Adaptation of a Self-Regulated Practice Behaviour Scale for Portuguese music students

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Abstract

The aim of this study was to analyse the validity and reliability of the Self-Regulated Practice Behaviour Scale (SRPB) developed by Miksza (2012) for music students in Portugal. Tasks involved in this study included: (1) translating the original scale and creating a viable Portuguese adaptation for Portuguese musical performance students; (2) analysing the psychometric properties of the Portuguese version of the scale. The translation and adaptation of the original scale resulted in a 52-item Portuguese Self-Regulated Practice Behaviour measure (Portuguese SRPB). Students enrolled in music education programmes from eight conservatoires answered the Portuguese SRPB (n = 1,200). The results of confirmatory factor analysis show that a five-factor model presenting the five correspondent theoretical dimensions of self-regulation (motive, method, behaviour, time management, and social influence) achieved the best fit to the data collected. All Portuguese SRPB dimensions were predictive of students' reports of average practice efficiency, grades, and practice time, highlighting preliminary evidence of predictive validity. The internal consistency reliability coefficients ranged from good to excellent (α = .71 to .84). The findings suggest that the Portuguese SRPB produced a valid and reliable measure of the self-regulatory practice behaviour of Portuguese conservatoire students.

Keywords

confirmatory factor analysis, conservatoire students, music practice, self-regulation, self-report measure

Recent research on music learning and teaching has highlighted the importance of understanding the processes adopted by students in order to develop their autonomy and self-sufficiency in practice (Austin & Berg, 2006; Bartolome, 2009; Christensen, 2010; Duke, Simmons, & Cash,

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2009; Jørgensen, 2004, 2008; Leon-Guerrero, 2008; McPherson, 2005; McPherson & Renwick, 2001; McPherson & Zimmerman, 2011; Miksza, 2007, 2012; Nielsen, 2001; StGeorge, Holbrook, & Cantwell, 2012; Zhukov, 2009). Some of these processes occur during individual practice, away from both the classroom and teacher-guided extrinsic regulation. Thus, individual practice involves self-instruction, dependent on the students' development and skills and on the teachers' teaching competences. Autonomy, motivation, organization and persistency are essential in order to overcome the challenges that a young student faces when learning a musical instrument (McPherson & Zimmerman, 2011).

Each individual develops strategies based on knowledge (Nielsen, 2012) and required skills (Smith, 2005), adopting behaviours that are at first extrinsically regulated. Interiorization is linked to the social origin of self-regulatory skills, and is developed through a series of four levels, as proposed by Schunk and Zimmerman (1997), which direct behaviours from extrinsic social regulation to intrinsic and self-motivated regulation: observational level, imitation level, self-controlled level, and self-regulated level. At the final level, students are able to systematically adapt their learning strategies according to varying personal and contextual settings (Bandura, 1986). Hence, it is important to understand self-regulation in order to provide useful tools for the optimization of individual practice (Boekaerts, 1997; Cleary & Zimmerman, 2004; Zimmerman, 2008).

According to Zimmerman (1998), "self-regulation is no longer viewed as a fixed characteristic of students but rather as context-specific processes that are selectively used to succeed in school" (p. 74). These procedures encompass various interacting psychological dimensions. These dimensions and their cyclic action of self-regulated processes are the basis of the theoretical framework proposed by Zimmerman (2000), and McPherson and Zimmerman (2011), which views self-regulation as a cyclic and open process that mobilizes and adjusts strategies, purposely pursuing learning objectives. Departing from previous research (Cleary & Zimmerman, 2004; Schunk & Zimmerman, 1997; Zimmerman, 2008), McPherson and Zimmerman (2011) describe a three-phase model of self-regulation in musical learning: (1) forethought, which involves task analysis and goal setting; (2) performance, which involves all processes that occur during actual learning, the application of previously planned strategies, and collecting cognitive, emotional and metacognitive information; and (3) self-reflection, which involves processing, evaluating and tracking causalities; this last phase cyclically engaging with the forethought phase, leading to the readjustment of efforts and goals. This model infers that the focus of the learning process should value the acquisition of skills that allow for the development of autonomy, creativity and individuality, a standpoint also proposed by Ryan and Deci's (2000) self-determination theory.

Research has addressed the identification of self-regulation variables and their internal relations (Hewitt, 2015; Miksza & Tan, 2015), as well as the identification of learning strategies that may enhance its occurrence in the context of cognitive development (Cleary & Zimmerman, 2004; Kitsantas & Zimmerman, 2009; Kostons, van Gog, & Paas, 2010, 2012; Perels, Gürtler, & Schmitz, 2005; Rozendaal, Minnaert, & Boekaerts, 2005). While the amount of effort involved in deliberate practice is singled out as an essential factor (Sloboda, Davidson, Howe, & Moore, 1996), research also draws attention to the relevance of organizational procedures, motivation, quality and adequacy of the practice and its strategies towards learning success and excellence in performance (Duke et al., 2009; Hallam et al., 2012; Jørgensen, 2008; Leon-Guerrero, 2008; Nielsen, 2001; Zhukov, 2009), in order to ascertain how students become active participants in their learning processes (McPherson & Zimmerman, 2011).

McPherson and Zimmerman (2011) have suggested a model of six psychological dimensions for the description of self-regulated processes: (1) motive; (2) method; (3) behaviour; (4)

social factors; (5) time; and (6) physical environment. Each dimension is connected to specific components, such as self-efficacy – in the context of motivation – which determines the amount of effort, the type of goals and the resilience required to overcome negative results (Bandura, 2002; Nielsen, 2012).

In order to achieve efficient learning outcomes, individuals also have to apply effective behavioural and motivational strategies, i.e., undertake deliberate practice (McPherson, 2005). Deliberate practice helps achieve the intended results in a short period without interfering with long-term aims (Hallam, 1997), and develops with experience and over time. Longitudinal studies addressing the early stages of instrumental learning have found a wide range of results in the use, understanding and suitability of strategies (McPherson, 2005), and point out the need for monitoring, goal setting and strategy choice as the basis for self-regulatory processes (McPherson & Renwick, 2001). The efficacy of deliberate practice has been shown to improve with an increased level of experience as well as with the time employed in practice and the quality of the applied strategies (Hallam et al., 2012; Williamon & Valentine, 2000). Efficient practice has also been linked to the creation and use of effective strategies (Zhukov, 2009), positive knowledge transfer and the avoidance of negative cycles (Alexander, 2013).

One of the foci of the learning process should be to "explicitly teach students how to engage in strategic practice as well as how to use a greater variety of practice strategies" (Austin & Berg, 2006, p. 553). Teachers may become mentors in this process (McPherson & Renwick, 2001; Schunk & Zimmerman, 1997), encouraging the development of metacognition, the discussion of procedures and strategies, the identification of problems and possible solutions, and opportunities for self-evaluation (Hallam, 2001).

The gap between reported knowledge about practice and the use of effective practice strategies has been identified, suggesting the need for an effective application of previously acquired knowledge (Christensen, 2010), and for a flexible use of acquired strategies (StGeorge et al., 2012), combined with a reflexive approach away from the instrument (Leon-Guerrero, 2008). Notwithstanding the fact that teachers report delivering specific instructions for home practice, students' perception and recollection of that information is generally reduced, thus demanding an adequate appraisal of self-regulated behaviours and constant feedback (Hallam et al., 2012), in a supportive and socially interactive manner (Nielsen, 2001).

A recent systematic review by Varela, Abrami, and Upitis (2016) points out that the corpus of extant research up to 2011 displays positive but weak relationships with the variables of interest, namely self-regulatory characteristics such as musical attainment, amount of practice, persistence, practice content, efficiency, and suggests that instruction designed to develop self-regulatory characteristics in students is the most strongly related variable (Miksza, 2015).

In this context, tools designed to provide teachers and students with reliable diagnostic information may play an important role in the promotion of self-regulation. A recent self-report measure by Araújo (2016) addresses advanced musicians, and is not fully suited for application in specific educational contexts. Studies addressing self-regulation through self-report methodology often employ adapted versions of Pintrich and De Groot's (1990) Motivation and Self-Regulated Learning Questionnaire (MSLQ). Findings from measurement studies suggest that a high level of self-regulation is positively associated with higher levels of musical competence (Hallam et al., 2012; McPherson & McCormick, 2006) and to music students' amounts of practice time (Austin & Berg, 2006; Miksza, 2012). However, the MSLQ has limitations when measuring self-regulatory processes in music students. The measure was not designed for specific application in musical instruction contexts, and has evidenced low internal consistency rates in music studies (Ersozlu & Miksza, 2015; Miksza, 2012).

In order to study music students' motivational components and self-regulated behaviours, Miksza (2012) developed a self-report measure (Self-Regulated Practice Behaviour Scale – SRPB) to assess self-regulatory aspects associated with motivation, method, behaviour, time and social contexts, departing from Zimmerman's (2000) theoretical model. This scale, which achieved robust results with regard to its validity and reliability, was applied to 302 middle-school wind and percussion students from the south-western United States. The scale has recently been adapted and translated into Turkish (Ersozlu & Miksza, 2015), and tested with a sample of college music students in Turkey (*n* = 252).

With the aim of providing a similar tool for the Portuguese language, Miksza's (2012) measure was chosen to be tested with a sample of Portuguese music students (Madeira, 2014), as there are no equivalent self-regulation measures in Portuguese or that have been validated for this language. Although Miksza's (2012) study presented evidence for predictive validity of the SRPB measure, few studies have examined its validity among a more comprehensive and representative sample of music students regarding musical instruments, age and other demographic variables. Also, there was a need to test whether Miksza's (2012) measure could be valid for application with music students from Portugal.

The general aim of this study was thus to analyse the validity and reliability of the Self-Regulated Practice Behaviour Scale developed by Miksza (2012) for music students in Portugal. The study provides analyses of the psychometric properties of a Portuguese version of the scale.

Method

Materials

Self-Regulated Practice Behaviour Scale. The original Self-Regulated Practice Behaviour Scale (Miksza, 2012) consists of 47 items and 5 hypothesized sub-scales: "Self-Efficacy/Motive" (10 items); "Method" (14 items); "Behaviour" (7 items); "Time Management" (6 items); and "Social Influences" (10 items). Each item is rated on a five-point Likert-type scale ranging from 1 – *strongly disagree* to 5 – *strongly agree*. The inter-item correlations in each of these sub-scales were significant (*p* < .01), with item-total correlations of at least *r* = .30. Miksza's (2012) study also shows retest reliability coefficients across the sub-scales ranging from *r* = .75 to .91, and Cronbach's alpha reliability coefficients spanning from α = .76 to .90. All Pearson correlations among the five sub-scales were significant (*r* = .19 to *r* = .78).

Miksza (2012) also applied confirmatory factor analysis (CFA) to examine the construct validity of the SRPB. Although fit statistics were generally accurate for several compared factor structures, the best fit was a four-factor model (CFI = .94, SRMR = .07, RMSEA = .05, χ^2 = 1,881.89, *df* = 939). The other models' fit statistics can be found in Miksza (2012) and Ersozlu and Miksza (2015). When comparing the competitor models, the results showed that the four-factor model, which included self-efficacy, combined method/behaviour, time management, and social influences, yielded the best fit to the data (Ersozlu & Miksza, 2015; Miksza, 2012).

Portuguese SRPB scale. In order to generate the Portuguese version of the SRPB scale, all original items were translated into Portuguese. The translation process followed three steps: translation, analysis by experts, and semantic analysis. Firstly, two authors of the present study completed an initial translation of the original document into Portuguese. This process had the support of a native English speaker who also understands Portuguese (a

doctoral student working in the same department as the first author), in order to identify possible semantic differences between the questions.

The second phase was the assessment of the translated version by three experts in the field of music education and music psychology. No modifications in wording were deemed necessary. The third and final step was a pilot study with 10 conservatoire music students for semantic analysis.[1] The participants' age range was between 10 and 18 years old. The application was during the last week of February 2014. After answering the questionnaire, the students offered opinions and suggestions to enhance the meaning of some of the items, which were taken into consideration for adaptations. The most significant change was on the item regarding formal and informal practice (Appendix, Part 1, Question 3). In the original scale, students were asked to report the percentage of their practice time playing for fun (i.e., informal practice) and playing with a technical or musical goal in mind (i.e., formal practice). Because some participants from the pilot group reported difficulties related to thinking in percentages and a lack of clarity for the item, the answer format was adapted for better comprehension (see Appendix). The resulting Portuguese version of the SRPB scale presented the same number of items in each of the five sub-scales as the original.

Sampling procedures

Selection of participants. The educational boards of 12 Portuguese music conservatoires were contacted in order to seek their collaboration in the application of the questionnaire with their students. These schools were chosen based on two criteria: (a) personal knowledge of the directors of the educational boards and school principals by the first author; and (b) geographical distribution of the schools in order to encompass different regions throughout the country. After eight schools agreed to collaborate on the research, the directors of the educational boards were informed about the procedures for the application of the measure. Parents or legal guardians completed and signed an informed consent form, which explained the purpose of the research and the use of data, allowing the students' participation. The authorized students answered the scale anonymously.

Sample. Two thousand five hundred questionnaires were distributed and applied during class. Questionnaires without demographic information were discarded. One thousand two hundred valid questionnaires were computed in an SPSS database. The sample comprised music students ($N = 1,200$) engaged in years 5 to 12 of instrumental music courses in the eight conservatoires. The participants (55.6% female and 44.4% male) ranged in age between 9 and 28 years ($M = 12.4$ years). The majority of participants were enrolled in years 5 to 9 (93.2%). Most participants' primary instruments were piano (19.3%), guitar (17.5%), or violin (15.2%), whereas a small percentage of participants reported specializing in several other instruments such as Portuguese guitar, tuba, mandolin, euphonium, and organ (Figure 1).

For assessment of the predictive validity (Pasquali, 2009) of the Portuguese Self-Regulated Practice Behaviour Scale, we collected data regarding participants' practice habits and their final grades in performance subjects in the preceding academic term. With regard to practice habits for the duration of the present study, the sample revealed diverse behaviours: the participants reported practice of an average of 43.59 minutes per day divided into 1.42 practice sessions on average. While 56.72% of daily practice time was devoted to formal practice, i.e., practice with a technical/musical goal in mind, the remaining 43.28% was used for informal practice, i.e., to play for pleasure, without any technical or musical goal in mind. The average self-assessment of daily practice efficiency was 6.81 on a scale of 1 to 10 (where 1 = not at all efficient and 10 = extremely efficient). Regarding their grades in the preceding academic
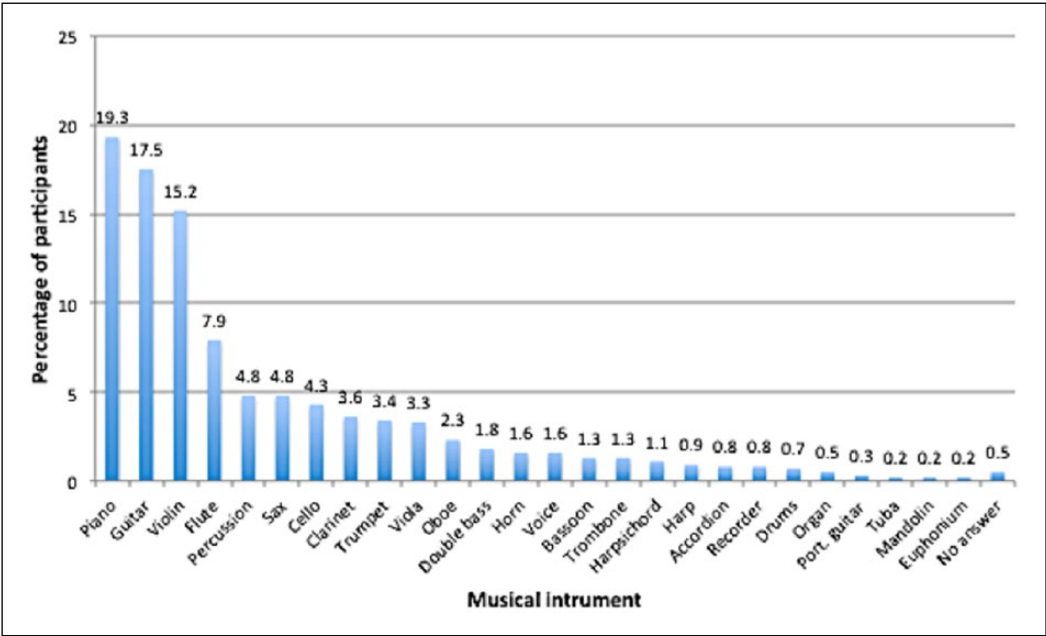
Figure 1. Percentage of participants per musical instrument.

trimester (first trimester), the participants reported a minimum evaluation of 2 and a maximum of 5 (on a scale of 1 to 5 points), resulting in an average of 3.64.

Procedures. The questionnaire was answered during music lecture lessons in the eight schools during the 2013–2014 academic year (March and April 2014). The participants completed an informed consent form approved by the schools' educational boards. The statistical analyses were run with the software IBM SPSS 21 statistics and Stata 13. Three main statistical techniques were applied. Firstly, the scale structure was inspected through reliability tests and Pearson correlations among sub-scales. Additionally, CFA was used in order to assess the construct validity, and predictive validity was analysed through two statistical procedures: the inspection of correlations between the self-regulatory sub-scales and reported practice habits, and results of probit linear regressions between competitor theoretical models of self-regulation and students' performance grades.

Results

Descriptive statistics and correlational analyses

For an initial inspection of the psychometric properties of the adapted Portuguese SRPB scale, we calculated means and standard deviations, Cronbach's alpha reliability coefficients, and Pearson correlations among the five sub-scales. The descriptive analyses for each sub-scale and reliability coefficients are presented in Table 1. As in the original study, the internal consistency reliability coefficients ranged from good to excellent ($\alpha = .71$ to $.84$).

Following Cohen (1992), our sample size of 1,200 observations permits us to estimate effect sizes with a statistical significance of $p \leq .01$, which he describes as small ($r \leq 0.1$),

Table 1. Portuguese SRPB and reported practice habits: Descriptive statistics.

Variable	Mean	SD	Skewness	Kurtosis	α
Motive (9 items)	3.69	.59	−.630	3.770	.85
Method (14 items)	3.65	.61	−.360	2.870	.83
Behaviour (7 items)	3.70	.64	−.430	3.070	.72
Time (6 items)	3.39	.83	.720	12.570	.71
Social (9 items)	3.68	.63	−.520	3.280	.77
Practice time per day	43.60	32.26	2.557	11.942	
Sessions per day	1.42	1.42	2.472	8.238	
Informal practice*	43.30	23.17	.362	−.394	
Formal practice*	56.70	23.22	−.364	−.398	
Practice efficiency**	6.81	1.58	−.572	.374	
Grades***	3.64	.79	−.040	−.464	

*Results based on reported percentages. **Range for this item was 1 (extremely inefficient) to 10 (extremely efficient). ***Range for this item was 1 to 5.

medium ($r \leq 0.3$) and large ($r \leq 0.5$) with a statistical power of 0.8. Yet estimates of r below 0.1 should be interpreted more cautiously. The results outlined in Table 2 show that all Pearson correlations computed among the five sub-scales were significant ($p \leq .01$), with coefficients ranging from .231 to .712, and the strongest relationships were observed between Method and Behaviour ($r = .712$) and Method and Social influence ($r = .712$). This is the same pattern of results found in the original study (Miksza, 2012).

In order to provide evidence of preliminary predictive validity of the Portuguese SRPB, correlations between several variables, including participants' grades, reported practice time, kind of practice (informal versus formal), reported practice efficiency and duration of daily practice and the SRPB sub-scales were examined (Table 2). The five sub-scales of the Portuguese SRPB scale were significantly and positively related to reported practice time (duration of daily practice in minutes and number of daily practice sessions), reported practice efficiency, and grades obtained in performance assessment. Practice efficiency and grades in school yielded the strongest associations. When assessing correlations with the kind of practice (informal versus formal), with the exception of the Motive dimension, informal practice was negatively related to the majority of the self-regulated sub-scales. On the contrary, formal practice, as expected, was positively related with the majority of the sub-scales, confirming the theoretical association between formal practice and self-regulation. The indicator Behaviour did not achieve any significant correlation.

Confirmatory factor analysis

Confirmatory factor analyses were performed to assess the construct validity of the Portuguese SRPB. We examined similar factor models tested in Miksza (2012): (a) a five-factor model, comprising one factor per dimension; (b) a four-factor model, considering Method and Behaviour dimensions combined in a single factor; (c) a three-factor model, considering Method, Behaviour and Social influence as a combined single factor; and (d) a two-factor model, considering only Motive separately from the other four dimensions combined as a single factor (Miksza, 2012).

Table 3 reports a number of goodness-of-fit statistics for each of the four estimated models. The table shows a progression in model fit moving from the two-factor to the five-factor model,

Table 2. Pearson correlations among the Portuguese SRPB sub-scales and reported practice habits.

Sub-scale	Motive	Method	Behaviour	Time	Social
Motive	1.000	.530**	.535**	.336**	.442**
Method		1.000	.712**	.333**	.712**
Behaviour			1.000	.261**	.639**
Time management				1.000	.231**
Social influence					1.000
Duration of daily practice in minutes	.221**	.345**	.192**	.195**	.280**
Number of daily practice sessions	.158**	.235**	.179**	.088**	.199**
Informal practice	.098**	−.102**	−.013	−.070*	−.063*
Formal practice	−.097**	.101**	.014	.069*	.063*
Reported practice efficiency/quality	.535**	.528**	.465**	.352**	.451**
Grade	.383**	.372**	.304**	.270**	.330**

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

Table 3. Goodness of fit for the estimated models.

Goodness of fit	Two-factor model	Three-factor model	Four-factor model	Five-factor model
χ^2 saturated	4,621.742	3,733.361	3,531.761	3,481.065
RMSEA	.061	.053	.052	.051
RMSEA close fit	> .001	.001	.078	.138
AIC	124,350.438	123,466.058	123,270.457	123,227.762
CFI	.762	.817	.830	.833
SRMR	.061	.058	.057	.057
CD	.986	.997	.998	.998
df	944	942	939	935

Notes. χ^2 = Minimum fit function chi-square; RMSEA = root mean square error of approximation; AIC = Akaike information criterion; CFI = comparative fit index; SRMR = standardized root mean square residual; CD = coefficient of determination.
Two-factor model = Motive + Method/Behaviour/Social influences/Time; Three-factor model = Method/Behaviour, Social influences + Time management + Motive; Four-factor model = Method/Behaviour + Social influences + Time management + Motive; Five-factor model = Motive + Method + Behaviour + Social influences + Time management.

whereby the improvement is strongest moving from the two-factor to the three-factor model. In this data, neither the two-factor nor the three-factor model have a close fit, as the null that the Root mean square error of approximation (RMSEA) ≤ 0.05 is rejected. Instead, the findings show that the four- and five-factor models display a close fit. Yet, in contrast to Ersozlu and Miksza (2015) and Miksza (2012), the preferred model here is the five-factor model. We estimated likelihood-ratio tests comparing the difference in the chi-squared values for the five-factor model with each of the three competitor models (cf. Miksza, 2012). The findings presented in Table 4 show that the five-factor model is a significant improvement compared to each competitor model. These findings, however, need to be interpreted with caution, as likelihood-ratio tests are only valid for nested models. However, the four competitor models are not nested, as, rather than paths being added when moving from one model to another, which would be required for nested models, the models here contain a "re-directing" of paths. We therefore complement their comparison with the Akaike information criterion (AIC), which does not require nested models (Table 3). Here, lower values indicate the preferred model, which again is

Table 4. Likelihood-ratio (LR) test of five-factor model with competitor models.

LR test	Diff χ^2
M5–M2	1,140.68*
M5–M3	232.30*
M5–M4	50.70*

Note. Diff χ^2 = difference between five-factor chi-square value and each comparative model. *Significant at the 0.001 level.

the five-factor model. The comparative fit index (CFI) and standardized root mean square residual (SRMR) further corroborate this picture.

Exploring predictive validity

We compared the four competitor factor models in their ability to predict the participants' performance grades. The usual approach, using linear regressions, would be to regress participants' performance grades separately on the latent factor scores produced by each of the four models and to compare the adjusted R^2. As the dependent variable (i.e., participants' grades) is ordinal, with values ranging from 2 to 5, we ran ordered probit regressions and compared McFadden's adjusted pseudo R^2, the analogue to the adjusted R^2 in linear regressions that adjusts for degrees of freedom. One should be reminded that a pseudo R^2 is conceptually different from the linear regression case where the R^2 represents the proportion of variance in the dependent variable that is explained by the model. In contrast, pseudo R^2 in non-linear regressions can be conceived as the change in model fit compared to a saturated model. We found that the all models appear to be of similar model fit, each achieving values of approximately 0.10.

We then explored whether the five-factor model can dominate the rival models in explanatory power. This idea stems from the notion of "encompassing" (Mizon & Richard, 1986), whereby two rival models are pooled together in linear regression. If model A encompasses a rival model B, then an *F*-test, restricting the coefficients of model B to zero answers this question (cf. Greene & Henscher, 2010, for an explanation of how analogues of *F*-tests can be computed for ordered probit regressions). If the coefficients of the rival model are jointly zero, i.e., the *F*-test cannot be rejected, then we have evidence supporting the hypothesis that model A dominates. This procedure, however, does not always deliver conclusive answers, as it is good practice to also test whether the rival model dominates the preferred model, i.e., testing whether the coefficients on model A are jointly zero. Thus, one might find that both *F*-tests are either not rejected or rejected, whereas conclusive answers can only be obtained when one of the two *F*-tests is rejected and the other is not (Verbeek, 2008). Again, we adapted this procedure to the ordered probit case. In each row, Table 5 compares two models, and reports the corresponding *F*-tests along with the degrees of freedom, i.e., the number of variables that are omitted. We found that the preferred five-factor model appears to dominate the two-factor model, but not any of the other rivals. As reported in Table 5, we do not have conclusive evidence in favour of the five-factor model. We found that the five-factor model and the three-factor model appear to dominate the two-factor model, but did not find that the five-factor model outperforms the other two rivals. Thus, we can only conclude that the two-factor model is slightly inferior to its rivals.

Discussion

Research in music education demonstrates that the teaching and learning processes can be improved with the inclusion of tools to assess important motivational and cognitive

Table 5. Predictive validity: Comparison of the preferred vs. rival.

Test	Preferred	Rival
Five-factor vs. two-factor	21.64***	4.52
	(5)	(2)
Five-factor vs. three-factor	16.78**	8.88*
	(5)	(3)
Five-factor vs. four-factor	31.89***	24.39***
	(5)	(4)
Four-factor vs. three-factor	4.52	3.98
	(4)	(3)
Four-factor vs. two-factor	9.79*	2.49
	(4)	(2)
Three-factor vs. two-factor	9.77*	4.06
	(3)	(2)

Note. Chi-squared reported, degrees of freedom in parentheses.
*Significant at the 0.05 level. **Significant at the 0.01 level. ***Significant at the 0.001 level.

components of musical practice. Thus, the general aim of this study was to generate a viable Portuguese adaptation of the Self-Regulated Practice Behaviour Scale (Miksza, 2012) for conservatoire performance students in specialized music education in Portugal. The SRPB scale was adapted and translated into Portuguese with support from experts in music education and music psychology. The psychometric properties of the Portuguese SRPB, i.e., internal consistency, construct validity and predictive validity, were also investigated. To our knowledge, this is the first study that has been designed to validate a measure of self-regulation in performance students of specialized music education in Portugal, addressing the need for cross-cultural validated measures of self-regulated practice behaviour for Portuguese speakers.

The results of this study revealed that the Portuguese version of the SRPB scale may be a reliable and valid scale for Portuguese music performance students between years 5 and 12 of the general education system (ages 10 to 17 years). The results of the confirmatory factor analysis applied to the Portuguese SRPB scale show that a five-factor model presenting the five correspondent theoretical dimensions of self-regulation (Motive, Method, Behaviour, Time management, and Social influence) achieved the best fit to the data (Tables 3 and 4). This finding differs from previous studies, which found the best fit for a four-factor model using the dimensions Method and Behaviour combined into one single factor (Miksza, 2012) and for a four-factor model without the Motive dimension (Ersozlu & Miksza, 2015). Ersozlu and Miksza (2015) explained the divergence based on differences in age and experience between their samples, but our study presented an age range relatively close to the original study ($M = 12.4$ years) and also found a distinct model. These divergences in the factorial structure of our study are likely to be explained by several differences between our sample and the other samples. The target population of this study belongs to a distinct and unique instrumental learning reality, i.e., music students in artistic education engaged in the study of several curricular components of specialized musical learning. Thus, it is possible that the musical experiences of the original sample differed from ours, because the original sample comprised students whose frequency of an instrumental syllabus stemmed from their participation in a band as a curriculum component of their regular school or summer music camps (Miksza, 2012). In contrast, our sample reflects self-regulatory skills in a context of greater specificity, diversity and depth of instrumental work, also reflected by the substantial difference in the time spent in practice between

our sample (*M* = 43.59 min) and the sample in Miksza's (2012) study (*M* = 23.59 min). In addition, the original sample was limited to band instruments (i.e., woodwind, brass and percussion), and our sample comprised instruments from all instrumental groups (Figure 1). Overall, the fact that the original theoretical framework of five self-regulatory dimensions proposed by McPherson and Zimmerman (2011) achieved the best fit to the data in the CFA may imply that the five-factor model may be more suitable to music students engaged in specialized music performance courses. Miksza (2012) stated that the application of the scale to different populations could change the configuration of the underlying factor structure, as instrumentalists at different levels of development "may perceive self-regulated learning with different levels of sophistication" (Miksza, 2012, p. 333).

The present study also investigated preliminary evidence of predictive validity for the Portuguese SRPB scale. Although our initial results favour the five-factor model, comparing the ability of the four rival models to explain final assessment scores (Table 5) suggests that all four rival models are equally good at doing so. Our data suggest that the two-factor model is slightly inferior to its rivals, but the evidence supporting this is weak. The previously mentioned sample differences may also be a possible explanation. Nevertheless, several significant correlations were detected among the five sub-scales, reported practice habits and the grade achieved in performance on their musical instrument. The factor loadings between all sub-scales and the first-trimester grade for the instrument subject (*r* = .27 to .38) may reinforce the validity of the Portuguese SRPB, highlighting the possible relevance of the individual dimensions for learning success. All Portuguese SRPB dimensions were also predictive of students' reports of average practice efficiency, grades, and practice time, suggesting that those who reported greater levels of practice efficiency, grades and practice time tend to report more self-regulatory tendencies. Yet our findings show that although the correlations of the SRPB dimensions with both informal and formal practice are statistically significant in eight cases, we lack the statistical power to confidently detect the small effect sizes in six of these cases (cf. Cohen, 1992).

The significant relationship between Motive and Method dimensions with daily practice time reflects the key role that is assigned to this factor in the literature concerning successful learning (Hallam et al., 2012; McPherson, 2005; McPherson & McCormick, 2006; McPherson & Renwick, 2001; Nielsen, 2008; Zhukov, 2009). The significant correlation between the reported practice efficiency and all of the Portuguese SRPB sub-scales (*r* = .35 to .53) also suggests that there is a specific consequence of self-regulated attitudes in the notion of quality and efficiency of individual study; a result also found in Miksza (2012).

In addition, the dimensions Method, Time management and Social influence were positively associated with formal practice (i.e., time spent practising with a particular technical/musical goal in mind) and negatively associated with informal practice (Table 2). These relationships indicate that the frequent use of these self-regulated strategies tend to encourage students spend more time in formal practice than informal (i.e., practising for fun). However, the inverted relationship between formal practice and the Motive dimension, the last comprising a scale measuring general self-efficacy (i.e., personal beliefs of music competence), suggests that students tend to be more confident when engaged in informal practice, without a specific technical/musical goal in mind. This result highlights the importance of the balance between formal and informal practice, referred to in the literature as an indicator of success in learning (McPherson, 2005; McPherson & Renwick, 2001). All the relationships outlined in this section of predictive validity are consistent with previous research.

The reliability coefficients for the five sub-scales identified in the Portuguese SRPB were acceptable, with a range of α = .71 to α = .85, a similar pattern achieved by the original study (α = .76 to α = .85; Table 2). The Motive and Method sub-scales demonstrated the strongest

internal consistency estimates (α = .85 and .83, respectively), as in Miksza (2012). However, while the sub-scale Social influence achieved the lower internal consistency in Miksza (2012), we found Time management and Behaviour with the lower estimates (α = .71 and α = .72), in correlation with Ersozlu and Miksza's (2015) study. In general, the reliability estimates found in the current study are close to those reported by Miksza (2012).

Although the specific demographic characteristics of this sample diverge from the original, influencing their practice habits, goals and learning experiences, the translation and adaptation of this scale maintained its originally proposed aim and suited the sample of 1,200 students in eight music conservatoires in Portugal. However, the sampling procedure (i.e., non-probabilistic sample by convenience) cannot guarantee any generalization of the present results to the entire population of Portuguese music students in conservatoires. Also, an evaluation of an English back-translation of the Portuguese SRPB by a native English speaker would increase face validity. These aspects are limitations of the present study that need further research and development. Future research also may use the Portuguese SRPB to devise intervention strategies and to understand how music students gradually develop a greater learning autonomy.

Note

1. Conservatoires in Portugal are not higher-education institutions. Courses offered are usually targeted for beginners (4 to 9 years old) and intermediate students (10 to 17 years old).

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Appendix. Self-Regulated Practice Behaviour Scale in English and Portuguese.

Practice Habit Survey

Inquérito sobre Hábitos de Estudo

Consider practicing be the time you spend playing alone (not in private lessons, or ensembles)

Considere "estudo" como o tempo que passa sozinho ao instrumento (não em aulas individuais, de grupo, ou ensaios)

PLEASE REMEMBER TO PROVIDE AN ANSWER FOR ALL QUESTIONS/STATEMENTS
LEMBRE-SE POR FAVOR DE RESPONDER A TODAS AS QUESTÕES

Part 1 – Instructions: Please answer the following items regarding your practice habits by writing in the requested number.
Parte 1 – Instruções: Responda por favor às seguintes questões relativamente aos seus hábitos de estudo:

1   What is your average amount of practicing per day in minutes?
     Qual a duração média do seu <u>estudo diário</u>, em minutos?

2   On average, how many practice sessions do you participate in per day?
     Quantas sessões de estudo faz <u>por dia</u> geralmente?

3   On average, what percentage of your practice time is spent playing simply for fun with NO specific musical or technical goals in mind?*
     A barra seguinte representa a duração de uma sessão normal de estudo. <u>Divida-a em duas partes</u> que representem:

     - a parte do tempo de estudo que passa a tocar apenas <u>por prazer</u>, sem ter nenhum objetivo em mente (marcar a sombreado)

     - a parte do tempo de estudo que passa a tocar <u>tendo</u> algum objetivo técnico ou musical em mente (deixar em branco)

Part 2 – Instructions: Please provide global assessments of your practice efficiency by choosing a rating between *"1-Extremely Inefficient"* and *"10-Extremely Efficient"*
Parte 2 – Instruções: Numa escala de 1 a 10, avalie globalmente a eficiência/qualidade do seu estudo diário:

On an AVERAGE DAILY BASIS my practicing is:

Em média, o meu estudo diário é:

Nada eficiente   1   2   3   4   5   6   7   8   9   10   *Extremamente eficiente*

Part 3 – Instructions: Please rate the following 10 statements by indicating whether you *Strongly Disagree (SD), Disagree (D), Neither Agree or Disagree (N), Agree (A), or Strongly Agree (SA)*
Parte 3 – Instruções: Indique o seu grau de concordância com cada uma das seguintes afirmações, assinalando – *Discordo Totalmente (DT), Discordo (D), Não Concordo nem Discordo (N), Concordo (C), ou Concordo Totalmente (CT)*

Item number	English and Portuguese wording
1	No musical task is too difficult for me Nenhuma tarefa musical é demasiado difícil para mim
2	I DO NOT feel confident in my ability to perform on my instrument Não sinto confiança nas minhas capacidades para tocar o meu instrumento
3	Compared with others in band, I think I am a good musician Comparado com outros colegas, penso que sou um bom músico
4	I believe I can become unusually good on my instrument Acredito que posso vir a ser muito bom no meu instrumento
5	When I set musical goals for myself, I am sure I can achieve them Quando estabeleço objetivos musicais tenho a certeza que os conseguir alcançar
6	I expect to be known as a good musician Espero vir a ser considerado um bom músico
7	I feel I can solve any musical problem I encounter Sinto que consigo resolver qualquer problema musical que encontre
8	I expect to do well in music in the future Espero vir a ser bom em música
9	I am confident in my ability to improve on my instrument Estou confiante na minha capacidade de melhorar no meu instrumento
10	Compared with other band students, I expect to do well Comparado com outros colegas, espero vir a ser um músico bem sucedido

Part 4 – Instructions: Please rate how often you do the following by indicating *"1-Never", "2-Rarely", "3-Sometimes", "4-Often", or "5-Always"*
Parte 4 – Instruções: Indique com que frequência ocorre cada uma das seguintes afirmações, escolhendo – *"1-Nunca", "2-Raramente", "3-Por vezes", "4-Frequentemente" ou "5-Sempre"*

Item Number	English and Portuguese wording
1	Talk to band/orchestra teacher about how to practice Converso com o professor sobre como devo estudar
2	Practice challenging music Estudo peças desafiantes

3	Look up definitions for unfamiliar terms and symbols when practicing Quando estudo, procuro definições de termos e símbolos desconhecidos
4	I think about pieces I'm practicing by singing them through in my mind Trabalho as obras que estou a estudar cantando-as interiormente
5	Mark trouble spots in music when practicing Assinalo partes problemáticas na partitura enquanto estudo
6	I daydream when practicing alone Sonho acordado enquanto estudo sozinho
7	When I'm practicing I stop playing and try to think about the best way to work out a problem Quando encontro um problema, paro de tocar e tento pensar sobre a melhor maneira de o resolver
8	Practice at least a little bit every day Estudo pelo menos um pouco todos os dias
9	I have difficulty concentrating when practicing for extended periods of time Tenho dificuldade em me concentrar quando estudo por longos períodos de tempo
10	Use band/orchestra teacher's advice when practicing Utilizo os conselhos do meu professor enquanto estudo
11	I listen to my own playing while I practice to make sure I am not reinforcing bad habits Enquanto estudo ouço atentamente o que estou a fazer para ter a certeza de que não estou a reforçar maus hábitos
12	If I can't play a piece correctly I stop to think about how it should sound Se não consigo tocar bem uma peça, paro para pensar como deveria soar
13	Spend some practice time sight-reading new music Dedico tempo do meu estudo a ler à primeira vista peças novas
14	Try to get one section of music perfect before practicing the next Tento aperfeiçoar uma passagem da obra antes de estudar a seguinte
15	Set specific practice goals Defino claramente os meus objetivos de estudo
16	I can only concentrate for short periods of time when practicing Enquanto estudo apenas consigo concentrar-me por curtos períodos de tempo
17	I practice to see how much better I can actually get at music Eu estudo para descobrir quão bom posso vir a ser em música
18	Think about things I learn in band/orchestra when practicing Enquanto estudo penso nas coisas que aprendi na aula
19	It is easy for me to remain focused on my music when practicing alone É fácil para mim manter-me concentrado enquanto estudo sozinho

20	Work to improve whenever practicing Sempre que estudo, trabalho para melhorar
21	Thoughts about non-musical things run through my head while I practice Ocorrem-me pensamentos sobre assuntos não-musicais enquanto estudo
22	Ask band/orchestra teacher for help practicing difficult music Peço ajuda ao meu professor quando trabalho obras difíceis
23	Hesitate to seek musical advice from others Hesito em pedir conselhos musicais a outras pessoas
24	Practice difficult spots very slowly Estudo as secções difíceis muito lentamente
25	Work hard when practicing Trabalho com dedicação enquanto estudo
26	Look to books for musical information that helps me learn Pesquiso em livros e outras fontes informações que me ajudem a aprender
27	Practice with a metronome Estudo com metrónomo
28	Begin each practice session with warm-ups Começo cada sessão de estudo com um aquecimento
29	Spend time in each practice session reviewing music Dedico algum tempo em cada sessão de estudo para rever músicas
30	Carefully look through a new piece before practicing Antes de estudar uma peça nova, observo-a cuidadosamente
31	Ask for feedback from band/orchestra teacher Peço a opinião do meu professor
32	Practice the day after a rehearsal or lesson Estudo logo no dia a seguir a uma aula
33	I am easily distracted when practicing Distraio-me facilmente enquanto estudo
34	Listen carefully to band/orchestra teacher's practice advice Ouço atentamente os conselhos de estudo dados pelo professor
35	Listen to musical recordings to help me learn Ouço gravações para me ajudar a aprender
36	Come well prepared to music rehearsals and lessons Vou bem preparado para as aulas e ensaios
37	Spend practice time on things I cannot do very well Dedico sempre algum tempo a resolver coisas que não consigo fazer bem