.38895	.14816	4.3929	4.9764	2.00	10.00
	22 to 24 years old	84	4.3333	2.00802	.21909	3.8976	4.7691	2.00	10.00
	25 years and older	290	4.1414	1.89810	.11146	3.9220	4.3608	2.00	10.00
	Total	3,920	4.9472	2.05301	.03279	4.8829	5.0115	2.00	10.00
Self-regulation: Motivated to practise well	7 to 9 years old	91	13.7692	3.79496	.39782	12.9789	14.5596	5.00	21.00
	10 to 12 years old	922	14.0043	3.89771	.12836	13.7524	14.2563	3.00	21.00
	13 to 15 years old	1,252	14.0575	3.80078	.10742	13.8468	14.2682	3.00	21.00
	16 to 18 years old	1,021	14.2635	3.67532	.11502	14.0378	14.4892	3.00	21.00
	19 to 21 years old	260	14.6077	3.48188	.21594	14.1825	15.0329	3.00	21.00
	22 to 24 years old	84	15.4048	2.82467	.30820	14.7918	16.0178	8.00	21.00
	25 years and older	290	15.7897	3.25511	.19115	15.4134	16.1659	3.00	21.00
	Total	3,920	14.2855	3.74464	.05981	14.1682	14.4027	3.00	21.00
Self-regulation: Poorly motivated to practise	7 to 9 years old	91	16.7912	5.29888	.55547	15.6877	17.8948	6.00	26.00
	10 to 12 years old	922	16.3959	5.11947	.16860	16.0650	16.7268	4.00	28.00
	13 to 15 years old	1,252	17.2660	4.98025	.14075	16.9898	17.5421	4.00	28.00
	16 to 18 years old	1,021	17.2929	4.88971	.15303	16.9926	17.5931	4.00	28.00
	19 to 21 years old	260	17.1346	4.96874	.30815	16.5278	17.7414	4.00	28.00
	22 to 24 years old	84	15.9524	5.28901	.57708	14.8046	17.1002	5.00	28.00
	25 years and older	290	13.9690	5.33018	.31300	13.3529	14.5850	4.00	28.00
	Total	3,920	16.7765	5.10393	.08152	16.6167	16.9364	4.00	28.00

Table 12 Continued

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Self-regulation: Planning/practising strategies	7 to 9 years old	91	22.1099	6.37783	.66858	20.7816	23.4381	5.00	34.00
	10 to 12 years old	922	23.7289	5.53895	.18242	23.3709	24.0868	8.00	35.00
	13 to 15 years old	1,252	24.4321	5.46402	.15442	24.1292	24.7351	5.00	35.00
	16 to 18 years old	1,021	25.1244	5.16865	.16176	24.8070	25.4418	6.00	35.00
	19 to 21 years old	260	25.8154	5.44156	.33747	25.1508	26.4799	5.00	35.00
	22 to 24 years old	84	27.1548	4.78827	.52244	26.1156	28.1939	14.00	35.00
	25 years and older	290	26.1345	4.94249	.29023	25.5632	26.7057	14.00	35.00
	Total	3,920	24.6691	5.44812	.08702	24.4985	24.8397	5.00	35.00
Self-regulation: Dealing with mistakes	7 to 9 years old	91	9.0659	2.05914	.21586	8.6371	9.4948	2.00	14.00
	10 to 12 years old	922	8.9675	1.89606	.06244	8.8449	9.0900	2.00	14.00
	13 to 15 years old	1,252	8.8411	1.91201	.05404	8.7350	8.9471	2.00	14.00
	16 to 18 years old	1,021	8.6278	1.90010	.05947	8.5111	8.7445	2.00	14.00
	19 to 21 years old	260	8.3846	1.84907	.11467	8.1588	8.6104	2.00	14.00
	22 to 24 years old	84	8.5238	1.61675	.17640	8.1730	8.8747	5.00	13.00
	25 years and older	290	8.3586	2.10182	.12342	8.1157	8.6015	2.00	14.00
	Total	3,920	8.7477	1.92282	.03071	8.6875	8.8079	2.00	14.00
Self-regulation: Reflecting/practising strategies	7 to 9 years old	91	20.2198	7.52153	.78847	18.6533	21.7862	7.00	42.00
	10 to 12 years old	922	22.4924	8.14569	.26826	21.9659	23.0189	7.00	49.00
	13 to 15 years old	1,252	23.7348	7.70613	.21779	23.3076	24.1621	7.00	47.00
	16 to 18 years old	1,021	25.0098	7.70930	.24127	24.5364	25.4832	7.00	49.00
	19 to 21 years old	260	26.3154	7.67691	.47610	25.3779	27.2529	8.00	49.00
	22 to 24 years old	84	28.2738	7.19999	.78558	26.7113	29.8363	7.00	44.00
	25 years and older	290	27.3621	7.79295	.45762	26.4614	28.2628	7.00	49.00
	Total	3,920	24.2298	7.96708	.12725	23.9804	24.4793	7.00	49.00

Table 12 Continued

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Enjoyment	7 to 9 years old	91	31.5714	6.57460	.68921	30.2022	32.9407	6.00	42.00
	10 to 12 years old	922	30.5380	6.55364	.21583	30.1144	30.9615	6.00	42.00
	13 to 15 years old	1,252	29.4257	6.45269	.18236	29.0679	29.7835	6.00	42.00
	16 to 18 years old	1,021	29.5945	5.97315	.18694	29.2277	29.9613	6.00	42.00
	19 to 21 years old	260	30.7269	6.05050	.37524	29.9880	31.4658	6.00	42.00
	22 to 24 years old	84	31.8333	4.85410	.52963	30.7799	32.8867	19.00	41.00
	25 years and older	290	33.6586	5.44593	.31980	33.0292	34.2880	12.00	42.00
	Total	3,920	30.2321	6.33139	.10112	30.0339	30.4304	6.00	42.00
Persistence	7 to 9 years old	91	27.1978	9.82539	1.02998	25.1516	29.2440	6.00	42.00
	10 to 12 years old	922	28.2560	9.36691	.30848	27.6506	28.8614	6.00	42.00
	13 to 15 years old	1,252	30.4792	8.61906	.24359	30.0013	30.9571	6.00	42.00
	16 to 18 years old	1,021	32.8080	7.90993	.24755	32.3223	33.2938	6.00	42.00
	19 to 21 years old	260	33.8077	8.16774	.50654	32.8102	34.8052	6.00	42.00
	22 to 24 years old	84	34.9167	6.50340	.70958	33.5053	36.3280	19.00	42.00
	25 years and older	290	30.9828	8.88273	.52161	29.9561	32.0094	6.00	42.00
	Total	3,920	30.8398	8.82210	.14091	30.5635	31.1161	6.00	42.00
Performance skills: Performing for others	7 to 9 years old	91	33.8352	6.06129	.63540	32.5728	35.0975	20.00	42.00
	10 to 12 years old	922	31.9002	7.29485	.24024	31.4287	32.3717	6.00	42.00
	13 to 15 years old	1,252	28.0048	8.29107	.23432	27.5451	28.4645	6.00	42.00
	16 to 18 years old	1,021	27.5397	8.31698	.26029	27.0289	28.0504	6.00	42.00
	19 to 21 years old	260	27.1346	8.12458	.50387	26.1424	28.1268	6.00	42.00
	22 to 24 years old	84	27.2738	8.84042	.96457	25.3553	29.1923	6.00	42.00
	25 years and older	290	27.0759	8.10193	.47576	26.1395	28.0123	7.00	42.00
	Total	3,920	28.7931	8.25072	.13178	28.5347	29.0515	6.00	42.00

Table 12 Continued

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Performance skills: Ear skills	7 to 9 years old	91	13.9890	4.62480	.48481	13.0258	14.9522	3.00	21.00
	10 to 12 years old	922	13.9707	4.26462	.14045	13.6951	14.2464	3.00	21.00
	13 to 15 years old	1,252	12.7548	4.44720	.12569	12.5082	13.0014	3.00	21.00
	16 to 18 years old	1,021	11.7444	4.73144	.14807	11.4538	12.0349	3.00	21.00
	19 to 21 years old	260	11.8692	4.89407	.30352	11.2716	12.4669	3.00	21.00
	22 to 24 years old	84	11.3690	4.55166	.49663	10.3813	12.3568	3.00	21.00
	25 years and older	290	11.0759	4.66835	.27414	10.5363	11.6154	3.00	21.00
	Total	3,920	12.5936	4.63238	.07399	12.4486	12.7387	3.00	21.00
Performance skills: Practising skills	7 to 9 years old	91	38.2967	6.94501	.72804	36.8503	39.7431	7.00	49.00
	10 to 12 years old	922	39.0022	5.69911	.18769	38.6338	39.3705	17.00	49.00
	13 to 15 years old	1,252	37.9345	5.96557	.16860	37.6037	38.2653	7.00	49.00
	16 to 18 years old	1,021	37.5837	6.03552	.18889	37.2131	37.9544	7.00	49.00
	19 to 21 years old	260	37.7308	5.72913	.35531	37.0311	38.4304	7.00	49.00
	22 to 24 years old	84	38.6667	5.49114	.59913	37.4750	39.8583	25.00	49.00
	25 years and older	290	37.4586	5.93331	.34842	36.7729	38.1444	14.00	49.00
	Total	3,920	38.0696	5.94154	.09490	37.8836	38.2557	7.00	49.00
Self-efficacy: Personal competency beliefs	7 to 9 years old	91	28.7033	5.97680	.62654	27.4586	29.9480	5.00	35.00
	10 to 12 years old	922	29.1085	5.02687	.16555	28.7836	29.4334	10.00	35.00
	13 to 15 years old	1,252	28.1230	5.31254	.15014	27.8284	28.4176	5.00	35.00
	16 to 18 years old	1,021	27.8208	5.41351	.16942	27.4883	28.1532	5.00	35.00
	19 to 21 years old	260	28.0923	5.40834	.33541	27.4318	28.7528	8.00	35.00
	22 to 24 years old	84	29.1310	4.50911	.49198	28.1524	30.1095	18.00	35.00
	25 years and older	290	27.2448	5.68724	.33397	26.5875	27.9021	9.00	35.00
	Total	3,920	28.2441	5.33562	.08522	28.0771	28.4112	5.00	35.00

Table 12 Continued

						95% C.I. for Mean			
		N	*M*	*SD*	*SE*	Lower	Upper	Min	Max
Self-efficacy: Externally influenced beliefs	7 to 9 years old	91	16.5495	3.85361	.40397	15.7469	17.3520	3.00	21.00
	10 to 12 years old	922	16.4241	3.61881	.11918	16.1902	16.6580	3.00	21.00
	13 to 15 years old	1,252	16.4425	3.60975	.10202	16.2423	16.6426	3.00	21.00
	16 to 18 years old	1,021	16.5906	3.59614	.11254	16.3698	16.8114	3.00	21.00
	19 to 21 years old	260	16.7115	3.49371	.21667	16.2849	17.1382	3.00	21.00
	22 to 24 years old	84	17.1905	2.84320	.31022	16.5735	17.8075	12.00	21.00
	25 years and older	290	15.8621	3.72334	.21864	15.4317	16.2924	3.00	21.00
	Total	3,920	16.4702	3.60433	.05757	16.3573	16.5830	3.00	21.00

Polynomial Contrasts. Polynomial contrasts revealed statistically significant linear trends for 10 of the dependent variables. Thus as age increased, scores on five variables also increased: intrinsic motivation, $F(1, 3913) = 101.396$, $p < .001$, $\eta_p^2 = .025$; motivated to practise well, $F(1, 3913) = 34.413$, $p < .001$, $\eta_p^2 = .009$; planning and effective practising strategies, $F(1, 3913) = 76.466$, $p < .001$, $\eta_p^2 = .019$; reflecting and effective practising strategies, $F(1, 3913) = 111.408$, $p < .001$, $\eta_p^2 = .028$; persistence, $F(1, 3913) = 56.761$, $< .001$, $\eta_p^2 = .014$. By contrast, as age increased, scores on five other variables actually decreased: extrinsic motivation, $F(1, 3913) = 259.634$, $p < .001$, $\eta_p^2 = .062$; employing aural abilities, $F(1, 3913) = 52.606$, $p < .001$, $\eta_p^2 = .013$; effective methods for dealing with mistakes, $F(1, 3913) = 101.396$, $p < .001$, $\eta_p^2 = .025$; performing for others, $F(1, 3913) = 77.110$, $p < .001$, $\eta_p^2 = .019$; and perception of aural skills, $F(1, 3913) = 57.317$, $p < .001$, $\eta_p^2 = .014$. Among these, clear and proportionate linear trends were however only observed for motivated to practise well, extrinsic motivation, and employing aural abilities.

In addition, polynomial contrasts revealed significant non-linear trends: quadratic for technical/exam components, $F(1, 3913) = 17.279$, $p < .001$, $\eta_p^2 = .004$ and enjoyment $F(1, 3913) = 45.923$, $p < .001$, $\eta_p^2 = .012$; cubic for poor motivation regarding practising, $F(1, 3913) = 6.224$, $p < .001$, $\eta_p^2 = .002$; and quartic for personal competency beliefs $F(1, 3913) = 12.258$, $p < .001$, $\eta_p^2 = .003$. Nevertheless, no significant trends were observed for four variables, namely musical skill development, lifelong music-making skills, practice skills, and externally influenced beliefs, in line with the results obtained from an examination of the means.

Discriminant Function Analysis (DFA)

The original MANOVA was followed up with a discriminant function analysis using the 18 dependent variables as predictors of membership in age groupings. Since DFA and

MANOVA share the same assumptions, no additional checking was necessary. Six discriminant functions were calculated. When combined, the six discriminant functions significantly differentiated the age groupings, $\Lambda = .577$, $\chi^2(108) = 2151.447$, $p < .001$. Successive removal of functions revealed that Function 2, 3, and 4 also significantly differentiated age groups: Function 2, $\Lambda = .843$, $\chi^2(85) = 668.200$, $p < .001$; Function 3, $\Lambda = .968$, $\chi^2(64) = 127.629$, $p < .001$; and Function 4, $\Lambda = .982$, $\chi^2(45) = 69.366$, $p < .001$. However, removal of Functions 1 through 4 revealed that neither Function 5 nor Function 6 significantly differentiated age groupings: Function 5, $\Lambda = .994$, $\chi^2(28) = 22.766$, $p < .001$; while Function 6, $\Lambda = .998$, $\chi^2(13) = 7.690$, $p < .001$.

Although the first four functions proved statistically significant, Functions 1 and 2 accounted for most of the variance. Function 1 explained 71.8% of the between-group variability, canonical $R^2 = .316$, while Function 2 explained 23.1%, canonical $R^2 = .129$. In contrast, Function 3 explained 2.3% of the between-group variability, canonical $R^2 = .015$, and Function 4 explained only 1.9%, canonical $R^2 = .012$. However, as the squared canonical correlations suggest, the functions' effect sizes were at best moderate to weak: Functions 1 and 2 respectively accounted for about 32% and 13% of the total relationship between predictors and age groupings, whereas Functions 3 and 4 merely accounted for .02% and .01%. Therefore, only Functions 1 and 2 were considered for further inspection.

Using .30 as a cut-off point, examination of the structure loading matrix of correlations (Table 13) suggested that the primary predictor in Function 1 was extrinsic motivation, with performing for others, perception of aural skills, and reflecting with effective practice strategies (negative loading) also proving important in maximally separating the groups. For Function 2, however, the most likely primary predictors were enjoyment (negative loading), poorly

motivated to practise well, and extrinsic motivation, with technical/exam work (negative loading) contributing to a lesser degree.

Table 13

Structure Loading Matrix of Correlations between Predictor Variables and Discriminant Functions

Predictor variable	Discriminant Functions					
	1	2	3	4	5	6
Extrinsic motivation	.518*	0.438	-0.106	0.118	-0.194	0.496
Reflecting with effective practice strategies	-.303*	-0.051	0.099	0.302	0.029	0.289
Employing aural abilities	.229*	0.108	0.016	0.009	-0.165	-0.129
Enjoyment	-0.083	-.445*	0.248	-0.02	-0.234	0.4
Poorly motivated to practise well	0.061	.439*	0.084	-0.155	-0.274	-0.227
Technical/exam work	0.147	-.300*	-0.224	0.294	0.184	-0.109
Performing for others	0.318	-0.231	.611*	-0.089	0.444	-0.032
Persistence: playing	-0.293	0.265	.380*	-0.031	0.041	0.152
Lifelong music-making skills	0.015	0.132	0.403	.516*	-0.345	0.144
Musical skill development	-0.028	-0.11	-0.13	.418*	-0.099	0.17
Planning with effective practice strategies	-0.239	-0.006	0.099	.338*	0.103	0.316
Practising skills	0.112	-0.07	0.239	.329*	0.224	0.303
Aural skills	0.305	-0.057	0.129	.310*	-0.159	-0.048
Personal competency beliefs	0.127	-0.027	0.373	0.335	0.152	.498*
Intrinsic motivation	-0.299	-0.067	0.122	0.19	0.068	.443*
Externally influenced beliefs	0.001	0.113	0.3	0.033	0.011	.439*
Motivated to practise well	-0.153	-0.206	0.002	0.11	-0.014	.381*
Effective methods for dealing with mistakes	0.151	0.03	-0.131	0.011	0.161	.326*

Note: Pooled within-groups correlations between discriminating variables and standardised canonical discriminant functions
Variables ordered by absolute size of correlation within function
* Largest absolute correlation between each variable and any discriminant function

The combined-groups plot for the two most powerful discriminant functions (see Figure 2) revealed that Function 1 separated age groupings such that higher discriminant scores were more likely to predict younger learners. Function 2 was less straightforward to interpret as the differences between age groupings were less pronounced.

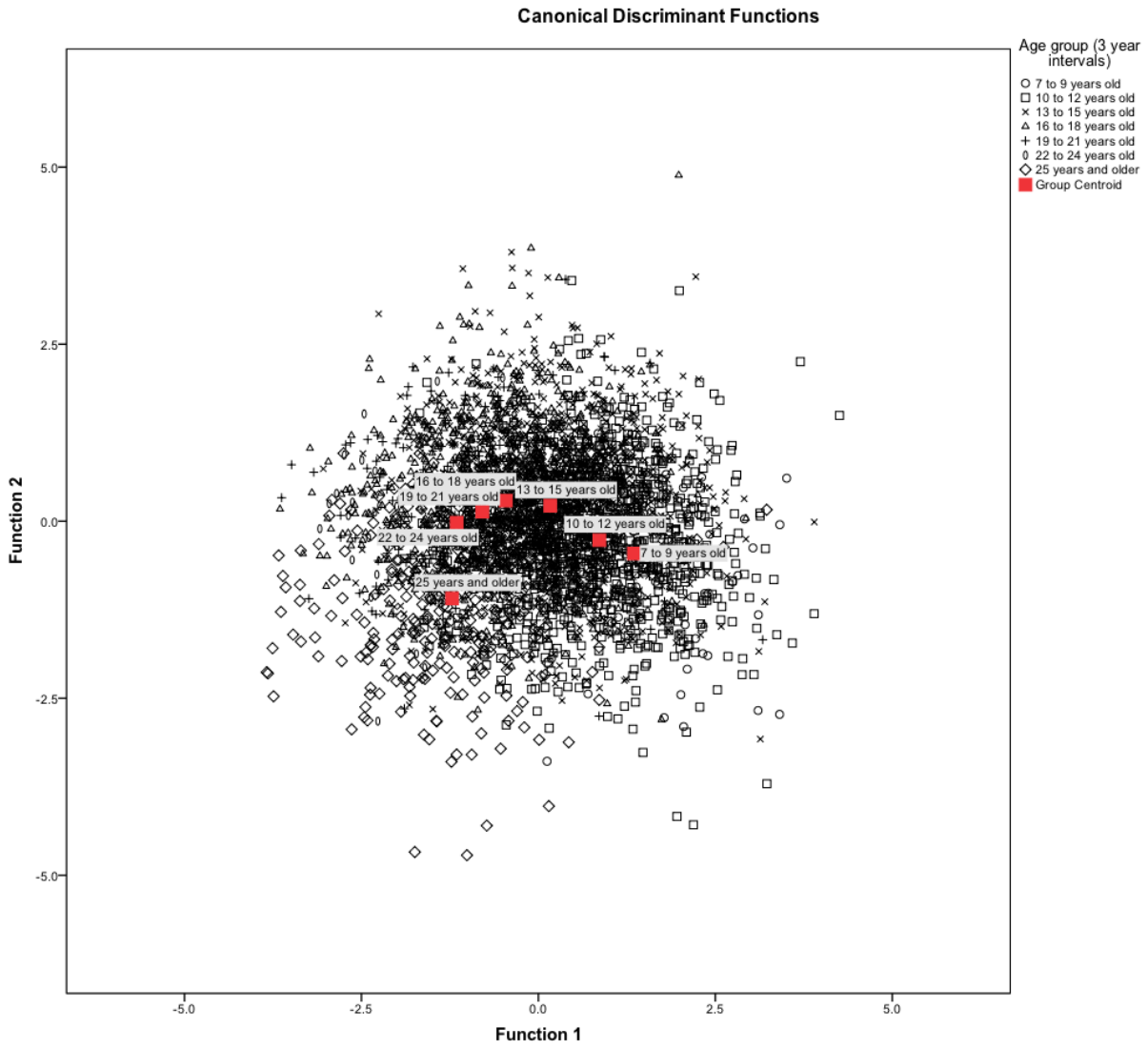

Figure 2. Combined-groups plot showing individual function scores and age-group centroids with respect to the two principal discriminant functions.

Finally, results for the overall classification procedure (Table 14) revealed that only 44.8% of the individuals were correctly classified into their age groupings. Moreover, rates of correct classification rates differed substantially, ranging from 0% to 51.8% for the 22–24 year olds and 10–12 year olds, respectively.

Table 14

Classification Results from Overall Discriminant Function Analysis

		Predicted Group Membership							
	Age group	7–9	10–12	13–15	16–18	19–21	22–24	25+	Total
Count	7–9	1	61	26	3	0	0	0	91
	10–12	2	478	347	74	0	0	21	922
	13–15	1	279	638	304	1	1	28	1252
	16–18	0	107	377	497	3	0	37	1021
	19–21	0	20	72	142	2	1	23	260
	22–24	0	0	19	52	3	0	10	84
	25+	0	22	36	88	1	1	142	290
%	7–9	1.1	67	28.6	3.3	0	0	0	100
	10–12	0.2	51.8	37.6	8	0	0	2.3	100
	13–15	0.1	22.3	51	24.3	0.1	0.1	2.2	100
	16–18	0	10.5	36.9	48.7	0.3	0	3.6	100
	19–21	0	7.7	27.7	54.6	0.8	0.4	8.8	100
	22–24	0	0	22.6	61.9	3.6	0	11.9	100
	25+	0	7.6	12.4	30.3	0.3	0.3	49	100

Note: 44.8% of original grouped cases correctly classified.

Summary of Analyses of Closed-ended Questions

The analyses of the closed-ended questions have built upon the findings of the primary study (Upitis, Abrami, Varela, King, et al., 2016). Using the same factors identified therein, the MANOVAs first of all revealed that musical self-regulation and associated constructs (when considered simultaneously) vary significantly as a function of age grouping. Secondly, the

univariate ANOVAs suggested that with the exception of musical skill development and externally influenced beliefs, each of the derived factors may contribute to these age-related differences. Meanwhile, analyses of trends in mean differences across age groups and polynomial contrasts pointed to an array of linear and non-linear trends. Although several of these, such as the rise in motivation to practise or the fall in extrinsic motivation, proceeded along anticipated paths, others—notably the decrease for employing aural abilities and performing for others—may have given the reader pause for thought. Finally, the Discriminant Function Analysis produced four statistically significant underlying functions. Of these, the first two explained over 90% of the variance, with moderate-to-weak effect sizes. Function 1 suggested that extrinsic motivation, performing for others, perception of aural skills, and reflecting with practice strategies (negative loading) were primary predictors in separating age groups. For Function 2, the primary predictors were enjoyment (negative loading), poorly motivated to practise well, extrinsic motivation, and technical/exam work (negative loading). However, this function's weaker explanatory power suggested it should be interpreted with caution. Collectively, these results lend support to age-related differences in musical self-regulation. They also add to our understanding of how these variables might behave across time. Nevertheless, the findings suggest additional factors may explain these age-related differences, and it is in this vein that the analysis now turns towards the survey's open-ended comments.

Chapter 5: Results for the Open-ended Question

Overview of the Chapter

The following chapter presents the findings for the analysis of the survey's final open-ended question. The chapter opens with a general description of the unfiltered and filtered data sets, moving on to an overview of across-group fluctuations in theme and category sizes. Next, detailed findings for each age group are provided, with themes and respective categories presented in decreasing order of magnitude. Finally, the chapter closes with a summary of the combined across-group findings.

Description of the Unfiltered and Filtered Data Sets

A total of 1,184 individuals provided a comment under the survey's final open-ended item, "Is there anything else you would like to tell us?" This number represented 30.2% of individuals who completed the closed-ended items. Comments ranged in length from one to 277 words ($M = 24.44$, $SD = 32.65$), with the overwhelming majority (82.7%) written by individuals aged between 10 and 18 years old. However, relative to group sizes for the closed-ended questions, the oldest (25 years and over) and youngest (7 to 9 years of age) age groups provided the most comments: 37.9% and 34.1%, respectively.

During the first round of coding, 289 irrelevant or otherwise uncodable comments were removed from the initial data set. Most of these were from individuals aged between 10 and 18 years old ($n = 264$) and typically consisted of 'No' or 'No-type' responses, such as "N/A," "Nope," or "No, there is nothing else I would like to tell you." Similarly excluded were comments in which individuals only gave their name, greeted the survey writers, or provided nonsensical answers, such as "I tried to catch some fog today…I mist."

The filtered data set therefore comprised 896 open-ended comments. This revised number constituted 75.7% of the initial data set, or 22.9% of individuals who completed the closed-ended items. Although the filtering process had a larger impact on teenage groups, the overall distribution of group sizes was similar to that of the initial data set and roughly reflected response rates for the closed-ended items. The filtered data set contained 28,429 words. While the overall range of words per comment remained the same, the average word count per comment increased slightly (M = 31.80, SD = 34.47). Furthermore, although most comments were relatively short, their average length generally increased across age groups, with individuals aged 25 and over tending to write more words per comment (M = 47.55, SD = 45.68). In addition, the proportion of comments yielding multiple coded segments rose from 28.6% (n = 6) for the 7- to 9-year-olds to 58.8% (n = 60) for the 25-and-overs, reflecting the comments' increasing conceptual complexity.

Description of Theme and Category Sizes Across Age Groups

Taking the filtered data set as a whole, the analysis of coded segments (N = 1,595) revealed that the two most frequently recurring themes were 'Self-regulated learning' (n = 539) and 'Music Learning' (n = 411), accounting for almost 60% of the respondents' coded segments. While 'Co-regulation' (n = 205), 'Survey' (n = 181), and 'Socio-contextual factors' (n = 168) also accounted for an appreciable number of segments, the 'Royal Conservatory of Music' contained considerably fewer (n = 91).

Within the six overarching themes, the number of segments per category ranged from just three for 'During' to 330 for 'Motivation' (see Figure 3). Thus, 'Motivation', 'Musical Accomplishments' (n = 257) and 'Reflection' (n = 145) represented the three most frequently mentioned categories, respectively. In contrast, 'Supports: technology (*negative*)' (n = 5),

'Amount Practised: non-SRL' (n = 5), and 'During' (n = 3) were the three least frequently mentioned. Where themes distinguished between positive or negative attitudes, positive segments were only more prominent for 'Co-regulation'. Indeed, in the case of 'Supports: people', positive segments were three times more frequent. However, both 'Survey' and 'Royal Conservatory of Music' contained twice as many negative segments, whereas the valence distribution was balanced almost evenly for 'Socio-contextual factors'.

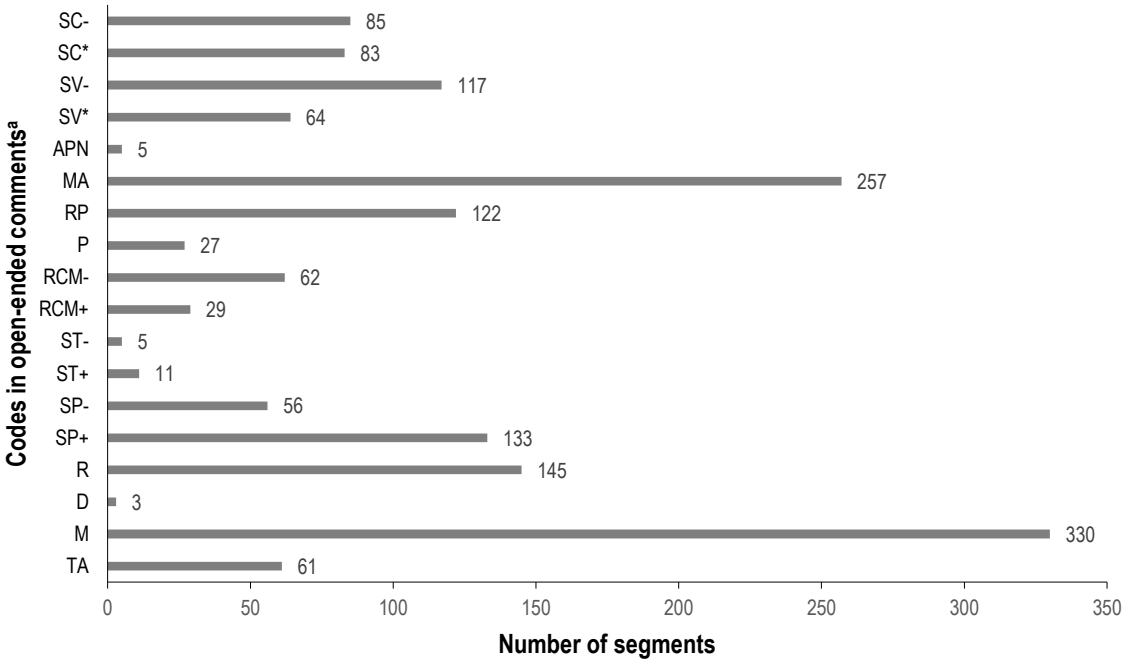

Figure 3. Frequency of coded segments. Codes used[a]: SC- Socio-contextual factors (*negative*); SC* Socio-contextual factors (*positive/neutral*); SV- Survey (*negative*); SV* (*positive/neutral*); APN Amount practised (not self-regulation); MA Musical accomplishments; RP Reasons to Play; P Persistence: RCM- Royal Conservatory of Music (*negative*); RCM+ Royal Conservatory of Music (*positive*); ST- Supports: technology (*negative*); ST+ Supports: technology (*positive*); SP- Supports: people (*negative*); SP+ Supports: people (*positive*); R Reflection; D During; M Motivation; and TA Task analysis.

Due to differences in group sizes, percentages were used to compare the relative (i.e., group-specific) proportion of segments contained within themes. As illustrated in Figure 4, 'Self-regulated learning' and 'Co-regulation' started out as by far the most mentioned themes. However, their trajectories soon diverged following a marked drop in 'Co-regulation' among 10-

to 12-year-olds. Also, while 'Self-regulated learning' was frequently referred to across age groups, 'Music Learning' emerged as an equally major theme from the 16- to 18-year-olds onwards. In contrast, proportions for other themes did not generally vary as much across age groups, with 'Socio-contextual factors' and 'RCM' remaining minor themes throughout as a result. An exception, however, was 'Survey', which increased noticeably as individuals grew older. Lastly, the 22- to 24-year-olds produced slight deviations in trends in all but two themes (i.e., 'Music Learning' and 'Survey'), perhaps most evident with 'Self-regulated learning'.

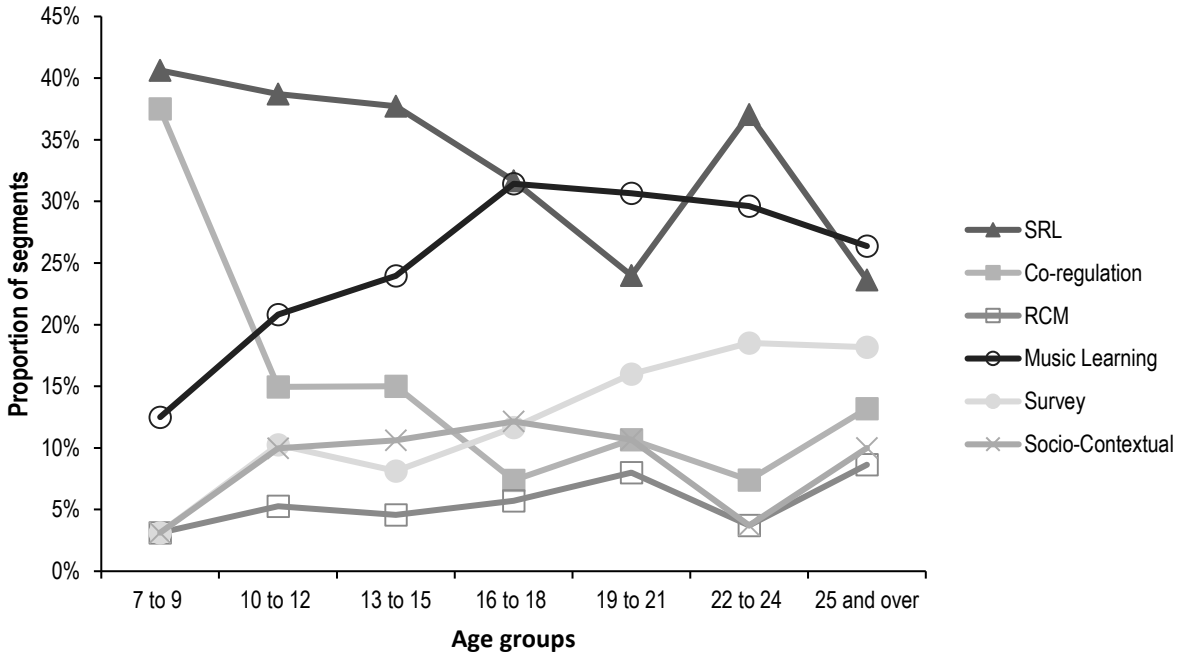

Figure 4. Thematic proportions within age groups.

With regards to categories contained within themes, relative proportions fluctuated somewhat across age groups (see Figures 5 through 10) but rarely beyond a 10% margin. The most pronounced differences, however, were the decrease in 'Supports: people (*positive*)' after the ages of seven to nine (see Figure 7), and the drop in 'Motivation' starting around the ages of 13 to 15 (see Figure 5). In contrast, positive and negative attitudes about the survey generally

increased, although their escalation was less marked. Finally, while both Royal Conservatory of Music categories yielded comparatively low relative proportions throughout, positive attitudes were more common only among the youngest and oldest age groups. The relative strength of each of the themes and their respective categories can be discerned from the collection of figures below. The themes are presented in diminishing level of magnitude.

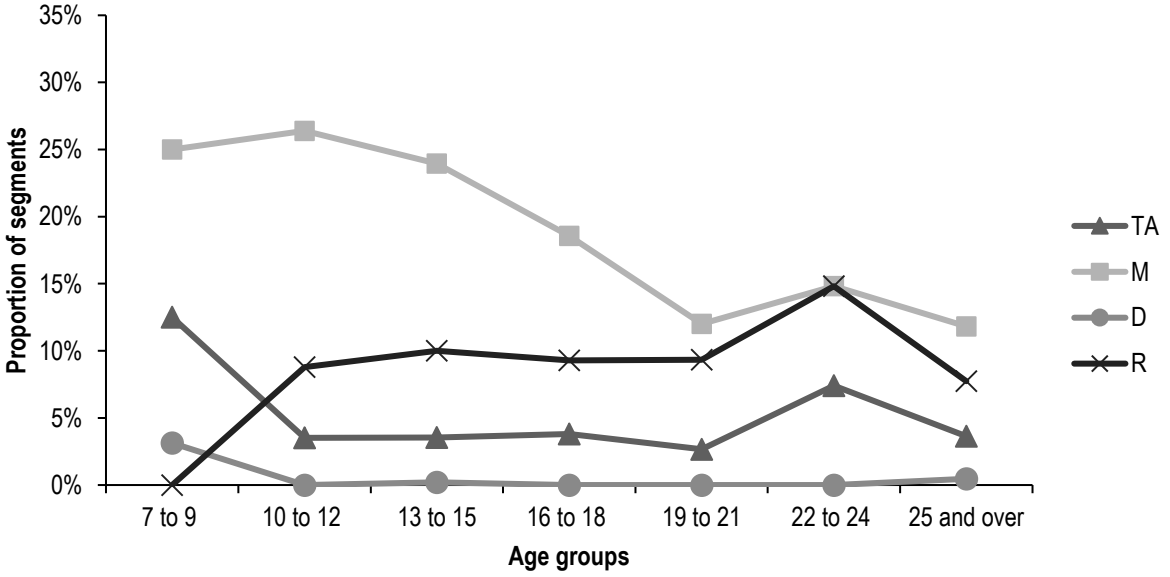

Figure 5. 'Self-regulation' proportions within age groups.

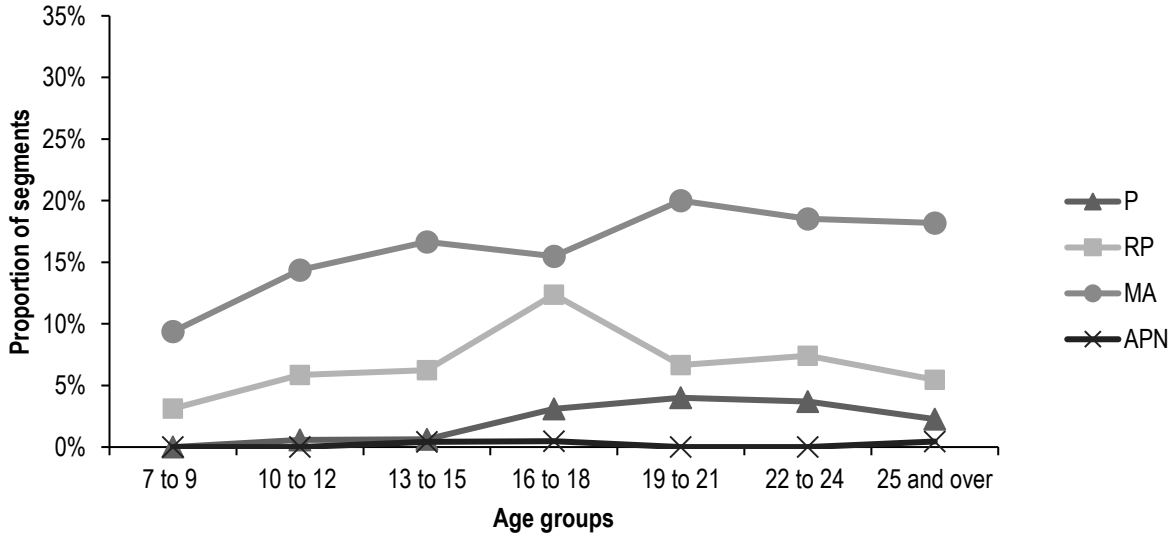

Figure 6. 'Music learning' proportions within age groups.

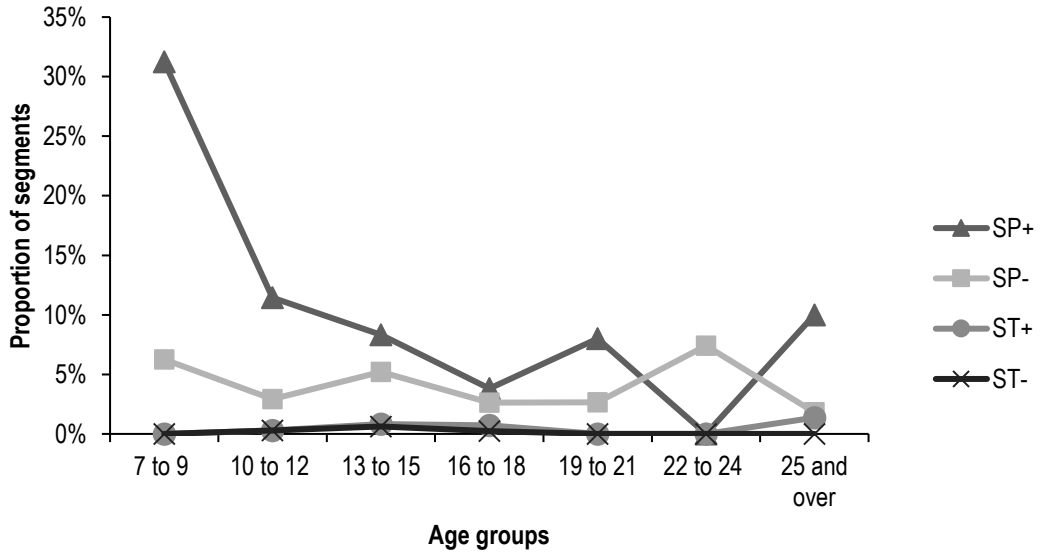

Figure 7. 'Co-regulation' proportions within age groups.

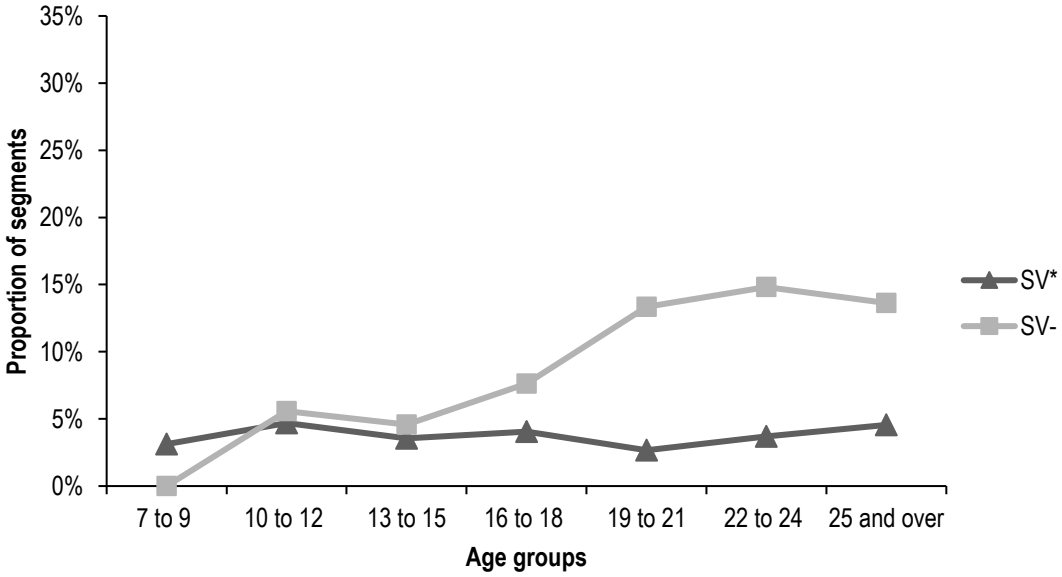

Figure 8. 'Survey' proportions within age groups.

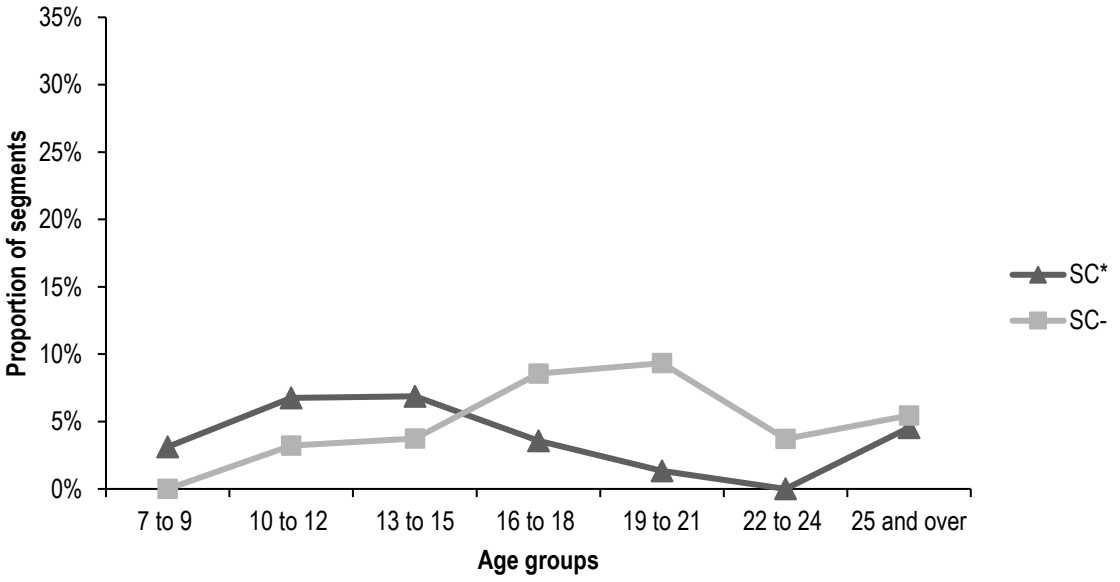

Figure 9. 'Socio-contextual factors' proportions within age groups.

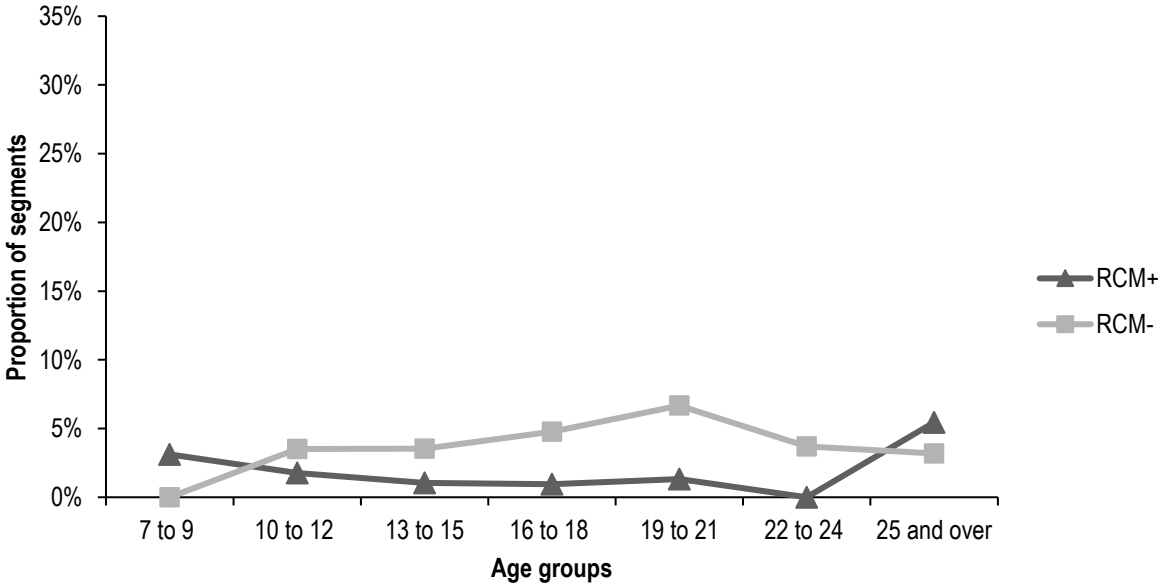

Figure 10. 'Royal Conservatory of Music' proportions within age groups.

Findings for the 7- to 9-year-olds

The 7- to 9-year-olds provided a total of 21 comments, or 32 coded segments. With an average length of 24.9 words (*SD* = 36.81), these comments were the second shortest of any age group after the 10- to 12-year-olds. Most segments fell under the themes of 'Self-regulated

learning' (n = 13) and 'Co-regulation' (n = 12). In contrast, 'Music learning' contained just 4 segments and the remaining themes one each. Also, the age group had the largest number of empty categories (n = 8).

Self-regulated learning. The majority of 'Self-regulated learning' segments were related to 'Motivation' (n = 8), although some referred to 'Task Analysis' (n = 4) and 'During' practice strategies (n = 1). 'Motivation' represented the second largest category overall, with segments essentially revealing that individuals either liked their instrument(s), music lessons, or music in general. However, one segment written by a parent provided some interesting detail: not only did his 7-year-old love learning repertoire of his own choosing—particularly pop and Christmas music—he did not need to be reminded to practise this repertoire. To the parent's surprise, however, his son disliked performing for others, friends included. Of note, this was the only negative 'Motivation' segment for the age group. Within 'Task Analysis', meanwhile, individuals explained they would soon be taking an elementary-level music exam or entering a competition for the first time. Although one 9-year-old wrote that she "sometimes work[ed] ahead," and thus hinted at some form of strategic planning, no additional information was provided. Similarly, while the previously mentioned 7-year-old boy occasionally played pieces at faster-than-usual speeds in order to finish his practice sessions earlier, little could be gleaned about this potential 'During' practice strategy, save that he rushed through certain pieces and that he was reportedly able to perform these "very well." Notably, no segments were related to 'Reflection'.

Co-regulation. 'Co-regulation' segments chiefly described support received from others rather than technology. Within 'Supports: people (*positive*)' (n = 10), children mentioned that they liked their teacher, felt inspired by them, or valued their teaching style. While few enlarged

upon their teacher's specific approach, some reported the following: issuing awards to students in recognition of their efforts, being continually encouraging, or teaching something new each lesson. Also, the father of the 7-year-old boy remarked he was impressed with the accuracy of his son's counting whenever he played for his instructor, which suggests the child was keen to show his teacher—and perhaps also his father—that he took the lessons seriously. Nevertheless, he also admitted that he usually needed to remind his son to practise and that if his son did not comply, he would not be allowed to play hockey. Children themselves also identified family members as sources of support. For example, one wrote that he enjoyed it when his parents listened to him practise, while another simply stated that his mother was his teacher, adding a 'smiley' afterward. Similarly, one liked it when his older sister helped him play the piano, while another student's piano had been bought by her grandparents and she was always asked to play whenever her grandmother visited because the latter liked to hear her play. Nevertheless, two 9-year-olds did not always feel supported. Hence, in 'Supports: people (*negative*)' (n = 2) one child wrote that people found it "funny" that she liked theory, whereas she herself found it "fun." Meanwhile, another felt frustrated when she did not understand what her teacher wanted her to practise. However, no segments came under either of the 'Supports: *technology*' categories.

Music learning. With just four segments, 'Music learning' represented the third largest theme among the 7- to 9-year-olds. Under 'Musical accomplishments' (n = 3), children reported either playing two musical instruments or not having taken a conservatory exam yet. Meanwhile, under 'Reasons to play' (n = 1), a 9-year-old boy explained the significant and inspirational role music played in his life thus: "I would like to say that music inspires me in many different ways and in a way music is like [*sic*] half my life…" However, no segments relating to either 'APN' (amount practised) or 'Persistence' were provided.

Royal Conservatory of Music, Survey, and Socio-contextual factors. Each of these themes contained a brief, albeit positive, segment. Thus, one child stated that he was looking forward to his upcoming RCM exam, one reminded the survey writers that she wanted to win the iPad, while another suggested an awareness of music as performance, even if hers happened to involve a rather obliging non-human audience: "I have a dog named Mika and I put her on the couch to let her listen to my piano playing. She always wiggles to the beat and whines like she's humming." No segments, however, were related to 'RCM (*negative*)', 'Survey (*negative*)', or either category in 'Socio-contextual factors'.

Findings for the 10- to 12-year-olds

The 10- to 12-year-olds produced 219 comments, or 341 coded segments, a considerable increase from the previous age group. However, these also comprised the shortest comments in the data set (M = 20.74, SD = 23.85). In addition, although 'Self-regulated learning' remained the most common theme (see Figure 5), there was an appreciable decrease in the proportion of segments related to 'Co-regulation', with all other themes gaining greater visibility (see Figure 7). As with the '7 to 9' age group, however, the least mentioned theme was the 'Royal Conservatory of Music'. Meanwhile, just two categories ('APN' and 'During') were empty.

Self-regulated learning. The largest category within this theme, and thus across all categories, was 'Motivation' (n = 90). Most 'Motivation' segments were brief and positive, with several individuals conveying their love for their instrument(s) or music in general. For instance, one 11-year-old exclaimed, "I love playing the piano…. I will most likely be playing piano for the rest of my life…. I LOVE MUSIC!!!" Considerably fewer individuals indicated an intrinsic interest in either music lessons, practising, composing, or performing. For instance, one 12-year-old remarked that while performing made others nervous, he felt it brought him to life. A few

individuals also expressed belief in their musical abilities, by describing themselves as being good musicians generally, or more specifically, as having good hearing and being able to figure out how to play any instrument given enough time. Nonetheless, others were more measured in their enthusiasm. For example, one 12-year-old explained that he liked to play the piano, but not to practise it. Another confessed that she wanted to learn some contemporary songs "in addition to *just* Conservatory pieces [emphasis added]." In contrast, ten segments expressed some form of negative emotion within this category. These included: no longer enjoying one's instrument, not enjoying performing or practising, preferring other activities over music, preferring modern music to classical, and not feeling talented. For one 10-year-old, lessons were even sleep-inducing, reportedly causing her eyes to start closing.

In contrast, the categories of 'Reflection' and 'Task analysis' were much less frequently mentioned. 'Reflection' segments (n = 30) conveyed pride in learning music and provided evaluations of practising, note accuracy, distractibility, and playing skills. Such evaluations were typically cursory (e.g., "I probably need to practice [*sic*] longer and more" and "I get distracted easily"). However, some of these evaluations were more specific. For example, one 12-year-old felt that if he practised more than 10 minutes a day he would become bored, while another boy of the same age believed scales were not so much improving his playing as undermining his confidence. Meanwhile, several individuals ascribed their musical successes to causes as varied as natural talent, a foundation in piano lessons, and the perceived superiority (due to the "greater experience") of home studio teachers. In a rare example of adaptive behaviour, one 11-year-old described using her younger sibling's music book for sight reading practice because she found this improved her concentration and sight reading skills. Twelve segments were related to 'Task

analysis' and simply listed instruments and pieces the children wanted to play, or upcoming RCM exams, the latter ranging from grades 3 to 8. No 'During' segments were recorded.

Music learning. 'Music Learning' emerged as the second most important theme among the 10- to 12-year-olds. This was largely due to the proportion of segments related to 'Musical accomplishments' (n = 49), the age group's second most mentioned category. The overwhelming majority of these segments were descriptive in nature and simply revealed that individuals played more than one instrument, with a couple of 10- to 12-year-olds reportedly playing as many as five. Whereas relatively few disclosed their level of playing, their stated range was from RCM grade 2 to grade 8.

Twenty segments were related to 'Reasons to play'. While some individuals outlined career aspirations, such as wanting to become music teachers, performers, or even "one of the 21st century's greatest composers," most referred to the perceived positive effects of playing a musical instrument. These effects included feeling more relaxed, mentally alert, and generally happier. For example, one 11-year-old remarked, "Music makes me feel very secure in myself…. I think it is nature's therapy." Another also identified rhythmic accuracy as a specific transferable skill:

> I think that one of the reasons that I keep playing piano is because it helps keep your brain sharp, and also, I am a dancer, and music very much helps me with that. For example, it helps me count and keep in time.

Just two segments were related to 'Persistence'. These simply conveyed either the individuals' pride in or stoic resignation to their continued musical engagement, with one 12-year-old philosophically observing that "… everything in life can be challenging, so you just have to keep practicing." No 'APN' segments were observed.

Co-regulation. 'Co-regulation' represented the third most popular theme in this age group, a slight drop in ranking. The theme's largest category (and the third most frequently mentioned overall) was 'Supports: people (*positive*)' (n = 39), previously the highest-ranked category among the 7- to 9-year-olds. Over half of the segments referred to liking one's teacher. Several children directly attributed their success and enjoyment of music learning to their instructor, while others commented on how the latter provided enjoyable lessons that were tailored to their needs. A number of individuals also described feeling fortunate to have found a good teacher, with one parent keenly aware of the expertise and dedication of the child's instructor:

> Finding a great music teacher is important. Our teacher […] has taken kids from Kindermusic (3 years) all the way to their grade 8 RCM exams. She includes a variety of techniques: games, motivation programs, technology, recitals at retirement homes, individual and group lessons. It's very hard to find someone that can individualize their programs and that is so great with kids!

Several individuals also referred to receiving support from their families, with family members serving as informal audience members, duet partners, or even models of musicianship. For certain children, therefore, the family unit provided considerable behind-the-scenes support and musical kinship. As one 11-year-old songwriter confessed, "No one even knew I had written my first song until my Mom asked what book that was from..." Meanwhile, a small number also felt encouraged by friends and non-family members. For example, one 12-year-old claimed that everybody told him he was a "really good singer," while an 11-year-old enjoyed comparing notes with musical peers at school about their "musical achievements, struggles, likes, and dislikes."

At the same time, however, some segments (n = 10) fell squarely under 'Supports: people (*negative*)'. Half of these expressed dislike for teachers, citing reasons such as excessive strictness, perceived inability to motivate students, personality clashes, and uncomfortable physical interaction when correcting posture or technique. For example, one 11-year-old said, "I would like to make violin teachers [not write] on my music or touch me (moving fingers and hand), it is annoying, I know how to move." A couple of children also referred to tensions with parents who struggled to make them practise, with one 12-year-old admitting she did not usually practise until her parents yelled at her to do so.

Just two segments in this age group made reference to technological supports, in both instances somewhat indirectly. In 'Supports: technology (*positive*)' (n = 1), one individual mentioned that she liked listening to music CDs. Meanwhile, in 'Supports: technology (*negative*)' (n = 1), a 12-year-old requested a free website with music printing capabilities, arguably indicating a need for such technological support.

Survey. 'Survey' (n = 35) represented the 10- to 12-year-olds' fourth most important theme, with a considerable increase in the number of segments compared to the previous age group. In 'Survey (*negative*)' (n = 19), almost half the individuals complained that the survey was too long. While one child felt that certain questions were targeted to older individuals, a few found much of the survey difficult to answer because they played more than one instrument. Indeed, some specified which of these they had had in mind when completing the survey. Similarly, although only one survey item had referred to homework, two children felt it necessary to explain they were home schooled, with one pointing out she did not therefore receive homework. Meanwhile, in 'Survey (*positive/neutral*)' (n = 16), individuals either referred to the iPad incentive (e.g., "Can I win the iPad? Just kidding, chances are tiny"), expressed

positive reactions to the survey (e.g., "This is a very good survey… I enjoyed it"), or thanked the survey writers.

Socio-contextual factors. Containing a significantly larger number of segments than in the previous age group, 'Socio-contextual factors' (n = 34) represented the 10- to 12-year-olds' fifth largest theme, with positive/neutral segments (n = 23) outnumbering negative ones (n = 11) twofold. Within 'Socio-contextual factors (*positive/neutral*)', individuals reported that as well as taking lessons, they were members of school choirs or bands, with a couple taking part in music camps/festivals. One 12-year-old even mentioned earning money by playing at weddings and restaurants. Several also commented they were busy with non-musical activities, such as sports or other performing arts, but such commitments did not reportedly interfere with their musical life, as illustrated in the following comment:

> I am a regional soccer player and I play a lot of hockey but I still enjoy taking piano. I enjoy competing at the musical festival to see how I compare to others and I enjoy winning scholarships at the highlights concert. I am happy that I will get a high school credit for studying piano.

Meanwhile, one 12-year-old observed that being home-schooled made it easier for her to practise because she could do so more or less whenever she wanted. In addition, another liked practising thanks to her "nice, quiet" practising room.

Despite certain individuals reportedly thriving on hectic schedules, almost half of the negative segments referred to being too busy to practise, typically due to sporting commitments. Only one individual found it difficult to practise because of the practice environment and attributed this to younger siblings playing in the very room in which she practised. Meanwhile, a couple of 12-year-old boys commented upon societal gender norms of music participation, with

one wishing there were more male music teachers and another reflecting on the discomfort of being openly musical when peers might challenge his masculinity as a result:

> It is very uncool these days in school to be musical. I used to be enthusiastic, though I do not really enjoy it anymore due to peer pressure. I have been called gay just because I play piano. Sorry if this negative energy comes through. Thank you!

Although lacking in detail, a small number of negative segments mentioned the forced hiatus in music lessons during the summer break, high tuition fees, performance anxiety, and physical tension as obstacles to their musical success or development.

Royal Conservatory of Music. The 10- to 12-year-olds' least frequently mentioned theme was 'RCM' (n = 18), with twice as many negative (n = 12) than positive segments (n = 6). All of the former related to RCM exams, with most of the individuals mentioning their fear of taking them, as well as negative experiences with examiners. For one 12-year-old, the latter had brought him close to quitting music altogether. Indeed, he held his examiner responsible for some of his friends abandoning music and urged that examiners like her be prevented from adjudicating children:

> My RCM exam judge was mean and made me cry. I had the same judge for both piano and voice and she was so bad! I never wanted to do another exam! [...] This is why some of my friends have quit and i [*sic*] almost did too! please don't let people like her judge kids—she really made me feel bad about myself for many months i [*sic*] never would do any piano or singing after her!

In addition, individuals commented on the high exam registration costs, the absence of non-classical repertoire in the syllabus, or a lack of clear guidance from the RCM about how to succeed in the exams. Others, however, did feel positively about RCM exams and its examiners.

For instance, they enjoyed taking exams, believed they covered a broad range of necessary skills and knowledge, or motivated students to practise. Moreover, one 12-year-old boy described his examiners as "very nice people who encouraged [him] even if [he] didn't know something."

Findings for the 13- to 15-year-olds

The 13- to 15-year-olds left 277 comments, or 480 coded segments, the most of any group. Despite a slight increase in the word length of comments ($M = 29.18$, $SD = 34.51$), the distribution of segments across themes was similar to that of the 10- to 12-year-olds. In terms of size ranking, the ordering of themes also remained mostly identical, although 'Socio-contextual factors' ($n = 51$) and 'Survey' ($n = 39$) swapped positions. Exceptionally, the age group contained no empty categories.

Self-regulated learning. 'Self-regulated learning' retained its position as the most common theme among 13- to 15-year-olds. As with the previous age group, SRL's 'Motivation' ($n = 115$) represented by far the largest category across all themes. Most 'Motivation' segments were brief, positively worded statements in which individuals expressed their love of either their instrument or their music. For example, one 14-year-old noted drolly that, "Without music, life would B♭", while another teenager stated that she played her instruments as soon as she returned from school, only to stop temporarily for supper. One 13-year-old even claimed to find educational value in every piece she learned:

> I think that we should be expected to play, learn and master all the pieces in the books because I do and I find [them] very beneficial since I learn a new skill with each piece and every song has a purpose.

A few individuals, however, were more specific about what aspect of music learning they valued. For instance, they mentioned learning new instruments, studying harmony, making

arrangements, performing, or playing fast pieces. Nonetheless, a small number of individuals also admitted to having mixed feelings about music learning. For instance, a handful liked playing but not practising or performing their instrument(s). Others explained they no longer found their music lessons fun or occasionally turned up to lessons only having practised pieces they liked. For one teenager, however, how he felt about music was not necessarily self-evident to others, commenting as follows, "I love playing music. To some it doesn't show as I cannot memorize all [pieces] or that [*sic*] I hate playing in front of people but overall it is something I do for myself." However, several individuals also revealed high self-efficacy, describing themselves as good memorisers or sight-readers, for example. Self-efficacy typically pertained to discrete musical skills, but not always. For instance, one boy linked his perfect pitch to his memorisation ability. Moreover, self-efficacy and musical enjoyment were often mentioned in tandem. For instance, one individual claimed he sang because he loved singing and was good at it, while another felt he could sight-sing well and therefore enjoyed his voice lessons much more than his piano lessons. Similarly, one 15-year-old argued that he was a "good musician" but only when he was enjoying making music. Nevertheless, there were ten negative segments in the 'Motivation' category, as in the 10- to 12-year-olds. Although a small number of teenagers expressed an aversion to music lessons, performing, or their instrument, none of these elaborated further. And while a couple of individuals described practice, scales, and ear tests as boring, they failed to explain why. An exception, however, was this disillusioned 13-year-old writing about her music learning experience in particularly bleak terms:

> Honestly, if I could turn back time, I would tell my younger self "It's a trap." I hate playing the piano. It's required so much of me. I always start the practice [*sic*] with a feeling of dread and used to end up in tears often. As of now, I realize that there's no

turning back and that I might as well get my credit. The prospect of practicing [*sic*] the piano is like a dark cloud at the edge of my mind, nagging at me. I can only grip my coat tighter and hope the storm will pass soon.

Forty-eight segments were coded under 'Reflection', making it the third largest category among the 13- to 15-year-olds. Approximately half of the segments involved some form of self-evaluation and were related to practice, performing, speed of learning, or exam performance. For instance, individuals provided statements such as the following: "I try my very best to reach excellence. I try not to slack off," "I do terribly in exams…," and "I am a learner who learns at a moderate pace." Others evaluated their playing with regards to accuracy, speed, or conveying of emotion. Although a few made normative evaluations, comparisons with more talented peers did not reportedly affect their perseverance or pride in their accomplishments. Also, while some individuals admitted they occasionally outshone others, they appeared loath to dwell upon this. For instance, one 13-year-old explained that knowing he had performed better than others did not make him feel superior as he believed this to be an "undesirable, arrogant trait." Although some segments made reference to stage fright or occasionally feeling discouraged after exams, several mentioned adaptive behaviours in the face of such challenges. For example, some individuals took up new instruments, practised on better quality instruments at school, or intensified their efforts in order to achieve objectives. Reflecting on the reasons behind their musical accomplishments, meanwhile, a few individuals listed prior piano lessons, harmony training, and rewards from their teachers. While a couple of teenagers directly attributed their musical talent to God or a higher power, a few acknowledged the importance of practice, having a good teacher, or playing in a band. One 14-year-old, for instance, explained that since joining a pop band she now only played piano by ear, suggesting a perceived link between the two. Finally, some

individuals felt they practised more effectively when they selected the repertoire themselves or if they did not feel pressured to practise.

In contrast, relatively few segments (n = 17) were related to 'Task Analysis'. The majority of these mentioned specific goals, such as upcoming RCM exams that ranged from grades 5 to 8, or the learning of new instruments, with a couple of individuals stating a desire to eventually become music teachers or professional songwriters. However, two others also confessed to a lack of direction or structure in their musical development. Finally, in the 'During' category, one 13-year-old stated that he practised "to music, rather than with a metronome," although what this meant is open to debate.

Music learning. 'Music learning' remained the second most common theme among 13- to 15-year-olds and each of its categories retained similar distributions to those in the previous age group. 'Musical accomplishments' (n = 80), again represented the second largest category across all themes, with most segments revealing the number of instruments the individual played. For instance, one 14-year-old played as many as eight. Several segments also listed current RCM grade(s) or score(s) obtained, frequently with a sense of pride if the individual felt they were progressing faster than anticipated. Others reported how long individuals had been playing their instrument, and in some cases this exceeded 10 years. However, less common accomplishments also included studying in selective music programs, teaching younger children how to play, playing by ear, and composing.

Thirty segments pertained to 'Reasons to play', with the majority referring to playing a musical instrument as an important emotional outlet: a source of relaxation and even solace. Accordingly, music was described as "a great escape," "the cure to anything," and "the one thing

that makes me happy […. without which] I would be partially lost." As one 15-year-old suggested, playing a musical instrument may have been a coping mechanism for some teenagers:

> Music has always been a way for [me] to destress, and separate myself from the chaos throughout society. For example, [if] I am not playing piano at home, I will [practise] trumpet at school before classes start with a group of friends to avoid the constant chatter about academic studies and issues from those studying in the cafeteria.

Perhaps unsurprisingly, some of these individuals expressed a desire to become professional musicians, whether as educators, songwriters, or performers.

In comparison, the remaining 'Music learning' categories received considerably fewer mentions. The limited number of segments and their accompanying lack of detail unfortunately afforded little insight into either 'Persistence' (n = 3) or 'APN' (n = 2) among 13- to 15-year-olds. Thus, in the former category, one individual reported being happy she had not abandoned the piano, another had stopped taking lessons but continued to teach herself new pieces, and one had taught herself how to read musical notation. Meanwhile, in 'APN', one individual reportedly practised between two and four hours daily and another divided her practice time between four instruments.

Co-regulation. As with the 10- to 12-year-olds, 'Co-regulation' (n = 72) represented the third most common theme, mostly due to the number of segments classified as 'Supports: people (*positive*)' (n = 40). These comprised a balance of references to either music teachers or family and friends. Several 13- to 15-year-olds credited their teachers for keeping them motivated, for example by selecting repertoire they liked, allowing them to choose their own repertoire, or encouraging them to perform in recitals and community outreach events. Thus, teachers were variously described as "patient," "awesome," and "much more than a piano teacher to me!" A

number of individuals, however, admitted they had required a change of teachers to feel this way. As with the 10- to 12-year-olds, parents were often cited as a source of support, either by encouraging them to achieve their goals or by giving them the freedom to decide whether to practise or even continue with lessons. However, both parental support and the child's appreciation of it may have evolved during early adolescence, as suggested in this 14-year-old's observation: "My parents coaxed me to [practise] as a child and that's perfect, as I was naïve and too young to decide for myself. But now in [my] teenage years, I'm glad I have the choice myself :) [*sic*]" Although less frequently mentioned, friends and siblings were also acknowledged as sources of encouragement and even inspiration. For instance, one teenager started the violin after hearing her friends play the instrument, while another took lessons at the same time as his best friend, an arrangement he reportedly found "much more fun."

Compared to the previous age group, a considerably higher proportion of segments were coded as 'Supports: people (*negative*)' (n = 25). Around half of these were related to teachers. Within the segments, individuals criticised teachers for hindering their musical development, mostly by being overly prescriptive and not attending to their individual needs. One 15-year-old even suggested teachers do more to find out what students want from their lessons rather than force them down a path they had never intended to follow:

> Music teachers should ask students how they expect to play e.g. [*sic*] If they play to learn, if they play to compete, or if they play for fun rather than pushing them to compete and master songs that are not capable of and practice for an hour when music really isn't their life.

Meanwhile, a smaller number of individuals mentioned being forced by their parents to practise or take lessons. Conversely, a couple of teenagers described parental opposition to, or lack of support for, their desire to pursue music further or focus on a specific instrument.

As with the 10- to 12-year-olds, very few segments were related to either 'Supports: technology (*positive*)' (n = 4) or 'Supports: technology (*negative*)' (n = 3). Nonetheless, in the former, individuals mentioned listening to recordings or videos on YouTube of pieces they were currently playing, using a GuitarTab app when performing in public, or composing electronic music on their computer. On the other hand, a couple of individuals voiced dissatisfaction with the quality of their instruments, while one enquired about the existence of music learning games or apps.

Socio-contextual factors. 'Socio-contextual factors' (n = 51) outnumbered 'Survey' to become the 13- to 15-year-olds' fourth most common theme. Like the previous age group, there were twice as many positive/neutral (n = 33) than negative segments (n = 18). Meanwhile, 'Socio-contextual factors (*positive/neutral*)' represented the fifth largest category overall, with individuals typically mentioning involvement in music-related activities outside of the music studio, such as performing, competing, or additional learning. In over half of the segments, individuals listed musical activities offered by their schools. The most frequently cited was playing in ensemble bands, although other activities included singing in choirs, performing in musical theatre productions, and taking elective instrumental lessons. However, 13- to 15-year-olds also participated in secular, non-school-based music-related activities. These included an air cadet band, a girl band, recitals at nursing homes, and regional/provincial music competitions, all of which appeared to invigorate pre-existing levels of motivation. For example, one 15-year-old explained that what she liked most about performing were "the huge smiles" on the faces of

senior citizens she performed to. Similarly, another claimed that while she had not been initially aware of the number of music-making options available to her, these had become her main source of motivation:

> When I first began learning the violin I didn't have any idea how many opportunities there would be. Lately I've been getting more and more involved with music camps, orchestras, chamber and duets. These opportunities are mostly what have been the biggest motivation lately.

Lastly, a couple of individuals described themselves as home-schooled, with one 14-year-old explaining that this gave her additional time to practise.

'Socio-contextual factors (*negative*)' (n = 18), meanwhile, described tensions between wanting to play a musical instrument and conflicting interests or obligations, the most common being lack of time due to school or sporting commitments. For one 14-year-old, this meant "always trying to squeeze [her] practice time in…. sometimes when [she was] too tired to enjoy or give it [her] best effort." For another, giving school precedence had meant giving up piano lessons altogether, a choice she found heart-wrenching. One 15-year-old even predicted a dilemma over pursuing a PhD and pop-music fame. For a few individuals, however, music-making proved challenging due to personal factors, such as stage fright, social anxiety, or autism. For a couple of others, potential challenges to musical development were associated with issues of access to musical events and the cost of learning a musical instrument.

Survey. Survey (n = 39) represented the second least common theme, a drop in ranking compared to the previous age group. As with the 10- to 12-year olds, there were slightly more negative segments (n = 22) for 'Survey' than positive/neutral ones (n = 17). Combined, however, these constituted the second least mentioned theme among the younger teenagers.

Again, the negative segments typically referred to being forced to answer about only one instrument. However, a small number also questioned either the point of the survey, its length, or the assumption that respondents were currently taking lessons. Others hinted that answering questions about practice was difficult, remarking that many answers depended on their time on-task, or else that questions about practising pieces they already knew were confusing. Similarly, in response to an item asking if individuals practised so that others thought they were good musicians, one 15-year-old clarified that although he wanted external validation, this was not what motivated him to practise. Meanwhile, one 14-year-old was surprised that the survey had not asked about the RCM's theory and history exams considering their importance for someone intending to pursue music as a career, not to mention their price. Finally, one 13-year-old explained she was unable to answer Canada-specific demographic items as she lived in the US.

At the same time, approximately half of the theme's positive/neutral segments either praised, thanked, or wished the survey writers luck, describing the questionnaire as "cool," "fun," and "interesting". A couple of individuals found it particularly thought-provoking, as manifested by this 15-year-old:

> Thank you for the survay [*sic*], it really helped me re-value how important music and violin is [to] me. I never knew that music was so important in my life and because of this survay [*sic*] i realized music has taken a huge part in my life. Thank you.

Lastly, while a few individuals briefly stated they had completed the survey truthfully, a small number asked about why the survey had been conducted, how the data would be used, and whether respondents would be remunerated.

Royal Conservatory of Music. 'RCM' was the least common theme among 13- to 15-year-olds but contained just over three times as many negative (n = 17) than positive (n = 5)

segments. Around half of the negative segments expressed a fear or dislike of RCM exams. For example, some individuals questioned the need for difficult ear tests, technical components, and sight-reading, while others felt the RCM repertoire lacked contemporary appeal. A few also complained about strict and unfriendly examiners, having to play on unfamiliar pianos during the exams, costly exam registration fees, or in one instance, failure to even issue results. Moreover, this stress and frustration was often conveyed with particular keenness, as illustrated by one 15-year-old who felt nerve-racking exams cast a shadow over her music learning experience and ran counter to what she held as the very purpose of music:

> I do not enjoy taking music exams and in fact would enjoy my music lessons and be more successful if I did not have to take the RCM exams. […] it makes me a bit angry that if your ear is not good or your memory of intervals and allllll [*sic*] those scales fails you simply when you are nervous in an exam, they judge you and brand you with a grade [….] This is not how we should be cultivating music in our lives because music is not a DREADED work!!! It's ENJOYABLE BEAUTIFUL ART that people should be drawn to rather than be nervous beyond belief about.

In contrast, very few segments revealed positive feelings about the RCM exams. Among those that did, individuals expressed appreciation for the Popular Selection List letting them select pop songs instead of studies, enjoyed studying harmony, or else described exams as "the most fun part" of playing their instrument.

Findings for the 16- to 18-year-olds

The 16- to 18-year-olds provided 220 comments, or 420 segments: the second largest number of segments for any age group. While their distribution generally mirrored that of the previous age group, there was a noticeable reduction for 'Co-regulation' (n = 31). 'Self-regulated

learning' (n = 133) and 'Music learning' (n = 132) continued to enjoy the largest shares of segments, followed by 'Socio-contextual factors' (n = 51) and 'Survey' (n = 49). Meanwhile, 'RCM' (n = 24) again received the lowest number of comments. Within these themes, however, 'During' was the only empty category.

Self-regulated learning. As with the 13- to 15-year-olds, 'Motivation' (n = 78) was the most frequently mentioned category overall, despite its segments decreasing by the largest amount proportionately. The 16- to 18-year-olds were thus largely motivated learners, with many openly expressing a love for music. For example, individuals described music as "great," "fab," and "my life blood," with several emphasising the importance music played in their life. Indeed, for one 17-year-old, music made the world a better place: "Music is life. Without it, this world would be bleak …" Although some individuals enjoyed performing, composing, teaching, or playing by ear, several also hinted they preferred to choose the music they practised. One 16-year old, for example, preferred playing pop songs to "weird" classical music because they could reportedly "be picked up quickly, [had] room for improvisation, [could] be enjoyed by others, and [were] enjoyable in a jam session." Others also expressed a love of learning, even if the focus or nature of this learning varied. For instance, one 16-year-old admitted she did not enjoy taking lessons but *did* like learning independently, while another said all he wanted to learn was music history. Relatively few individuals mentioned their perceived ability, but when they did, most referred to specific areas of learning, as was the case with the 13- to 15-year-olds. However, these statements were marked by occasional references to lower self-efficacy. For instance, one 16-year-old acknowledged that she struggled with improvisation and composition despite the piano coming naturally to her, while another did not trust friends who told her she was a good musician. At the same time, a couple of individuals referred to changes in their

attitude towards their instrument or music in general. Thus, one 17-year-old remarked that while her commitment to her instrument had waned, she had expanded her scope of musical interest and this had allowed her passion for music to flourish. Unlike the 13- to 15-year-olds, however, none of the segments described strongly negative sentiments.

Although 'Reflection' (n = 39) contained roughly half as many segments as 'Motivation', it was the age group's fourth most frequently cited category. Unlike the previous age group, half the 'Reflection' segments described some form of causal attribution. For example, one 17-year-old felt that her learning speed was closely linked to her level of motivation: if she practised the music she liked, she could learn pieces in a single practice session. Meanwhile, another individual observed that many teachers did not really teach students how to practise:

> I think it is important for students to be able to know how to practice [*sic*], I feel like a lot of students go home not knowing how to start or what to do. Maybe if students were offered this knowledge they would be able to practice [*sic*] efficiently.

Indeed, just two individuals credited their musical successes to their teacher, and one claimed that his musicality was inherited. Meanwhile, two others attributed their improvisation ability, or lack thereof, to their level of exposure to this type of music-making. Whereas several identified stage fright as a major debilitating factor, others acknowledged that experience, confidence in one's technical skill, and the ability to create an atmosphere for oneself on stage all improved one's performances. In general, however, self-evaluations were negative, with some individuals describing themselves as lazy, less talented than their peers, and not as good as they should be, considering the effort they had invested. Nevertheless, a few were reportedly very satisfied with their music learning. Although reports of adaptive behaviour were rare, one teenager described making an effort to overcome performance anxiety by trying to enjoy herself more onstage and

another viewed such performances as an "amazing incentive to practice [*sic*]." However, in the sole example of what could be interpreted as 'defensive' behaviour, an 18-year-old described giving up music lessons because they had become a burden, severely affected her school grades, and made her depressed.

Like the previous age group, the 16- to 18-year-olds produced comparatively few segments related to 'Task Analysis' (n = 16). Besides upper-level RCM-exam goals, such as taking Grade 8 or ARCT, several mentioned plans to pursue postsecondary studies in music, while others stated goals such as learning new instruments, composing an orchestral piece, and raising money through charity performances. However, no segments were related to strategies during practice (i.e., 'During').

Music learning. As with the 13- to 15-year-olds, 'Music learning' (n = 132) was the second most common theme, largely due to 'Musical accomplishments' (n = 65) constituting the 16- to 18-year-olds' second largest category overall. Once again, many segments in this category merely itemised the number of instruments the individual played. Like the 13- to 15-year-olds, several individuals stated the length of time spent learning their instrument(s), with one 17-year-old reportedly having started as early as age four. Several respondents also listed the typically advanced-level RCM exams they had taken or skipped, along with the high results achieved. Among other accomplishments, individuals mentioned independently playing covers of non-classical repertoire, composing, and playing by ear. A small number, meanwhile, revealed they had just started studying music at the post-secondary level.

Compared to the previous age group, 16- to 18-year-olds provided more segments associated with 'Reasons to play' (n = 52), making it the third most frequently mentioned category. Most individuals cited perceived extra-musical benefits of playing or learning an

instrument: for many, music provided a way to relieve stress and express themselves, but several believed it had also taught them valuable transferable skills, such as concentration, time-management, dedication, and perseverance. Such individuals expressed firm beliefs that music played a major role in their personal development and had even helped define them as individuals, even if they did not intend to become professional musicians. In addition, more than one teenager referred to the societal benefits of learning to play an instrument. Thus, while several agreed that music lessons had exerted a positive influence on their life, particularly their studies, others recognised a link between their own wellbeing and that of the world around them. For instance, one 18-year-old described music as "the very backbone of [her] sanity, and in a broader sense one of the things that enables our society to be so open to everybody and open-minded." Finally, a smaller number of 16- to 18-year-olds also mentioned career aspirations under 'Reasons to play'. These ranged from the somewhat vague, such as wanting a job in music, to the more specific—namely, wanting to be music teachers, performers, film composers, or music therapists.

Segments relating to 'Persistence' (n = 13), meanwhile, contained several examples of perseverance, and to a lesser extent, the reasons behind this. For instance, individuals explained they still practised, taught themselves to play new instruments, and held on to their musical dreams despite no longer taking lessons or not having access to a decent instrument. Furthermore, completion of RCM exams did not necessarily mark the end of music learning. Thus, one individual wrote that two years after finishing grade 8 RCM, she still took lessons, while another promised himself that after passing grade 10, he would continue to seek music-making opportunities beyond just music lessons. However, such persistence was not always due to a love of their instrument, but rather a general tenacity, as suggested by this 16-year-old:

> [Taking] this survey has made me question whether I should continue with my musical studies at the level that I am currently. When I ask these questions of myself honestly, I think maybe not. […] I've just kept going because I don't tend to quit things, not really out of love for the art of the instrument. For me it is easier to keep going than to quit.

Finally, just two segments were related to 'APN', in which the individuals simply stated they practised up to two hours every morning.

Socio-contextual factors. Socio-contextual factors (n = 51) gained prominence among 16- to 18-year-olds, becoming the third most common theme overall. Unlike the previous age group, 'Socio-contextual factors (*negative*)' (n = 36) outnumbered 'Socio-contextual factors (*positive/neutral*)' approximately twofold, rendering it the fifth most mentioned category. Most of the negative segments referred to competing interests or obligations that limited the time available for practising properly and in turn called into question the need for lessons. Thus, these individuals reported being generally too busy, with "more pertinent things going on" or else "too many distractions and things in life" to practise. For one overstretched 16-year-old, the cost-benefit ratio of continuing was less than ideal, claiming that she dreaded attending lessons as she would not "have much to bring." As with the previous age group, school commitments were cited as the main impediment to musical development. One 17-year-old, moreover, had stopped exchanging RCM exams for school credits as the exams would bring down her GPA. A couple of non-music majors, meanwhile, expressed sadness and regret at having to stop music lessons once they started university. Besides school commitments, access to musical development opportunities were cited as a challenge by about one-fourth of the individuals. For instance, a few teenagers described both music lessons and RCM exams as unduly expensive, with one 16-year-old boy observing that musical individuals from lower income families had to overcome

social barriers since "[there] is a stigma to pursuing music, that you have to [have] a good financial background to pursue private lessons and music as a career." Meanwhile, others lamented the amount of funding for the arts versus that for sports, the lack of music competitions and festivals in rural areas, and the absence of improvisation categories in such events. Although less common, a handful of individuals cited physical or psychological reasons impeding their music-making. These included frequent relocation during childhood, performance anxiety, and physical injury. Thus, one 16-year old reported taking a year off piano lessons due to carpal tunnel syndrome from over-practising while learning ARCT repertoire.

Most of the segments in 'Socio-contextual factors (*positive/neutral*)' (n = 15) described involvement in communal music-making. This generally occurred at school, where students were members of ensembles or accompanists, but also in churches and music festivals. Like the previous age group, individuals typically provided brief, factual statements, although one 16-year-old instrumentalist offered a somewhat heartfelt account of why she enjoyed communal music-making:

> I also play the alto saxophone at school and I love it when I play well with my friends. I love the sound when everything is in harmony. It makes me feel happy when the band holds a chord because the full, round, warm sound touches my heart.

Although only a minority of individuals reportedly made music in religious settings, the feelings of one 18-year-old were rather intense, declaring that while music was important to her, "it is personally more important to me that I use my talent to glorify the God I serve." Finally, one 16-year-old observed that recovering from physical injury meant she could now return to her music lessons.

Survey. 'Survey' (n = 49) ranked as the fourth most common theme among 16- to 18-year-olds. As with the previous age group, there were more negative (n = 32) than positive/neutral (n = 17) segments. Almost half of the 'Survey (*negative*)' segments again referred to the issue of having to provide answers about only one instrument. Thus, several individuals explained that their responses would have been different had they chosen to focus on an instrument they enjoyed more (or practised less). Others revealed they had provided amalgamated responses, with one 18-year-old confessing to subsequent confusion. A few individuals also explained they would have responded differently at other periods in their lives, with some claiming they had answered retrospectively. Meanwhile, others voiced disapproval of items which grouped friends and family as a homogeneous entity, the length of the survey, the amount of paper used for its printed versions, and the perceived misspelling of 'practice/practise' throughout. Suggested improvements included replacing Likert scales with multiple choice—the former allegedly forcing biased answers—as well as adding 'auditions' and 'masterclasses' to items that listed 'performance opportunities'.

Consistent with the previous age group, roughly half of the 'Survey (*positive/neutral*)' segments were brief statements that thanked the survey writers or wished them luck in their endeavours. Once again, several individuals praised the researchers for crafting a "very complete," "well set up" questionnaire that focused entirely on music students. While just one individual believed the survey might influence how she might practise in future, a few showed interest in the study's eventual findings and its broader implications. Meanwhile, two individuals mentioned wanting to win the iPad.

Co-regulation. Compared to the previous age group, 'Co-regulation' (n = 31) received fewer comments, thus slipping from the 3rd to 5th most common theme overall among the 16- to

18-year-olds. While most segments still pertained to the 'Supports: people' categories, both of these were less frequently mentioned, with the margin between them narrowing considerably. 'Supports: people (*positive*)' (n = 16) contained a fairly even distribution of segments relating to teachers, parents/family, and other individuals. Thus, roughly a third of the individuals praised or thanked their teachers, with one observing that her teacher was the reason she had not given up lessons and was now even "grooming" her to become a teacher herself. Meanwhile, others explained they had started music lessons because of their parents, who in one case believed the lessons would enhance their child's brain development. Although just one individual claimed to enjoy performing for her family, it was obvious her family members were particularly musical themselves:

> I enjoy playing for my family so that they can encourage me to do ever better […] My mother and her family were raised to play piano. My grandfather was an expert playing the piano and he inspired me to do well.

One teenager expressed gratitude to her parents and teacher for pushing her to practise and take music lessons since this had allowed her to reach her current level. A few, however, either described how they had been told they played well, were inspired by listening to other musicians, or felt more supported by their friends than family members.

'Supports: people (*negative*)' (n = 11) contained slightly fewer segments, with over half relating to parents and/or teachers. For example, a couple of individuals disliked performing for their family or being forced to practise, with one describing a loss of confidence whenever her family seemed disinterested in her playing. Although one claimed that neither her parents nor her teachers were especially involved in her musical education, others felt stressed by these adults' expectations or their opposition to their interest in pop music. Indeed, one individual firmly

believed she did not need to listen to the subjective musical opinions of "some old lady (piano teacher)." On an unrelated note, another expressed a need for a teacher who could teach about technique.

Only a small minority of 16- to 18-year-olds' segments were coded as 'Supports: technology'. In 'Supports: technology (*positive*)', three individuals referred to listening to online performances as a means of improving their playing, wanting to win the iPad prize in order to use the Cubasis music recording app, or owning specific models of instruments. Meanwhile, in 'Supports: technology (*negative*)', one individual mentioned wanting a new piano.

Royal Conservatory of Music. Like the 13- to 15-year-olds, the least common theme was 'Royal Conservatory of Music', displaying a similar imbalance of negative ($n = 20$) versus positive ($n = 4$) segments. Among the perceived problems with the RCM's practical exams, individuals mentioned the stress they generated and the negative effect this stress had on performances. Others expressed frustration with the exams' perceived prescriptiveness, set pieces they did not enjoy learning, or syllabus changes. Some teenagers also voiced concerns about the poor quality of pianos in certain exam centres, examiners who did not play the candidates' instrument, or unfair results. A few even decried the exams as a potential tool of parental control and commodification of music-making, as exemplified by this 17-year-old:

> …. practising for the RCM exams simply because your parents negatively enforce it on you, where you follow the RCM's strict programming, preparing for their specific technical tests, their sight-reading tests, their ear tests, is the worst feeling in the world. It makes something as beautiful and as free as music, a prison in itself. I dread the piano now […] All of this dread, caused by a simple certificate that 'validates' my skill…

In stark contrast, however, four individuals praised the RCM and its exams for motivating them to practise and set "effective goals," as well as for educating the public about music. One 16-year-old even observed that as he progressed musically, he felt increasingly appreciative of the Baroque and Classical set pieces in Lists A and B of the syllabus.

Findings for the 19- to 21-year-olds

The 19- to 21-year-olds provided just 41 comments, or 75 segments. Although this represented over a fivefold decrease in segments compared to the 16- to 18-year-olds, the proportion of segments across themes generally remained somewhat similar, with the exception of 'Co-regulation' and 'Socio-contextual factors', which obtained the same number of segments (*ns* = 8). Nevertheless, 'Self-regulation' (*n* = 18) had the largest observable decrease, resulting in 'Music learning' (*n* = 23) taking its place as the age group's most mentioned theme, if only by a relatively small margin. As with other age groups, 'Royal Conservatory of Music' (*n* = 6) was the least common theme. However, the difference in number of segments compared to other themes was small. Also, four categories remained empty: 'APN', 'Supports: technology (*positive*)', 'Supports: technology (*negative*)', and 'During'.

Music learning. The largest category within 'Music learning', and indeed across all categories, was 'Musical accomplishments' (*n* = 15). Segments within this category were typically brief. In roughly half of them, individuals stated they were taking college-level music degrees, such as undergraduate- and master's-level programs. Also, individuals referred to the number of instruments they played, higher-level exams they had passed, and their teaching experience. While one 19-year-old wrote that she taught herself "musicality, not mastery," no explanation was offered.

Other categories in this theme contained comparatively few segments. For 'Reasons to play' (n = 5), individuals alluded to music's importance in their lives and expressed a desire to continue playing or taking lessons. For example, one 20-year-old explained she had returned to music lessons because she felt "like a huge part of [her] was missing" otherwise. Under 'Persistence' (n = 3), two individuals who were no longer taking lessons currently taught themselves by learning new repertoire or accompanying other musicians. Another funded her music studies by working part-time and teaching children. Again, however, no segments were related to 'APN'.

Self-regulated learning. With just nine comments, 'Motivation' was the third largest category overall and, as with previous age groups, the largest under 'Self-regulated learning' (n = 18). Segments were generally brief but conveyed a love for music, instruments played, or particular composers. For one 20-year-old, a fundamental part of choosing new repertoire was how "beautiful" and "impressive" it would eventually sound. Meanwhile, one 19-year-old understood that musical mastery was a lengthy process and stated: "Willing to take years to attain my goal, I don't care if the results are small to start with." In the only negative segment, one Master of Music candidate admitted she hated solo performances, recitals, and competitions. The 'Reflection' (n = 7) category contained a similar number of segments to 'Motivation', with individuals either evaluating their playing or reflecting upon the causes behind successful practice sessions and performances. For instance, one 19-year-old lamented not having "learned to relax while playing and practicing [*sic*] years ago!" Although another understood that reactions to her playing were largely subjective, one music major explained that solo performances made her particularly nervous because these were generally assessed and thus had

a direct bearing on her future. Nevertheless, personal agency and playing music one actually loved were also cited as key to musical success:

> This is the way learning and performing music often works: when you love the music, you will learn it to the best of your ability, and when it comes time to perform, the music will pour out of you as it is supposed to...the way it was written to be played, expressed with your own interpretation. When you learn the music because you have to, when you practice [*sic*] it will be drudgery and when it comes time to perform, no one will hear music...only notes.

The 19- to 21-year-olds yielded only two short 'Task Analysis' segments. In these, individuals shared goals of either increasing their motivation to practise or entering a performance-based Bachelor of Music program. However, no segments related to strategies during practice (i.e., 'During') were observed.

Survey. 'Survey' (n = 12) ranked as the third most popular theme among the 19- to 21-year-olds, with negative segments (n = 10) outnumbering positive/neutral ones (n = 2) fivefold. In 'Survey (*negative*)', which was the second most mentioned category overall, individuals explained why the survey was problematic, with reasons including not having taken exams recently, never having performed in public, or playing other instruments for which answers would have differed. A couple of individuals, meanwhile, struggled with the wording of specific items. For example, one 21-year-old argued that certain questions erroneously suggested that practice routines were fixed, while another challenged the conflation of improvisation and composition, "Improvising is a separate talent from composing, as improv [*sic*] usually happens on the fly in a jamming environment and is immediately forgotten, whereas composing is usually written for a purpose."

In ‘Survey (*positive/neutral*)’, individuals either praised the survey as “valuable” and “quite inspiring” or explained that they had completed it without knowing if their answers were valid, with one 20-year-old who had stopped taking lessons commenting, “I hope you can still use the data as I was very careful in my choices, and I still do play.”

Co-regulation. ‘Co-regulation’ (n = 8), the 19- to 21-year-olds’ fourth shared largest theme, comprised eight segments. Most came under ‘Supports: people (*positive*)’ (n = 6), with individuals identifying not only teachers but also musical peers, informal audiences, and parents as sources of support. Thus, one individual praised her teacher for her constant encouragement, personalised approach, and clear explanations, while another argued that a good teacher-student fit had the power to make one’s playing “come alive.” For one 19-year-old, playing in ensembles and accompanying others had made her a better musician and was unexpectedly fulfilling given that, in her view, conservatories prepared individuals for a life of music but only if they went on to become soloists. Another wrote that making music in settings where she did not feel judged helped her identify as a musician. Although only one individual acknowledged her parents for supporting her decision to become a singer, another envisioned herself as someone who would ensure her kids would “grow up with an appreciation for music and the hard work it takes to be able to create beautiful music.” Meanwhile, under ‘Supports: people (*negative*)’ (n = 2), one individual who had recently stopped lessons explained that she had always felt coerced into doing them, while another argued that students tended to lose interest in music when teachers followed RCM guidelines too closely, ‘I think too often teachers drive their students away from lessons and from the whole POINT [*sic*] of music in general when they try to ‘regulate’ it too much with the boundaries and rules of RCM.” No segments relating to either ‘Supports: technology (*positive*)’ or ‘Supports: technology (*negative*)’ were observed.

Socio-contextual factors. With the same number of segments, 'Socio-contextual factors' (n = 8) tied with 'Co-regulation' as the 19- to 21-year-olds' fourth most common theme, but ranked two places lower than in the previous age group. Once again, its negative segments outnumbered (n = 7) positive/neutral ones (n = 1). Segments within 'Socio-contextual factors (negative)' mostly came from non-music majors who had either quit lessons or otherwise reduced their music-making. Accordingly, several expressed difficulty fitting music into their new schedules. Interestingly, the one individual who did not mention time constraints called for an increase in music-related programs at university and in society generally, as well as useful learning strategies for motivated but time-strapped music students. Meanwhile, one music major commented that the demands of her program had dampened her enthusiasm for making music. In contrast to these negative segments, however, one 19-year-old described the joy and musical benefits of playing in her school concert band, although it is unclear if by 'school' she implied 'university'.

Royal Conservatory of Music. As with other age groups, the 19- to 21-year-olds' least common theme was 'Royal Conservatory of Music' (n = 6). Although one individual felt RCM exams helped him "gauge [his] abilities and areas needing improvement" (i.e., 'RCM (*positive*)' (n = 1), most segments were negative. Under 'RCM (*negative*)' (n = 5), individuals criticised RCM exams on several grounds: for being subjectively graded; for failing to promote ensemble work and the important skills this instilled; and for being the main reason children discontinue music. Echoing views held in other age groups, one 19-year-old argued that the imposition of RCM exams on children was directly responsible for music's high dropout rate among this population and, moreover, antithetical to music itself:

> If you are ever looking for a reason as to why kids always tend to drop out, my only conclusion is because the conservatory is forced upon them. […] RCM has moved away from what the whole intention of music is supposed to be; a discovery of this universal language. It is not something that cannot be so easily rationalized just by stamping a grade on an examination.

A couple of segments also highlighted instances of substandard pianos and constricted room arrangements in particular exam venues. One individual, for example, recalled being "crammed in the corner of a church and [feeling] slightly claustrophobic" to the point he was "even worried about hitting the wall behind [him], as well as the lighting."

Findings for the 22- to 24-year-olds

The 22- to 24-year-olds provided the least comments (n = 16) or segments (n = 27) of any age group, resulting in 7 empty categories. Only two themes contained more than five segments: 'Self-regulated learning' and 'Music learning' (ns = 10 and 8). While all themes had considerably fewer segments than in the previous age group, 'Self-regulated learning' demonstrated the largest proportional increase for this age group (see Figure 5), as reflected in the theme size rankings. Thus, besides the reversal in positions for 'Self-regulated learning' and 'Music learning' and 'Socio-contextual factors' dropping one position, theme size rankings remained relatively similar.

Self-regulated learning. With just four segments apiece, 'Motivation' and 'Reflection' represented the largest categories within 'Self-regulated learning', and joint second largest categories across themes. 'Motivation' segments were exclusively positive. Although brief, these conveyed a love of music, with individuals expressing enjoyment or valuing of either music-making, studying music theory, or taking lessons. Moreover, one 22-year-old described

continuing to play as important. ‘Reflection’ segments were similarly short and were largely related to practising. Although one 23-year-old admitted he found it hard to practise without a fixed routine, others either claimed they practised intensely, frequently, or at least satisfactorily. For instance, while one 24-year-old described her practice as erratic, she did not believe this to be an issue:

> I am no good at it, and I don’t practice [*sic*] often, but when I do get into practice, I can go on for many hours without stopping. For now, I just like to go at my own slow pace. It has taken me this far, slowly, but I don’t want to stop playing.

Segments under ‘Task analysis’ (n = 2) were also brief but rather less revealing, with individuals simply stating their intention to either take RCM theory lessons or a Grade 10 exam in order to teach local high school students. No segments appeared under ‘During’, however.

Music learning. ‘Music learning’ (n = 8) ranked as the second largest theme, with ‘Musical accomplishments’ (n = 5) constituting the largest category overall. Within this category, individuals either listed the RCM exams/theory lessons they had taken or, in the case of one 24-year-old, described themselves as professional musicians. Although two individuals had completed Grade 9 or higher, one 22-year-old had only recently sat her Grade 3 history and harmony exams. Meanwhile, under ‘Reasons to play’ (n = 2), individuals referred to the perceived stress-relieving properties of playing an instrument. For example, one mechanical engineer explained she mostly played to challenge herself and to relax. However, despite working full-time in a non-musical field, she still learned new repertoire whenever she was asked to perform at weddings and funerals (Persistence, n = 1). No segments were observed under ‘APN’.

Survey. 'Survey' (n = 5) ranked as the 22- to 24-year-olds' third most common theme. Like the 19- to 21-year-olds, negative segments (n = 4) exceeded positive/neutral (n = 1) ones. To varying degrees, the individuals within the 'Survey (*negative*)' category queried assumptions regarding the survey respondents. For example, two individuals felt the survey was primarily geared towards younger learners or beginners, with one 24-year-old describing questions which referred to parents or guardians as "completely irrelevant" to older students. Another individual found it difficult to complete the survey as she had taken her last RCM exam over a year prior. Also, one called for greater transgender inclusivity in questions about gender, requesting the inclusion of an "other" option. Nevertheless, 'Survey (*positive/neutral*)' revealed one 22-year-old found the survey useful as it helped him think about his practising:

> This questionnaire has provided me with the opportunity to reflect on my own abilities and practice habits. I feel like it has helped me to realize and recognize what habits need to be changed and what I can work on musically. A good reflection tool!

Co-regulation. The age group's fourth largest theme, 'Co-regulation', contained just two segments in 'Supports: people (*negative*)' and these referred to family-related issues. Thus, one individual alluded to tensions over when and where to practise, explaining that he practised in the living room where his family always watched TV. Another revealed her self-confidence was weakened whenever her family did not approve of her concert programs.

Socio-contextual factors. As with the previous age group, 'Socio-contextual factors' (n = 1) was the 22- to 24-year-olds' fifth largest theme albeit comprising just one segment. Thus, in 'Socio-contextual factors (*negative*)' one 23-year-old explained that he not only found it hard to practise more than one day a week due to his busy work schedule but also that he struggled to develop a regular routine as he practised in the family living room.

Royal Conservatory of Music. Finally, with just a single segment under 'RCM (*negative*)', in which an individual asked for more affordable exams, 'Royal Conservatory of Music' tied with 'Socio-contextual factors' as the 22- to 24-year-olds' second smallest theme.

Findings for the 25-and-overs

While analysing the 25-and-overs' open-ended comments, it soon became apparent that the age-range of the survey's participants was considerably broader than the survey writers had perhaps anticipated. Forty-three individuals (i.e., 42.16% of those in this age group who provided a comment) either stated (n = 24) or alluded to (n = 19) their age. The latter was manifest in statements such as "I started taking music lessons @ 58 yrs [*sic*] of age" or "I am a senior." Conservative estimates of such individuals' ages were then imputed, which when combined with the reported ages yielded a range of 30 to 78 years old (M = 54.19, SD = 12.09). Furthermore, as illustrated in Figure 11, there was a concentration of individuals between their mid-40s and late 60s. While it is impossible to ascertain how representative this was of all 25-and-overs who provided comments (or indeed of those who answered the closed-ended questions), it is worth remembering that this group's age range was highly idiosyncratic.

The 25-and-overs produced 102 comments, or 220 segments, both considerably larger than the previous age group, and resulting in just one empty category: 'Supports: technology (*negative*)'. Although the number of segments for the two most common themes resulted in a reversal of their size rankings (i.e., 'Music learning' [n = 58] and 'Self-regulated learning' [n = 52]), the surge in segments did not dramatically affect other themes' respective rankings. Notwithstanding the overall increase in proportional sizes, most notably for 'Royal Conservatory of Music' (n = 19) and 'Music Learning', that of 'Self-regulation' decreased considerably.

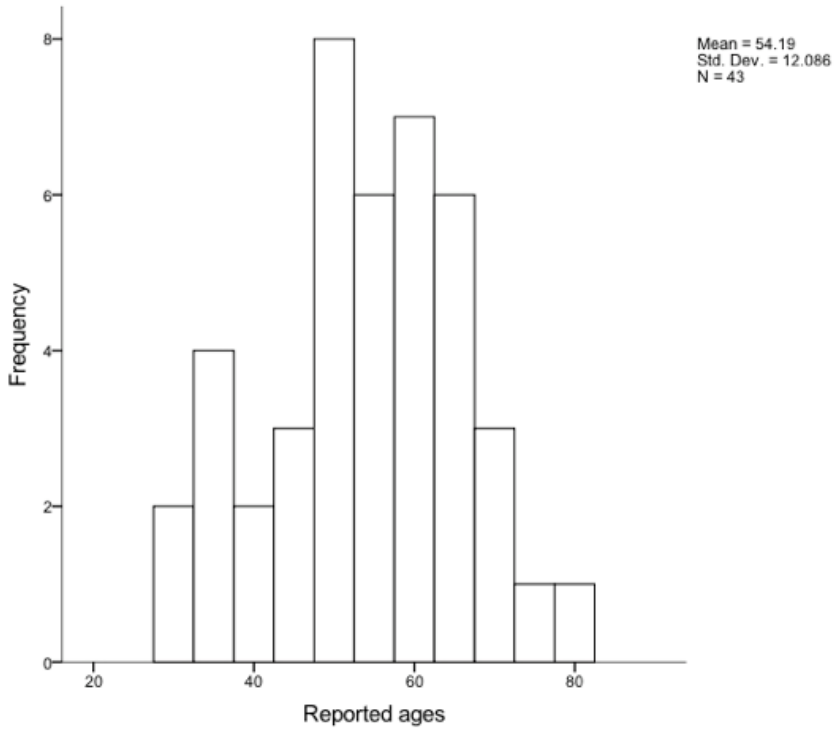

Figure 11. Reported ages (stated or alluded to) among the 25-and-overs.

Music learning. For 'Music learning', the 25-and-overs' two largest categories were 'Musical accomplishments' (n = 40) and 'Reasons to play' (n = 12), with the former representing the age group's most popular category overall. Within 'Musical accomplishments', just over half of the individuals either explicitly described themselves as adult learners or stated they were currently taking lessons. However, four of the 25-and-overs no longer took lessons and had finished Grade 9 or 10 and/or gave lessons themselves. Meanwhile, seven had returned to music lessons after an especially long hiatus, in one case spanning 60 years. Next, almost a third listed RCM exams taken and occasionally reported scores obtained. Although most of these were Grade 8 or higher, a couple had recently completed beginner-level grades. One of these had won an RCM Grade 2 Gold Medal: an award for candidates obtaining the highest scores in a province or region. While a quarter played at least two instruments, a few of these had reportedly played

their main instrument for twenty years or more. Just three had taken up a new instrument later in life, including one who had received piano lessons as a child and then started singing lessons at 40. Nevertheless, a handful of the 25-and-overs were also now giving music lessons, with one teaching as many as 35 private students. Of note, just two individuals explicitly self-identified as 'musicians': a touring heavy metal band member and a respondent in her mid-forties who was currently preparing for Grade 9. Finally, although individuals rarely clarified how long they had been playing their instrument, one 62-year-old had played for 55 years.

Although one individual claimed to have started piano lessons "just because," most 'Reasons to play' segments (n = 12) described clear, perceived extra-musical benefits. These included mental and physical stimulation, relaxation, and emotional well-being. For instance, individuals called playing their instrument "weightlifting for the brain," "zen/yoga for [the] mind," and an activity that made them "happy with life." Moreover, one 57-year-old maintained that such benefits were not limited to older learners since she had also witnessed this in younger musicians. One music teacher, meanwhile, wanted to represent a force for positive change in her students' lives and a civil servant/published author hoped one day to teach the piano to other committed adults like herself.

Compared to the 22- to 24-year-olds, a slightly higher number of segments were related to 'Persistence' (n = 5). Arguably, any individual aged 25 and over still playing, practising, or taking lessons could be labelled 'persistent', if only for the exponential increase in responsibilities commonly faced by this age group. However, in keeping with the codebook definition, the category was reserved for individuals who themselves referred to overcoming adversity or dealing with multiple responsibilities. These respondents either continued to practise without the help of a teacher (whether due to financial difficulties or unspecified reasons), held

concurrent careers, or encountered specific difficulties related to starting or resuming music lessons later in life. For instance, one individual explained that as an older beginner, she had no idea how to read musical notation or prior experience playing an instrument. Meanwhile, another observed that after 40 years away from her instrument, she had felt obliged to "start all over again, learn to read music again, etc." As with other age groups, however, 'APN' was highly underrepresented. In its sole segment, a 62-year-old explained that she usually practised for 20–30 minutes (on weekdays) but increased this to 90–120 minutes (6 or 7 days a week) when preparing for exams.

Self-regulated learning. Within 'Self-regulated learning' (n = 52), the 25-and-overs' two largest categories were 'Motivation' (n = 26) and 'Reflection' (n = 17). 'Motivation' segments typically revealed individuals' enjoyment of either playing or learning an instrument. Several emphasised that taking lessons was a personal choice. One respondent, moreover, noted that after retirement "you pursue [musical] excellence because you want to and are totally self-motivated." For those who had taken up music late, the experience was a lifelong dream. For others, returning to music was not only fun but considerably more rewarding the second time around, with one admitting that practising as an adult was far more enjoyable. Meanwhile, after changing instruments to one she loved, another individual observed she could learn her pieces faster. Respondents were thus overwhelmingly positive about the challenge of learning music during adulthood, perhaps best illustrated in this comment:

> Learning music: understanding its theory, being able to read well, its history, listening to music of many varieties, and to play it is one of the great lifelong, "unfinished, never finished" passions of my life.... Learning to play is probably the most interesting, frustrating, mysterious journey I have ever embarked on.

Although negative segments were rare, a couple of individuals voiced concern at their teachers' predominant focus on classical repertoire. For example, one 43-year-old described the pieces he was required to play as "out of touch with the times," adding that not everybody enjoyed classical music. Very few expressed views about their musical abilities. One speculated she would never play as well as someone who had started lessons as a child; however, she did not seem discouraged by this prospect because she maintained she would always enjoy playing, irrespective of how she might sound.

Just under half of the 'Reflection' segments were related to levels of satisfaction with, or feelings about, their music education. Unsurprisingly, several individuals declared themselves lifelong learners, maintaining that it was "never too late" and "learning music never ends." Although one described herself as "a self-directed 62 year old [*sic*]," one septuagenarian matter-of-factly stated that he would only take lessons until he stopped improving because "[at] that point lessons become a waste of everyone's time." Similarly, while a couple of individuals felt that lessons had considerably enhanced their lives, a few also expressed a degree of regret and frustration with their music education. For example, one wished she had learned to improvise or play by ear as a child since in her view these skills made for a well-rounded musician and helped foster musical relationships, important given her conviction that "music should bring people together in the community." In contrast, a 42-year-old who had already improvised and played by ear for many years branded the process of learning to sight read and practise as "very limiting", given his pre-existing skill set. Meanwhile, one individual expressed remorse at not developing musical self-discipline during her childhood as she believed this would have had a positive impact on many areas of her life. Notably, however, a few of the 25-and-overs described adaptive behaviour in response to their musical shortcomings. For instance, one had found an

instructor who could specifically teach her keyboard harmony and technique, while another had invested much time and effort learning about efficient practice and memorisation strategies after narrowly scraping through her last RCM exam. Finally, only a few respondents made causal attributions. For example, one reported that she played better in private than in front of an audience and another suggested that underlying age-related differences with regards to goals and motivations explained why adults might find learning to play an instrument "intimidating at first."

Compared with 'Motivation' and 'Reflection', 'Task analysis' (n = 8) comprised fewer segments and dropped considerably in size-based rankings. Most individuals reported RCM exam-related goals, which ranged from passing Grade 6 to obtaining the ARCT by the age of 60. Three respondents also hoped to continue playing or taking lessons for as long as possible. The youngest of these, a 57-year-old woman, hinted at some form of major strategic planning but did not offer specific details, stating: "I am pursuing the full course of RCM theory and practical for as far as I can go and I have changed my lifestyle to support that goal." On the other hand, one respondent who had recently passed grade 10 and stopped taking lessons, stated she had no plans to continue further. Finally, under 'During' (n = 1), one individual reportedly self-monitored by keeping a record of practice hours for the previous four years, thereby registering a total of 2,250 hours.

Survey. With three times as many negative segments than positive/neutral ones, 'Survey' (n = 40) was the 25-and-overs' third most popular theme. 'Survey (*negative*)' (n = 30) ranked as the largest category across all themes and for the most part consisted of segments related to the survey's focus on younger learners. Half the individuals remarked that certain sections were not applicable to adults, particularly where reference was made to 'parents' or 'guardians'; as one

43-year-old quipped, “I don’t think my dad needs an email receipt.” Others, however, concluded that most or even all of the survey was irrelevant to adult learners, with one branding it “ageist” and arguing that its writers had “the mistaken notion that all the people who study conservatory and take exams are children.” Although about a third expressed concerns that their responses might skew the researchers’ findings, several said they completed the questionnaire to the best of their ability. In some cases, this had involved answering non-applicable items as they might have done when younger, something that they felt could complicate interpretation of their answers. A few reportedly finished the survey because they felt their input was of value, while remaining critical of the researchers’ decision to limit their attention to younger individuals. For example, one 60-year-old suggested researchers made greater efforts “to reach out to us mature folks.” Another respondent argued that as major supporters of the arts in an increasingly ageing world, retired learners deserved at least some consideration:

> I recently spoke to a piano salesperson who said that his two main categories of piano purchasers were parents of children taking lessons and retirees like myself. I think this might be a good area of study: what effect will the boomers have on the arts as they retire? Are they moving from being passive consumers to being active producers of art? Is the system geared up for them (i.e. conservatories, arts schools and departments)?

In addition to these concerns, however, a couple of respondents felt the survey was overly long and repetitious, with one individual doubting whether younger learners would even complete it. Meanwhile, another criticised the researchers’ understanding of practice, recommending additional questions, such as how long individuals practised without breaks, how many breaks they took between sessions, and if they really listened to themselves when practising.

Although in the minority, 'Survey (*positive/neutral*)' (n = 10) revealed a number of 25-and-overs felt positively about the survey, describing it as "excellent," "thought-provoking," and "thorough." Some individuals thanked the researchers for giving them the opportunity to participate and thereby reflect upon their practising, playing, and areas of weakness. One respondent even wished he could have saved his completed survey for future viewing, while another was curious to learn the study's eventual findings. Another respondent declared she would have her children complete the survey too.

Co-regulation. The fourth most common theme was 'Co-regulation' (n = 29). While the previous age group barely mentioned any form of support, this was not the case for the 25-and-overs. In particular, 'Supports: people (*positive*)' (n = 22) had the largest increase in size ranking across all categories, with teachers and family members constituting the most frequently cited sources of support. These individuals described their teachers as "fabulous" and "wonderful," praising them for being "very encouraging" and for having "the patience of a saint," for example. Although few respondents went into further detail, a couple admitted they felt especially fortunate to have met their teachers. One respondent described feeling "enlightened" by and eager to learn all she possibly could from her teacher, a former college professor and orchestra member. Meanwhile, for another individual, the resulting bond had evidently remained particularly enduring, "My teacher is in her 90's and was the teacher I had for a couple of years when I was a teenager—she is wonderful, and her opinion of my playing is important."

Several of the 25-and-overs also referred to support within the family. Some explained they had started music lessons at (or around the same time as) their children, including one father whose enthusiasm had reportedly motivated his daughter to take up lessons. Also, two senior citizens claimed to have spouses who supported their musical development, while another

individual recalled his parents' phlegmatic reaction to his lack of practise as a child, explaining that they had not chosen "to battle" with him. In addition to teachers and family members, a small number of individuals mentioned friends and musical peers as agents of co-regulation. One pointed out that besides exam adjudicators, the only people who might want to listen to an intermediate-level student like herself were a few select friends. Another respondent who had started lessons in her late 50s actively encouraged her friends and acquaintances to take up lessons themselves, adding that they all wanted to anyway. Lastly, one individual reported she was in a band that played at private functions, while another (aged 57) enjoyed studying with, and was inspired by, younger peers at summer music courses.

By comparison, 'Supports: people (*negative*)' ($n = 4$) comprised a small number of segments. Three of these related to teachers: one individual criticised her childhood music instructor for not being very good, while two mentioned a perceived endemic reluctance to teach difficult subjects such as technique, harmony, or theory. Lastly, one of the individuals explained how having particularly young children could easily hamper one's ability to practise and take lessons, but how this did not disqualify her as a serious music student:

> I have two kids under three, so I always have half an ear out for them and my daughter is usually next to me "accompanying" me on "her" notes. This is what I have to do to be able to play at all and the reason I'm not doing lessons formally. It does not mean I am not a piano student.

'Supports: technology (*positive*)', meanwhile, contained three segments. Two individuals named the instrument they owned, the purchase of which had led one to start lessons with an "excellent" teacher. Finally, one respondent described feeling both encouraged and heartened after reading texts about practice, citing the so-called 10,000-hour rule and the memoir of an amateur

pianist/newspaper editor who mastered Chopin's Ballade No. 1 in just over a year. In contrast, 'Supports: technology (*negative*)' contained no segments whatsoever.

Socio-contextual factors. 'Socio-contextual factors' (n = 22) represented the fifth most common theme among the 25-and-overs and contained a reasonable balance of negative and positive/neutral statements. Under 'Socio-contextual factors (*negative*)' (n = 12), individuals commented on the challenges they faced as older learners. For example, a small number claimed there was insufficient encouragement to take lessons and that performing opportunities for adult students were non-existent. While one individual acknowledged that the marginalisation of retirees was not unique to music education, she did not seem averse to challenging this:

> I suspect I am part of a trend of retirees returning to something they once loved to do but had to set aside to get on with the business of earning a living. […] I am one of the oldest boomers, and am used to not having services in place; rather, having to create them for those that come after me. It would be nice to have trends anticipated for a change.

Others remarked that it was much harder for adults to schedule practice sessions due to their multiple responsibilities at home and work. For one individual who preferred to practise in absolute seclusion, the problem was further compounded since practice was "difficult if others are in ear-shot because practising is mostly playing stuff you don't play well yet." Meanwhile, other respondents mentioned tendonitis, age-related cognitive decline, or financial worries as additional factors impeding their musical development.

Ten individuals, however, also mentioned positive or neutral socio-contextual factors. Most of these described playing or singing with others, for example in church choirs, musical theatre groups, bands, or ensembles. In the case of one individual, her musical schedule was exceptionally busy since she not only performed as principal pianist for a university choral

society, but also accompanied at informal recitals, musical gatherings, and master classes, and on occasion even stood in for church organists. A couple of individuals also remarked that music lessons, if one could afford them, represented an opportunity for social interaction and were, moreover, not always the preserve of young learners. Thus, one 76-year-old had resumed lessons "to enjoy the social aspect of playing with others" while another individual pointed out that over half of the Orpheum Annex music school's students in Vancouver were retirees. Meanwhile, one man in his 70s explained that as his wife did not enjoy listening to music he practised in the basement, an arrangement which evidently suited both parties. Finally, for one individual who had started lessons at 58, a period of convalescence had paradoxically allowed her to spend more time practising.

Royal Conservatory of Music. The least common theme among the 25-and-overs was 'Royal Conservatory of Music' (n = 19). In contrast to all other age groups, the theme comprised slightly more positive (n = 12) than negative (n = 7) segments. Under 'RCM (*positive*)', several individuals described RCM exams as a valuable learning experience. Some also associated exam preparation with better quality practice. For example, one individual who had entered herself in for RCM exams so as to take her lessons seriously claimed the exams had "brought a whole new discipline" to her practice sessions. Others were grateful that the exams included sight-reading and harmony, even if one admitted she "may have despised the sight-reading component of Conservatory exams" during her childhood days. For one individual, exams represented her only chance to perform in front of someone. While this was obviously not the case for the professional heavy metal musician, she did feel her RCM training had taught her to play with other (presumably classically trained) musicians. However, for some individuals, the RCM represented the most satisfying and challenging aspect of learning a musical instrument, as

illustrated by the following observation, "As an adult, receiving RCM music training is the best journey of my musical career. I am learning and taking on new challenges such as exams and performing outside my comfort zone."

However, not all 25-and-overs felt positively about the Royal Conservatory of Music. Indeed, most segments within 'RCM (*negative*)' ($n = 7$) were openly critical of the institution's exam system. For example, a couple of individuals found RCM exams expensive and its syllabus limiting. One individual suggested expanding the syllabus to include playing by ear and improvisation, as she felt it was regrettable that RCM-trained musicians could only play for others if they had their sheet music in front of them. Another said she would willingly pay additional fees in order to choose her own exam times, implying that current exam schedules did not necessarily suit adult learners. In a more excoriating critique, however, one individual described the syllabus as an "obsolete hindrance to creating a well rounded [*sic*] musician." Unsurprisingly, she had completely turned her back on RCM exams, neither taking them herself nor entering her students in for them. Since changing to a teacher who shared her views, she also claimed to have become a "much more complete and happy musician." Nevertheless, she did not offer clarification as to why the RCM syllabus was a hindrance, what she was learning with her new teacher, or how she was instructing her own students. Finally, one respondent voiced concerns about a particularly austere examiner, raising doubts about his suitability for such a position:

> My last piano exam, the examiner made me so nervous, I felt like I was in front of a parole officer. He never said anything with more than two syllables and monotone. It felt like I was begging for my life. Who would like to play music like that?

Across-Group Findings

Self-regulated learning. 'Self-regulated learning' (n = 539) was the most frequently mentioned theme in most age groups and accounted for about a third of the total coded segments. Group-specific proportions decreased relatively steadily across the first four age groups. In contrast, the increased proportion among the 22- to 24-year-olds reflected increases within the age group for three of the theme's categories.

Motivation. Despite a gradual decline in group-specific size after the 10- to 12-year-olds, 'Motivation' (n = 330) ranked as the most frequently mentioned category overall, comprising 20.7% of the total coded segments. Irrespective of age groups, it remained firmly within the top three categories and consistently ranked first place among 'Self-regulation' categories (see Figure 5). Across the data set, the most frequently recurring sentiment expressed within 'Motivation' was love for music, followed by love for one's instrument(s), learning music, and music lessons. Notably, hardly any individuals reported that they enjoyed practising unless this involved repertoire they had chosen and/or liked. While it was not uncommon to express a dislike or resistance to learning music, usually because of the repertoire or the need to practise, this was most typical among individuals aged between 10 and 15. Although affirmations of high and low self-efficacy were scattered across the range of age groups, these were not particularly common. Unlike other age groups, the 25-and-overs further elaborated on the nature of their intrinsic motivation, emphasising that taking lessons was very much a personal choice. The 25-and-overs were also more apt to question the tendency among some instructors to limit their teaching to classical repertoire, while ignoring such skills as playing by ear and improvisation.

Reflection. 'Reflection' (n = 145) comprised 9.1% of the total segments and was the third most mentioned category overall. It ranked within the top five categories throughout the

data set and mostly occupied second place within the theme of 'Self-regulation'. While the 7- to 9-year-olds yielded no 'Reflection' segments, most observations involved either self-evaluations or causal attributions. Within these, individuals typically made positive evaluations of their practice, playing, or learning and, from the 13- to 15-year-olds onwards, attributed their degree of success to whether or not they had chosen their own repertoire. Meanwhile, negative self-evaluations were mostly restricted to the 16- to 18-year-olds, who occasionally described themselves as lazy, less talented than their peers, or not as advanced as they felt they should be, given the time and effort they had invested. Examples of adaptive behaviour were infrequent and limited to two age groups. Thus, some 13- to 15-year-olds dealt with setbacks by changing instruments, practising on different ones, or simply practising harder. Meanwhile, a few 25-and-overs demonstrated adaptive behaviour by working with instructors who could teach them the skills they specifically needed.

Task analysis. 'Task analysis' (n = 61) accounted for just 3.8% of the total segments and ranked 11th overall among the categories. Furthermore, although 'Task analysis' typically placed third within the theme of 'Self-regulation', it generally constituted less than 5% of the segments within any particular age group. By far the majority of 'Task analysis' segments either listed RCM exams or stated general learning goals, such as wanting to learn new pieces or different instruments. Most segments were brief with no mention of how goals were arranged hierarchically. As could be anticipated, the grade level of RCM exams tended to increase with age, and an interest in pursuing postsecondary music studies became more apparent among older teenagers. Meanwhile, although some 25-and-overs echoed their younger counterparts' desire to reach an RCM exam milestone, others simply hoped to continue as long as possible.

During. 'During' (n = 3) constituted a mere 0.2% of the total coded segments and was the least frequently mentioned category overall. Accordingly, it was the lowest ranking category within 'Self-regulation'. With only three segments to speak of—two of which were ambiguously worded—it was not possible to identify trends or commonalities.

Music learning. The second largest theme, 'Music learning' (n = 411), represented approximately a quarter of the total coded segments. Characterised by a clear upward trajectory among school-aged groups, Figure 6 suggests that 'Musical accomplishments', and to a lesser extent 'Reasons to play', may have been associated with its increased visibility among younger groups. From the 19- to 21-year-olds onwards, however, it appears that the 'Musical accomplishments' category was the one mostly responsible for consolidating the theme's importance among older learners.

Musical accomplishments. 'Musical accomplishments' (n = 257), ranked as the second most frequently mentioned category overall and represented 7.6% of all coded segments. Most of these listed one or more of the following indicators of musical accomplishment: playing multiple instruments, having passed or done well in an RCM exam, or having played for a certain number of years. The first two indicators recurred regardless of age group and revealed that while multi-instrumentalists generally played two or three instruments, younger learners had typically passed lower-level RCM exams. In contrast, length of time playing an instrument was more frequently mentioned from the 13- to 15-year-old group onwards. Among the three older age groups, musical accomplishments also included studying music at the post-secondary level or teaching music, with a quarter of the 25-and-overs giving music lessons.

Reasons to play. While typically ranking second within its parent theme, 'Reasons to play' (n = 122) made up 7.6% of the total segments and was the fifth most frequently mentioned

category overall. By far the most common examples of reasons to play were the positive therapeutic and cognitive effects of playing a musical instrument, followed by career aspirations. As illustrated in Figure 6, most of the category's segments were concentrated among four age groups, such that less could be ascertained about either the 7- to 9-year-olds or individuals aged between 19 and 24. Nevertheless, individuals often claimed that playing a musical instrument made them feel happier and more relaxed, with several 13- to 15-year-olds describing music as a coping mechanism and emotional outlet. Increased mental alertness was a familiar refrain, with some 16- to 18-year-olds suggesting that learning an instrument had a beneficial effect on their academic performance. Across groups, certain individuals also harboured ambitions of a musical career. Such aspirations, however, were more specific with age: 10- to 12-year-olds hoped to become 'musicians', whereas 16- to 18-year-olds had their sights set on becoming film composers or music therapists.

Persistence. Despite marginal increases across age groups, 'Persistence' (n = 27) remained a minor category, ranking 13th overall and comprising just 1.7% of the coded segments. Typically containing five or fewer segments per group, the most commonly cited example of persistence was continuing to play or practise despite no longer taking music lessons. Among the 16- to 18-year-olds, however, persistence also involved continuing after finishing upper-level RCM grades. For the 25-and-overs, persistence included confronting cognitive and physical challenges associated with starting or resuming lessons later in life.

Amount practised (non-SRL). 'Amount practised (non-SRL)' (n = 5) accounted for a mere 0.3% of the coded segments and consequently ranked second lowest overall (jointly with 'Supports: technology [negative]'). Relevant segments were rare and found among the two

teenage groups and the 25-and overs, with individuals simply specifying the length of time practised.

Co-regulation. Comprising 205, or 12.85%, of the total coded segments, 'Co-regulation' represented the third largest theme and displayed a 3:1 ratio of positive and negative segments. Its group-specific proportions fluctuated the most of any theme, with its importance for 7- to 9-year-olds, subsequent decrease, then modest increase amongst 25-and-overs closely corresponding to the path observed for 'Supports: people (*positive*)'.

Supports: people (positive). Although 'Supports: people (*positive*)' (n = 133) ranked as the fourth largest category overall, both its group-specific proportions and rankings were the least stable. Irrespective of these fluctuations, teachers, family, and friends were consistently cited as forms of support. Among these, teachers were the most frequently mentioned and were routinely praised for their encouragement and patience. Notably, however, several 10- to 12-year-olds felt grateful to have teachers who taught them in a way that matched their own interests. Family members also offered considerable encouragement. Although the 7- to 15-year-olds acknowledged support from the largest variety of family members, siblings were only cited among 10- to 15-year olds, and parents were no longer referred to after the age of 18. Several 13- to 15-year-olds described appreciation for parents who let them choose whether to practise or continue taking lessons. In contrast, the 25-and-overs referred to having supportive spouses or children with whom they had started lessons. Where mentioned, friends generally lent support by praising the respondents' musicality or somehow sharing their musical experiences, although it should be pointed out that the 7- to 9-year-olds made no reference to friends.

Supports: people (negative). With roughly half the segments of its positive counterpart, 'Supports: people (*negative*)' (n = 56) was the second most frequently mentioned category

within ‘Supports’, but accounted for only 3.5% of all coded segments. While the category’s group-specific proportions fluctuated somewhat, variations were less marked than those of ‘Supports: people (*positive*)’. Once again, teachers featured the most prominently, with individuals of diverse age groups describing their teachers as overly prescriptive. However, some 10- to 12-year-olds also referred to their teacher’s inability to motivate or relate to them as individuals. Family members were mentioned from the age of 13 upwards, with teenagers typically expressing resentment towards parents who coerced them into taking lessons or practising. In contrast, after the age of 22, a few students felt younger siblings or children hindered their ability to practise properly. Perhaps unsurprisingly, friends were not mentioned in connection with lack of support.

Supports: technology (positive). Within ‘Supports’, the third most frequently mentioned category was ‘Supports: technology (*positive*)’. With just 11 segments, it comprised only 0.7% of the total coded segments and thus constituted a particularly minor category. The 7- to 9-year-olds made no mention of technology, but a few older, school-aged individuals explained they listened to (or watched) online recordings of music in order to improve their playing, with a couple of teenagers specifying which technological applications they used to perform or record themselves. Although a few of the 25-and-overs mentioned owning particular models of instruments, one also described reading texts related to practising.

Supports: technology (negative). ‘Supports: technology (*negative*)’ (n = 5) was the second smallest category (jointly with ‘Amount practised’) and accounted for a mere 0.3% of coded segments. Its segments were confined to a smattering of individuals aged between 10 and 18 who either alluded to dissatisfaction with their musical instrument or suggested a need for technological apps that could help with their music-making.

Survey. 'Survey' (n = 181) represented the fourth largest theme and contained 11.35% of the total coded segments. Although it initially accounted for a small proportion of the 7- to 9-year-olds' segments, 'Survey' grew more or less steadily across age groups. This may have been closely associated with the marked rise in group-specific sizes for 'Survey (*negative*)', particularly from the 13- to 15-year-old age group onwards. While the difference between positive and negative segments was minimal in the younger age groups, the gap widened appreciably among the three oldest age groups. 'Survey' contained twice as many negative segments as positive ones overall.

Survey (negative). 'Survey (*negative*)' (n = 117) contained 7.3% of the total coded segments. Although this category was the sixth largest overall, its group-specific proportions generally increased as individuals grew older. The most frequent observation, and one which was made repeatedly across four successive groups (i.e., individuals aged between 10 and 21), was that the survey was problematic for multi-instruments as responses could differ by instrument. This prompted some 16- to 18-year-olds to admit to providing amalgamated answers or responding erratically. At the same time, while a common refrain among 10- to 12-year-olds was that the survey was too long, several individuals aged 22 and over criticised the survey for being conspicuously aimed at children and teenagers. Also, various 16- to 18-year-olds pointed out that they would have answered the survey differently at other points of their life, with some answering *ex post facto*. While the latter was also true of some 25-and-overs, these individuals were more concerned about their answers distorting the data, with some choosing to answer because they felt their voices should be heard nonetheless.

Survey (positive). 'Survey (*positive*)' (n = 64) constituted 4% of the total coded segments and, unlike its negative equivalent, group-specific proportions remained comparatively small,

barely shifting across age groups. While some individuals in the two younger age groups expressed interest in the iPad lottery incentive, most segments were related to the survey's design. Thus, across the groups the survey was variously described as fun, thorough, and from the 16- to 18-year-olds onwards, thought-provoking. While several 13- to 15-year-olds enquired about the survey's purpose, others were keen to learn the eventual findings and/or how the data would be used. Such curiosity about the research was also displayed among some 16- to 18-year-olds.

Socio-contextual factors. 'Socio-contextual factors' (n = 168) ranked as the fifth largest theme and accounted for 10.53% of the total coded segments. Peaking among the 16- to 18-year-olds, this theme's proportions described an arc spanning the first six age groups but with a slight increase among the 25-and-overs. As Figure 9 suggests, it is somewhat difficult to gauge which category may have driven the theme's overall trajectory, and the overall distribution of positive versus negative segments was evenly balanced. However, it appears 'Socio-contextual factors (*positive*)' assumed a slightly more important role among the 25-and-overs. At the same time, while positive segments initially outnumbered negative ones, 'Socio-contextual factors (*negative*)' grew more salient from the 16- to 18-year-olds onwards.

***Socio-contextual factors* (*negative*).** 'Socio-contextual factors (*negative*)' (n = 85) comprised 5.3% of the total segments and ranked seventh overall. While this category contained no mentions among the 7- to 9-year-olds and just one among the 22- to 24-year-olds, it was generally characterised by a slight rise in negative feelings, with most segments found among individuals aged between 16 and 21. By far the most repeated complaint was being too busy to practise. Nevertheless, other issues included the high cost of lessons, limited access to music events/education, and intrapersonal challenges such as stage-fright or physical tension. As could

be expected, younger individuals were reportedly too busy with academic and sporting commitments. However, issues such as lack of encouragement, financial worries, or physical/cognitive decline were restricted to the 25-and-overs.

Socio-contextual factors (positive/neutral). Closely matching its negative counterpart, 'Socio-contextual factors (*positive/neutral*)' (n = 83) represented 5.2% of the coded segments and was the eighth most frequently mentioned category overall. As suggested by Figure 9, younger teenagers felt more positively about socio-contextual factors than other groups, in spite of a small increase in group-specific size among the 25-and-overs. Most of the younger learners referred to communal music-making, such as performing in a band or choir, and this largely happened in school settings. Interestingly, several 10- to 12-year-olds claimed to have no problems balancing their musical and non-musical interests, while some 13- to 15-year-olds found it motivating to make music outside of the studio and/or school. Although the 25-and-overs also participated in group music-making, this occurred within the general community (e.g., in churches and community music groups).

Royal Conservatory of Music. 'Royal Conservatory of Music' (n = 91) ranked as the least frequently mentioned theme and accounted for just 5.71% of the coded segments. Group-specific proportions did not fluctuate excessively and despite a predominance of positive segments among the youngest and oldest age groups, there were twice as many negative observations about the RCM overall. Moreover, as Figure 10 suggests, the theme's trajectory appears to have been chiefly related to the relative dominance of negative feelings about the RCM. That said, the proportion of positive segments among the 25-and-overs may have contributed to the theme's increased importance among this age group.

***Royal Conservatory of Music* (*negative*).** 'Royal Conservatory of Music (*negative*)' (n = 62) was a relatively minor category, accounting for 3.9% of the coded segments. As illustrated in Figure 10, negative observations about the RCM were generally more frequent than positive ones, although this was not true of the very youngest and oldest age groups. Most negative observations were concentrated among individuals aged between 10 and 21, with none found among the 7- to 9-year-olds and just one among the 22- to 24-year-olds. Generally, however, such observations related either to RCM exams or syllabi. Allusions to the fear and stress associated with taking these exams were more prevalent among individuals aged between 10 and 18, although most age groups contained isolated references to unpleasant examiners. From age 16 onwards, such observations gave way to complaints about the RCM's syllabi and its administration of exams. Other negative segments were scattered less systematically across age groups, and these included references to the following: poor quality pianos in exam centres, high exam registration costs, unfair grading, and the RCM's espousal of a Western classical canon that was perceived to be antiquated and limited at best.

***Royal Conservatory of Music* (*positive*).** Like its negative counterpart, 'Royal Conservatory of Music (*positive*)' (n = 29) constituted a minor category, representing a mere 1.8% of the total coded segments. Most age groups contained conspicuously few positive segments, with only the 25-and-overs offering more than 10. These essentially revealed that some individuals enjoyed taking exams and/or found them motivating. Due to the scant number of segments, however, it was not possible to draw conclusions about age-related trends. Nevertheless, the most frequent observation in the oldest (and best-represented) group was that exams were not only fun, but also valuable experiences.

General Summary of the Open-ended Comments Analysis

The analysis of the open-ended comments showed that 'Self-regulation' was the most frequently mentioned theme. This theme contained a large number of references to the respondents' high levels of motivation. However, the comments provided little information with regards to the strategies individuals used during practice. The second most important theme was 'Musical learning'. Here, respondents of all age groups frequently cited their successes in RCM exams as examples of musical accomplishment. 'Co-regulation' was the next largest theme. The findings suggested that, overall, respondents felt supported by their teachers, families, and friends. Nevertheless, individuals provided relatively few examples of technological support. The fourth largest theme was 'Survey'. Although comments about the survey drew mixed responses, criticisms increased in line with age, with older respondents voicing disappointment about the survey writers' explicit targeting of younger learners. 'Socio-contextual factors' was the fifth largest theme. Whereas some individuals were fortunate enough to participate in music making activities within their community, many respondents were not, often due to constraints such as lack of time or money. The 'RCM' was the smallest theme of all. While many individuals felt motivated to succeed within the parameters of the RCM curriculum, more respondents found music exams stressful and its traditional approach limiting.

Due to the extremely open-ended (and optional) nature of the final item, it is impossible to gauge whether fluctuations in sizes of themes and categories would have also occurred had all respondents answered the final item, or had this item been replaced by a series of tightly focused, open-ended items. Nonetheless, as will be demonstrated in the discussion chapter that follows, the broad range of responses added contextual flavour to the closed-ended findings.

Chapter 6: Discussion

The results of this study clearly suggest that there are significant age-related differences between music learners with respect to self-regulatory processes and associated constructs. Insofar as the responses to the open-ended and closed-ended questions could be compared, they both reflected these age-related differences. In the discussion that follows, the research questions are revisited, and the overall results are summarised in relation to previous research reported in the literature. Next, pedagogical implications for music studio teaching are outlined. The chapter ends with a discussion of limitations and possibilities for further research.

Interpreting the Results in Relation to the Research Questions and Literature

The three major questions explored in the thesis were as follows: (1) How do age groupings differ with regard to self-regulatory processes and associated constructs among Canadian music learners?; (2) Which combination of self-regulatory processes and associated constructs best predict age groupings?; and (3) How do open-ended responses of music students differ by age groupings? The results for each of these questions are now summarised in turn.

How do age groupings differ with regard to self-regulatory processes and associated constructs among Canadian music learners? This question was primarily addressed through the analysis of the closed-ended responses using a MANOVA, univariate ANOVAs, trends in mean differences across age groups, and polynomial contrasts, as reported in the results in Chapter 4. While the open-ended responses reported in Chapter 5 provided additional evidence that may serve to guide future research, these are dealt with later in the discussion.

The closed-ended responses revealed that in some cases, self-regulatory processes and associated constructs improved with age. For example, the use of planning strategies, persistence

in practising, intrinsic motivation to learn music and to practise, reflecting on progress, and motivation to practise generally increased steadily across age groupings, even if this was not always true of the 25-and-overs. These findings appear to be at odds with those of Bonneville-Roussy and Bouffard (2014), who found no age-related differences for use of self-regulation strategies. However, these authors targeted advanced-level, younger adults who may have wanted to pursue further musical studies—or even become professional musicians—and may, therefore, have been similarly self-regulated to begin with.

The closed-ended responses also demonstrated that certain self-regulatory processes and constructs deteriorated with age. For example, levels of extrinsic motivation decreased across age groups. This is perhaps unexceptionable, given that the extrinsic motivation items referred not only to the role of teachers, but also parents, and guardians. It is also consonant with Araújo's (2016) finding that self-regulation through external resources decreased significantly with age. However, several age-related deteriorations were somewhat unsettling. First, while physical and mental reactions to performance suggested the very youngest learners were comfortable performing, there was a discernible drop in comfort levels between the ages of 10 to 15. Moreover, these levels remained low for the older age groups. This is disturbing because one would hope that musical performance, both formal and informal, would be something that learners would feel more comfortable with as time progressed. A second troubling finding was a drop across age groups in both the perception of aural abilities and use of aural skills. This ought to represent grounds for concern because one would presumably expect that aural abilities only become heightened with time and experience, as is often manifest with informal music making (Brook, Upitis, & Varela, 2017; Green, 2009).

A third set of results was less straightforward. One of these complex findings was that the frequency of practising technique, sight-reading, and ear training displayed a (noninverted) U-shaped pattern, a pattern that has also been found in other music studies examining the progress of young learners (Bamberger, 1982). Practising such components of musical learning dropped steadily until the age of 19 and then picked up again with older learners. Given the decrease in the use of aural skills with increasing age, it would perhaps be expected that the skills in this third group would also decrease with older learners. However, it is possible that older learners better understand the importance and place of technical skills, even though they may not enjoy practising these skills. For example, this was evidenced by an open-ended response from one older music learner who described how deep and full engagement with music learning necessarily involved an integration of the elements of technique, history, and theory.

Another perplexing finding was related to the trajectory across age groups for personal competency beliefs. Considering the importance of self-efficacy in models of self-regulation (Bandura, 1991; McPherson & McCormick, 2006; Zimmerman, 2000) one would expect that self-efficacy and personal competency beliefs would be higher for older age groups. The findings from the current study indicate that personal competency beliefs drop dramatically for music learners 25 years and older. Perhaps even more disconcerting is the finding that once music learners reached the teenage years, they, too, experienced a relatively low level of personal competency. Indeed, students in this age group also hinted at this limited self-efficacy in their responses to the open-ended question.

In summary, many of the self-regulatory processes and associated constructs, such as motivation, reflection, and planning varied with age groupings as one would perhaps predict. Others, such as aural skills, perceived aural abilities, and personal competency beliefs, behaved

in more surprising or complex ways. These more problematic variables will be revisited in the discussion on further research and pedagogical implications.

Which combination of self-regulatory processes and associated constructs best predict age groupings? The second research question was addressed through the Discriminant Function Analysis reported in Chapter 4. There were four significant results, of which the first two accounted for most of the variance (95%) and are summarised below.

The discriminant function that best separated the age groupings accounted for 71.8% of the variance and suggested that younger music learners were more likely to be extrinsically motivated to practise, to feel relatively comfortable performing for others, to have a strong perception of aural skills, but generally be less likely to reflect on their practice strategies. This result was in keeping with the findings for the first research question; it would appear that young students have yet to develop the skills associated with self-reflection. Further, they require, or at least benefit from, external forms of motivation, a finding which resonates with other research findings (Faulkner et al., 2010; Hadwin & Oshige, 2011; McPherson & Renwick, 2001; Upitis et al., 2010; Upitis, Abrami, Varela, King, et al., 2016). In addition, they have not yet developed an aversion to performance, nor do they appear to doubt their aural skills. Of these four variables, extrinsic motivation was the most important.

The second strongest discriminant function explained 23.1% of the variance. As indicated in the results, the most reliable predictors in this cluster of processes and constructs were mostly negative and included lack of enjoyment for music learning and practising, poor motivation to practise effectively, a dislike of technical work and exam skills, as well as extrinsic motivation. However, this function's weaker effect size suggested it was less capable of discriminating between age groupings.

From these analyses, it is not clear what additional factors may distinguish the groupings from one another. However, the open-ended comments further clarify some of the characteristics that may be of relevance. These characteristics are addressed below and in the section on further research.

How do open-ended responses of music students differ by age groupings? The third and final research question involved the analysis of an unexpectedly large number of responses. Using a combination of *a priori* and emergent coding, the responses' six overarching themes were determined to be as follows: (a) self-regulation (including motivation, task analysis, during, and reflection), (b) music learning (persistence, reasons to play, musical accomplishments, and amount practised), (c) co-regulation (people, technology), (d) survey, (e) socio-contextual factors, and (f) the Royal Conservatory of Music (RCM). Each of these broad themes are now summarised in turn.

In most age groups, self-regulated learning was the most frequently mentioned theme, accounting for fully a third of the segmented comments. As noted in Chapter 5, the group-specific proportions decreased relatively steadily across the first four age groups. This may have been due to a parallel drop in motivation segments, as motivation was the largest category under self-regulation. However, this was not necessarily symptomatic of decreased self-regulation or motivation among older respondents. Declarations of love for one's instrument(s), learning music, and music lessons were common across all age groups, even if negative reactions to classical repertoire and having to practise came to the fore among some of the 10- to 15-year-olds. This finding coincides with the overwhelmingly positive direction of the factors, as well as the age around which learners tend to quit classical music lessons (Cremaschi, Ilinykh, Leger, & Smith, 2015; McPherson et al., 2012). Similarly, most age groups provided positive evaluations

of their music learning experiences. That said, the 7- to 9-year-olds did not provide any reflection segments, consistent with the findings of the discriminant function analysis. Also, the category of task analysis comprised less than 5% of the segments for all age groups. While it may not be overly surprising that RCM exam-goals increased in line with age, the absence of intermediary, hierarchically arranged goals arguably speaks to the importance of RCM exams as distal goals for many learners in this population. In contrast, the dearth of comments about practice-related strategies may have been due to the amount of questions the respondents had already answered about practice strategies.

The second largest theme was music learning and represented approximately 25% of the coded segments. Musical accomplishments were the most frequently mentioned aspect of music learning, regardless of age group. Evidence of musical accomplishments identified by respondents included playing more than one instrument, having succeeded in the RCM exam context, or having played for several years. Accordingly, playing multiple instruments has been identified by other researchers (e.g., McPherson et al., 2012) as an indicator of long-term musical accomplishment and enjoyment. While playing multiple instruments and RCM exam success were mentioned in all age groups, the older groups' examples of accomplishment also extended to music college admissions and teaching others, as one might expect given their ages. By far the most common reasons to play were associated with the therapeutic and cognitive benefits of playing a musical instrument, particularly among younger teenagers and the 25-and-overs. To what extent such extra-musical benefits were specifically linked to classical music, however, was unclear. Persistence was a minor category that varied minimally across age groups. This contrasted with the quantitative findings but may have been due to the persistence category's

efforts to capture examples of long-term persistence in contrast to the factor's measurement of hypothetical persistence.

Although it comprised fewer than 15% of the coded segments, co-regulation represented the third largest theme. Co-regulation has been recognised in the more recent musical self-regulation literature as important for the development of autonomy and hence long-term engagement (Brook & Upitis, 2015; Kupers et al., 2015). Also, the attitudes of teachers, parents, and friends are known to influence individuals' perceptions of themselves as music learners (McPherson, 2009; Sichivitsa, 2007). While co-regulation segments were more common among the 7- to 9-year-olds, comments were chiefly positive throughout, describing teachers, family, and friends as sources of guidance and support. However, some comments about teachers were negative, particularly among younger individuals who found their instructors neither sufficiently motivating nor flexible. At the same time, there was a slight increase in co-regulation segments among the 25-and-overs. This might have been because while many older learners were more intrinsically motivated, they also lacked the socio-contextual support available to younger musicians and therefore relied on teachers, friends, and spouses for additional encouragement. Overall, technology comments comprised under 1% of the total coded segments, with only a handful of individuals (mostly school-aged) claiming to use technological support. It is surprising, perhaps, that so few music learners associate technology with music study, practising, and performance, a finding that will be revisited later in this chapter.

The fourth largest theme was the survey itself. Despite praise and appreciation for the survey, negative reactions increased in line with age, resulting in twice as many negative comments as positive ones. One common concern was individuals who played more than one instrument found it difficult to respond because they felt that their answers would differ by

instrument. Meanwhile, older learners expressed regret that the survey seemed to be designed for younger respondents. These and other criticisms are addressed under the limitations section of this chapter.

Socio-contextual factors accounted for just over 10% of the coded segments. Although positive and negative segments were somewhat evenly distributed, the latter became more pronounced as individuals approached and then entered their college years. This ties in with evidence in the literature that musical drop-out rates tend to peak around the time of school transitions, a period when academic responsibilities often take on greater importance and uncertainty about one's future musical identity or surroundings may loom large (McPherson et al., 2012). Arguably, such uncertainty lurks in wait for any amateur musician who has completed their RCM exams but lacks access to (or time to fully participate in) a musical community. The findings nevertheless showed that some adult learners were, in fact, active members of musical communities. Hence, despite concerns more could be done to meet the needs of older learners, some individuals did enjoy the well-documented social, cognitive, and emotional benefits of community music-making (e.g., Lee, Davidson, & Krause, 2016; Rohwer, 2017; White, 2016). Moreover, the increased presence of positive comments relating to socio-contextual factors among the 25-and-overs is congruent with McPherson's emphasis on socio-contextual factors supporting music study and engagement across age groups (McPherson, 2009; McPherson et al., 2012).

Finally, for the comments relating specifically to the RCM, there were twice as many negative observations as positive ones. In terms of the age groups, the very youngest and the older music learners had more to say that was positive, while the negative comments were prevalent for learners aged 10 through to 21 years of age. These negative comments among the

adolescents were primarily related to the RCM curriculum and exam requirements, as well as the stress these can elicit. Nevertheless, the responses also suggested that over time, other individuals may come to change their attitudes towards the RCM curriculum, becoming more appreciative of its scope and viewing exams as effective goals or measures of progress that motivate them to practise in a more disciplined manner.

Implications for Pedagogical Practices

Given the apparent differences by age groups, as revealed through the results associated with each of the three research questions, one could argue that it befits both teachers and those involved in designing examination systems to consider how teaching, exams, and related musical activities can be best structured to take into account the self-reported characteristics and motivations of learners in each age group. While there are perhaps various ways in which these results could be used to inform teaching and student learning, two issues are now explored: (a) teaching to the unique characteristics of each age group, and (b) deepening our understanding of the role of the Royal Conservatory of Music, and likewise, other parallel formal systems of music learning.

Unique Characteristics by Age Group. The research has revealed some strong characteristics that both support and challenge music learning in the age groups that were represented in the study. For example, both discriminant functions suggested younger respondents were more reliant on extrinsic motivation, even if this clearly changed in the later years. How might that initial reliance on extrinsic motivation be used to advantage? What kinds of extrinsic motivators could teachers provide to support these learners? The research also revealed that these young respondents enjoyed performance, but that the love of performance was sadly short-lived. Knowing that, how can pedagogy enhance the continued enjoyment of

performance? And appreciating that employment of aural abilities, as well as perceived aural skills, diminish across age groups, what can teachers do to properly develop the aural skills of their students? Might the curriculum expand its focus on notation-based learning to include playing by ear and improvising, as suggested in the responses to the open-ended question?

In general, it can be argued that teachers need to be mindful of the differences among learners regarding self-regulatory processes and associated constructs. The complexity of self-efficacy and motivation, by way of illustration, are important facets in understanding musical self-regulation across age groups. While many teachers are likely to recognise that persistence, motivation, enjoyment of music in general, and personal competency beliefs may drop during the teenage years, the research results also indicate that if these learners can somehow be encouraged to persist through the more challenging years, it is possible that these learners will gain the level of understanding and expertise required to maximise their music learning experience.

Supporting younger learners. As the open-ended findings attest, teachers are fundamental when it comes to motivating music learners. Regular encouragement was highly valued, and teachers of younger students, in particular, were singled out for the diverse range of techniques they employ to keep learning enjoyable, whether by organising student concerts or using games, rewards, and technology. However, even the very best teachers can only ever represent part of the equation. Also, although parental support is recognised in the literature as instrumental in the musical development of young learners (Davidson et al., 1997; Faulkner et al., 2010; McPherson et al., 2012), this support is perhaps not always fully harnessed. In two related papers, Upitis and her collaborators found that while parents felt they played a highly supportive role in their child's musical development (Upitis, Abrami, Brook, et al., 2017), studio teachers argued that lack of parental support was the principal reason some children did not

practise (Upitis, Abrami, Brook, Boese, et al., 2017). If this is indeed the case, what can teachers do to engage parents more in their children's musical education?

One novel suggestion has emerged through the development of musical digital portfolios. Such tools extend the concept of traditional dictation books to online spaces where learners can set practice goals, upload recordings, and evaluate progress—while simultaneously being able to receive and reply to feedback from teachers, peers, and parents (e.g., Upitis, Abrami, Brook, Troop, & Catalano, et al., 2010; Upitis & Abrami, 2017). Since many young learners often choose to judge their practice simply on the number of times they play a piece through (McPherson & Renwick, 2001; Renwick & McPherson, 2002), teachers need to impress upon their younger students that reflection involves more than an appraisal of superficial musical outcomes. At the very highest levels of self-regulation, evaluation should take into account the appropriateness and effectiveness of strategies used during practice, as well as the general management of thoughts, feelings, and behaviours. While this may seem like a tall order for young learners, research suggests that we would be ill-advised to underestimate children's capacity for metacognition (Whitebread et al., 2010). However, young students are still coming to terms with more immediately obvious aspects of music learning, such as physical coordination and learning to read notation. Therefore, the concept of reflection should perhaps be introduced very carefully. Digital portfolios may help document this process as well as simultaneously enlist parental support. For instance, during a lesson, the teacher-student dyad could brainstorm ways the student will attain a goal in the coming week. The teacher could then type these strategies and goals into the student's digital portfolio, and so that every member of the teacher-parent-student network is fully aware of the week's goals, the digital portfolio would be accessible at every practice session. Unlike a traditional dictation book, however, each member of the network

could comment online on the effectiveness of the strategies used, thereby improving the amount of quality reflection. Over time, the student would moreover develop an array of tried-and-tested strategies that benefit their practice and motivate them to practise further.

Supporting teenagers. Despite general improvements across the age groups in self-regulatory behaviour, the findings are a reminder that the teenage years can often present a host of significant challenges to music studio teachers. Firstly, the drop in enjoyment levels around the ages of 10 to 18 needs to be tackled with particular care since learners who are not enjoying lessons are unlikely to want to continue. Also, while parents trust that music lessons will enrich their child's life (Upitis, Abrami, Brook, et al., 2017), many will eventually buckle under demands to quit lessons if their child is not enjoying themselves (McPherson et al., 2012). Given the large number of negative comments linking the RCM curriculum and decreased student enjoyment—especially with regard to repertoire selection and exam stress—teachers need to consider whether the RCM system is really for everyone. Of course, many teachers already do, with research demonstrating considerable variability in the percentage of students taking exams within Canadian music studios (Upitis, Abrami, Brook, Boese, et al., 2017). However, it bears repeating that levels of enjoyment are optimised when students' basic psychological needs for competence, autonomy, and relatedness are met (Deci & Ryan, 1985; McPherson et al., 2012).

Ironically, while performing well in exams may provide some teenagers with evidence of competence, the anxiety caused by taking increasingly difficult exams—in unfamiliar locations and in front of unknown examiners, to boot—may prevent others from fully demonstrating their potential. Research suggests that letting students choose repertoire they relate to can lead to surprisingly high levels of self-regulation, even among young children (Renwick & McPherson, 2002). Some teachers might, therefore, need to rethink the repertoire-selection process, as well as

the performance options open to teenagers. This could involve actively supporting informal concerts so that students can overcome their fears of performing in front of others and ultimately feel validated as individuals who are capable of expressing themselves musically. Furthermore, regardless of whether an RCM exam route is chosen, instruction in how to reduce performance anxiety may also be appropriate, particularly given this study's finding that fear and discomfort when performing increases from the teenage years onwards. With the rapid development of virtual reality (VR) technology, mobile apps that replicate real-life performance settings, complete with virtual audiences and examiners of varying dispositions, may one day become commonplace. Such apps could, for example, facilitate alternative evaluations of performance readiness and anxiety-reduction techniques. For instance, recent research into VR-based simulations among nine conservatory-level students in the UK suggests this may already represent an ecologically valid approach to aspiring musicians (Aufegger, Perkins, Wasley, & Williamon, 2017).

Perhaps another avenue worth exploring is the integration of improvisation and informal learning approaches into lessons. The current study demonstrates that the teenage years mark the onset of an ongoing decrease in both the perception and use of aural skills. This decrease is both disconcerting and intriguing, but not only because music is a primarily aural art form. In Upitis, Abrami, Brook, Boese, et al.'s (2017) study of 1,468 Canadian music studio teachers, almost 60% of the respondents reportedly taught their students how to play by ear, and nearly 50% instructed them in how to compose and improvise. One plausible explanation for these contradictory findings is that the students who receive instruction in such skills also eschew the RCM exam route and are therefore not represented in the present sample. Alternatively, perhaps

the full integration of improvisation and informal learning approaches is made difficult within a system that emphasises notation-based learning.

However, there are several reasons why integrating improvisation and informal learning methods may warrant special consideration. First of all, any such integration would grant students access to repertoire and genres that teenagers—but not only—may relate to more readily, as revealed in many of the open-ended comments. Secondly, studies suggest that informal learning approaches can have positive, complementary effects on classical instruction. According to Baker and Green (2013), young classically trained students who were asked to learn pieces by ear over a 10-week period scored better in traditional RCM-style ear tests than students taught through traditional means. Similarly, students who were taught using a combination of approaches went on to identify harmonic similarities between music of different genres (Brook et al., 2017). Thirdly, there is evidence to suggest that even introductory courses to free improvisation can diminish performance anxiety among young learners. In a controlled experimental study of 36 middle and high school students, Allen (2011) found that students who received either improvisation instruction or a combination of improvisation and traditional instruction over a six-week period exhibited significantly reduced performance anxiety than individuals receiving traditional instruction only.

Supporting adults. Musical self-regulation theory predicts that older, more advanced learners will consistently place at the higher ends of self-regulatory functioning and therefore require less teacher support to practise effectively (McPherson & Zimmerman, 2009). In several respects, the older learners in this study provided ample support for this prediction. For instance, the 22- to 24-year-olds were at the uppermost end of age-related increases in intrinsic motivation, planning, reflecting, and persistence. The 25-and-overs followed closely behind for

all these constructs except persistence. Moreover, the oldest learners boasted the highest levels of enjoying music learning and valuing musical skill development, bucked a downward trend for practising technical/exam components, and bore the lowest levels of poor motivation to practise and extrinsic motivation. Such results would hence appear to indicate that studio teachers might reasonably expect older learners to be considerably more self-reliant than their younger peers.

One could argue that the oldest learners' decreased use of so-called 'effective methods' for dealing with mistakes and their diminished interest in lifelong music-making are cause for concern. However, the results may have stemmed from the inapplicability of items contained within these factors. For instance, two of the lifelong music-making items asked respondents if they took lessons because they wanted to have musical careers or establish good work habits. Neither of these may have applied to either working adults or retirees. Meanwhile, the substantial drop in scores for externally influenced beliefs may merely reflect an adaptive decline in the need for external validation.

However, some of the study's findings suggest that older learners may still require self-regulatory support in certain areas. For example, the 25-and-overs reportedly used their aural abilities less than any other age group, had the lowest self-efficacy for their aural skills, and felt the least comfortable performing for others. These results represent the culmination of decreasing trends across age groups, and may, therefore, be part of a larger problem in music studio teaching and performance opportunities for older learners. Teachers may be tempted to embrace some of the earlier-mentioned approaches to tackling problems connected to aural skills and performance. After all, several open-ended comments among this age group echoed some of the teenagers' misgivings and frustrations with traditional notation-based methods. However, in addressing these issues, teachers will need to remain mindful that approaches used with younger

learners may not necessarily be appropriate at the other end of the age span and that the needs and competencies of two individuals are ever identical or static, irrespective of age group.

Given the paramount importance of self-efficacy with respect to musical development and achievement (e.g., McCormick & McPherson, 2003; McPherson & McCormick, 2000; McPherson et al., 2012; Miksza, 2006; Miksza, 2011), the 25-and-overs' visible drops in personal competency beliefs and perceptions of their practising skills are perhaps especially worrying. With some younger students, teachers may need to challenge the common belief that musical ability is innate, as reinforced by TV talent shows popular among adolescents, for example (Klaus & O'Connor, 2013). In contrast, the open-ended comments revealed that some older learners doubted if they would ever play as well as students who had started as children or felt constrained by perceived declines in their cognitive or physical abilities. Therefore, to promote more fluid models of musical ability, studio teachers need to adopt strategies that provide students with evidence that self-efficacy is malleable and susceptible to fluctuation. Teachers could do this by asking learners to complete brief, daily self-regulation checklists (e.g., Cremaschi, 2012; Kim, 2008). Alternatively, teachers could encourage students to experiment with mobile apps such as *Piano Practice with Wolfie* that permit users to record pieces they are learning, evaluate their recordings on pitch, rhythm, and tempo, as well as keep track of their scores (Tonara Ltd., 2016). However, the degree to which empirical evidence accrues in support of such apps and whether they gain traction among music studio teachers and their students remains to be seen.

Royal Conservatory of Music. There was a range of responses to the conservatory system in Canada. For the younger learners, as well as for older students who are just beginning instruction, the scaffolding provided by the RCM system seemed to support their development as

self-regulated learners, as evidenced by the open-ended responses. In both the open-ended and closed-ended analyses, it appears that the RCM structure provided a mechanism for goal setting for those students who were amenable to such goal setting. However, the open-ended comments indicated that the same mechanism may have acted as a counterweight to certain individuals. That is, rather than scaffolding their goal-setting behaviours, the exam system constrained them, particularly in their choice of repertoire and preferred learning approach. In some cases, the exams detracted from their overall enjoyment of playing.

Given these results, teachers and parents need to be sensitive to the power of the RCM system, both in its ability to motivate and guide goal setting and, by contrast, its ability to negatively impact music learners. There are implications, as well, for the RCM system itself, particularly in terms of the specificity of requirements, such as those associated with sight-reading and ear tests, as well as repertoire selection. For example, despite the occasional foray into notated, contemporary or jazz-inspired repertoire, the RCM curriculum foregrounds the Western musical canon and thereby privileges traditional notation-based learning. With each grade, increasing technical and interpretative demands are placed upon candidates, along with progressively challenging sight-reading and aural tests whose practical application may not always be properly understood. Furthermore, the RCM curriculum does not require that students improvise or play by ear, a problematic choice that may make sense in terms of the Western canon, but perhaps not for other musical genres or for the development of a well-rounded musician (Green, 2006). Lastly, while the music that adolescents listen to in their free time often serves to regulate their emotional well-being and reflects the social or cultural identities they hold dear (Leipold & Loepthien, 2015; McPherson et al., 2012; Miranda, 2013), it is unlikely this music would, for all adolescents at least, include RCM exam pieces. If the ultimate goal of music

education is self-regulation through music, and the RCM hopes to continue as the flagship of music learning, perhaps this tension between upholding tradition and unleashing the force of informal learning approaches deserves further attention.

Limitations and Implications for Further Research

Two types of limitations are now discussed, both of which have implications for future research. In the first instance, revisions to specific data collection and analysis are outlined. Next, studies that could be designed to address some of the most intriguing unanswered questions, arising out of the findings reported here, are noted.

Data collection and analysis.

Survey design. Several limitations to the survey were identified through the course of the research. First, since the online drop-down menu ended at '+25', older respondents were by default categorised into one ostensibly homogeneous group. Moreover, as only 14.78% of these individuals disclosed, or otherwise hinted at, their age in the final open-ended question, it was not possible to further break down the group with any accuracy. Since the oldest reported age was 78, the 25-and-overs' age range spanned at least five decades, in marked contrast to that of the other age groups. Findings for the 25-and-overs should, therefore, be interpreted with caution. Based on the preliminary findings reported in this thesis, a subsequent survey was re-designed to include more categories for music learners aged 25 and over (Upitis, Abrami, Varela, Boese, & King, 2016), and the results are now being analysed by the research team.

A second limitation in terms of design was the extent to which socioeconomic variables such as income could be used in the analyses. Studies that explore the effects of income are difficult, as many respondents choose not to report household income, and further, such self-reports are often unreliable (Alwin, Zeiser, & Gensimore, 2014). However, with the

reinstatement of Canada's long-form census, a future study might explore the effect of income by converting postal codes to estimates of income levels.

Thirdly, the wording of certain items meant they could not be entered as variables in additional analyses. For example, 'At what age did you begin taking music lessons?' could not be used as this did not necessarily refer to the respondent's main instrument. The item relating to RCM grade was also problematic as it was only interested in individuals who had taken exams in the previous 12 months. This only comprised 64% of the sample (Upitis, Abrami, Varela, King, et al., 2016), which would have resulted in a decreased sample size and reduced statistical power. Subsequent items regarding achievement on that last exam could not be used for the same reason. While it may have been helpful to factor out years playing one's instrument, the item had an upper limit of 10 years which likely did not reflect the variability among the oldest groups. Lastly, questions regarding the amount of practice did not take into account the number of instruments each respondent may have played. Regardless, the author concedes one cannot rule out the possibility of residual confounding by any of these variables.

Fourthly, given that the survey was intended for younger music students, the analysis and interpretation of older participants' answers were restricted to those individuals who chose to complete the survey regardless. Considering the anticipated growth in older music learners, however, future instruments should perhaps include questions tailored towards a broader age range. These should, furthermore, reflect existing psychological theories that speak to the intersection of self-regulation and ageing. For example, Brandstädter, Rothermund, and Schmitz (1998) have suggested that ageing individuals adjust their goals in order to maintain their self-efficacy. Since musical self-efficacy appeared to be a problem for the adult learners in this study, it may be worth designing questions that determine which older music students adapt their

practice and performance goals in line with age-related challenges. Targeted open-ended questions, could further explore *how* these individuals set about reconfiguring their practice and musical identity. Alternatively, survey writers may wish to consider including open-ended items that invite participants to reflect further on the themes emerging from the current study.

With respect to the analysis of open-ended comments, however, additional steps could be taken to bolster analytic rigour during the coding phase. The qualitative coding of the open-ended comments was likely influenced by my identification of self-regulatory characteristics analysed in the systematic review, as well as by my involvement in the development of the instrument. To counterbalance researcher expectancy effects, initial coding of the open-ended comments was conducted in consultation with additional researchers. While neither of these was specialized in musical self-regulation, their involvement in the broader research project (e.g., the coding of open-ended comments in the parallel teacher and parent surveys) may have also coloured their analytic judgment. Therefore, to maximise the potential for additional emergent themes, the analysis would have perhaps benefited from including coders previously uninvolved with the research project.

Sampling. Another notable limitation was the use of non-probabilistic sampling, which removed any guarantee of representativeness of music learners as a whole, or within the RCM system. Indeed, the data set already excluded individuals who had not taken music exams in the previous two years (Upitis, Abrami, Varela, King, et al., 2016). Nonetheless, it should be borne in mind that the post-K–12 music learner population is much harder to reach and thereby renders the adoption of a probabilistic sampling approach unfeasible.

It should also be noted that although the student survey was specifically aimed at younger music learners, its broad distribution to the entire RCM database, and those of other music

schools in Canada, resulted in a discrepancy between the intended target population and the final obtained sample. With regards to comments made about the survey in the open-ended question, it is therefore not surprising that some older respondents would have expressed disappointment that the survey focused on younger learners, something that was particularly evident in items that referred to parents, school, or homework. This was the case even though the survey writers had been transparent about their intended population and many items could have been answered by individuals of any age. Revisions to the sampling process were consequently also made with the revised survey cited above.

End-of-survey open-ended item. A final item that asks respondents if they have "anything else" they wish to add is problematic for several reasons. First, it constitutes a generic, end-of-survey question that individuals are free to ignore. In this study, only one-fifth of the respondents provided codable comments, and therefore one cannot be sure that the views expressed within them were representative of the overall sample. More importantly, unlike the closed-ended questions which came before it, this item lacked any obvious focus and those individuals who chose to answer it faced three options: to elaborate on one or more of the survey's preceding items, to provide views on other topics of interest/concern, or to do both. However, just because individuals did not elaborate on their answers or express an opinion on a new topic, it did not necessarily follow that they had nothing else to add. By way of analogy, a bar conversation among graduate students who have just attended a lecture on self-regulation may reveal something about their self-regulatory processes; however, simply because they do not choose to discuss their levels of self-regulation while enjoying a few drinks, it does not mean they are not self-regulated. Also, any views they do express may or may not be representative of the whole student population. In this particular study, the decision to analyse the survey's open-

ended comments in depth seemed appropriate given preliminary inspection of the data. However, this may not be applicable to similar data from other studies. Finally, despite some thematic convergence, a direct comparison of the findings for the closed- and open-ended items was not possible due to the statistically derived composition of the quantitative factors.

Additional studies.

Aural abilities. It was noted earlier in the chapter that employment of aural skills and the perception of aural abilities decreased across age groupings. This finding begs a number of questions. Were aural abilities really diminishing? Or were the examination tests becoming more difficult, thus affecting perception of aural abilities? Or is it that the examination structure and curriculum is predominantly a visual, rather than an aural one, and that as learners register the possible limitations of such an approach, they also begin to call into question their abilities in this area? The complexity of aural skills and perceptions is most certainly an area worthy of further research. One suggestion would be to design case studies of individuals from the different age groups so as to understand perceptions of their lived experiences with regard to self-efficacy formation, perhaps using interpretative phenomenological analysis to explore the resulting data.

Technology. Despite the prevalence of digital music tools for teaching and learning, both in informal and formal contexts (Ruthmann & Mantie, 2017; Waldron, 2013), it was surprising that so few music learners identified technology as a source of support in the open-ended comments. Further, the closed-ended questions related to technology in the survey did not load onto the factors described therein. Although some respondents noted that they used, for example, digital recordings in helping them master repertoire, which corresponds to other research pointing to the adoption of recording technologies for music study (Partti, 2012; Upitis, Abrami, Brook, Boese, et al., 2017), why is it that respondents rarely commented about the use of

technology to support their learning? Is it that they perceive that digital technologies are more suitable to informal music making (Green, 2009; Waldron, 2013) and not to the formal structures of studio music instruction in the Western musical canon? Could it be the result of some music teachers' concerns that time spent on technology deprives students of the benefits of the teacher-student dyad (Upitis, Abrami, Brook, Boese, et al., 2017)? Or for younger learners, is it a consequence of many parents valuing the fact that music lessons can offer respite from flashing screens and social media (Upitis, Abrami, Brook, et al., 2017)?

Further study is required to develop a more nuanced understanding of when and how technology aids in learning across age groups. For instance, one possibility might be a controlled experiment in which age-related cohorts use music-related mobile apps prior to an exam in order to ascertain the possible impact of mobile app use on exam scores.

Motivating learners to self-regulate—should we always be trying? One of the underlying assumptions of studio instruction, as evidenced over the past several centuries (Harwood, 2007; Zhukov, 2009) is that the pursuit of the Western musical canon is worthwhile and even necessary. Clearly, this is the case for some music learners. But not all. Even in this sample of respondents associated with the conservatory system, there was a considerable drop in motivation, self-efficacy, interest in performance, and other factors during the teenage years. One response to this decrease is to create innovative teaching techniques to motivate reluctant learners—some of which were suggested in the previous section. Another proposition is to be more cognizant of the socio-contextual support systems that may not be in place for musicians of particular age groups or circumstances. Still another response is to consider the ways that music engages learners who push against the Western canon, who may be engaged—or wish to be engaged—in other forms of music making (Harwood, 2007; Green, 2009). Is encouraging these

students to self-regulate (setting goals, etc.,) necessarily going to motivate them to practise Western pieces? What about those older learners who are taking music lessons 'just for fun'? Should teachers insist, for example, on the hierarchically arranged goals and reflections espoused by self-regulation models with such individuals?

Issues like these take into account the broad range of personal goals of learners, and perhaps, if we attend to them closely, we can nurture the learning supports suitable to many forms of music learning. That said, another contribution to the literature would be a thoughtful position paper on the role of music learning in the 21st century, while bearing these factors in mind.

Conclusion

Although not the initial intent, this study contains the largest range of ages of Canadian respondents involved in music studios of any study conducted to date. For that reason alone, it offers a unique contribution to the research on age-related differences in musical self-regulation. But there is more to consider. As ever-growing numbers of people gain access to recorded music in genres that they can easily retrieve and enjoy, it seems somewhat ironic that instruction in the Western musical canon continues to dominate the music studio in spite of the trends in the popular culture. What happens to those musicians, and people who are listeners or connoisseurs of non-classical genres, who abandon formal studies because of the repertoire and requirements of the structured system? And if it is true that some students perceive they are benefitting from the structured system, what befalls them once they have completed their formal studies? Ultimately, this work has illuminated the importance of questions such as these and highlighted the potentially powerful presence of music throughout all our students' lives.

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Appendix A

Ethics Clearance

CERTIFICATION OF ETHICAL ACCEPTABILITY
FOR RESEARCH INVOLVING HUMAN SUBJECTS

Name of Applicant: Dr. Philip C Abrami

Department: Faculty of Arts and Science\Education

Agency: Social Sciences & Humanities Research Council

Title of Project: Transforming music education with digital tools

Certification Number: 30001692

Valid From: August 14, 2014 to: August 13, 2015

The members of the University Human Research Ethics Committee have examined the application for a grant to support the above-named project, and consider the experimental procedures, as outlined by the applicant, to be acceptable on ethical grounds for research involving human subjects.

Dr. James Pfaus, Chair, University Human Research Ethics Committee

May 24, 2012

Dr. Rena Upitis, Professor
Faculty of Education
Duncan McArthur Hall
Queen's University
511 Union Street
Kingston ON K7M 5R7

GREB Ref #: GEDUC-618-12; Romeo # 6006989
Title: "GEDUC-618-12 Transforming music education with a web-based portfolio tool"

Dear Dr. Upitis:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled **"GEDUC-618-12 Transforming music education with a web-based portfolio tool"** for ethical compliance with the Tri-Council Guidelines (TCPS) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (article D.1.6) and Senate Terms of Reference (article G), your project has been cleared for one year. At the end of each year, the GREB will ask if your project has been completed and if not, what changes have occurred or will occur in the next year.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB, of any adverse event(s) that occur during this one year period (access this form at https://eservices.queensu.ca/romeo_researcher/ and click Events - GREB Adverse Event Report). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes to the level of risk, applicant characteristics, and implementations of new procedures. To make an amendment, access the application at https://eservices.queensu.ca/romeo_researcher/ and click Events - GREB Amendment to Approved Study Form. These changes will automatically be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or irvingg@queensu.ca for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

Joan Stevenson, Ph.D.
Professor and Chair
General Research Ethics Board

cc: Dr. Philip Abrami and Ms. Angela Elster, Co-Applicants
Dr. Lesly Wade-Woolley, Chair, Unit REB
Erin Wicklam, c/o Graduate Studies & Bureau of Research

Appendix B

Music Student Survey, Print Version, 2013

Music Student Survey

This is a survey for young people who take music lessons. We'd love to hear from as many students as possible, and so we're distributing the survey through teachers, music organizations, and online sites.

We're interested in how long you've been playing, the ways that you practise, and how you share music with family and friends. It will take about 20 to 25 minutes to complete the survey. If you complete the survey, your name will be entered into a draw for an iPad mini package (iPad mini, case, iTunes gift card). You may also complete the survey without providing your name. Even if you give us your name, we will not share your responses with your peers, family, or teachers.

Our questions are based on the work of Gary McPherson (University of New South Wales), Susan Hallam (Institute of Education, University of London), and researchers at Queen's and Concordia Universities.

Thank you for taking the time to fill out the survey. Your responses are *very* important to us and will help teachers and students become better musicians. If you would like to have your name entered into a draw for an iPad mini package (iPad, case, and iTunes card), fill in your name and email address here:

Name: _____ Email: _____

You can learn more about our research at www.iscorenews.com. Check it out – and like us on Facebook or follow us on Twitter!

You can complete and send the survey in four different ways:

- Fill it out online: http://queensu.fluidsurveys.com/s/musicstudent/
- Fill it out on paper, scan it, and send it to info@iscorenews.com.
- Pop it in an envelope and send it to Rena Upitis (address below).
- Drop it off to your teacher, school, or conservatory contact, and it will be mailed for you.

Researchers:

Dr. Rena Upitis	Faculty of Education, Queen's University, Kingston, ON CANADA K7L 3N6
Dr. Philip C. Abrami	Centre for the Study of Learning and Performance, Concordia University, Montreal, QC CANADA
Ms. Angela Elster	The Royal Conservatory, Toronto, ON CANADA

Social Sciences and Humanities Research Council of Canada | Conseil de recherches en sciences humaines du Canada | Canada

Section 1: Your Background

1. How old are you? _____
2. Are you male or female?

   1☐ Male 2☐ Female

3. What is your postal code? _____
4. How would you describe the area where you live?

   1☐ Urban (city or town) 2☐ Rural (in the country)

5. In what province or territory do you live? _____
6. At what age did you begin taking music lessons?

   1 ☐ 5 years old or younger
   2 ☐ 6 to 9 years old
   3 ☐ 10 to 12 years old
   4 ☐ 13 years old or older

7. What instrument do you play the most? *Please choose **only one instrument.***

1☐ Piano	5☐ Voice	9 ☐ Brass (e.g., trumpet)
2☐ Strings (e.g., violin)	6☐ Woodwinds (e.g., flute)	10☐ Recorder
3☐ Accordion	7☐ Organ	11☐ Other _____
4☐ Percussion	8☐ Guitar	

8. For how long have you been playing your instrument?

1☐ 1 year or less	5☐ 5 years	8 ☐ 8 years
2☐ 2 years	6☐ 6 years	9 ☐ 9 years
3☐ 3 years	7☐ 7 years	10☐ 10 years or more
4☐ 4 years		

9. Do either or both of your parents play an instrument?

   1☐ Yes 2☐ No 3☐ Not any more

10. In addition to music lessons, how often do you do these other activities?

*Please choose **one box** on each line.*	Never	Rarely	Sometimes	Regularly
i. Other arts clubs/activities (e.g., art lessons)	☐	☐	☐	☐
ii. Religious activities (e.g., service or event at your church, mosque, or synagogue)	☐	☐	☐	☐
iii. Sports activities	☐	☐	☐	☐
iv. Language classes	☐	☐	☐	☐
v. Community groups or clubs (e.g., Scouts, chess, math, debating, Rotary, 4-H)	☐	☐	☐	☐
vi. Chores or jobs (e.g., babysitting)	☐	☐	☐	☐
vii. Tutoring (e.g., Kumon)	☐	☐	☐	☐

11. How much time do you spend doing homework on a normal weeknight?

_____ minutes _____ N/A

12. How often are you double-booked (for example, you have to choose between a birthday party and a soccer game that are scheduled at the same time)?

1 ☐ Often 2 ☐ Sometimes 3 ☐ Rarely 4 ☐ Never

13. Have you taken a playing or singing exam from a conservatory (e.g., The Royal Conservatory) in the past 12 months? *If no, go to Section 2 on the next page.*

1 ☐ Yes 2 ☐ No If yes, which conservatory? _____

14. If yes, what mark did you get on your last exam? _____

15. If yes, what grade of exam did you take? _____

Section 2: Practising

WHERE YOU PRACTISE

16. Where do you practise most often? *Please choose **one box**.*

- 1 ☐ Living room, family room, or some other family space
- 2 ☐ Bedroom
- 3 ☐ Home music room
- 4 ☐ Studio or practice room at a school (not at home)
- 5 ☐ Other (please specify) _____

17. How true are the following statements?
Choose a response between 1 (not true) and 7 (always true).

	*Please choose **one box** on each line.*	1 not true	2	3	4	5	6	7 always true
i.	I am distracted when I am practising.	☐	☐	☐	☐	☐	☐	☐
ii.	My practice space is set up to help me practise well.	☐	☐	☐	☐	☐	☐	☐
iii.	I like my practice space.	☐	☐	☐	☐	☐	☐	☐

PRACTICE TIMES

18. How many days a week do you usually practise?

- 1☐ 0 days a week
- 2☐ 1 day a week
- 3☐ 2 days a week
- 4☐ 3 days a week
- 5☐ 4 days a week
- 6☐ 5 days a week
- 7☐ 6 days a week
- 8☐ 7 days a week

19. How long do your practices usually last? _____ minutes

20. On weekdays, do you normally practise at the same time of the day? (e.g., after supper or before school)

- 1☐ Yes
- 2☐ No

WHAT YOU PRACTISE

21. When you practise, how often do you do the following?

*Please choose **one box** on each line.*		Never	Rarely	Sometimes	Often	Always
i.	Technique (e.g., scales)	☐	☐	☐	☐	☐
ii.	Work on my pieces	☐	☐	☐	☐	☐
iii.	Play pieces I already know	☐	☐	☐	☐	☐
iv.	Sight-reading	☐	☐	☐	☐	☐
v.	Ear training	☐	☐	☐	☐	☐
vi.	Play pieces by ear	☐	☐	☐	☐	☐
vii.	Make up (compose) my own music	☐	☐	☐	☐	☐

HOW YOU PRACTISE

22. How true are the following statements?
Choose a response between 1 (not true) and 7 (always true).

*Please choose **one box** on each line.*		1 (not true)	2	3	4	5	6	7 (always true)
i.	I make myself practise even if there are other things I would rather be doing.	☐	☐	☐	☐	☐	☐	☐
ii.	I find it easy to concentrate when I practise.	☐	☐	☐	☐	☐	☐	☐
iii.	I like practising.	☐	☐	☐	☐	☐	☐	☐
iv.	I avoid practising pieces I don't like.	☐	☐	☐	☐	☐	☐	☐
v.	I start playing without thinking about what I should practise.	☐	☐	☐	☐	☐	☐	☐
vi.	I spend most of my time running through pieces I can already play.	☐	☐	☐	☐	☐	☐	☐
vii.	I usually begin with something I enjoy.	☐	☐	☐	☐	☐	☐	☐

23. How true are the following statements?
Choose a response between 1 (not true) and 7 (always true).

	*Please choose **one box** on each line.*	not true 1	2	3	4	5	6	always true 7
i.	Before I practise something, I try to get an overall sense of what it will sound like.	☐	☐	☐	☐	☐	☐	☐
ii.	Before I practise, I read over the notes my teacher writes during my lessons.	☐	☐	☐	☐	☐	☐	☐
iii.	I practise small sections of the pieces I am learning.	☐	☐	☐	☐	☐	☐	☐
iv.	When I make a mistake, I go back to the beginning and start again.	☐	☐	☐	☐	☐	☐	☐
v.	When I make a mistake, I correct it and then carry on.	☐	☐	☐	☐	☐	☐	☐
vi.	I mark things on the music to help me.	☐	☐	☐	☐	☐	☐	☐
vii.	I learn by playing slowly at first, and then speeding up.	☐	☐	☐	☐	☐	☐	☐

24. How true are the following statements?
Choose a response between 1 (not true) and 7 (always true).

	*Please choose **one box** on each line.*	not true 1	2	3	4	5	6	always true 7
i.	I record myself playing and listen to the recordings.	☐	☐	☐	☐	☐	☐	☐
ii.	I think about how I want the music to sound.	☐	☐	☐	☐	☐	☐	☐
iii.	I practise with a metronome.	☐	☐	☐	☐	☐	☐	☐
iv.	I write down things I need to ask my teacher.	☐	☐	☐	☐	☐	☐	☐
v.	When I am away from my instrument, I think about pieces I am learning.	☐	☐	☐	☐	☐	☐	☐
vi.	I use apps or games to help me with my practising.	☐	☐	☐	☐	☐	☐	☐
vii.	After practising, I think about what to do at my next practice.	☐	☐	☐	☐	☐	☐	☐

5

WHY YOU PRACTISE

25. How true are the following statements?
Choose a response between 1 (not true) and 7 (always true).

I practise because …		not true						always true
	*Please choose **one box** on each line.*	**1**	**2**	**3**	**4**	**5**	**6**	**7**
i.	I want my teacher to think I'm a good musician.	☐	☐	☐	☐	☐	☐	☐
ii.	I want to be able to play well.	☐	☐	☐	☐	☐	☐	☐
iii.	It's important to me.	☐	☐	☐	☐	☐	☐	☐
iv.	I love playing my instrument.	☐	☐	☐	☐	☐	☐	☐
v.	It's what I'm supposed to do.	☐	☐	☐	☐	☐	☐	☐
vi.	It matters to my parents or guardians.	☐	☐	☐	☐	☐	☐	☐
vii.	My parent or guardian or teacher rewards me.	☐	☐	☐	☐	☐	☐	☐
viii.	I want other students to think I'm a good musician.	☐	☐	☐	☐	☐	☐	☐
ix.	I want to earn high school credits.	☐	☐	☐	☐	☐	☐	☐
x.	I want to have a career in music.	☐	☐	☐	☐	☐	☐	☐
xi.	I want to develop good work habits.	☐	☐	☐	☐	☐	☐	☐
xii.	I want to play with other musicians.	☐	☐	☐	☐	☐	☐	☐
xiii.	I enjoy a challenge with music.	☐	☐	☐	☐	☐	☐	☐

PARENTS AND PRACTISING

26. When I practise at home, my parent(s)/guardian(s)... [Skip this question if you are over 18.]

*Please choose **one box** on each line.*	Never	Rarely	Sometimes	Often	Always
i. Remind me to practise.	☐	☐	☐	☐	☐
ii. Answer questions.	☐	☐	☐	☐	☐
iii. Help me use technology (e.g., making a recording).	☐	☐	☐	☐	☐
iv. Listen to my playing.	☐	☐	☐	☐	☐
v. Give me comments or suggestions.	☐	☐	☐	☐	☐
vi. Help me with my entire practice.	☐	☐	☐	☐	☐
vii. Keep track of how long I practise.	☐	☐	☐	☐	☐

Section 3: Musical Skills

27. How important is each of the following?
Choose a response between 1 (not important) and 7 (very important).

*Please choose **one box** on each line.*	1 (not important)	2	3	4	5	6	7 (very important)
i. Being good at playing my musical instrument	☐	☐	☐	☐	☐	☐	☐
ii. Being good at technical work (e.g., scales)	☐	☐	☐	☐	☐	☐	☐
iii. Being good at learning new pieces	☐	☐	☐	☐	☐	☐	☐
iv. Being good at playing pieces I already know	☐	☐	☐	☐	☐	☐	☐
v. Being able to sight-read well	☐	☐	☐	☐	☐	☐	☐
vi. Being good at ear tests (e.g., identifying intervals or clap backs)	☐	☐	☐	☐	☐	☐	☐
vii. Being good at playing pieces by ear (without using printed music)	☐	☐	☐	☐	☐	☐	☐
viii. Being good at composing/improvising (making up my own music)	☐	☐	☐	☐	☐	☐	☐

7

28. How much does the quality of your music playing depend on...
Choose a response between 1 (not at all) and 7 (completely).

	*Please choose **one box** on each line.*	not at all 1	2	3	4	5	6	completely 7
i.	Your musical abilities?	☐	☐	☐	☐	☐	☐	☐
ii.	The effort you put into your playing?	☐	☐	☐	☐	☐	☐	☐
iii.	The difficulty of the music?	☐	☐	☐	☐	☐	☐	☐
iv.	Luck?	☐	☐	☐	☐	☐	☐	☐
v.	Your teacher?	☐	☐	☐	☐	☐	☐	☐

Section 4: Enjoyment of Music

29. How enjoyable do you find the following activities?
Choose a response between 1 (not enjoyable) and 7 (very enjoyable).

	*Please choose **one box** on each line.*	not enjoyable 1	2	3	4	5	6	very enjoyable 7
i.	Practising my instrument at home	☐	☐	☐	☐	☐	☐	☐
ii.	Attending my music lessons	☐	☐	☐	☐	☐	☐	☐
iii.	Practising technical work (e.g., scales)	☐	☐	☐	☐	☐	☐	☐
iv.	Practising new pieces	☐	☐	☐	☐	☐	☐	☐
v.	Playing pieces I already know	☐	☐	☐	☐	☐	☐	☐
vi.	Working on my sight-reading	☐	☐	☐	☐	☐	☐	☐
vii.	Practising ear tests (e.g., identifying intervals or chords)	☐	☐	☐	☐	☐	☐	☐

30. When I perform for others…
Choose a response between 1 (not true) and 7 (always true).

	*Please choose **one box** on each line.*	not true 1	2	3	4	5	6	always true 7
i.	I enjoy the experience.	☐	☐	☐	☐	☐	☐	☐
ii.	**I feel good about myself.**	☐	☐	☐	☐	☐	☐	☐
iii.	I feel physically unwell.	☐	☐	☐	☐	☐	☐	☐
iv.	**I am scared of performing badly.**	☐	☐	☐	☐	☐	☐	☐
v.	My mind goes blank.	☐	☐	☐	☐	☐	☐	☐
vi.	My whole body becomes tense.	☐	☐	☐	☐	☐	☐	☐

31. How enjoyable are each of the following activities?
Choose a response between 1 (not enjoyable) and 7 (very enjoyable).
Use the N/A box if you don't take part in the activity at all.

	*Please choose **one box** on each line.*	N/A	not enjoyable 1	2	3	4	5	6	very enjoyable 7
i.	Playing pieces by ear	☐	☐	☐	☐	☐	☐	☐	☐
ii.	Making up (composing) my own music	☐	☐	☐	☐	☐	☐	☐	☐
iii.	Playing music with others (e.g., duets, jamming)	☐	☐	☐	☐	☐	☐	☐	☐
iv.	Playing music to relax	☐	☐	☐	☐	☐	☐	☐	☐
v.	Performing in my teacher's recitals	☐	☐	☐	☐	☐	☐	☐	☐
vi.	Performing at festivals or competitions	☐	☐	☐	☐	☐	☐	☐	☐
vii.	Performing at variety nights or talent shows	☐	☐	☐	☐	☐	☐	☐	☐
viii.	Performing for my family and friends	☐	☐	☐	☐	☐	☐	☐	☐

Section 5: Musical Achievements

32. When you perform in the following ways, how successful are you?
Choose a response between 1 (not successful) and 7 (very successful).
Use the N/A box if you don't take part in the activity at all.

	*Please choose **one box** on each line.*	N/A	1 (not successful)	2	3	4	5	6	7 (very successful)
i.	In my teacher's recitals	☐	☐	☐	☐	☐	☐	☐	☐
ii.	At festivals or competitions	☐	☐	☐	☐	☐	☐	☐	☐
iii.	At coffee houses or talent shows or variety nights	☐	☐	☐	☐	☐	☐	☐	☐
iv.	For my family and friends	☐	☐	☐	☐	☐	☐	☐	☐
v.	Taking conservatory exams	☐	☐	☐	☐	☐	☐	☐	☐

33. How good are you at the following skills? *Choose a response between 1 (very bad) and 7 (very good).*

	*Please choose **one box** on each line.*	1 (very bad)	2	3	4	5	6	7 (very good)
i.	Learning my instrument	☐	☐	☐	☐	☐	☐	☐
ii.	Technical work (e.g., scales)	☐	☐	☐	☐	☐	☐	☐
iii.	Learning new pieces I choose myself	☐	☐	☐	☐	☐	☐	☐
iv.	Learning new pieces my teacher chooses	☐	☐	☐	☐	☐	☐	☐
v.	Playing pieces I already know	☐	☐	☐	☐	☐	☐	☐
vi.	Sight-reading music	☐	☐	☐	☐	☐	☐	☐
vii.	Ear tests	☐	☐	☐	☐	☐	☐	☐
viii.	Playing pieces by ear (without using printed music)	☐	☐	☐	☐	☐	☐	☐
ix.	Improvising/composing	☐	☐	☐	☐	☐	☐	☐
x.	Practising efficiently	☐	☐	☐	☐	☐	☐	☐

34. If you stop taking lessons, would you …
Choose a response between 1 (not likely) and 7 (very likely).

	*Please choose **one box** on each line.*	not likely 1	2	3	4	5	6	very likely 7
i.	Keep on playing your instrument or singing for enjoyment?	☐	☐	☐	☐	☐	☐	☐
ii.	Perform (formally or informally)?	☐	☐	☐	☐	☐	☐	☐
iii.	Play your instrument or sing with others?	☐	☐	☐	☐	☐	☐	☐
iv.	Play your instrument or sing to help you relax?	☐	☐	☐	☐	☐	☐	☐
v.	Learn new pieces?	☐	☐	☐	☐	☐	☐	☐
vi.	Enjoy listening to live musical performances?	☐	☐	☐	☐	☐	☐	☐
vii.	Enjoy listening to recorded music?	☐	☐	☐	☐	☐	☐	☐
viii.	Teach others to play or sing?	☐	☐	☐	☐	☐	☐	☐

35. When you perform well in public, who is mostly responsible? *Circle **one** number.*

Others are mostly responsible 1 2 3 4 5 6 7 *I am mostly responsible*

36. When you perform well in public, how likely is it that you will perform well again? *Circle **one** number.*

Not likely 1 2 3 4 5 6 7 *Very likely*

37. How true are the following statements?
Choose a response between 1 (not true) and 7 (very true).

	*Please choose **one box** on each line.*	not true 1	2	3	4	5	6	very true 7
i.	I am usually able to master the pieces I choose to learn.	☐	☐	☐	☐	☐	☐	☐
ii.	My music teacher tells me I have musical talent.	☐	☐	☐	☐	☐	☐	☐
iii.	My family or friends tell me I have musical talent.	☐	☐	☐	☐	☐	☐	☐
iv.	If it were up to me, I would stop taking music lessons.	☐	☐	☐	☐	☐	☐	☐
v.	Hearing others perform well inspires me to practise.	☐	☐	☐	☐	☐	☐	☐
vi.	When my family is proud of my music making, I feel good about myself.	☐	☐	☐	☐	☐	☐	☐
vii.	Knowing that I play/sing better than others makes me feel good about myself.	☐	☐	☐	☐	☐	☐	☐
viii.	I am a good musician.	☐	☐	☐	☐	☐	☐	☐
ix.	I expect to do well at my music lessons.	☐	☐	☐	☐	☐	☐	☐

38. Is there anything else that you would like to tell us?

Thank you for taking the time to complete this survey. Please tear off the last page to give to your parent or guardian. The front section explains how to submit your survey.

PLEASE TEAR OFF THIS PAGE AND GIVE IT TO YOUR PARENT OR GUARDIAN

Project title: *Transforming music education with digital tools*

Researchers:	Dr. Rena Upitis	Faculty of Education, Queen's University, Kingston, ON
	Dr. Philip C. Abrami	Centre for the Study of Learning and Performance, Concordia University, Montreal, QC
	Ms. Angela Elster	The Royal Conservatory, Toronto, ON

This page comes from a survey distributed to your child from the researchers listed above. We are interested in investigating how music instruction can be enhanced through the use of interactive digital tools. Your child answered a survey for young people who take music lessons. We're interested in learning about the ways they practise, views they have about music and their musicianship, and how they share music with family and friends. We are distributing the survey through teachers, music organizations, and online sites. The results will help teachers and students become better musicians. If you are interested, we'd be pleased for you to fill out the parent survey, which can be found at http://queensu.fluidsurveys.com/c/musicparent1/.

Your child *may* have provided his/her name to be entered into a draw for an iPad mini package. The draw will take place in June 2014, once the survey has closed. Your child's name and e-mail address will only be used for the draw. Names and email addresses will be removed from the survey before the researchers compile the data.

There are no known risks to participating in this study. Participation is voluntary. If your child provided identifying information for the purposes of the draw and you wish to have your child's identifying information withdrawn, please contact the research team at info@iscorenews.com.

You can learn more about this survey and about our research at www.iscorenews.com. Check it out – and like us on Facebook or follow us on Twitter! Any questions about study participation may be directed to Dr. Rena Upitis (613-533-6212 or by email at rena.upitis@queensu.ca). Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at 613-533-6081 or chair.GREB@queensu.ca.

Thank you for your support.

Appendix C

Codebook

The codebook contains 18 codes organised into six overarching groups, or 'themes':

- Self-regulated Learning
- Co-regulation
- Royal Conservatory of Music
- Music learning
- Survey
- Socio-contextual factors

Definitions for each of the codes can be found in the 'Code Definitions and Examples' section.

Number of codes per comment

The major idea(s) within each comment should be coded. Although longer comments may require additional codes, the length of a comment does not necessarily determine its number of codes. To ensure that multiple coders assign the same number of codes per comment, the primary coder will segment any comment he judges to have more than one major idea and indicate these segments clearly on the coding document. For example, in the following screenshot, comments shaded in grey have already been segmented by the primary coder and these segments appear below the grey box.

Comment	COMMENT	CODE
1	I don't like being forced to play.	
2	My violin is a good friend!.	
3	I stopped my piano lessons two years ago when I began university due to the lack of time available to practice.	
4	I play the piano, the clarinet, the recorder,and I do theory and voice lessons.	
5	I am an adult no longer taking lessons. I have two children that play. I will have them do the survey.	
6	I really enjoy playing Music. I also love and really enjoy to play sports. I wouldn't be able to do any of it without the help and support of my mom.	
	I really enjoy playing Music.	
	I also love and really enjoy to play sports.	
	I wouldn't be able to do any of it [music and sports] without the help and support of my mom.	

Where necessary, the primary coder should also clarify pronoun referents and group different parts of the original comment that happen to fall under the same code.

Grouping of the codes

Self-regulated learning	Co-regulation	Royal Conservatory of Music
TA Task analysis	**SP +** Supports: people (*positive*)	**RCM +** RCM (*positive*)
M Motivation	**SP -** Supports: people (*negative*)	**RCM -** RCM (*negative*)
D During	**ST +** Supports: technology (*positive*)	
R Reflection	**ST -** Supports: technology (*negative*)	

Music learning	Survey	Socio-contextual factors
P Persistence	**SV *** Survey (*positive/neutral*)	**SC *** Socio-contextual (*positive/neutral*)
RP Reasons to play	**SV -** Survey (*negative*)	**SC -** Socio-contextual (*negative*)
MA Musical accomplishments		
APN Amount practised (non SRL)		

Code Definitions and Examples

Self-Regulated Learning (SRL)

The 'SRL' group contains 4 codes: 'Task analysis' (**TA**), 'Motivation' (**M**), 'During' (**D**), and 'Reflection' (**R**). Each of these codes refer to self-regulatory processes.

TA Task analysis

Setting well-defined, future-bound goals and/or planning the strategies needed to achieve these goals.

Goals can fall anywhere along a proximal-distal continuum but are not so broad that they constitute 'Reasons to play'. For example, references to upcoming music exams and auditions to music schools might be coded under 'task analysis' but career aspirations would not.

- *I'm hoping to pass the Grade 8 Piano exam with the RCM in June of this year.*
- *I want to get into the habit of practicing much more regularly.*
- *[….] I was thinking of coming to Queens for the music program.*

M Motivation

Self-motivational beliefs present *before* an individual begins a learning task. These include goal orientation, intrinsic interest/value, outcome expectations, and self-efficacy.

Individuals may therefore indicate a process (i.e., mastery) and/or product (i.e., performance) orientation to learning. They may also express their perceptions about the personal importance, usefulness, and inherent interest of a specific activity or type of repertoire. Others may state beliefs about the ultimate ends or consequences of achieving a specific goal. Equally, they may describe beliefs about their capabilities to learn or perform effectively.

- *I love to play the cello.*
- *Music is life. Without it, this world would be bleak and awed up.*
- *While I am very good musically, my technical skills are merely adequate.*
- *…. I find memorizing music is important…*

D During

Processes that affect an individual's concentration and performance while engaged in a learning task. These include self-experimentation, self-recording, self-instruction, imagery, attention focusing, and task strategies.

In self-experimentation, the individual systematically tests alternative approaches, usually when a current strategy appears not to be working and the reasons for this are unclear. Self-recording is when the individual keeps accurate records of their performance in order to monitor their progress. For example, the individual may keep a practice journal or mark their score in order to highlight errors or problematic passages. Self-instruction can be overt or covert and occurs when the individual talks to themselves about how to perform a task *while* executing it. Imagery may be visual or aural and examples may include activating a mental map of a piece while performing, using visual images to solve musical problems, or recalling recordings of a piece one is currently learning. Attention focusing describes the use of strategies that enable an individual's concentration, such as blocking out distractions, practicing slowly, or managing one's attention or effort during practice. Task strategies refer to breaking down complex tasks into more manageable parts, including how one's practice time is managed.

- *[I] have over the past 4 years kept a record of practice hours. This year I surpassed 2,250 hours.*
- *I practise to music, rather than with a metronome.*

R Reflection

Processes that occur *after* a learning task and that influence subsequent learning-related behaviour. These include self-evaluation, causal attribution, self-satisfaction/affect, and adaptive/defensive inferences.

During 'self-evaluation', an individual may compare a practice outcome against an intended goal, other individuals' achievements, their own prior performance(s), or how they have contributed to group goal. In 'causal attribution', the individual describes reasons for a particular outcome. In 'self-satisfaction/affect', the individual expresses their feelings about such an outcome, whereas adaptive/defensive inferences' refer to whether or not an individual chooses to adapt their self-regulatory approach in subsequent learning tasks.

- *I do sight reading in my little brother's piano book because I don't like my sight reading tests and I concentrate and do better.*
- *I think it is because I started with this instrument that I am able to play and enjoy music at School.*
- *I feel that I still need to push myself harder in order to attain my goals.*

- *It is only my low confidence in actually performing that stops me, since I feel like it's a fluke when I win awards, but I've come to far to quit, and that keeps me going.*
- *I have done my first piano exam a few months ago and i have not received the results. But i am confident that i did really well.*

Co-regulation

The 'Co-regulation' group contains two categories: **'**Supports: people' (SP) and **'**Supports: technology' (ST). Each category is subdivided into positive and negative valences, resulting in 4 codes: **SP+**, **SP-**, **ST+**, and **ST-**. 'Supports: people' refers to *individuals* who foster the learner's musical self-regulation. 'Supports: technology' refers to *technology* (e.g., apps, books, musical instruments) which influence the learner's musical self-regulation.

'Supports: people' (SP)

SP+ Supports: people (*positive*)

Perceived presence of support from individuals.

- *I had so much fun with my music teacher while doing the conservatory.*
- *thankyou [sic] to everyone who teaches and inspires musicians. We need you as much as we need the music.*

SP- Supports: people (*negative*)

Perceived absence of support from individuals.

- *Teachers are extremely important in a child's music education. If the teacher is always putting down the child, the child will likely develop aversion towards his or her instrument.*
- *My music teacher is very negative. She is very good at pointing out what I do wrong, but rarely tells me what I'm doing well.*

'Supports: technology' (ST)

ST+ Supports: technology (*positive*)

Perceived presence of technological support.

- *I am a fan of Alan Rusridger's [sic] book "Play it Again" - good to know I'm not the only adult pursuing this in a serious way.*
- *I tend to listen to actual recordings of the piece or see on youtube [sic] how others play it. This gives me a sense of what mine should sound like.*

ST- Supports: technology (*negative*)

Perceived absence of technological support.

- *wish i had a grand piano to practise on!*
- *I want a new piano. That would be cool.*

Royal Conservatory of Music (RCM)

The RCM group comprises two codes which denote positive (**RCM+)** and negative (**RCM-**) perceptions about the Royal Conservatory of Music. These may, for example, be related to the RCM syllabus, exams, and examiners.

RCM+ RCM (*positive*) — Perceived positive perceptions about the Royal Conservatory of Music.

- *Conservatory exams helped me gauge my abilities and areas needing improvement.*
- *My years at the conservatory with voice and piano have really helped me adapt to playing with other professional musicians.*

RCM- RCM (*negative*) — Perceived negative perceptions about the Royal Conservatory of Music.

- *In addition, I must note that the Royal Conservatory for Music once had exams for people with small hands. They no longer have this option, making my playing for my last piano exam very difficult, since my hands are smaller than a 6-year old's.*
- *[Practising] where you follow the RCM's strict programming, preparing for their specific technical tests, their sight reading tests, their ear tests, is the worst feeling in the world.*

Music Learning

The 'Music Learning' group comprises four codes: 'Persistence' (**P**), 'Reasons to play' (**RP**), 'Musical accomplishments' (**MA**), and 'Amount Practised (not self-regulation)' (**AP**).

P Persistence — Long-term perseverance and is characterised by persistence in the face of adversity or challenges. It could also include continuing to play even though one no longer takes lessons.

- *[…] Throughout this entire time I've been playing (on a ratty keyboard mind you) and keeping up learning new songs.*
- *[I am] glad that I stuck it out this long.*
- *[…] I don't plan on quitting piano anytime soon.*

RP Reasons to Play — Broadly defined long-term goals or major, underlying motivations. These might include general career aspirations or extra-musical benefits of playing an instrument.

- *I would like to be a music teacher.*
- *[Music] can always make me feel better and it [is] often my escape.*

- *[Playing piano] helps me in school, mostly math, and it helps my singing and dancing because I can keep a beat.*
- *I like to play mainly to relax. I will often sit and play often during the day to destress especially when doing homework.*

MA	Musical accomplishments	Musical accomplishments can include information such as exams taken, prizes won, time spent learning, instruments played, or self-identification as a musician.

- *I have just recently started Royal Conservatory last march and started at grade 4 and am now capable of playing grade 8 level pieces (in less than 6 months!)*
- *I'm a jazz musician.*
- *Though I skipped my gr 8 exam I got honours with distinction on my gr 7 exam and won a gold medal for the maritimes [sic].*
- *I play many musical instruments, but my other main instrument is cello.*

APN	Amount practised (not self-regulation)	This involves statements of how long an individual practises without reference to a clear self-regulatory process.

- *There was a question regarding how much I practise on a daily basis. When I'm not preparing for an exam, it's about 20-30 minutes/day, 4-5 days a week. However, for about 6 weeks prior to an exam, my practise is ramped up to about 90-120 minutes/day, 6 or 6 days/week.*
- *I have to balance my practice time between four instruments.*

Survey

The 'Survey' group comprises two codes, which denote positive (**SV+)** and negative (**SV-**) perceptions about the survey.

SV*	Survey (*positive/neutral*)	Perceived positive, or not obviously negative, perceptions about the survey.

- *What is this data going to be used for? It was fun ;)*
- *Thanks for producing this survey.*

SV-	Survey (*negative*)	Perceived negative perceptions about the survey. This code also covers suggested improvements to the survey.

- *the survey was too long*
- *It would be great if you made one of these surveys geared towards people who play in bands, [as I have a band myself] and would love to talk about it!*

Socio-contextual factors

The ‘Socio-contextual factors’ group comprises two codes (**SC*** and **SC-)** denoting societal or contextual factors that influence the learner’s musical self-regulation and or musical self-development.

SC*	Socio-contextual (*positive/neutral*)	Societal or contextual factors that exert a positive, or not obviously negative, effect on the individual’s musical self-regulation. The code can also cover references to church worship, God, or some ‘higher power’. ▪ *Lately I've been getting more and more involved with music camps, orchestras, chamber and duets. These opportunities are mostly what have been the biggest motivation lately.* ▪ *I sing and play at church regularly too.*
SC-	Socio-contextual (*negative*)	Societal or contextual factors that exert a negative effect on the individual’s musical self-regulation. The code also covers competing demands and health-related issues. ▪ *I took a two year break after completing my grade 8 RCM exam, because I moved cities.* ▪ *[…] I wish I had the opportunity to express myself in festivals or recitals, but there haven’t been any for several years now.*

Appendix D

Factors, Constituent Items, and Age-Related Scores

Table D1

Composite Factors, Constituent Items, and Age-Related Scores

Composite factors and items		Age-group means and standard deviations													
Extrinsic motivation		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
25.i	I want my teacher to think I'm a good musician.	4.96	1.93	4.72	1.98	4.71	1.82	4.60	1.86	4.67	1.93	4.76	1.78	4.11	2.11
25.v	It's what I'm supposed to do.	5.35	1.81	4.84	1.91	4.74	1.84	4.41	1.88	4.30	1.95	4.23	2.16	3.47	2.26
25.vi	It matters to my parent(s) or guardian(s).	5.69	1.76	5.37	1.86	5.04	1.87	4.32	2.01	3.83	1.98	3.23	2.03	2.06	1.74
25.vii	My parent or guardian or teacher rewards me.	4.35	2.20	3.23	2.15	2.73	1.86	2.31	1.66	2.26	1.66	2.30	1.85	1.75	1.47
25.viii	I want other students to think I'm a good musician.	4.68	2.12	4.48	2.16	4.53	2.03	4.45	2.04	4.39	2.12	4.37	2.17	3.12	2.27
25.ix	I want to earn high school credits.	3.34	2.46	4.41	2.33	4.52	2.20	3.36	2.26	2.32	1.99	1.83	1.88	1.49	1.30
Intrinsic motivation		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
27.i	Being good at playing my musical instrument is important to me.	5.66	1.36	5.98	1.18	6.15	1.11	6.22	1.04	6.22	1.09	6.60	0.76	6.29	1.11
25.ii	I practise because I want to be able to play well.	6.07	1.32	6.28	1.10	6.33	1.08	6.41	0.97	6.45	1.04	6.67	0.63	6.57	0.80
25.iii	I practise because it's important to me.	5.25	1.73	5.54	1.52	5.70	1.52	5.96	1.35	6.11	1.29	6.50	0.80	6.40	1.08
25.iv	I practise because I love playing my instrument.	5.45	1.58	5.63	1.51	5.78	1.50	6.07	1.29	6.25	1.21	6.60	0.71	6.38	1.05
25.xiii	I enjoy a challenge with music.	4.80	1.94	4.92	1.87	5.21	1.76	5.46	1.59	5.84	1.44	6.12	1.33	6.15	1.23

Table D1 Continued

Composite factors and items		Age-group means and standard deviations													
Internalised motivation: **Musical skills**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
27.ii	Being good at technical work (e.g., scales) is important to me.	4.82	1.72	5.23	1.59	5.24	1.53	5.19	1.56	5.38	1.57	5.58	1.55	5.71	1.40
27.iii	Being good at learning new pieces is important to me.	5.64	1.35	5.88	1.23	5.92	1.16	5.90	1.14	5.92	1.18	6.21	0.92	6.11	1.21
27.iv	Being good at playing pieces I already know is important to me.	5.98	1.23	5.80	1.31	5.80	1.29	5.83	1.24	5.88	1.23	6.08	1.10	6.07	1.20
27.v	Being able to sight-read well is important to me.	5.21	1.69	5.56	1.50	5.70	1.39	5.69	1.35	5.77	1.43	6.06	1.05	6.00	1.29
27.vi	Being good at ear tests (e.g., identifying intervals or clap backs) is important to me.	4.79	1.76	5.32	1.62	5.16	1.63	4.94	1.70	5.13	1.75	5.15	1.75	5.31	1.73
27.vii	Being good at playing pieces by ear is important to me.	5.02	1.79	5.23	1.75	5.11	1.78	4.88	1.80	4.94	1.88	4.62	1.88	4.74	2.06
Internalised motivation: **Lifelong music**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
27.viii	Being good at composing/improvising is important to me.	4.25	2.06	4.54	1.95	4.42	1.95	4.27	2.00	4.57	2.07	4.05	2.06	3.78	2.29
25.x	I practise because I want to have a career in music.	3.12	2.00	3.56	2.02	3.43	2.06	3.45	2.25	3.83	2.35	4.43	2.54	3.23	2.44
25.xi	I practise because I want to develop good work habits.	4.62	1.91	4.91	1.91	4.82	1.92	4.75	1.96	4.90	2.06	5.02	1.98	4.23	2.34
25.xii	I practise because I want to play with other musicians.	3.87	2.17	4.16	2.13	4.38	2.08	4.42	2.13	4.93	2.02	4.83	2.25	4.38	2.37
Practice components: **Technical/exam-related**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
21.i	How often I practise technique (e.g., scales)	3.82	1.10	3.90	0.94	3.72	1.04	3.54	1.07	3.50	1.14	3.46	1.19	3.93	1.02
21.iv	How often I practise sight-reading	3.22	1.17	3.16	1.06	2.98	1.03	2.91	1.07	2.89	1.06	2.99	0.98	3.17	1.04
21.v	How often I practise ear training	2.32	1.19	2.60	1.09	2.40	0.98	2.27	0.98	2.25	0.96	2.25	0.92	2.44	1.05

Table D1 Continued

Composite factors and items		Age-group means and standard deviations													
Practice components: **Employing aural abilities**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
21.vi	How often I play pieces by ear	2.87	1.22	2.82	1.21	2.79	1.22	2.56	1.19	2.39	1.28	2.29	1.10	2.27	1.12
21.vii	How often I practise compose my own music	2.63	1.08	2.46	1.17	2.29	1.15	2.22	1.18	2.30	1.35	2.05	1.15	1.88	1.10
Self-regulation: **Motivated to practise well**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
22.i	I make myself practise even if there are other things I would rather be doing.	4.29	1.92	4.40	1.72	4.38	1.70	4.36	1.71	4.29	1.75	4.71	1.67	4.63	1.85
22.ii	I find it easy to concentrate when I practise.	4.84	1.57	4.86	1.49	4.87	1.49	4.87	1.47	4.97	1.40	5.14	1.27	5.37	1.38
22.iii	I like practising.	4.65	1.68	4.74	1.64	4.81	1.63	5.04	1.55	5.35	1.43	5.55	1.20	5.79	1.27
Self-regulation: **Poorly motivated to practise**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
22.iv	I avoid practising pieces I don't like.	3.52	1.96	3.48	1.90	4.01	1.80	4.20	1.66	4.22	1.68	3.96	1.71	3.77	1.87
22.v	I start playing without thinking about what I should practise.	3.91	2.12	3.75	2.00	4.02	1.90	4.10	1.79	4.02	1.83	3.68	1.83	3.12	1.95
22.vi	I spend most of my time running through pieces I can already play.	3.95	1.80	3.61	1.85	3.77	1.72	3.69	1.69	3.57	1.67	3.24	1.68	2.67	1.57
22.vii	I usually begin with something I enjoy.	5.42	1.80	5.55	1.74	5.47	1.70	5.30	1.71	5.32	1.61	5.07	1.78	4.41	1.96

Table D1 Continued

Composite factors and items		Age-group means and standard deviations													
***Self-regulation:* Planning/practicing strategies**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
23.i	Before I practise something, I try to get an overall sense of what it will sound like.	3.92	1.93	4.24	1.90	4.51	1.81	4.72	1.74	4.83	1.74	4.95	1.66	4.69	1.75
23.ii	Before I practise, I read over the notes my teacher writes during my lessons.	4.19	1.87	4.59	1.89	4.48	1.83	4.27	1.82	4.11	1.89	4.61	1.76	4.31	1.94
23.iii	I practise small sections of the pieces I am learning.	4.66	1.74	5.04	1.62	5.02	1.53	5.20	1.44	5.40	1.51	5.57	1.36	5.48	1.44
23.vi	I mark things on the music to help me.	3.96	2.21	4.09	2.12	4.57	2.02	4.97	1.92	5.45	1.79	5.85	1.69	5.51	1.73
23.vii	I learn by playing slowly at first, and then speeding up.	5.38	1.79	5.77	1.47	5.85	1.38	5.96	1.27	6.03	1.23	6.18	1.15	6.14	1.21
***Self-regulation:* Dealing with mistakes**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
23.iv	When I make a mistake, I go back to the beginning and start again.	4.40	1.74	3.99	1.85	3.60	1.78	3.41	1.68	3.20	1.60	3.17	1.61	3.32	1.71
23.v	When I make a mistake, I correct it and then carry on.	4.67	1.69	4.98	1.64	5.24	1.37	5.21	1.34	5.19	1.36	5.36	1.31	5.04	1.39
***Self-regulation:* Reflecting/practising strategies**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
24.i	I record myself playing and listen to the recordings	2.16	1.54	2.72	1.91	3.10	1.93	3.32	2.00	3.34	1.97	3.33	2.03	2.76	1.84
24.ii	I think about how I want the music to sound.	3.99	1.91	4.45	1.86	4.86	1.69	5.25	1.62	5.48	1.47	5.76	1.46	5.22	1.62
24.iii	I practise with a metronome.	3.21	1.89	3.90	1.87	3.91	1.80	4.11	1.79	4.30	1.80	4.54	1.82	4.20	1.81
24.iv	I write down things I need to ask my teacher.	2.13	1.59	2.37	1.75	2.57	1.74	2.74	1.85	3.22	2.02	3.79	2.12	3.90	2.12
24.v	When I am away from my instrument, I think about pieces I am learning.	3.40	1.95	3.62	1.91	3.91	1.87	4.23	1.78	4.49	1.79	4.82	1.53	4.88	1.68
24.vi	I use apps or games to help me practise.	2.54	1.87	2.32	1.82	2.18	1.69	2.05	1.63	1.93	1.60	2.13	1.70	2.51	1.97
24.vii	After practising, I think about what to do next time.	2.79	1.88	3.11	1.86	3.20	1.87	3.31	1.82	3.55	1.91	3.90	1.86	3.89	2.05

Table D1 Continued

Composite factors and items		Age-group means and standard deviations													
Enjoyment		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
29.i	I enjoy practising my instrument at home.	5.33	1.36	5.19	1.52	5.21	1.49	5.47	1.40	5.75	1.37	5.77	1.31	6.15	1.10
29.ii	I enjoy attending my music lessons.	5.86	1.32	5.48	1.45	5.18	1.50	5.18	1.51	5.44	1.44	5.73	1.27	6.00	1.22
29.iii	I enjoy practising technical work (e.g., scales).	4.42	1.78	4.20	1.65	3.61	1.60	3.42	1.65	3.70	1.78	3.87	1.55	4.82	1.59
29.iv	I enjoy practising new pieces.	5.34	1.57	5.49	1.46	5.40	1.46	5.43	1.35	5.49	1.34	5.64	1.20	5.81	1.15
29.v	I enjoy playing pieces I already know.	5.99	1.29	5.91	1.22	5.88	1.22	5.91	1.17	6.03	1.17	6.32	0.81	6.09	1.04
29.vi	I enjoy working on my sight-reading.	4.64	1.67	4.29	1.67	4.13	1.70	4.17	1.71	4.32	1.79	4.50	1.70	4.79	1.57
Persistence		7–9		10–12		13–15		16–18		19–21		22–24		25+	
If I stop taking lessons, I will…		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
34.i	Keep on playing my instrument or singing for enjoyment.	5.34	1.76	5.62	1.63	5.90	1.50	6.25	1.27	6.30	1.31	6.56	0.96	6.19	1.34
34.ii	Perform (formally or informally).	4.21	2.18	4.23	2.04	4.36	2.01	4.58	2.04	4.74	2.10	4.99	2.00	4.34	2.33
34.iii	Play my instrument or sing with others.	4.79	1.96	4.77	1.98	5.07	1.88	5.32	1.85	5.49	1.87	5.55	1.76	4.79	2.22
34.iv	Play my instrument or sing to help me relax.	4.49	2.12	4.73	2.04	5.30	1.91	5.92	1.61	6.21	1.41	6.40	1.00	5.81	1.72
34.v	Learn new pieces.	4.48	2.16	4.75	1.97	5.43	1.71	5.83	1.42	5.82	1.54	5.95	1.42	5.68	1.68
34.viii	Teach others to play or sing.	3.88	2.08	4.15	2.12	4.42	1.98	4.91	1.92	5.25	1.96	5.46	1.79	4.18	2.37

Table D1 Continued

Composite factors and items		Age-group means and standard deviations													
Performance skills: **Performing for others**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
When I perform for others…		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
30.i	I enjoy the experience.	5.59	1.52	5.52	1.60	5.06	1.80	5.12	1.70	5.11	1.72	5.18	1.77	4.76	1.80
30.ii	I feel good about myself.	5.97	1.26	5.76	1.46	5.16	1.72	5.12	1.66	4.92	1.74	5.10	1.77	4.99	1.69
30.iii	I feel physically unwell.	2.04	1.39	2.25	1.61	2.86	1.84	2.96	1.86	3.09	1.89	3.29	1.99	2.93	1.92
30.iv	I am scared of performing badly.	3.37	2.00	4.00	2.07	4.77	1.94	4.83	1.94	4.83	1.82	4.90	1.83	4.69	1.92
30.v	My mind goes blank.	1.97	1.39	2.23	1.59	2.98	1.84	3.21	1.85	3.27	1.82	3.12	1.90	3.21	1.80
30.vi	My whole body becomes tense.	2.34	1.73	2.89	1.92	3.61	2.06	3.70	2.00	3.70	1.98	3.69	2.01	3.84	2.00
Performance skills: **Aural abilities**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
33.vii	I am skilled at ear tests.	4.91	1.83	4.91	1.58	4.57	1.65	4.40	1.69	4.55	1.78	4.74	1.79	4.34	1.72
33.viii	I am skilled at playing pieces by ear.	4.81	1.93	4.73	1.80	4.34	1.89	3.89	1.95	3.73	2.02	3.64	1.88	3.67	1.97
33.ix	I am skilled at improvising/composing.	4.26	1.98	4.32	1.93	3.85	1.91	3.46	1.99	3.58	2.01	2.99	1.83	3.07	1.97
Performance skills: **Practising**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
33.i	I am skilled at learning my instrument.	5.88	1.04	6.01	0.94	5.93	0.98	5.86	1.07	5.90	1.03	6.01	0.92	5.59	1.05
33.ii	I am skilled at technical work (e.g., scales).	5.45	1.30	5.31	1.28	4.92	1.35	4.80	1.42	4.77	1.34	5.14	1.15	5.07	1.15
33.iv	I am skilled at learning new pieces my teacher chooses.	5.48	1.29	5.57	1.15	5.52	1.14	5.43	1.13	5.47	1.12	5.55	1.01	5.40	1.12
33.v	I am skilled at playing pieces I already know.	6.19	1.11	6.29	0.91	6.23	0.92	6.20	0.89	6.17	0.94	6.27	0.75	5.86	0.99
33.vi	I am skilled at sight-reading music.	5.01	1.52	4.89	1.44	4.74	1.53	4.75	1.59	4.87	1.58	4.94	1.52	4.77	1.44
33.x	I am skilled at practising efficiently.	4.78	1.52	5.09	1.39	4.74	1.56	4.71	1.49	4.77	1.47	4.95	1.26	5.23	1.30

Table D1 Continued

Composite factors and items		Age-group means and standard deviations													
***Self-efficacy:* Personal competency beliefs**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
37.i	I am usually able to master the pieces I choose to learn.	5.78	1.21	5.99	1.12	5.97	1.03	5.86	1.08	5.87	1.06	5.94	0.88	5.86	0.99
37.ii	My music teacher tells me I have musical talent.	5.55	1.65	5.53	1.64	5.46	1.63	5.43	1.61	5.52	1.63	5.81	1.38	5.28	1.67
37.iii	My family or friends tell me I have musical talent.	5.67	1.61	5.96	1.41	5.81	1.46	5.80	1.50	5.88	1.54	6.18	1.20	5.37	1.67
37.viii	I am a good musician.	5.69	1.45	5.72	1.23	5.39	1.32	5.34	1.35	5.38	1.36	5.45	1.26	5.06	1.52
37.ix	I expect to do well at my music lessons.	6.01	1.21	5.91	1.20	5.49	1.38	5.39	1.40	5.44	1.47	5.75	1.18	5.68	1.25
***Self-efficacy:* Externally influenced beliefs**		7–9		10–12		13–15		16–18		19–21		22–24		25+	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
37.v	Hearing others perform well inspires me to practise.	5.11	1.84	5.09	1.78	5.36	1.69	5.71	1.54	5.86	1.44	6.20	1.18	5.90	1.43
37.vi	When my family is proud of my music making, I feel good.	6.30	1.12	6.19	1.22	5.90	1.39	5.78	1.49	5.95	1.34	6.00	1.29	5.54	1.72
37.vii	Knowing that I play/sing better than others makes me feel good.	5.14	1.95	5.14	1.89	5.18	1.78	5.10	1.81	4.90	1.93	4.99	1.87	4.42	2.06