

Self-Regulated Learning in Music Practice and Performance

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Introduction

This chapter discusses self-regulated learning in the context of music. Self-regulated learning holds significant potential for increasing the efficiency of musical skill acquisition across all aspects of music performance instruction. We begin with a review of selected research that has studied skill acquisition when learning to play a musical instrument. Although the literature related to this topic is growing steadily, much of the scholarship is scattered and atheoretical. Moreover, researchers in music tend to concentrate on behavior and cognition as separate and somewhat unrelated theoretical topics to the exclusion of affect. We discuss these limitations and present a summary of literature that brings research-based evidence pertaining to behavior, cognition, and affect together into a coherent self-regulated learning framework. Current and future research priorities are then detailed as a means of outlining ways of maximizing music practice, teacher student interactions, and efficient approaches to learning complex musical skills. Our final section summarizes the discussion and provides implications for how self-regulated learning might be adopted more widely in the music education domain.¹

Relevant Theoretical Ideas Underlying Musical Self-Regulated Learning

There are multiple reasons why self-regulated learning is relevant to studying music performance. Musicians spend hours practicing their instrument or voice by themselves and rehearsing with others, and unlike many other areas of academic learning, they typically do this because they have made a choice to study music, rather than being required to learn as part of a

¹ The first-person ‘we’ and ‘our’ throughout the chapter refer to any or all authors of the chapter and our colleagues as indicated in citations.

school curriculum (McPherson, Davidson & Faulkner, 2012; McPherson & Zimmerman, 2002, 2011).

It is self-evident that being able to monitor and control one's learning is fundamental to the acquisition of the highest level of music performance skill. Yet despite this view, the area of instrumental and vocal performance is one of the most conservative domains of learning. It is dominated by teacher-centered pedagogy and a strong master-apprentice model in which a highly experienced music performer imparts his or her knowledge to a passive, receptive learner (Bennett, 2008). Indeed, there are many music performance teachers who are skeptical of the value of research and who view the processes of acquiring artistic expertise as too disparate or esoteric to study. Consequently, music teaching and learning processes are often characterized by a hierarchical and asymmetric pattern of interaction that can leave little room for students and teachers to discuss and reflect on the process, and few opportunities for input from the students (Creech & Gaunt, 2013; Young, Burwell & Pickup, 2003). Such pedagogy compromises motivation and stifles practice quality, yet in many music environments, particularly at the tertiary levels, such approaches have remained largely unchanged and unchallenged for centuries.

A major distinction in music is that musicians do much of their personal skill development practicing in isolation, as compared to other areas such as sport, dance and theatre, where a coach or director provides informative feedback and well-defined tasks during frequent rehearsals or training sessions. In one-to-one studio sessions, teachers tend to focus on music techniques and interpretation of repertoire, rather than informative feedback regarding the student's hierarchy of goals, the strategies they are using, and how to monitor their progress towards goals. As a result, students do not explicitly learn how to practice. Accordingly, the

practice quality of typical music performance students is often poor because of their use of ineffective and unsystematic strategies. It is for this reason that we believe that self-regulated learning provides the best theoretical and applicable framework for understanding the context-specific set of processes that learners draw upon as they promote their own learning.

Yet another challenge in the music literature is the dominance of behavioral approaches to studying expert performance as a means of understanding the psychological mechanisms underpinning high level-performance and using this knowledge to inform the training of less advanced learners. To date, much of the literature on music practice has focused on either tracking the behaviors of musicians while practicing (Gruson, 1988, Gabrielsson, 1999; Miksza, 2006a; 2011b, Palmer, 2013) and the quantity of deliberate practice they engage in whilst practicing (Ericsson, Krampe, & Tesch-Römer 1993)

Initial theoretical efforts to apply the SRL framework examined the extent to which young music learners displayed the capacity to engage in the kinds of self-regulated learning processes that unsupervised home practice demands (McPherson & Zimmerman, 2002, 2011; McPherson & Renwick 2011). The first author framed much of these initial approaches to research in this area around Zimmerman's (2000) six socialization processes that collectively explain a developmental pathway that beginning musicians experience as they progress during the early years of their learning. As can be seen in Table 1, these six dimensions – motive, method, time, behavior, physical environment and social processes - emphasized the kinds of support that young learners need from others before they can be internally regulated themselves.

[Insert Table 1 around here]

Like the measurement of any artistic competence, assessing musical development and achievement is complex. Our early thinking about learners' progress during the initial years of

their instrumental lessons therefore focused on questions such as: What type of performance skills did the learners acquire and what differences distinguished successful versus unsuccessful learners? What were the learners thinking when they were performing music? What metacognitive strategies did they adopt to monitor their own performance and practice? We were also interested to understand how often the beginners needed to be supervised or encouraged to practice, and as they matured, the degree to which they became less dependent on others to regulate their practice.

Research Evidence in Music

The theoretical ideas outlined above focused on the attributes music learners need to acquire in order to plan, monitor, direct, and regulate their own learning when practicing their instrument or voice by themselves. Research emanating from these approaches has helped to better understand how contemporary music teaching might be updated and redefined through the adoption of SRL. In this section, we review a range of our findings on SRL processes in instrumental music learning.

Research on beginning instrumentalists in childhood and adolescence

The first author's empirical work on music-related SRL processes began with studying beginning instrumentalists in a range of different school music programs. This work traced children who began their instrumental learning around the ages of 8 and 9 and continued for another 14 years until all had left high school and many had completed university. Along the way, many of the children had ceased learning music but as they reflected back on their experience the impact of this learning provided valuable insights into their thoughts and feelings about having been a part of an elective instrumental program, and the value it played in their overall educational development.

From Other- to Self-Regulated Music Learner. As shown in Table 1, a key aspect of the research examined how the children's musical development followed a simple linear trajectory of moving from other- to self-regulation as indicated by the initial support the children received from their teachers and parents. Our early estimates of the importance of other-regulation focused on the children's home practice, yet as we examined the data, we found some puzzling results. For example, we expected that children who continued learning would be those who were the most consistent and regular with their practice, which we defined at that time as the most self-regulated learners. However, what we found was that children who continued into the second year did not typically practice at the same time every day (McPherson & Davidson, 2002)—a habit that is often anecdotally positively associated with a more conscientious approach to instrumental practice. Our closer examination of the data showed that those children who practiced at the same time of the day were often doing so because they were receiving high levels of reminders and external encouragement or even coercion from their teachers or parents, as compared to initiating the practice by themselves as a result of their own internalized self-regulation.

This finding was supported by further evidence showing that the children whose parents used rewards to incentivize practice gave up earlier than their peers whose parents did not use such rewards (Faulkner, Davidson, & McPherson, 2010). Consistent with other studies on instrumental learning (Davidson, Howe, Moore, & Sloboda, 1996), differing kinds of parental support, such as gentle reminders, supportive comments, and informal checking of whether the child practiced his or her instrument each day, were seen as positively supporting the child's sense of autonomy. These could be compared to the more extrinsic motivators such as rewards or

controlling and demanding interactions that apparently diminished the child's interest in learning an instrument (McPherson & Davidson, 2002; McPherson, 2009).

As we tracked children through their first year of learning, we observed changes in parents' support for music practice. Whereas many parents will continue to remind their children to complete their homework over many years, the support our learners received from their parents tended to decrease toward the end of the children's first year of learning (McPherson & Davidson, 2002; McPherson, 2009). Unfortunately, this is the very time the children needed ongoing encouragement to continue across the difficult period of adjusting to their instrument and gaining sufficient skill to continue into their second year of learning. We found also that some of their parents began to form judgments about their child's ability to cope with practice, as well as their own capacity to devote energy into regulating the child's practice through continual reminders and encouragement. Many parents therefore tended to withdraw their reminders, often because they felt that their child did not have a flair for learning music, was not investing the effort and commitment required, or because the parents were unwilling to invest their own personal time and effort into regulating their child's daily schedule. In other words, some of the parents had given up on their children much sooner than the children had given up on themselves (McPherson & Davidson, 2002; McPherson, 2009).

Task Strategies and Practice Behaviors. One initial attempt to understand self-regulated learning processes in music practice focused on the observable behaviors of beginning and intermediate level children from the early months of learning until three years later (McPherson & Renwick, 2001). The videos from this study of children practicing their instrument at home were analyzed according to practice content, the nature of performance errors and off-task behaviors, and interactions of family members. These early data collection

techniques were important because they clearly documented low levels of self-regulatory behavior as evidenced in the children's lack of effective practice behaviors. Most of the students' practice time was spent playing through pieces once or twice, with most errors being ignored or corrected by repeating one or two notes. Importantly, the self-regulatory processes used by the children varied widely thus providing important clues on why some music learners develop their performance skills quickly while others struggled.

As part of this longitudinal study, McPherson (2005) administered music performance tests at the end of each school year, across the first three years of their learning, to assess the beginning learner's abilities to perform rehearsed music, sight-read, play from memory, play by ear and improvise. Ongoing interviews were also undertaken with the children's mothers in order to calculate how much practice they had accumulated on their instrument. During the process of assessing the music performance skills, the children were asked a series of questions that helped to identify the quality of task related strategies they adopted to perform in each of the five ways.

The results of this study showed that understanding children's musical progress involves much more than simply examining the relationship between the amount of practice they have accumulated and their achievement on their instrument (McPherson, 2005; McPherson, Davidson, & Evans, 2016). Watching the children develop across the three years and analyzing their responses provided ample evidence that better players possessed more sophisticated mental strategies for playing their instrument very early in their development and that these players were the ones who went on to achieve at the highest level. Importantly, these were the most self-regulated players who knew when and how to apply their strategies (especially when asked to complete the more challenging musical tasks), possessed the general understanding that their performance was tied to the quality of their effort (particularly effort expended in employing

appropriate strategies to complete individual tasks), and were able to coordinate these actions to control their own playing.

Motivation and SRL in music learning. Yet another aspect of research on this group of learners sought to understand why some students are more self-regulated than others. In one case study, the practice sessions of a 12-year-old clarinetist revealed stark differences between the intensity of her practice of repertoire assigned by her teacher as compared to a piece that she asked her teacher to learn (Renwick & McPherson, 2002; McPherson & Renwick, 2011). While practicing the piece assigned by her teacher, this student spent on average one second per note, almost exclusively using her ‘default’ play-through approach without stopping to work on errors. In contrast, while practicing a piece she had chosen herself, her time per note increased eleven-fold, and she was observed adopting more self-regulated, strategic behaviors, such as silently replicating the physical movements needed to play through passages, thinking carefully about upcoming measures before attempting to play them, deliberately slowing the music to grasp the actions necessary to play it, repeating sections, and stitching together short sections into longer, coherent sections. In this case, the student’s more sophisticated practice of repertoire she chose was based on her desire to improve her playing and her determination to fully master the piece she wanted to learn. This result is consistent with findings showing that providing choice about what to work on and which method to use will increase intrinsic motivation and task involvement (Evans, 2015; McPherson, Davidson, & Evans, 2016).

The motivational climate seems to be an important antecedent for self-regulated learning and ongoing engagement with music. Students from homes where music was valued and seen as meaningful were more likely to value their music education and set higher musical expectations for themselves (McPherson & Davidson, 2002). In our longitudinal study, we studied the impact

of school cultures that valued active, quality music programs, and found that over a ten-year period, students in these schools persisted with their music learning much longer before giving up (Evans & McPherson, 2015).

In parallel with this longitudinal study, work with other groups of music learners has sought to understand the importance of self-efficacy beliefs in demanding music performance situations. Music learners who were preparing for externally graded music performance examinations were surveyed before they undertook their performance examination. Structural equation modeling of two different populations showed that self-efficacy was a strong predictor of the student's performance result in the examination, even more so than the amount of formal practice students devoted to preparing for their examination (McCormick & McPherson, 2003; McPherson & McCormick, 2006).

Research with Intermediate and Advanced Musicians

The research by McPherson and Evans within the Australian environment with children and adolescents has run in parallel to research in the United States by Miksza (2011a) focusing on more advanced students in high school and college. Miksza and colleagues have conducted observational studies of advanced (Miksza, 2006a; 2011b) and intermediate musicians practicing (Miksza, 2007; Miksza, Prichard, & Sorbo, 2012) as well as questionnaire-based studies investigating intermediate (Miksza, 2006b; 2011c) and advanced musicians' motivational dispositions and self-regulatory practice habits (Ersozlu & Miksza, 2015; Miksza & Tan, 2015). The work with intermediate musicians corroborates that of McPherson and colleagues in that beginning instrumentalists often reported or were often observed practicing with a lack of planning, direction, and self-monitoring. In contrast, the research dealing with more advanced musicians helped to identify the types of practice strategies (e.g., slowing, chaining, whole-part-

whole playing) and motivation orientations (e.g., mastery and approach success) that seem to be most consistently associated with performance achievement and other indicators of self-regulation.

Miksza (2015) tested the effect of self-regulation instruction among advanced, collegiate instrumentalists. Participants were randomly assigned to a group that included video-based instruction in either (a) the application of practice strategies (slowing, repetition, whole-part-whole, chaining), or (b) self-regulation principles (concentration, goal-selection, planning, self-evaluation, rest/reflective activity) in addition to the aforementioned strategies. Pre- and post-test measures of performance achievement, self-efficacy, and practice behaviors were taken. The musicians' who received the self-regulation instruction showed greater gains in performance than those who did not. No significant differences were found between the groups' practice behaviors or self-efficacy reports. However, there was a fairly clear trend in the data suggesting that those who received the self-regulation instruction tended to feel more efficacious at the end of the study.

Most recently, Miksza, Blackwell, Roseth, and Cole (2016) examined the effectiveness of a pedagogical approach for enhancing advanced, collegiate music students' self-regulated learning tendencies by using a multiple-baseline experimental design with an intervention staggered across three participants. The intervention emphasized learning processes emblematic of the forethought, performance, and self-reflection phases described in Zimmerman's (2000) self-regulated learning process. The intervention consisted of instruction in adaptive behavioral strategies and positive reframing of attitudinal beliefs. The behavioral strategies emphasized elements of practice highlighted in Miksza's (2006a; 2007; 2011b) previous work such as goal setting, repetition techniques, matching strategies to particular objectives, mental imagery, and

mindful attention to focused activity. Attitudinal topics included degree of intrinsic interest for and value of practicing, personal appraisals of one's efforts, implicit theories of ability, response patterns when confronted with failure, attributions for success, and achievement goal orientations. The results of this study indicate that the intervention seemed to help the students develop a more sophisticated understanding of how to set goals, plan for practicing, and execute strategies in a deliberate manner. Overall, the participants were very forthcoming about how the personalized intervention increased their awareness of just how much care can be applied to developing a self-regulated practice approach. Given the research design employed, these findings cannot be generalized and must be considered tentative. Conducting research with more rigorous, true-experimental designs would help to assess whether interventions of these sort could lead to robust effects.

Autonomy Supportive Learning Environments

Autonomy has been examined as an important motivational antecedent to the use of self-regulated learning strategies in music (Evans, 2015). Autonomy is central in young music learner's musical development where the social context plays an important role in development and where teacher's autonomy support is associated with positive outcomes in learners. Studies with certified Suzuki trained teachers (Küpers, van Dijk, van Geert, & McPherson, 2015) have sought to explore what types of teacher-student interactions best foster autonomy supportive learning and might best lead to higher engagement by the beginning music learner. 'Engagement' in this context may be considered as a conceptualization of self-regulated learning, as it was operationalized in this study as behavioral involvement in the lesson, help-seeking through asking the teacher questions and verbally interacting with the teacher, and showing initiative and creativity in the lesson. Student states in string instrumental lessons were coded according to

levels of autonomy and engagement. The relationship between autonomy and engagement was configured using a four quadrant representation as shown in in Figure 1:

1. Autonomous engagement (high autonomy and displaying self-regulated learning). Used to describe instances during the lesson where the student would be take on-task initiative by asking questions or making relevant on-task remarks.
2. Resistance (high autonomy and negatively engaged). Used to describe instances during the lesson when students were actively resisting the task, by saying, for example, ‘I don’t want to do this,’ or by making off-task remarks such as ‘I’m going to the playground later.’
3. Mimicry (low autonomy and positively engaged). Used to describe instances during the lessons when student would be ‘going with the flow,’ merely doing what was expected by the teacher and not displaying their own self-regulated learning.
4. Absence (low autonomy and negatively engaged). Used to describe instances during the lesson when the student was not engaged with the task, would not answer teacher questions, but also not be actively resisting what was being taught (see Küpers, van Dijk, van Geert & McPherson, 2015, pp. 340-341).

[Insert Figure 1 around here]

Using the above framework resulted in the observation of large differences in the dyadic transactions between students higher in autonomy and those lower in autonomy. We also observed instances where autonomy support was ‘negotiated’ between teacher and student, where the autonomy support and autonomy expression levels of both the teacher and student were well coordinated, and moments where there were large discrepancies. We describe this relationship as co-regulation (see also Hadwin, Järvelä, & Miller, this volume). These results led to an exploration of the function of the dyadic synchrony in autonomy levels and the conclusion

that maintaining momentum in the learning process depends in part on interactions where a teacher offers autonomy support at a higher level than the student's current level of autonomy. A key point is that there is no single approach that will work for every learner, and that autonomy development and the techniques teachers use to provide autonomy support need to be tailored to each individual student. Further research will also need to understand more fully the moment-to-moment synchronicity in teacher-student interactions and how moderate amounts of asynchrony might actually challenge, stimulate and propel a student to higher levels of engagement.

Future Research Directions

The streams of work reported above in Australia and the USA are now coming together as part of a program of research that connects self-regulated learning with self-determination theory (Ryan & Deci, 2000; Evans, 2015). The research agenda examines motivation and practice quality in musicians who are majoring as performers in undergraduate music degrees and is focused on the types of research issues described below.

Our conceptual approach attempts to explain the complex relationships between motivation (operationalized as self-determined motivation), practice quality (operationalized as self-regulated learning) and performance outcomes as they unfold over time. The innovative aspect of this approach is that we are using self-determination theory to study how musicians' psychological needs and feelings of competence, relatedness, and autonomy impact their overall levels of motivation to become competent in music in combination with self-regulated learning. The self-determination theory framework can help explain how particular aspects of the music-learning environment can be problematic for learners: competition, anxiety, poorly-defined personal goals, and the teacher-centered approach to instruction so typical of the music studio environment at these levels. Evans and Bonneville-Roussy (2016), for example, found that

university music students with self-determined motivation reported better, more productive practice. Bonneville-Roussy and Bouffard (2014) also found that when practice quality (self-regulated practice) was taken into account, it predicted achievement much better than considering the amount of weekly practice alone. It seems feasible therefore that practice quality—operationalized as musical SRL—may be predicted by self-determined motivation.

Another advantage of the self-regulated learning framework is that it covers the cognitive, affective, and behavioral processes involved when musicians plan their practice, approach difficult or novel tasks, master new repertoire and techniques, and reflect on their progress. Previous research on music practice has tended to focus either on cognitive, behavioral, or affective aspects of practice, without accounting for all three dimensions together. For example, a typical research strategy is to observe and then record the accuracy of the practice or map out how musicians document and reflect on their individual practice using self-report questionnaires, interviews, and journals of practice over time. But the limitation of this is that it does not have the theoretical and conceptual framework that SRL offers to be able to understand why particular strategies may or may not be effective. One technique we are using to approach these issues is microanalysis (see further Cleary & Callan, this volume). We are in the process of applying self-regulated learning microanalysis to gain an understanding of the cognitive, affective, and behavioral processes involved when students practice their instrument or voice. Microanalysis is “a strategic, coordinated plan of administering context-specific questions targeting multiple cyclical phase sub processes as students engage in authentic activities” (Cleary, Callan & Zimmerman, 2012, p. 4). As such, it is a powerful way to examine self-regulated learning because it targets the full range of self-regulated learning processes and avoids

the limitations of retrospective self-report measures that regard self-regulated learning as a generic, rather than context-specific, set of processes.

Our approach to microanalysis involves asking questions immediately before musicians commence a practice session, and then replaying a video of the practice session which the musician has just completed and asking brief context-specific questions for them to explain what they were doing, thinking or feeling. The videos are used to avoid intruding on the lesson and manipulating the particular self-regulated learning strategies used by the learners. The use of videos in this way reflects a kind of stimulated-recall methodology (Calderhead, 1981), where video or audio is used to allow participants to 'relive' certain aspects of their experiences. The method thus maximizes the benefit of ecological validity by not intruding in the learning process itself, but somewhat overcomes the limitations of retrospective recall by providing a rich stimulus for more accurate recall. Videos of the microanalysis are also analyzed and coded according to the forethought, performance, and reflection cycles that occur during the practice sessions. This work (McPherson, Osborne, Evans & Miksza, submitted) aims to extend our previous studies that have attempted to understand the self-regulatory processes of beginning and intermediate level musicians.

Self-Regulated Learning Interventions in Music

Yet another area of our collaboration will utilize intervention studies to examine whether explicit instruction in motivation and practice quality can deliver lasting changes across time. Specifically, we are interested in examining whether targeted instruction can have a lasting effect on student motivation and practice quality. Part of the motive for undertaking this type of research is to help music teaching evolve from the longstanding conservative master-apprentice tradition that pervades much one-to-one instrumental and vocal teaching. Our future work

therefore seeks to determine ways of introducing concepts and better teaching practices to musicians who teach in university music schools.

Education-based research interventions show that teachers appear to be able to effectively learn how to adapt to a student-centered environment, and provide more autonomy supportive environments for their students, even when they may otherwise be resistant to such ideas (Su & Reeve, 2010). Our own anecdotal experience with students undertaking university pedagogy courses shows that trainee instrumental and vocal teachers are quick to accept student-centered environments, even though the master teachers with whom they are taking music lessons appear to be far less willing to change their teaching strategies. The same may apply for the explicit teaching of self-regulated learning strategies.

Miksza, McPherson, Herceg, and Meider (in press) have written specifically on the benefits of applying self-regulated learning theory to beginning and intermediate levels of instrumental music pedagogy. This work represents a collaboration between researchers and current school music teachers and includes descriptions of two exemplar music lessons for systematically introducing and reinforcing self-regulated learning principles among developing musicians. In both cases, the teachers describe methods that encourage the students to become autonomous learners via clear sequencing, peer-based activities, reflective exercises, and care for developing efficacious and adaptive motivation dispositions.

Overall, our core research aim is to understand how motivation and practice quality facilitate the acquisition of expert music performance skills. Our current belief is that there is a cyclical relationship between the two and that in music learning influences will occur in both directions where self-determined motivation is likely to facilitate self-regulatory strategies being spontaneously implemented, and in turn, self-regulatory strategies will fulfill basic psychological

needs and facilitate self-determined motivation. In a study of a mathematics classroom, for example, students who were taught only self-regulatory skills showed declines in achievement, but those who were taught self-regulatory skills plus motivational strategies improved their achievement (Blackwell, Trzesniewski, Dweck, 2007). Building on from our previous research, the proposed project will be the first to investigate these possibilities in the domain of music.

Conclusions

Surveyed within this chapter are some recent theoretical developments in self-regulated learning as applied to learning a musical instrument or voice. In the earlier sections we discussed research by the authors that has applied self-regulated learning theory. Subsequent sections documented (a) our current research which attempts to encourage innovation through the adoption of self-regulated learning theory, and (b) our more recent and ongoing collaborative efforts to combine this with self-determination theory to better understand music practice quality and motivation.

Research that clarifies more precisely how students develop into self-regulated musicians deserves special attention from music scholars who wish to draw upon and integrate some of the major developments in education into their own research. Adapting and expanding current theories on this issue and drawing on and integrating information from other areas of educational psychology will enable music researchers to develop more sophisticated theories of musical development that can be used to underpin future teaching and learning in music.

Most areas of education are slow to adapt to changing views that are based on research evidence, and this is particularly prominent in music education. Only when evidence-based approaches are sufficiently developed and presented to musicians and music educators in ways they can easily understand will the profession be convinced of the benefits for adopting different

techniques for engaging learners and encouraging them to take charge of their own music learning in a self-regulated fashion. As part of this transition, it will undoubtedly be challenging to move from teacher-dominated methods of instruction where the ‘master teacher’ is seen as the most important source of knowledge, and where skill acquisition through repeated, habitual practice is the norm, to more learner-oriented styles of teaching. However, the rewards of adopting self-regulated learning to guide, frame and motivate music learning have now become obvious. And for us, ingredients that enable optimized learning, including an intellectual curiosity and emotional engagement with the music being learned, blossom most effectively when learners are able to take control of their learning in the ways described in this and other chapters within this volume.

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