



Self-Regulated Learning in Music Education: A Structural Model of Social Support and Performance-Related Challenges

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Abstract

This study analyses the relationship between self-regulated learning (SRL), music performance anxiety (MPA), and social support in a sample of 72 students at music conservatories in Spain. Using a structural equation model, the direct and indirect effects of psychological and social factors on self-regulation are examined, with instrument practice hours as a mediating variable. The results show that self-regulation is boosted by social support from teachers and by hours of study, while performance anxiety and helplessness have significant adverse effects. In addition, performance anxiety is associated with higher levels of helplessness and with an unfavourable early educational context. Support from family and friends is negatively associated with helplessness, indicating a protective role, although its direct influence on instrument practice is limited. The final model explains 52% of the variance in self-regulated learning, suggesting that support quality and perceived independence are decisive and highlighting the importance of pedagogical practices that foster self-regulation, metacognition, and emotional resilience in music education.

Keywords: self-regulated learning; music performance anxiety; social support; music conservatory education; structural equation model

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INTRODUCTION

Self-regulated learning (SRL) is the process by which students transform their mental abilities into academic skills. It is an activity that students undertake independently rather than in response to teacher requests (Zimmerman, 2002).

This process includes the cognitive, metacognitive, behavioural, motivational, and emotional aspects of learning. Therefore, many variables that influence learning

can be studied within the conceptual framework of SRL, making it one of the most prolific areas of educational psychology in recent years (Panadero, 2017).

Zimmerman (1986), the author who has investigated this process the most, proposes a cyclical model with three phases. The first is the forethought phase, which involves carrying out task analysis, goal setting, and beliefs about self-motivation, like self-efficacy or expected results. The second phase is the performance phase,

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during which the task is carried out and includes self-control, defined as the learner's self-imposed instructions and task strategies, such as self-observation. The next phase is one of self-reflection, where the student analyses their own performance and readjusts their actions for future situations, thereby making the process cyclical. This final phase involves conducting self-evaluation and self-reflection. In addition to the model's cyclical nature, it is important to highlight the interaction among the cognitive, motivational, behavioural, and attitudinal processes within the learning context.

Research has been able to prove that students with a high level of SRL have more intrinsic motivation, better academic performance, and a higher sense of self-efficacy (Schunk & Zimmerman, 2007).

As far as music practice is concerned, it should be one of the academic areas in which the self-regulation of learning is more predominant because the students study their instrument in parallel to their regulated studies (Schunk & Greene, 2017). However, there is very little research into the reason why teachers tend to be opposed to it. This occurs because of the preference for a hierarchical structure, where the teachers teach and act as the active subject, whereas the students merely acquire concepts in a passive way. This means that they do not participate in the teaching-learning process, and the self-regulation of learning is hindered.

In addition, another relevant aspect is that the study of a musical instrument is mostly done alone. During classes, teachers usually focus more on the technical and expressive aspects of the repertoire, leaving aside study techniques. All this leads to a low-quality study due to a lack of effective study techniques, making it even more necessary for this type of student to develop SRL (McPherson et al., 2017).

Following these authors, research on the self-regulation of learning has focused on two aspects: on the one hand, the attributes students must acquire to plan, supervise, lead, and regulate their own

learning; and, on the other, how contemporary music teaching could benefit from adopting SRL.

McPherson and Davidson (2002) found that parental and teacher support and supervision in early music education are very important for helping children develop self-regulation of study in the future. However, they underline that children who always studied at the same time obtained worse results than those who did so at different times. This occurred because, in the first group, support was perceived as an obligation or even as coercion, whereas in the second group it was perceived as words of encouragement or friendly reminders, which further fostered independence in music practice.

Focusing on higher education, Miksza (2015) states that self-regulated learning should play a central role because students face very high technical and artistic demands. The transition from obligatory practice to deliberate and mindful practice depends largely on students' capacity for self-regulation.

The development of self-regulation in musicians does not occur spontaneously. This process requires teaching that encourages musical metacognition, independent decision making, and responsibility. In this sense, McPherson and Zimmerman (2011) suggest that the instrument teacher should act as "scaffolding" for learning. In this way, instrumental teachers could help students identify attainable goals in their studies, reflect on their progress, and develop strategies for adapting their practice.

Music performance anxiety (MPA) is defined as an emotional, cognitive, and physiological response that interferes with music performance in front of an audience (Kenny et al., 2004). Although a certain amount of anxiety can be beneficial in these situations, too high a level of anxiety can have a negative effect on concentration, memory, and the artistic quality of the performance.

The classic definition of performance anxiety was given by Salmon (1990) as the experience of distressing apprehension

which impairs performance skills in a public context, to a degree unwarranted given the individual's aptitude, training, and level of preparation. In fact, it can even threaten a musician's professional career, since excessive performance anxiety can cause real impairment in performance skills (Yoshie et al., 2009). People with performance anxiety issues can have three types of different responses: cognitive, physiological, and behavioural. Cognitive responses include memory lapses, an inability to think straight, or negative thoughts about the performance or themselves. Physiological responses include excessive sweating of the palms of the hands, trembling of hands, legs or knees, a dry mouth, a shaky voice, nausea and even vomiting. Behavioural responses include avoidance or escape behaviours (Papageorgi et al., 2007; Zarza et al., 2017).

In this study, performance anxiety has been considered as a fact that can be clearly explained by Barlow's anxiety theory (2000). This theory posits that anxiety arises from the combination of three vulnerability factors. According to this theory, there is a biological vulnerability that is inherited to a certain extent, a generalised psychological vulnerability related to everyday events, and a specific vulnerability linked to specific tasks or moments, such as speaking in public or performing live. The first vulnerability factor refers to the existence of biological causes, which are difficult to locate, and which contribute to the possible origin of different anxiety disorders and negative affectivity. The second factor is based on early experiences and a lack of personal control over events in one's immediate environment. The third factor is determined by specific environmental stimuli, different types of learning and experiences directly related to performance. This last factor is a necessary condition for the presence of anxiety, and in the end, the combination of all these factors determines the presence of higher or lower levels of performance anxiety or even the origin of specific anxiety disorders (Barlow, 2000; Kenny et al., 2004; Ken-

ny & Osborne, 2006).

In a context which is more relevant to performance anxiety in musicians, Kenny (2009a, 2009b) adapts Barlow's model (2000) and explains anxiety according to three factors: first, the importance of the context of early relationships; second, the psychological vulnerability of each individual; and third, concerns specifically related to performance.

In addition, in this paper, we consider the idea of Gallagher et al. (2014), who highlight the importance of continuing to research other dimensions and incorporating the study of other factors that could be related. This research on the existence of performance anxiety among Spanish music conservatory students also examines the constructs described below, which have been investigated very little in Spain.

After reviewing the existing literature, it can be observed that there are no studies that directly analyse the relationship between self-regulated learning and performance anxiety, or whether this can act as a mediating variable. However, both constructs share common psychological variables like self-efficacy, self-concept, or self-instruction, which could explain their connection.

Several authors highlight the importance of others in the process of music education. In this regard, Gruber et al. (2008) and Lehman and Kristensen (2014) refer to these individuals as Persons in the Shadow. They use this term to refer to the observation that an analysis of successful music careers always reveals the presence of individuals who have been fundamental to the musicians' education, both at early and later stages. From a psychological perspective, this phenomenon refers to social support (Orejudo et al., 2021; Sarason et al., 1990; Zarza et al., 2020) and means the existence of resources for psychological support provided by significant people who help to satisfy basic needs of interaction with others. These needs involve having information about the presence of people who show interest in us, value us, and love us; with whom we have open

communication and mutual obligations; and whom we can trust.

Several studies have empirically shown that social support is a key factor in musical success (Creech & Hallam, 2003; Davidson et al., 1996; Zarza et al., 2020). Moore et al. (2003) relate it to progress in one's musical career; Nogaj and Ossowski relate it to performance; and Sichivitsa (2007) finds that parental support is a fundamental factor in the musical self-concept of music students. It is defined as a multidimensional construct, according to the type of support involved (instrumental and emotional support) and the agents that can provide it (in the case of music: families, teachers, and peers) (Orejudo et al., 2021). As far as types of support are concerned, Creech (2009) specifies that parents can provide support in three different dimensions: behavioural, cognitive and personal. Through these, they can complement the teacher's role by helping to organise study, offer opportunities to interact with music, or set goals or expectations. As has been observed, these tasks carried out by parents are part of the conditions that favour the development of positive perceptions about personal worth, as well as fostering skills for the self-regulation of learning.

Although parents play a fundamental role in their children's music education, their work is not done separately from teachers and peers. Together, these three groups are considered to be the main sources of support for music students, and are responsible for the motivational and emotional processes needed to develop this career path (Lehmann & Kristensen, 2014; Nogaj & Ossowski, 2015; Sloboda, 2001). In fact, they are not considered to be independent sources. For example, parents with musical training and a direct relationship with music are perceived as better sources of support (Orejudo et al., 2021; Ritchie & Williamon, 2013; Sichivitsa, 2007) and effectively promote continuity in music education (Jeppsson & Lindgren, 2018). Directly through self-efficacy, Upitis et al. (2017) have found that having a family member or tutor who also plays an

instrument contributes to self-efficacy and more enjoyment of the situation, and can reinforce intrinsic motivation if it does not exist.

Teachers are another key agent in the education of music students. By establishing a direct relationship with sources of self-efficacy, teachers can play a fundamental role in the learning process, contributing significantly to students' motivation (Long, 2024; Upitis et al., 2017). This task involves different aspects, such as goal-setting in the short, medium and long term; supervision of the process; repertoire choice; commenting on the process, tests or general worth; teaching of strategies to mitigate performance anxiety; and social and emotional support in collaboration with the families. In this sense, there is some evidence of the importance of the teacher's role and its relationship with parents and students. Upitis et al. (2017) and Ang et al. (2021) discovered that the quality of the teacher is an important factor for students to report on their achievements and to enjoy performing. Waters (2020) reviews the factors which influence the effectiveness of teacher guidance. When students tackle the learning context in a proactive way, they manage to take on the guidance of their teachers. On the contrary, when this independence does not exist, the students who manage to take on the strategies suggested by their teachers do so with very little sense of control, and do not manage to convert them into tools to improve their learning. In these cases, these students end up feeling less in control and have a reduced sense of self-efficacy.

Peers are also considered a source of social support for musicians, but there is little evidence of their relationship with musical development. Hendricks (2014) found that especially girls manage to improve their self-efficacy when they are in contexts where they feel very supported, which is more likely to occur when the context is not perceived as highly competitive.

The objective of this paper is to try to explain the different levels of self-regulation

on of learning according to the three main sources of social support (teachers, parents and friends) and the factors of helplessness and early context associated with the specific factor of MPA. In addition, the number of hours of study has been used as a mediating variable and to explain the differences in the levels of self-regulated learning.

Therefore, the main working hypothesis for this study is that the self-regulation of learning will be explained by the relationships between social support, the specific component of performance anxiety, the state of helplessness, the early context factor and the hours the student spends studying.

This study seeks to explain variations in self-regulated learning by considering social and emotional factors relevant to music education. Based on the identified research gap, this study aims to examine a structural model of self-regulated learning in music education by analyzing the relationships among social support, performance-related emotional challenges, helplessness, and learning regulation.

METHODS

Participants

The sample for this study comprises 72 students (34.7% men and 63.9% women) with an average age of 20.41 years ($SD = 2.57$). The students belong to three music conservatories in Spain. At this level of education, equivalent to a university degree, the goal is to become music professionals, not only to study music as a hobby or extracurricular activity.

Measuring instruments and procedure

Measuring instruments

In this study, a set of three surveys were used, which included the Spanish version of the KMPAI (α Cronbach = 0.826) (Zarza et al., 2016). The survey is composed of 26 items divided into three subscales responsible for measuring the state of

helplessness, the early context factor for first musical experiences and a third factor which specifically evaluates performance anxiety. A Spanish adaptation (α Cronbach = 0.853) of the Hatfield et al. (2016) survey on the self-regulation of learning was also used. This survey is made up of 34 items and is completely valid for use in higher education music environments. Finally, the social support survey (Orejudo et al., 2021) was used. This is a survey with 31 items, which is specifically valid for higher education music environments (α Cronbach = 0.873). This social support survey differentiates between three main sources of support (teachers, parents, and friends) on three subscales. In addition, students were asked about the number of hours spent studying their instrument.

Procedure

Regarding data collection, emails were sent to management and music teachers at various conservatories to explain the research and request their participation. Once they gave their consent, the students were given informed consent together with a letter explaining the research. Under Spanish law, parental consent was not required because all students were over 14 years of age. In addition, the research was approved by the ethics committee of the University of Zaragoza for the collection and processing of confidential data (protocol number RAT 2025-207). The surveys were administered online anonymously and voluntarily via Google Docs. The time required to respond to all the surveys was between 20 and 30 minutes.

As far as the statistical process is concerned, the analysis techniques used structural equation models with the program AMOS 26.0.

RESULTS AND DISCUSSION

In the initial analysis, all the variables mentioned above were introduced, as can be seen in the Figure 1.

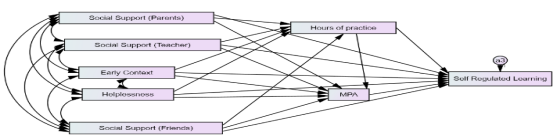


Figure 1. Initial Model

However, this first tentative model does not show significant relationships among the variables ($p > 0.05$). Table 1 shows that, with respect to MPA, there are no significant relationships with the three social support factors. For their part, the hours of instrument practice do not appear to be explained by social support from parents or friends. This does not ap-

pear to have a significant relationship with the early context factor of anxiety, either, or with the state of helplessness declared by the students. In the same way, the different levels of SRL do not seem to have a significant relationship with social support from parents or friends, or with the early context factor of performance anxiety.

With regard to the relationship between the explanatory variables of the model, it can be seen that social support from parents is not significantly related to social support from the teacher. In the same way, the early context factor does not seem to be associated in a significant way with social

Table 1. Standardized regression weights

Variables related		β	p
Hours of practice	Social Support (Parents)	-.082	.528
Hours of practice	Social Support (Teacher)	-.308	.006
Hours of practice	Early Context	-.026	.830
Hours of practice	Helplessness	-.139	.298
Hours of practice	Social Support (Friends)	-.223	.077
MPA	Social Support (Friends)	.016	.902
MPA	Social Support (Parents)	-.144	.264
MPA	Social Support (Teacher)	-.037	.752
MPA	Early Context	-.263	.031
MPA	Helplessness	.275	.040
MPA	Hours of practice	.169	.152
SRL	Social Support (Parents)	-.156	.106
SRL	Social Support (Teacher)	.221	.011
SRL	Early Context	-.107	.253
SRL	Helplessness	-.329	.001
SRL	Social Support (Friends)	.166	.082
SRL	Hours of practice	.400	***
SRL	MPA	-.440	***
Early Context	Helplessness_1	.350	.005
Helplessness	Social Support (Friends)	-.448	***
Social Support (Parents)	Social Support (Teacher)	.035	.769
Early Context	Social Support (Parents)	-.381	.003
Helplessness	Social Support (Parents)	-.428	***
Social Support (Friends)	Social Support (Parents)	.379	.003
Early Context	Social Support (Teacher)	.087	.464
Early Context	Social Support (Friends)	-.125	.295
Social Support (Friends)	Social Support (Teacher)	.128	.285
Helplessness	Social Support (Teacher)	-.149	.214

support from the teacher or friends. Finally, it can be observed that social support from the teacher is not significantly related to helplessness or to social support from friends.

In light of these preliminary results, the model was adjusted to interpret the findings in terms of significant relationships among the variables (Figure 2).

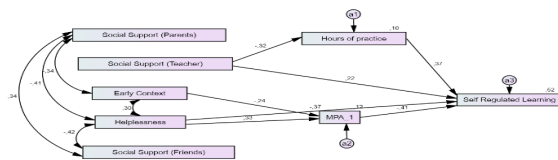


Figure 2. Adjusted model

This model presents optimal adjustment data (CMIN/df = 1.131; $p = 0.318$; CFI = 0.980; RMSEA = 0.043) and accounts for approximately 52% of the variance in the factor, which measures the levels of self-regulation of learning.

As can be observed in Table 2, the specific factor of performance anxiety (MPA) is explained in a significant and directly proportional way by the state of helplessness ($\beta = 0.327$; $p = 0.005$), and in

an inversely proportional way by the early context factor ($\beta = -0.240$; $p = 0.040$). In the same way, the number of hours of instrument practice is only explained inversely by teacher social support ($\beta = -0.321$; $p = 0.004$). In turn, the self-regulated learning factor (SRL) is explained directly by teacher support ($\beta = 0.215$; $p = 0.013$), and by the number of instrument study hours ($\beta = 0.374$; $p = 0.000$), and inversely by helplessness ($\beta = -0.371$; $p = 0.000$) and by MPA ($\beta = -0.408$; $p = 0.000$).

There is also a significant association between early context and the helplessness factor ($\beta = 0.303$; $p = 0.008$), and an inverse association with parental social support ($\beta = -0.344$; $p = 0.004$). The helplessness factor is inversely related to parental social support ($\beta = -0.410$; $p = 0.001$) and to support from friends ($\beta = -0.417$; $p = 0.000$). Finally, there is a direct, significant relationship between social support from parents and friends ($\beta = 0.341$; $p = 0.004$).

In addition to direct effects, we observe significant indirect effects. Starting with a bootstrap sample of $n = 1000$ with a 99% confidence level, we observe that all estimates fall within the range (Table 3).

Table 2. Standardized regression weights

Variables related		β	p
Hours of practice	Social Support (Teacher)	-.321	.004
MPA	Early Context	-.240	.040
MPA	Helplessness	.327	.005
SRL	Social Support (Teacher)	.215	.013
SRL	Helplessness	-.371	***
SRL	Hours of practice	.374	***
SRL	MPA	-.408	***
Early Context	Helplessness	.303	.008
Helplessness	Social Support (Friends)	-.417	***
Early Context	Social Support (Parents)	-.344	.004
Helplessness	Social Support (Parents)	-.410	.001
Social Support (Friends)	Social Support (Parents)	.341	.004

Table 3. Indirect effects on self-regulated learning based on bootstrap estimates

Variables related		β	p	Lower Bound	Upper Bound
Social Support (Teacher)	SRL	-.120	.009	-.345	-.003
Helplessness	SRL	-.134	.007	-.338	-.006
Early Context	SRL	.098	.028	-.039	.281

In addition, and due to the multi-variate Kurtosis index of the total sample being equal to 7.64, slightly out of the range that Hair et al. (2014) recommend (± 7), but within the margins that Griffin and Steinbrecher (2013) accept (± 10), it was decided to try the model using Bollen-Stine bootstrapping, which gave a p value of 0.391, so goodness of fit is assumed for the model.

The results obtained in the adjusted model help clarify the interplay between the psychological, emotional, and behavioural factors involved in the self-regulation of learning among conservatory students. The model shows a good fit, accounting for 52% of the variance in the self-regulation factor, supporting both the relevance of the included variables and their coherence with established theoretical frameworks.

Firstly, hours of practice and performance anxiety are the variables that contribute most to self-regulated learning. Hours of practice show a positive effect ($\beta = 0.374$; $p = 0.000$), whereas performance anxiety shows a negative effect ($\beta = -0.408$; $p = 0.000$). These results are aligned with previous research indicating that musicians with higher levels of self-regulation tend to engage in more mindful and deliberate practice and report lower levels of performance anxiety (McPherson & Renwick, 2011). Taken together, the findings suggest that self-regulation depends less on the time invested in practice and more on the quality of the strategies employed and the emotional regulation accompanying the learning process.

Teacher social support is also positively associated with self-regulation ($\beta = 0.215$; $p = 0.013$). This underscores the importance of student-teacher interactions in shaping goal-setting, strategic planning, and reflective processes, which are central to self-regulated learning. From this perspective, teachers act as mediators who facilitate shared regulation processes (Hadwin & Järvelä, 2011), promoting reflective dialogue, structured planning, and constructive feedback.

A particularly noteworthy finding is the negative relationship between teacher social support and hours of practice ($\beta = -0.321$; $p = 0.004$). Although unexpected at first glance, this pattern may reflect differences in how students perceive the nature of teacher support. Support perceived as overly directive or controlling may reduce students' autonomous engagement in individual practice, whereas support that encourages independent decision-making tends to promote strategic and efficient work habits. In this sense, teacher support may enhance the *quality* of self-regulation rather than the *quantity* of practice, a perspective consistent with research emphasising deliberate practice and metacognitive regulation over sheer time investment (López-Iñiguez & McPherson, 2020).

With regard to emotional variables, music performance anxiety (MPA) is positively associated with helplessness ($\beta = 0.327$; $p = 0.005$) and negatively associated with early musical context ($\beta = -0.240$; $p = 0.040$). These findings suggest that students with lower perceived competence experience higher levels of anxiety, whereas those who benefited from supportive early environments display greater emotional management when performing in public. This is consistent with Bandura's (1977) notion that early mastery experiences strengthen self-efficacy and reduce anxiety in evaluative situations.

Family support is negatively associated with both early context ($\beta = -0.344$; $p = 0.004$) and helplessness ($\beta = -0.410$; $p = 0.001$). Although this pattern may initially appear contradictory, it may reflect processes associated with academic resilience (Martin & Marsh, 2006). Students who develop autonomy in contexts with less family involvement may acquire adaptive strategies that support emotional self-regulation, thereby protecting them from the anxiety commonly associated with public performance and comparison in music studies.

The adverse effect of teacher support on hours of practice, combined with its po-

sitive effect on self-regulation, reinforces the idea that effective pedagogical guidance fosters more efficient and mindful study habits. In other words, students receiving adequate study strategies and feedback may achieve better learning outcomes with fewer hours of practice, highlighting once again the central role of deliberate and reflective practice in musical learning (López-Íñiguez & McPherson, 2020).

Finally, this study presents some limitations. The sample was relatively small ($N = 72$, 34.7% men and 62.9% women) and drawn from only three conservatories in Spain, which restricts the generalisability of the findings. Moreover, the quantitative approach does not allow for an in-depth understanding of individual perceptions and experiences. Future studies could complement these findings with qualitative methods (e.g., interviews, focus groups) to explore how students interpret the support they receive, how they structure their practice, and how they manage the emotions associated with musical performance.

CONCLUSION

In summary, the results highlight that self-regulated learning in higher education music studies is a social process in which the influence of external support is largely indirect. The effectiveness of this support depends on how it is perceived and enacted: support that is overly controlling may interfere with practice, whereas support that encourages independence and reflection appears to foster self-regulation of learning. In certain contexts, limited social support, while remaining a potential risk factor, may also be associated with the development of emotional resilience and adaptive coping strategies that help students manage performance-related challenges. These findings invite a reconsideration of the role of social support in music education, suggesting a shift from externally managed instruction toward more collaborative pedagogical approaches, in which musicians learn to regulate their

studies, motivation, and emotions while maintaining their autonomy. Therefore, encouraging pedagogical practices centred on self-regulation and resilience may represent a key strategy for enhancing learning quality and sustaining students' engagement in higher music education.

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Institutional review statement

In accordance with Spanish regulations, parental or legal guardian consent was not required, as all participants were aged 14 years or older. The study was approved by the Ethics Committee of the University of Zaragoza (protocol number RAT 2025-207)

Conflicts of Interest

The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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