Disentangling motivation within instrumental music learning: A systematic review

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Abstract

Motivation is a crucial aspect of learning, particularly in the field of music. For decades, motivation for learning music has been a much-discussed subject, and yet its influence still remains a convoluted issue. This study systematically analyses peer-reviewed English language studies, according to PRISMA guidelines, in order to understand how children's and adolescents' motivation to learn a musical instrument has been studied, the theories that have been adopted to frame this research, the types of quantitative instruments that have been designed or adopted within the research designs, and the types of findings that have documented. A search on *Web of Science*, Education Resources Information Center - *ERIC*, and *Scopus* was conducted, using the following search terms: music, instrument, learn, education, study, and motivation. The initial search identified 447 studies. Twenty of these met the inclusion criteria for investigating any music-related aspect of motivation that was based on the analysis of quantitative data. Results show a limited number of studies that have explored children's motivation in the context of learning a musical instrument and report a special focus on the central role of parents and social background. Implications of these results for music education and the adequacy of questionnaires to children are discussed.

Keywords: motivation, musical instrument, music education, systematic review, PRISMA

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Introduction

Motivation is a crucial aspect of learning, with decades of research examining the reasons for people's actions, their willingness to engage, and their goals. One of the most accepted frameworks for studying this topic defines motivation in terms of the energy that drives an individual to initiate a given task, with the level of motivation being seen as impacting on the intensity of this involvement, the level of commitment required to persist with it, and the resilience needed to cope with failure and setbacks (Wentzel & Wigfield, 2009). Accordingly, research in the field of music has demonstrated that motivated students tend to learn more and produce better academic, social, and emotional outcomes (Hodgins, Brown, & Carver, 2007). Furthermore, high levels of motivation have also been associated with higher levels of self-beliefs (e.g., self-efficacy, self-esteem), autonomy, and a sense of belonging to a particular group or community (Hodgins et al., 2007).

Different perspectives have been used to understand an individual's motivation to study music, ranging from more general approaches that are based on music as an area of learning in elementary and high schools, to more specific approaches focused on the learning of musical instruments. Perhaps the most comprehensive of the first type involved a series of studies led by McPherson that surveyed over 30,000 school students across nine different countries that examined students' motivation to study music as compared to their other school subjects (McPherson & O'Neill, 2010; Gonzalez-Moreno, 2010; Leung & McPherson, 2010; Hentschke, 2010; McPherson & Henricks, 2010; Portowitz, González-Moreno, & Hendricks, 2010; Xie & Leung, 2011; Juvonen, 2011; Seog, Hendricks, & González-Moreno, 2011; McPherson, Osborne, Davidson, Barrett, & Faulkner, R, 2015). McPherson and his colleagues report a decline in interest in studying music as a school subject as students approach the 9th grade, which they interpret to a lower valuing of music and its usefulness by the students as they begin to focus on their future careers after leaving school.

Less comprehensive is the literature that investigates motivation in the context of musical instrument lessons. In most formal music education institutions, students receive guidance and support from their teachers only once a week. Thus, if students are to succeed in learning their musical instruments, they must be able to develop and maintain an intense daily practice routine even in the absence of direct assistance from their teachers.

According to Gagné (2009), several intrapersonal catalysts related to an individual's personality, sense of volition and motivation, shape talent development. These intrapersonal catalysts filter other environmental catalysts since the contexts are interpreted and given significance by the individual. Importantly, within this framework, motivation is seen as exerting a significant impact on the level of success within any learning process. Furthermore, motivation also seems to be enhanced by the support of significant others in the student's life, namely, their parents and peers (Comeau, Huta, & Liu, 2015).

With the above in mind, a number of authors (Creech, 2010; Sosniak, 1985; Howe & Sloboda, 1991; McPherson, 2009) have addressed the nature and the impact of parental support in formal instrumental music education, suggesting that students become more involved and motivated when their parents are actively engaged in the process. When parents attend to their child's early music lessons and individual practising, the child's valuing of music increases. This is due to an internalisation of the importance of music in the child's own life as conveyed by the parents' attitude. This internalisation occurs due to the transfer of responsibility from an external regulator – the parents – to the student. As a result, the student seems to be better positioned to experience autonomy, and to develop a sense of self-regulation, and a determination to learn (Küpers et al., 2014). This pattern of influence is also consistent with other aspects of the child's academic learning and development (Carlton & Winsler, 1988).

The transference from external to internal regulation is a crucial feature of Self-Determination Theory which outlines three basic human psychological needs: autonomy (the need to feel in control; a sense of self-regulation and determination over the path to follow), relatedness (the need to feel connected with others; a sense of belonging to something more significant than oneself), and competence (the need for mastery experiences and the required skills to pursue a chosen goal and achieve it with success) (Deci & Ryan, 1985). Self-Determination Theory states that individuals will become more motivated and engaged with activities that fulfil these basic psychological needs. It also proposes a continuum of different motivation levels, ranging from amotivation (a total absence of motivation), passing through various levels of extrinsic motivation (motivated by external factors, such as rewards or the satisfaction of parents' expectations), to intrinsic motivation (experiencing pleasure from doing a given task for the sake of it alone rather than for some extrinsic reinforcement).

Another important dimension has been included in this process through the lens of Self-Determination Theory to understand motivation in the context of learning music. Research has sought to understand how the dynamic and contingent interactions between students and teachers during lessons foster or promote autonomy (Comeau et al., 2015; Küpers, Dijk, van Geert, & McPherson, 2015). These studies have provided various explanations of the teachers' role as an autonomy-supporter in their interactions with students during lessons (micro-level) and as a facilitator of their overall musical development (macro-level).

Overall, previous research has shown that a psychological need that keeps individuals involved with music is relatedness. Through music, individuals establish social bonds with others with whom they share common musical interests (McPherson, Davidson, & Faulkner, 2012). In a similar fashion, competence and its related concept of self-efficacy have also been investigated in terms of their impact on motivation and engagement with the learning process. For instance, McPherson and McCormick (2006) and Ritchie and Williamon (2012) report that self-efficacy is a more reliable predictor of musical achievement, even when compared to practising. Such results can be explained because students with stronger self-efficacy perceptions tend to utilize adaptive strategies when practising.

Self-efficacy is a fundamental component of Expectancy-Value Motivation Theory (Wigfield & Eccles, 2000), which states that individuals show higher interest in activities they value the most. This theory helps to explain why individuals tend to engage in activities in which they anticipate having the required skills to perform successfully (Wigfield & Eccles, 2000). Indeed, the feeling of competence is influenced by the perception of the difficulty of the task, implying that teachers should design goals that are within the reach of their students.

Reasons invoked to explain success and failure play an important role in explaining students' motivation. According to Attribution Theory (Asmus, 1986; Weiner, 1995), these reasons can be understood according to two dimensions: locus of control and stability. Furthermore, these two dimensions can be divided into two other elements: in terms of locus of control, attributions can be internal (effort, skills) or external (task difficulty, chance); according to stability, attributions can be stable (skills, task difficulty) or unstable (effort, chance). Students who show fixed convictions about learning an instrument, namely that progress is dependent on individual talent and set ability, tend to show low motivation and little resilience to setbacks because they

explain failure as a result of not having the required talent to achieve the performing standards. Conversely, students with malleable views regarding their development tend to attain better outcomes because they explain their success in terms of aspects that are under their control, such as putting in more effort next time to achieve a better results.

The review reported here is part of a more extensive study that addresses the admission procedures to Music Conservatories. Our review, therefore, aims at understanding how motivation to learn a musical instrument has been studied in previous literature, namely which theories were most adopted, which quantitative instruments have been designed or devised to collect data, and which outcomes have been reached. In line with the scope of the investigation, we restricted our samples to children and adolescents, within the age range of Music Conservatories' students. It is known that this is a particular sensitive range of ages, considering that students within this age group require more external support during the early years of their music education to trigger motivation in addition to the transitions from elementary to high school in order to sustain their motivation.

Method

Search Strategy

All phases of our research were performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, & Altman, 2009).

A systematic search was applied to identify relevant articles to establish a minimum set of publications that can be reported in this systematic review. First, an initial search in the selected electronic databases (*Web of Science*, Education Resources Information Center - *ERIC*, and *Scopus*) was undertaken to identify the most appropriate keywords. Then, with the chosen keywords, a search was carried out in the same databases. This search commenced on 08 September 2019 with no date restriction. We limited our search to English-language articles and used the following main search terms (*music** AND *instrument** AND *motivation* AND *learn**) OR (*music** AND *instrument** AND *motivation* AND *study*) OR (*music** AND *instrument** AND *motivation* AND *education*), presented in the title, abstract and/or keyword fields. Furthermore, the references for the remaining records were scanned to identify any further articles not yet identified.

Article selection

To be included, studies had to: 1) investigate any aspect of motivation to study or continue to learn a musical instrument; 2) include participants who were studying in the primary/elementary or secondary/middle-high school levels; and 3) comprise quantitative data measured systematically (semi-structured interviews or questionnaires, providing quantitative analyses supported by the choice and application of an adequate statistical test recommended to the nature of the study).

Reasons for exclusion included: 1) reviews, theoretical articles, books, chapters, and meta-analyses; 2) no-human studies; 3) uncontrolled trials; 4) qualitative, case studies, or articles focused on questionnaire validation; 5) reports and conference papers; 6) studies investigating the motivation of parents or teachers; 7) articles not related to the learning of a musical instrument; 8) articles not written in English; and 9) articles where the full-text was not available in the databases used for this review.

The first and second authors performed eligibility and assessed all full-text articles selected for this systematic review independently. In the case of disagreement, the solution was discussed during a consensus meeting (if necessary, including senior researchers). Within the articles selected for review, significant information was summarized and compared. Namely, from each study, instruments, sample description, underlying theory, design, and outcomes were extracted for comparison and interpretation.

Results

The identification and extraction processes are displayed in the flow diagram in Figure 1. Although we extracted design specifications as well as statistical results, which enabled us to calculate effect sizes, according to the Cochrane systematic review guidelines (Higgins & Green, 2011), a meta-analysis was deemed inappropriate due to heterogeneity of the examined studies' design, features of the samples and measures.

After removal of duplicates, we screened 442 articles. As a result of the supplementary search, we added an additional 5 articles. From these, 180 were excluded because they were either review, theoretical articles, books, chapters, meta-analyses or non-English articles. Out of the resulting 267 articles, 199 were excluded because they were not related to the field; thus, the resulting 68 articles were checked for eligibility according to the aforementioned inclusion criteria with a further 48 being excluded according to these criteria. A total of 20 articles where subsequently included in our systematic review.

The motivation theories adopted by the authors of the selected articles are systematized in the Table 1, with Figure 2 providing an explanation of the theories.

(INSERT FIGURE 1 HERE)

Participants and Setting Characteristics

Of the twenty articles that met the inclusion criteria of this systematic review, three explore motivational aspects for musical instrument learning in samples of children, 10 comprising adolescent participants, and seven are restricted to children and adolescents. With the aim of discussing motivation differences according to age, we organized our results into three sections: i) articles investigating samples of children; ii) articles investigating samples of both children and adolescents, and iii) articles examining samples of adolescents.

We detected articles comprising samples sizes ranging from 38 to 3325 participants with data collection across 6 countries: the USA (n = 8), Australia (n = 5), the UK (n = 4), Canada (n = 1), Canada, China, and the USA (n = 1), and the USA and Singapore (n = 1). References for all included studies are listed in Table 1.

(INSERT TABLE 1 HERE)

(INSERT FIGURE 2 HERE)

Articles Investigating Samples of Children

Three of the selected articles include samples of children (Evans & McPherson, 2015; Evans, McPherson, & Davidson, 2013; McPherson, 2000) and were developed as part of the same longitudinal research. Two of these investigate the impact of musical identity in musical achievement in two different time spans: after nine months of formal instrument instruction (McPherson, 2000), and after three years of formal instrument instruction (Evans & McPherson, 2015). Two articles adopt the Expectancy-Value Theory as a theoretical lens (McPherson, 2000; Evans & McPherson, 2015), whereas the other article applies Self-Determination Theory as the chosen model (Evans, McPherson, & Davidson, 2013). All of these use self-report questionnaires as data collection instruments, with some administered to the students, while others collect

information from parents such as time spent practising whenever this source seemed more reliable than students.

McPherson (2000) divides the prospective commitment declared by the participants into three categories: 1) short-term commitment (intention to play the instrument until the end of primary school), 2) medium-term commitment (intention to play the instrument throughout high school), and 3) long-term commitment (intention to play the instrument after leaving high school and during later life). McPherson also collects the duration time of the practising sessions from the students' mothers to estimate an average of practising time accumulated across a period of 9 months. Those children who reported long-term commitment scored significantly higher on performance mastery measures than medium-term committed children. The lowest scores on performance mastery scales were from students who expressed a short-term commitment to learning their instrument. Finally, McPherson (2000) observed that students who expressed an extrinsic motivation before commencing their instrument tended to score lower on the performance mastery scales; conversely, those scoring higher on performance mastery scales tended to express a more intrinsic motivation.

In a similar fashion, Evans and McPherson (2015) explored both musical identity and practice on performance mastery after three years of learning by collecting data on four periods: before the commencement of instrumental learning, and at the end of the first, second and third year of learning an instrument. Again, after a longer period of learning (3 years), it was found that the long-term commitment evidenced by the best students impacted on their practising strategies by making them more effective, thus resulting in higher scores on performance mastery scales. Furthermore, those with long-term commitment and the highest amount of practice also played their instruments for a longer period of time.

Finally, Evans, McPherson, and Davidson (2013) explored the impact of the fulfilment of the three basic psychological needs as proposed by the Self-Determination Theory on decisions to cease music learning. This analysis revealed that participants reported higher satisfaction and lower inhibition of the three psychological needs during the high engagement context, and, conversely, lower satisfaction and higher inhibition prior to the cessation of their musical learning.

Other reasons to cease studies not related to the basic psychological needs are mentioned, such as physical conditions, context, and economical factors: orthodontic braces, stolen instrument, and too expensive an activity, respectively.

Articles Investigating Samples of both Children and Adolescents

We uncovered seven articles focusing on both children and adolescents (Comeau, Huta, & Liu, 2015; Creech & Hallam, 2011; Hallam et al., 2016; Hallam, Papageorgi, Varvarigou, & Creech, 2018; Schatt, 2018; Schmidt, 2005, 2007). These articles focus on different musical instruments: one studied exclusively pianists (Comeau et al., 2015), another investigated violin players solely (Creech & Hallam, 2011), three examine wind band instrument players (woodwind, brass, and percussion) (Schatt, 2018; Schmidt, 2005, 2007), and two consider the full range of classical and popular instruments (Hallam et al., 2016; Hallam et al., 2018). All the above-quoted articles collect data through self-report questionnaires, with some being validated previously (e.g., the Piano Autonomous Motivation Scale used by Comeau, Huta, & Liu, 2015), and others developed for the research (e.g., Hallam et al., 2016) (see Table 1 for further details). A broad array of theories was used in these seven articles: Self-Determination Theory (Comeau, Huta, & Liu, 2015; Schatt, 2018); Attribution Theory (Schmidt, 2005); Self-Efficacy, Group-Efficacy and Entity-Incremental Theories (Schmidt, 2007). Three articles did not specify any theoretical framework.

The articles authored by Hallam et al. (2018), and Hallam et al. (2016) included the same sample of students. However, one considered the complete sample, and the other only investigated the subgroup of those who had taken performance examinations. Specifically, Hallam et al. (2018) investigated the relationship between motivation and examination outcomes, with only those who had taken performance examinations being considered in this study. Data was collected on practising strategies and quality of practice, practising time, and scores obtained in the students' last performance examination (fail, pass, commended, and highly commended). Overall, the authors report that students who practiced the least were those who had obtained a pass, practising around 177 minutes per week on average.

Interestingly, those who failed had amassed longer weekly practising average times of approximately 233 minutes. Students who obtained a *pass* provided lower responses on practising variables meaning that they adopted less effective strategies. Those who received a *pass* (but not those who received a *fail*) provided lower responses to motivation variables. Those who had failed expressed less *enjoyment of performing* and *less enjoyment of playing, lessons, and practice*. From these results, the authors

concluded that success feeds motivation and that this leads to the adoption of more effective strategies in challenges to come, in a type of "virtuous cycle".

A different approach was taken by Hallam et al. (2016), who explored the relationship between motivation variables and musical aspirations. Information on grade level and accordance with three different statements of musical aspirations was collected – 1) always wanted to be involved with music, 2) want to be a musician, and 3) I think playing an instrument will be useful for my future career. The global score of motivation declined between grades 1 and 4, probably indicating a reaction to the more difficult and challenging repertoire. These researchers found that students who *always wanted to be involved with music activities* scored high on social life and the value of playing an instrument, enjoyment of performing, and enjoyment of instrumental music activities. This research also highlighted the importance of social and parental support, for all aspiration levels considered, *social life and the value of playing an instrument* was a robust predictor.

Two studies (Comeau et al., 2015; Creech & Hallam, 2011) investigate how interactions between children and significant adults impact motivation. Comeau et al. (2015) compare how two cultures – Chinese and American – and their traditional parental styles influence students' motivation. The authors report that Chinese students believe they must practice harder than other students to achieve a successful outcome. Applying variables identified in Self-Determination Theory, the Chinese sample reported twice as much practising time than the American sample and scored higher than their American counterparts in all of the motivation variables, with the exception of introjection.

Creech and Hallam (2011) examined how student-teacher and student-parent dynamics might affect self-esteem, self-efficacy, motivation, enjoyment of music, musical attainment, and satisfaction with lessons. Their results show that pupil-teacher reticence had a negative impact on several motivation variables: enjoyment of music, satisfaction with violin lessons, motivation, and self-esteem. Receptiveness to parental support had a positive association with all the motivation variables (enjoyment of music, satisfaction with violin lessons, motivation, self-efficacy, and self-esteem) except for musical attainment, thus suggesting that parental support thwarts musical achievement. This controversial finding deserves further research attention.

The last three articles investigated samples comprising band programs. Schatt (2018) sought to assess self-determination to practice (i.e., the relationship between

self-determination to practice, years of experience, and weekly practising time), in order to determine whether there are differences in self-determination to practice according to grade level, sex, instrument, and the experience of private lessons. The relationship between self-determination to practice and years of experience showed that *amotivation* correlated positively with years of experience, whereas all three intrinsic motivation variables, and both *extrinsic motivation-identified* and -*introjected* correlates negatively. Results also suggested that the longer the students play the instrument, the less they are motivated to practice.

A study undertaken by Schmidt (2005) investigated the relations between motivation, performance achievement, and music experience on a sample of band students. Schmidt found that intrinsic motivation was related to practising time and effort. Students attributed their success to mastery and cooperative orientations and also report learning more consistently in the group. Moreover, there was a tendency for more advanced students to demonstrate intrinsic and mastery orientations, whereas younger students tended to express competitive and ego orientations as well as avoid failure.

Another study by Schmidt (2007) aimed at evaluating intrinsic-mastery motivation in instrumental music as a higher-order construct. For that purpose, Schmidt investigated band students from grades 6 to 12, subdivided into two groups: middle school (grade 6-8) and high school (grade 9-12). Schmidt reports that students develop positive perspectives in terms of intrinsic motivation, cooperative attitudes and commitment to band, and incremental views of musical skills. Schmidt also found that intrinsic-mastery and commitment to the band are strong predictors of practising time.

Articles Investigating Samples of Adolescents

Three of the selected articles apply Attribution Theory (Chandler, Chiarella, & Auria, 1987; Austin, 1988; Schatt, 2011); two others analyse the sample through the lenses of Self-Determination Theory (MacIntyre, Potter, and Burns, 2012; Evans & Liu, 2018); two utilise Achievement-Goal Theory (Ng, 2017; Miksza, Tan, & Dye, 2016); one uses Self-Regulation Theory (Austin and Berg, 2006); and two do not specify any underlying theory (Egilmez & Engur, 2016; Driscoll, 2009). All administer questionnaires to collect information, some of which had been previously validated (e.g., Evans and Liu, 2018), whilst others developed instruments for the research (e.g., Austin, 1988).

Three of the selected articles investigated high school students' motivation to study a musical instrument. For instance, Evans and Liu (2018) explored motivation using the psychological needs of high school students to continue in an orchestra. Their findings reveal consistent results related to psychological needs satisfaction, which predicted time spent practising, intentions to continue, and self-esteem. Frustration predicted only self-esteem.

Another study (MacIntyre, Potter, & Burns, 2012), explored instrumental learning motivation and attitudes not only related to students but also according to external factors such as the impact of social environments involving parents, peers, and others. Their results demonstrated that motivation to learn a musical instrument was endorsed by positive attitudes – such as the effort for learning in relation to the musical environment; in other words, to the course and teachers – and by social environments, such as parents, peers, and others.

In contrast to the above studies, Schatt (2011) focused on the students' perspectives on their instrumental learning by adopting the Attribution Theory paradigm to clarify behaviour regarding practising. Schatt found that students understood the importance of practising for providing a better performance, and for this reason, higher values on the scale were obtained for the internal attribute – effort. Regarding motivation, students recognized that practising can be driven by extrinsic motivation, on an approach success trend. However, instrument practising was not related to extrinsic motivation, but instead to intrinsic motivation factors, thus suggesting that private lessons encourage learners to practice for themselves and not for external reasons.

Another two articles, with different aims, explored motivation in participants aged from 10 to 12 years. This article (Austin, 1988) sought to test two contest conditions, namely a rated evaluation and a second form of evaluation that included only comments on music achievement. In general, the rated music contest promoted higher musical achievement. Moreover, the author found that motivation for success in the music competition was based exclusively on perceptions of effort. Nevertheless, the author noted the need to include other motivational determinants to explain a broader range of intrinsic and extrinsic factors.

Austin and Berg (2006) investigated the relationship between regulation and motivation to practice in students who were learning instruments in orchestras and bands. These authors observed that regulation and motivation were different aspects of musical practice since a motivated student cannot show practising regulation. Another

finding was related to a higher practising motivation for orchestra students, which was linked with the environmental quality in which students usually practice.

Two articles (Chandler, Chiarella, & Auria, 1987; Egilmez & Engur, 2016) explored the same age range (14 – 17 years). However, the first involved a cross-sectional study, while the second applied a longitudinal design. Specifically, Chandler, Chiarella and Auria (1987) demonstrated that students who sense success attribute it to internal factors. On the other hand, failure was associated with external attributions and fewer challenges. Their data suggest that help from the band director does not positively impact on motivation since the director was perceived as an external and uncontrollable factor.

A one-year longitudinal study (Egilmez & Engur, 2016) explored the motivation of high school participants to study piano. Results suggest that after 10th grade, motivation (musical engagement) and self-efficacy (performance) decrease. Moreover, 85% of the participants highlighted that teachers do not effectively prepare piano lessons, and 70% of the students associated their failure in piano lessons due to the high expectation that family or friends posit on them.

The remaining three articles focused on different age ranges to explore motivation in instrumental and choral music students (Ng, 2017), investigate the associations between Achievement Goal motivation and engagement, rehearsal, and others (Miksza, Tan, & Dye, 2016), or examine motivation in adolescents who are currently studying instruments or involved in singing classes, with those who had ceased learning (Driscoll, 2009). The study carried out by Ng (2017), classifies his sample as being mastery focused (e.g., participants who express mastery aims, but are weak in performance aims), having multiple-goals (e.g., participants who have both strong mastery and performance aims), and unmotivated participants (e.g., those who are weak in both mastery and performance). Results show that mastery-focused and multiple-goal participants exhibited a higher self-concept of their ability and a higher enjoyment of their learning than their unmotivated peers. An interesting finding was related to parental support. Multiple-goal participants scored higher for parental support, followed by mastery-focused students, and then unmotivated students. These findings suggest that social factors are intimately related to the maintenance and motivation of instrumental learning.

Another study undertaken by Miksza et al. (2016) explored two high school samples, one from the USA and the other from Singapore, using a 2 × 2 Achievement

Goal orientation framework (mastery approach, mastery avoid, performance approach, and performance avoid). The authors explored the associations between quoted achievement goal motivation and flow (i.e., strong engagement and intrinsic satisfaction) in band rehearsal, grit in practising (i.e., perseverance and enthusiasm for long-term goals), and commitment to the band. Although no differences were detected between groups on the achievement goal scale, it was observed that the mastery approach orientations to the band were higher for the American students. Moreover, American participants also demonstrated associations between flow, grit, and a mastery approach. According to the authors, these results suggest that self-referential progress is associated with the American students' motivation results.

Finally, Driscoll (2009) collected evidence revealing that peers' support is a predictor of discontinuation of studies; furthermore, family support is reported to be twice as large than peers' support. Moreover, Driscoll found that the most typical reason to cease instrumental learning was that the participants found the classes annoying (reporting lack of interest and progress). Finally, similar to other studies, the author reports that dropout rates of instrumental learning rose from age 11, after the difficult transition into secondary school.

Discussion

The present study sought to systematically review and summarize the existing literature that apply quantitative research instruments to study children's and adolescents' motivation to learn a musical instrument. Our focus was to clarify which theories have been adopted to support the published work on this topic, identify the quantitative instruments adopted, and understand the systematized primary outcomes.

Of the 20 selected articles, we noticed that the most adopted instruments for collecting information on factors associated with motivation were questionnaires or surveys. Some authors (Creech & Hallam, 2011; Schatt, 2018) administered existing and validated questionnaires such as the SPA (Survey of Pupil Attitudes) and MLSS (Music Lesson Satisfaction Scale), or the MPMS (Musical Practice Motivation Scale), while others developed new questionnaires with variables aimed at assessing factors related to their research questions (Hallam et al., 2016; Hallam et al., 2018).

It is well known that self-report measures have advantages, because they can quickly and easily be used to collect and then analyse and interpret extensive data from large samples. However, as with any type of measure, questionnaires also have

limitations. Some of these limitations are the tendency for young respondents to provide meaningless responses due to being inattentive, lacking sufficient self-knowledge and metacognition, or even strategy use. Another essential concern commonly addressed for young respondents is that they can also choose the most straightforward answer, which researchers refer to as the 'primacy effect' (Scott, 2000). To solve this shortcoming, some researchers have triangulated their results with information obtained by others (e.g., parents) in order to validate data obtained from an analysis of the children's responses.

A delicate point we signal is the adequacy of the questionnaires to assess very young students. According to Bell (2007), the number of points on the Likert scale should be adapted considering specific ages. In our systematic review, we observe that several studies administered the same 7-point Likert scale questionnaire to all participants regardless of age, ranging from 6 to 19 years old. Bell (2007) points out that young respondents do not understand the subtleties of the small differences between the 7 possible answers of a 7-point scale. Thus, she advises that for a sample ranging from 7 until 11 years old, a scale of 3 or 4 points should be adopted; for samples from 11 until 18 years old, 4 or 5 possible answers should be offered. An advantage of using a 7-point Likert scale such as the one mentioned above, is that it allows for more discrimination in the data. In order to overcome the mentioned limitation of self-report assessment, future research could investigate other measurement options to those currently being used with young respondents, such as verbal self-reports and graphic self-reports (Fryer & Dinsmore, 2020).

In addition, a wide range of questionnaires were used in the studies reported here, thus making comparisons more difficult across samples. Consequently, the use of more standardised and validated questionnaires administered across studies would increase the validity of current findings.

Regarding the age of respondents, we noticed that the number of studies on motivation to play an instrument is minimal with samples of children. We found only three articles with this population (Evans & McPherson, 2015; Evans et al., 2013; McPherson, 2000). A possible explanation may be that some schools advocate that the learning of some instruments (e.g., brass) must start later on when children have more developed and mature bodies and muscles. Another possible reason is that not every music school offers programs at the elementary school level.

Most of the studies included in this review utilised a cross-sectional design. These studies all show that motivation tends to decline at the onset of adolescence. However, this observation is a result of the comparison of different subjects. One of the strengths of longitudinal research – observation of the evolution of motivation of a given subject across time – would allow for a deeper understanding of this dynamic because it would pinpoint the major turning points when motivation is strengthened or diminished.

A number of investigations report that students who bring a personal interest to their instrumental learning tend to be more intrinsically motivated, which, in turn, fosters self-regulation and results in better musical and emotional outcomes (McPherson, 2000; Schmidt, 2005; Schmidt, 2007; Creech and Hallam, 2011; Schatt, 2011; Evans & McPherson, 2015; Hallam et al., 2016; Ng, 2017). These intrinsically motivated students tend to form musical identities at much younger ages, and this view of themselves drives their subsequent engagement in learning music (Evans & McPherson, 2015).

As observed in nine articles, the social context is an important factor that influences motivation. Whenever students feel comfortable in the learning setting (e.g., good relationships with teachers and peers) and feel integrated into the group, this relatedness impacts on the value they attribute to music, with the result that music becomes a central part of their lives (Creech & Hallam, 2011; Driscoll, 2009; Egilmez and Engur, 2016; Evans et al., 2013; Evans & McPherson, 2015; Evans & Liu, 2018; Hallam et al., 2016; Ng, 2017; Schmidt, 2005).

Findings also suggest that the level of parental support also impacts on the learning process. The cross-cultural study comparing motivation between Chinese and American students showed that a work ethic robustly impacts on students' commitment to learn their instrument. Chinese students seem to internalise the values of their parents' culture and apply this to their learning realities. They tend to view their musical achievement as a result of hard work and consequently engage themselves more intensively in their musical learning (Comeau et al., 2015).

A factor studied by many authors is practising. The number of hours amassed practising is an indicator of engagement and motivation. Findings show that the more one is motivated, the more one will practice (Schmidt, 2005; Austin and Berg, 2006; Schatt, 2011; Comeau et al., 2015; Evans & Liu, 2018; Hallam et al., 2018; Schatt, 2018). Importantly, the quality of practising plays a major role, but it is undeniable that

the number of hours of practiced is a strong predictor of musical achievement. Hallam et al., (2018) even suggest that a "virtuous cycle" in which motivation leads to more practising thus achieving better outcomes, which, in turn, results in higher levels of motivation.

As for the motivation theories, those studies that adopted the Expectancy-Value framework to assess motivation to learn an instrument before commencing learning, focused on understand the expectations, visions and perceptions students bring to the learning process and how this impact on their subsequent engagement with music. By attributing success to high achievers' internal and unstable reasons, Attribution Theory reminds us about the need for teachers to reinforce in their students that their talent is not fixed but something that can be developed.

Achievement-Goal Theory has allowed researchers to understand what drives a student. This framework has been used to assess whether students are focused on a desire to learn an instrument for the pleasure of playing it or if they are driven by external motivators, such as public success or approval from others. Teachers may be aware that these external goals may motivate some students, but they often come with a detrimental impact in terms of psychological stress.

Self-Regulation Theory was adopted when researchers sought to understand how practising strategies impact on the improvement of students' overall performance and, consequently, their engagement with the repertoire they are attempting to master. Self-Efficacy, Group Efficacy, and Entity-Incremental Theory have been applied to understand how self-beliefs impact one's engagement with a shared project and on an ensemble's performance.

Self-Determination Theory has allowed the assessment of fine-grained fluctuations of motivation as a result of many different factors. This permits researchers to understand how dyadic relations such as the dynamics of the student-parent-teacher relationship or interactions with peers, impact perceptions of competence, need for autonomy, and relatedness, which affects one's commitment and willingness to continue engaging in the learning process. For these reasons, Self-Determination Theory helps with efforts to provide a more comprehensive understanding of the instrumental learning process. The three basic psychological needs permit a broad framing of several variables and provide significance to internal factors (self-beliefs such as competence and self-needs such as autonomy) as well as external factors (attribution of social meaning to the task). Furthermore, the 7 points on the motivational

scale ranging from amotivation to intrinsic motivation provide a comprehensive framework for distinguishing between the different levels of commitment and engagement observed in-between students (inter-subject) and even within the same person as motivation unfolds over time (intra-subject).

Conclusion

Based on the results of this study, it can be recommended that researchers devise more studies that incorporate a longitudinal design into their work, in order to understand at a much deeper level, the moment to moment and longer-term fluctuations in students' motivation across time. For us, Self-Determination Theory provides a unique theoretical lens for providing a more comprehensive understanding of motivational factors that impact on learning and long-term participation in music.

The existing literature is limited by few studies that have explored motivation in the context of music education during the beginning stages of learning an instrument, with far less work undertaken that studies the predispositions and beliefs that children possess before commencing learning and which they bring to their initial experiences of learning music.

We see a particular need for researchers to develop and validate new measurement techniques to assess learners' motivation to play an instrument before and immediately after learning commences. These instruments need to be designed and constructed in accordance with the age ranges of the children, such that the concepts and elements studied are clearly understood by the learners so that they can provide reliable responses. At post-secondary school ages, more robust measures that can be used by Music Conservatories would allow panels to move beyond performance-based measures of attainment, to a broader sampling of a range of personal motivational attributes that help determine success in studying music at the advanced stages of musical development.

One positive indication of how the research literature in this topic is maturing is a shift from studies that lack an overarching theoretical position, to those that are now drawing on established theoretical frameworks such as Self-Regulated Learning and Self-Determination Theory, both of which have an extensive literature in other areas of learning.

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