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A POTENTIAL QUESTIONNAIRE FOR PROBING STUDENTS SELF-EFFICACY AND SELF-REGULATION PROCESSES IN MUSIC SIGHT-READING

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Abstract: The purpose of this study was to evaluate the potentiality of questionnaire for verifying self-efficacy and self-regulation processes in music sight-reading (MSR), in Brazilian undergraduate music students that have music sight-reading course in their curriculum. A questionnaire bearing four dimensions regarding motivational constructs have been taken into account: (i) Beliefs on acquisition of sight-reading as a music skill; (ii) Motivation for practicing MSR; (iii) Self-efficacy beliefs about MSR capacities; (iv) Self-regulation for MSR management. Initially, one preliminary MSR questionnaire was answered by 22 students from a university in southern Brazil. Afterwards, another 37 students from two other Southern Brazilian universities answer the final version of the collecting tool. The reviewed questionnaire was tested, monitored by statistical tools and evaluated in terms of assessable internal coherence, correlations and reliability as a measuring instrument. These exploratory results have shown that proposed questionnaire has a potential of providing evidences of self-efficacy and self-regulation about music sight-reading investigated context. Further studies are necessaries to evaluate the potentiality of this tool in others music educational contexts.

Keywords: Music sight-reading; self-regulation; self-efficacy; music learning.

INTRODUCTION AND BACKGROUND

Music sight-reading (MSR) is considered as important functional skill in Western musical domains that deals with several factors, including level of expertise, aural training, auditory imagery, mental and psychomotor, and improvisation skills (Wolfs, Henny and Strien 2018; Houghton 2018) among others. This skill is required in formal situations such institutional music examinations tests or orchestral entrance competitions involving therefore complex simultaneous tasks regarding visual, auditory and motor processing (Karacharova and Khmelnitskaya 2018; Fireman 2008). Accompanists have to be able to read sequences with fewer (and shorter) glances between patterns. Orchestral musicians regularly continue to perform such task throughout their professional lives. (Lehmann and Kopiez 2009; Stenberg and Cross 2019). On the other hand, MSR difficulty is usually associated with a list of deficiencies of the domain of western classical music (Acker 2018; Bovin 2018; Cara 2018).

Early music training, accumulated practice solo and sight-reading practice has also been associated to MSR achievement (Ericsson 1996; Gudmundsdottir 2010; Kopiez and Lee 2008). In fact, literature on MSR has shown that superior working memoire capacity, practice-related skills, high levels of theoretical (and practical) knowledge are critical conditions necessary for development of music sight-reading expertise (Arthur 2021, 2017; Arthur, McPheeb and Blom 2019; Meinz and Hambrick 2010). In addition, music reading can be considered as the end point in the process of constructing meanings necessary maturation within Western classical music tradition (Zhukov 2014).

Fournier et al (2019) categorize strategies in a broad range of sources, including six interviews, five scientific publications, two professional books, and two ear-training manuals. The authors founded 72 cognitive strategies grouped into four main categories and 14 subcategories, such as, reading mechanisms (pitch decoding, pattern building, validation), sight-singing (preparation, performance), reading skills acquisition (musical vocabulary enrichment, symbolic associations, internalization, rehearsal techniques) and learning support (self-regulation, attention, time management, motivation, stress). Besides, as a cognitive

process, music sight-reading is influenced by psychological (emotional and environmental) factors (Lim 2018). Such factors seem to directly interfere with the use and performance of tasks and activities of this skill. The lack of motivation, clear objectives, organization and regularity in the study can affect musicians' achievements in their reading tasks. In this sense, personal as well cognitions and affections factors, all with environmental aspects, will lead to the practice of MSR. Thus, the subject/environment/behavior/learning relationship brings the present study closer to the Social Cognitive Theory, elaborated by Canadian psychologist Albert Bandura. Bandura's socio-cognitive theory points out that we must exercise control over their feelings, actions and thinking through their self-beliefs (Bandura 1997).

Musicians, especially in the apprenticeship stage, can often question themselves about their skills to perform musical tasks when they ask themselves about their self-efficacy beliefs regarding that activity:

> Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave. Such beliefs produce these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes. (Bandura 1994, 71)

According to Bandura (1994, 71), self-efficacy beliefs can be developed through four main sources of influence:

- Mastery Experiences: "The most effective way of creating a strong sense of efficacy is through mastery experiences".
- Vicarious experiences: "[...] provided by social models. Seeing people similar to oneself succeed by sustained effort raises observers' beliefs that they too possess the capabilities to master comparable

activities required to succeed."
- Social persuasion: "People who are persuaded verbally that they possess the capabilities to master given activities are likely to mobilize greater effort and sustain it than if they harbor self-doubts and dwell on personal deficiencies when problems arise" (id).
- Somatic and emotional states: "People also rely partly on their somatic and emotional states in judging their capabilities "(id).

Along with the four sources that influence self-efficacy beliefs and complement them are the self-regulatory processes of learning. Self-regulation comprises actions, strategies, thoughts used to achieve the objectives in a given action (Bandura 1997). In music performance domain, literature has beem investigated the role of self-efficacy and its relationship to musical qualities and processes related to performing in music exam (McCormick and McPherson 2003; McPherson and McCormick 2006) . Studies of instrumental practice have found that music students who are more self-regulated tended to report being more self-efficacious, strategic, and proactive in regard to their practice and also tend to employ a greater variety of practice strategies when compared to those who are less self-regulated (e.g., Hatfield, Halvari, and Lemyre 2016; Miksza and Tan 2015; Miksza 2015). Taking into account that self-regulatory beliefs support strategies and thoughts during the learning processes of activities of MSR, what is the possibilities and difficulties to develop an instrument to assess self-efficacy and self-regulation beliefs of students for (and during) learning MSR activities?

Seeking to answer this question, the objective for the present study was to adapt and testing a questionnaire to verify self-efficacy and self-regulation learning processes

in MSR activities in the light of Albert Bandura's Social Cognitive Theory. The hypothesis underlying this investigation is the idea that, based on studies on self-efficacy and self-regulation beliefs (constructs of the Social Cognitive Theory), it is possible to understand psychological aspects inherent in the teaching/learning process of music sight- reading, facilitating its understanding and possible action to optimize this musical practice. In this sense, we seek to contribute through this research, with other studies on MSR, bringing a differentiated look, not based particularly on cognitive/mental processes, as described in much of the literature on first sight reading, but valuing the processes psychological/cognitive factors involved in this modality of musical practice.

METHODOLOGY

This research complied with ethical protocols, including the use of the Informed Consent Form (ICF) following the guidelines contained in the Basic Guidelines on Ethics, Rigor and Integrity in Scientific Research (Normative Instruction n.2 of July/2018/ UFPR/ Brazil). Initially this study was carried out with students from a MSR course at a university in southern Brazil, who voluntarily answered an open-ended question that asked for a description of challenges and/or obstacles to the routine execution of sight-reading activities. The data obtained from the preliminary testimonies of the students recognized the learning challenges for the MSR. In addition, the same data allowed us to establish aspects to be included in the pilot questionnaire in terms of motivation/ self-efficacy (vicarious, experiences, somatic/ physiological/emotional states, mastery/ successful experiences and verbal persuasion); self-regulation; evaluation; teaching methodology; class time; and musical elements.

Two scales of self-efficacy already validated by the social cognitive theory provide de basis for the questions: (i) the Teacher Self-Efficacy Scale – TSES proposed by Bandura in 2006 and (ii) the Norwegian Teacher Sense of Efficacy Scale – NTSES proposed by Skaalvik in 2007. The Portuguese translation of these two scales was elaborated by Cereser (2011). One preliminary questionnaire was applied to 22 undergraduate music students from a university in Southern Brazil (the same participants in the preliminary survey).

The questionnaire was bearing taking into account four dimensions: (i) Beliefs on acquisition of sight-reading as a music skill; (ii) Motivation for practicing MSR; (iii) Self-efficacy beliefs about MSR capacities; (iv) Self-regulation for MSR management.

The questionnaire as a survey strategy was organized by grouping the questions (Q) into six parts:

1. Demographic information (Q1 to 6): This group of questions included gender, age, specialization graduation degree, university where they studied, musical instrument, former years of training;

2. Acquisition of sight-reading as a skill (Q7 to Q9): Three questions were considered in this item: the age at which the student began to study music, the frequency with which he practices music reading, and the degree of fluency in MSR.

3. Motivation (Q10 to Q12): This group of questions was used to assess the degree of motivation related to the study and practice of MSR in three dimensions: a) Practice; b) perform tasks in the classroom; c) continue practicing after class. For these questions, a 5-point Likert scale was used, with the following orientation for the extreme points: "1 = I don't feel motivated" and "5 = I feel totally motivated".

4. Self-Efficacy Beliefs (Q13 to Q28): This category has been divided into two parts. The first part focused on the analysis of the degree of self-efficacy beliefs on MSR, based on the four main sources that nourish them, as postulated by Bandura (1997, 79): successful experience, vicarious experience, verbal persuasion as well as physiological and / or affective. For these questions, a five-point Likert scale was used, with the following orientation of the extremes: "1=I don't feel capable" and "5=I feel totally capable". The questions analyzed were: i) Sight-reading music scores; ii) study MSR; iii) MSR in front of the teacher and classmates; iv) MSR after receiving encouragement from the teacher; v) MSR after receiving criticism from the teacher; vi) MSR during a reading test; vii) Sight-reading after observing my colleagues succeeding at MSR. In the second part, it was observed the degree of self-efficacy beliefs of students about their abilities to sight-read the musical structures pointed out in the preliminary statement, considered by students as the most complex to this activity: a) chords; b) polyphony; c) syncopated or complex rhythms; d) fast paced; e) dynamics; f) notes in supplementary lines; g) joints; h) phrasing; i) all these elements simultaneously. Each of these elements composed an analysis dimension, evaluated on a five-point Likert scale, where "1=I have a lot of difficulty" and "5=I have a lot of ease".

5. Self-regulation (Q29 to Q47): The questions in this category were divided into three sections - (a) frequency of study, (b) planning and use of study strategies, (c) motivators and self-evaluation of performance. In the first section, on the frequency of the study (Q29-30), the aim was to understand how often students used to study MSR outside of the course hours, on a scale with the following options: never, rarely, once in a while, almost always, and always. If the student chose the option rarely or never, he was asked in the next question about the possible reason for these choices. The second section of the self-regulation category focused on investigating the pre-study planning stages of the MSR. It was composed of 8 questions (Q31 to Q38) about the frequency with which students adopt certain study strategies, and followed the same five-point measurement scale, in which "1=I never do it", and "5=I always do it" . Thus, questions 31 to 34 served to investigate whether, before starting the MSR study, the student reflected on the course of actions he/she needs to take to achieve the objectives; recalled the instructions received by the teacher; made a previous analysis of the work; and a silent mental study was carried out before carrying it out. Therefore, the four subsequent questions (Q35 to Q38) were used to investigate practical strategies during the execution of the MSR, observing whether the student used the metronome during the execution; if you paid attention to errors to correct them later; a good place to study was found, away from distractions; and a time was established to study daily. These questions evaluated the strategies chosen during the performance control phase, which occurs during the learning process and involves concentration, self-instruction, self-observation, and self-monitoring (Zimmerman 2008, 178-179). The third and last part of the self-regulation category focused

on investigating the students' self-efficacy regarding their performance assessment, and motivating elements that kept them focused on their goals during the time of study music reading. This part consisted of 9 questions for students to assign the degree that best represented their realities in relation to their practices or study of MSR, with an option on a five-point scale that had as extremes "1 = very difficult" and "5 = no difficulty". The five subsequent questions assessed the students' degree of difficulty regarding their self-monitoring skills during practice (Q43), self-assessment - precisely identifying what they needed to improve on (Q44), self-reactions - assessing whether the student perceived the feedback (Q45), as was the progress of their study (Q46), and it was possible to attribute causes for the attainment of the results achieved (Q47).

6. Course evaluation (Q-48-52): In this category, we sought to show how students understood the structure and organization of the MSR subject, analyzing their beliefs about: the sufficiency of the workload allocated to the MSR subject (Q48); on the effectiveness of the teaching methodology received during the course of the course (Q49); on the need to use didactic material to support MSR learning (Q50); on the effectiveness of the assessment strategies adopted by the teacher (Q51); about the existence of other challenges or obstacles they may face during the study and practice of MSR that were not mentioned in the questionnaire (question 52).

To test the questionnaire, the internet was used as a means of contacting the participants. According to Cohen, Manion and Morrison (2007), studies that use the internet as a technological resource are called internet-based surveys. The use of this feature compared to conventional surveys has great advantage, since the platforms that offer this technology provide a database of survey results, and collect the data online. In addition, the use of internet resources speeds up data collection, location and delivery of materials, making it advantageous in terms of size and speed.

After preliminary testing (N=22), another 37 students from two other universities, who also had music sight-reading courses in their curriculum, answered the reviewed questionnaire. The investigated survey sample (N=37) was composed by 16 students from University I (43%), 9 males and 7 females, mean age of 29.2 SD 8.6, 7 pianists; 7 string players (violin, viola and cello), 1 singer and 1 flutiste, mean timing of music leaning 13.4 SD 3.5; and 21 students from University II (57%), 10 males and 11 females, mean age 26.2 SD 11.2 of which 7 pianists, 14 singers and 1 guitarist, mean timing of music learning 13 SD 4.4. In this version, it was possible to perform the Cronbach's alpha statistical test, which allowed us to verify the internal consistency of the questionnaire and whether all questions measured similar situations (RUSSELL, 2018). By calculating the alpha coefficient, it is possible to verify if there is a measure of comprehension of the questionnaire's scale, and if the data are minimally reliable.

RESULTS AND DISCUSSION

Table 1 (Q10-Q28) and Table 2 (Q31-Q52) show the results in terms of mean and alpha. Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. This index is considered a measure of the scale's reliability (Taber, 2018, p. 1273).

According to Table 1 (see Table 1), Cronbach's alpha was strong ($\alpha = 0.91$-0.93) for all items, indicating high consistency and

reliability between the questions. As shown in Table 1, the highest mean was achieved regarding beliefs of studying sight-reading. When we analyse age beginning musical studies with the frequency of student's music reading practice, or with self-judgment on the degree of fluency in MSR, it is clear that the later the students started studying music, the more intense is the perception of the necessity of music reading pratice, which in turn make them feeling less fluent during this task. It was also possible to note that 50% of students at University I (8 participants) practice music reading with low frequency, which reflects their less fluency attribution in musical reading. On the other hand, the students of University II maintain greater regularity in the practice of music reading, sugesting greater indices of self-efficacy beliefs, and, consequently, greater fluency in reading. Taking to account the participants' attribution of fluency in this task, data on this exploratory survey indicate that regular practice of MSR can contribute to a greater degree of music reading self-efficacy beliefs. These results have to be futher investigated.

Motivation is related to the interest in being open to perform a certain task. Concerning motivating for sight reading (questions 10 to 12 in Table 1) the average lain between 3.43 and 3.60, which in turn reflects such task interest by this sample. According to Hallam (2016, 480), several aspects interact in someone's motivation for something: lasting individual characteristics (physical characteristics, personality, age, gender), cognitive characteristics of the individual (knowledge and skills, metacognitive skills, beliefs about learning and ability), malleable aspects of personality and self-concept (ideal self, possible self, self-esteem, self-efficacy), cognitive process, goals and objectives, environment. In the study by Fournier et al. (2017) motivation was identified as a

subcategory of cognitive strategy (belonging to a category labeled as learning support). Motivation (and stress) issues seemed to be of primary importance to the participants: coping with stress and motivation were the two biggest problems they had to face. Motivation was also reported in the study by Johnson (2017), who found motivational orientation as possible moderating variables in improving the ability to read by sight in the secondary instrumental music classroom. Pike and Shoemaker (2013) identify an increase in motivation, whether in traditional face-to-face instructions or in online video instructions.

Self-efficacy beliefs are based on assessments of the probability of success in relation to specific tasks, such as sight reading (Hallan 2016). According the investigated sample, self-efficacy beliefs in sight-reading (questions 13 to 28 in Table 1) showed a greater variation of means (2.64 - 4.27), suggesting that such activity may be hard to perform. According to McPherson and McCormick (2006, 100), self-efficacy is the most important indicator of test success. Miksza and Elpus (2018) consider that self-efficacy questionnaires can provide information about self-confidence, while sight-reading tasks can provide information about performance. Pike (2014, 79), in a study that aimed to develop sight-reading skills and harmonization for music education students at higher level, employing cognitive strategies and collaborative learning, observed an improvement in self-efficacy in pianistic performance tasks. Ciorba (2009) created a model to predict the success of jazz improvisation, in which reading ability and self-efficacy were considered among seven independent variables.

Questions 19 to 27 dealt with the self-efficacy beliefs of students in carrying out specific activities in the context of sight-music reading as it explores the self-efficacy beliefs

of students in carrying out specific activities in the context of music sight-reading. Literature had been emphasized the importance of pattern recognition and prediction skills, such as the ability to guess where the music is likely to go, comes from understanding of structure, typical formulas, harmony and phrasing of different styles (Sloboda 1984; Thompson and Lehmann 2004). For example, Alexander and Henry (2012) showed that instrumental sight-reading is affected by the key in which the music is written, with more errors occurring as the number of sharps or flats in the key signature increases. Undergeaduate students here investigated found that are variables (and implicit) elements on the score (like indications of tempo, articulation, dynamics, phrasing, for instance) the more challenging to face during tasks of sight-reading. It is noteworthy that, according to Zuhkov (2014), musicians understand the stylistic differences between of composition in terms of structure, texture, harmony, melody and rhythm. For example, in the polyphonic style, reading errors are likely to be isolated notes due to the linear nature of the music, while in the homophonic style, errors tend to occur in chords, with chord accompaniment being typical of this style (Palmer and Van De Sande 1995).

According to Table 2 (see Table 2), the questionnaire also achieved strong Cronbach's alpha (α). The highest mean was observed in the fact of paying attention to the mistakes made, while the lowest was related to stress or anxiety during the study.

In Tables 1 and 2, therefore, it is possible to verify that all dimensions questioned through the scales have an alpha coefficient greater than 0.89. Russell (2018, 239) clarifies that the minimum acceptable value for the reliability of a questionnaire is $\alpha \geq 0.70$.

Two non-parametric tests were also used: Mann-Whitney test, with two independent samples (which is equivalent to the t test); and the Kruskal-Wallis test, with two or more independent samples, (which is equivalent to the F test - variance). As independent variables, the following were considered: Gender, Age, hours of practice per week, Beginning of musical study (age). In item (i) Motivation (questions 10-12), there was no significant correlation between the independent variables and the questions except for quest "MSR tasks classroom" and "Continue practicing MSR after class" (see Table 3).

In the second category of analysis (ii) Self-efficacy beliefs (Q13-Q28), no statistically significant relationship was observed between the independent variables and the questions, using the two tests, but two Spearman correlations with statistical significance ($p < 0,05$) were observed:

- Chords and hours of practice per week ($r_{Sp} = 0.424$)
- Fast paces and age ($r_{Sp} = 0.430$)

In the third category (iii) Self-Regulation (Q29-Q47), a negative correlation was identified between hours of practice per week and Q36 "I listen to recordings of the work before performing it" ($r_{Sp} = -0.537$, for $p < 0.05$). In this sense, it was interpreted that the more hours of practice per week, the less the student listens to recordings before performing it. A relationship with gender was also identified in questions 32, 39 and 40 respectively "Before starting my MSR study, I remember the instructions received from the teacher during class", "I find a good place to study, away from distractions", "I establish a time to study daily" (see table 4).

Finally, in the category (iv) Subject evaluation (questions 48-52), a statistical significance was found in relation to gender in question 51 "Assess whether I am reaching the goals I established and their contribution to my performance", in which the F > M (Mann-Whitney test) brought Q51 (rank value): 8.59

(p = 0.0.37, p < 0.05).

Thus, after testing the questionnaire, the final version was defined with 52 questions, the first nine referring to general data and data on the acquisition of music reading and the other questions on motivation, self-efficacy beliefs, self-regulation and evaluation. The questions in the final version of the questionnaire are shown in table 5. (see Table 5).

FINAL REMARKS

This exploratory study aimed at developing a tool for measuring self-efficacy and self-regulation learning processes in MSR activities. The limitation of the present research lain in the small sample size (N = 36), although the questionnaire has shown internal consistency of the queries, their correlations and reliability as a measuring instrument. Its application to Brazilian undergraduate teaching-learning context has provided empirical evidences about psychological aspects in MSR domain. Cognitive-affective aspects seems to interfere in the subject's beliefs about his/her abilities about how effective he/she is carrying out a MSR task.

MSR involves perceptual, motor and mnemonic aspects which can be developed and improved by regular training. These skills can also be affected by cognitive and behavioral aspects, which in turn may directly interfere the performance domain during sight-reading tasks. Anxiety, discouragement, lack of motivation, limiting beliefs, physiological dysfunctions are influenceable psychological aspects that may affect performing MSR tasks. When looking at the learning processes of MSR, it is clear that in order to develop self-regulation of learning for MSR, instrumentalist needs to believe in his/hers own ability to persistently apply these skills, even though they are possible difficulties or stressful situations. In other words, effective MSR self-regulation is achieved when strongly develops self-beliefs about their own capacity for self-regulation.

Further studies are necessaries to evaluate the potentiality of this tool in others music educational contexts. Therefore, the results indicate that the instrument can be used with musicians from other contexts, bringing contributions to studies aimed at understanding the motivating elements of students in the teaching/learning processes of music sight-reading.

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