Music Performance Anxiety Inventory for Adolescents: Psychometric properties of the Portuguese version

Pedro Dias[1, 2], *Maria João Batista*[3], *Sofia Serra*[4], *Lurdes Veríssimo*[2, 5], *Patrícia Oliveira-Silva*[2, 5], *and Daniela Coimbra*[6]

[1] University of the Azores, Department of Psychology.

[2] CEDH–Research Centre for Human Development, Universidade Católica Portuguesa.

[3] CIEd–Research Centre on Education, University of Minho; CCM - Centro de Cultura Musical.

[4] CITAR–Research Centre for Science and Technology of the Arts, School of Arts, Universidade Católica Portuguesa.

[5] Universidade Católica Portuguesa, Faculty of Education and Psychology.

[6] i2ADS–Research Institute of Art, Design and Society; School of Music and Performing Arts, Polytechnic Institute of Porto.

ABSTRACT

The aim of the current study was to develop the Portuguese version of the Music Performance Anxiety Inventory for Adolescents (MPAI-A) and to examine its psychometric properties with a sample of 161 adolescent music students in Portugal. Participants completed the Portuguese version of the MPAI-A, the State-Trait Anxiety Inventory for Children, and a sociodemographic questionnaire. The MPAI-A psychometric properties were examined for validity and reliability. A two-factor structure was identified through Exploratory Factor Analysis: F1-Music Performance Anxiety cognitive and somatic symptoms; F2-Performance. Concurrent and known-group validity were established, and reliability scores were appropriate for the dimensions and total score. Results provide initial evidence of the appropriateness of the Portuguese version of the MPAI-A. Practical implications are discussed and future studies with this instrument are suggested.

KEYWORDS

music performance anxiety
assessment
MPAI-A
adolescents
validation
psychometric properties

INTRODUCTION

Music performance anxiety (MPA) is defined as a state of "marked and persistent anxious apprehension related to musical performance" (Kenny, 2011, p. 61). It is often associated with settings where there is an evaluation situation and a consequent fear of failure. The symptoms of MPA can reflect distress in somatic (e.g., shaking hands), emotional (e.g., apprehension towards a performance), cognitive (e.g., focused attention on fear), and behavioural dimensions (e.g., avoiding auditions, Kenny, 2011).

MPA is frequently reported among musicians (Burin & Osorio, 2017; Kenny et al., 2014). It can affect individuals in all stages of their professional trajectory in music and is partially independent from experience level (Faur et al., 2020). For that reason, it is very important to study and understand MPA at an early stage of musicians' development. Research on MPA in adult musicians is frequent, whereas in younger musicians, it seems to be still insufficient (e.g., Papageorgi, 2021; Ryan, 2005).

Recent research with young musicians aged 9-12 (Kalenska-Rodzaj, 2020) indicated the urgent need for psychological help in MPA prevention and treatment at an early stage of music education: 45% of the participants involved in that study presented MPA profiles, 31% believed MPA had a negative impact on their performance, 18% reported helplessness in coping with MPA, and 15% perceived pressure rather than support from music audition listeners. When focusing on adolescent musicians, this developmental period is crucial in increasing vulnerability to MPA (e.g., Fehm & Schmidt, 2006; Kenny & Osborne, 2006). In fact, Fehm and Schmidt (2006) found that 33% of adolescent musicians experienced a negative impact of MPA. Papageorgi (2020) found that in a sample of 410 adolescent musicians, 11% reported high MPA levels.

Many factors can explain MPA. Based on Barlow's (2000) model of anxiety, Kenny (2011) suggests that MPA could arise from three types of vulnerabilities: (a) generalized biological vulnerability: biological factors that influence the development of negative emotions; (b) generalized psychological vulnerability: early experiences that induce a perception that

Corresponding author: Pedro Dias, University of the Azores, Department of Psychology, 9500-321 Ponta Delgada, Portugal.

Email: pedro.mb.dias@uac.pt

some events are uncontrollable; and (c) specific psychological vulnerability: anxiety associated with specific environmental stimuli through early learning processes (e.g., vicarious conditioning).

The literature emphasizes individual and situational factors related to MPA. The situational factors include early experiences, family and peer support, or performance conditions (Michiko et al., 2009; Papageorgi et al., 2007). The individual factors include musicians' gender, age, personality, self-efficacy, or perfectionism (Dobos et al., 2019; Eğilmez, 2015; Gonzalez et al., 2018; Papageorgi et al., 2007; Patston & Osborne, 2016). Considering gender differences, the literature on MPA shows that girls experience higher levels of MPA compared to boys (e.g., Kenny & Osborne, 2006; Patston & Osborne, 2016; Thomas & Nettelbeck, 2014), although there is a need to further examine these differences, as they are not consistently found in some studies (e.g., Dempsey & Comeau, 2019; Papageorgi, 2020).

Research has shown that psychological intervention reduces self-reported MPA in high school music students (Braden et al., 2015). In order to identify and assess MPA and to monitor eventual intervention to reduce MPA in young musicians, the development of valid and reliable assessment tools in adolescents is crucial.

One of the most used instruments developed to assess MPA in adolescents is the Music Performance Anxiety Inventory for Adolescents (MPAI-A; Osborne & Kenny, 2005). Based on Barlow's (2000) model adapted to MPA, the MPAI-A was designed for use with adolescents to assess the somatic, cognitive and behavioral components of MPA. The MPAI-A includes 15 items (Osborne & Kenny, 2005). The items are rated using a 7-point Likert scale, ranging from 0 (*none of the time*) to 6 (*all of the time*). The psychometric properties of the MPAI-A were analysed with 381 young musicians aged 12 to 19 years, attending secondary performing arts high schools. A three-factor structure showed appropriate psychometric properties: Factor 1 = Somatic and cognitive features (α = .90) – eight items assessing physical symptoms of anxiety related to music performance and worries of making mistakes during the performance; Factor 2 = Performance context (α = .77): three items assessing the preference of musicians about performance contexts and audience; and Factor 3 = Performance evaluation (α = .69): four items assessing the way the musician or the audience evaluate the performance. These three factors together accounted for 53% of the variance (Osborne & Kenny, 2005). The psychometric properties of the MPAI-A were also examined in a study with two samples of younger musicians (11-13 years-old), from Australia and the USA. The internal consistency of the instrument with this age group remained robust (Osborne et al., 2005).

The present study aimed to contribute to the validation of the MPAI-A and to study its psychometric properties in a sample of adolescent music students in Portugal.

METHOD

Participants

Participants were 161 students (54.6% female), aged between 12 and 19 years-old (M = 14.48; SD = 1.79) enrolled in a specialized music school (7th to 12th grade) in Portugal. In Portugal, there are day-schools with a focus on music (mostly public conservatories) and other schools (public and private) with music teaching happening as an extra-curricular activity, but with the same curriculum as the conservatories (specialized music schools). The school where the current study's data were collected was a private specialized music school. All participants studied classical repertoire in the following instruments: strings (51%); woodwind (29%), brass (18%), and percussion (2%). On average, participants studied their instruments for 4.23 years (SD = 2.15).

Instruments

The Portuguese version of the *Music Performance Anxiety Inventory for Adolescents* (MPAI-A; Osborne & Kenny, 2005) was used.

State-Trait Anxiety Inventory for Children (STAI-C; Spielberger, 1973; Portuguese version: Dias & Gonçalves, 1999).

The trait anxiety scale of the STAI–C includes 20 items, designed to assess children's and adolescents' general tendency to experience anxiety. The Portuguese version of the STAI-C showed satisfactory internal consistency (α = .76) and adequate convergent validity with the *Children's Manifest Anxiety Scale-Revised* (CMAS-R; Reynolds & Richmond, 1978, r = .58, Dias & Gonçalves, 1999).

The *sociodemographic questionnaire* was developed by the research team to collect sociodemographic data such as (a) gender, (b) age, (c) school year, (d) instrument, (e) years of instrument practice, and (f) instrument practice time per week.

Procedure

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Scientific Board of the School of Arts of Universidade Católica Portuguesa. Data were collected in a specialized music school after obtaining the authorization from the school's head teacher. Informed consent was obtained from participants' parents (for participants aged between 12 and 17) and from adult participants, ensuring voluntary participation and anonymity of the data. Data collection took place in the classroom, facilitated by one of the researchers.

Translation of the MPAI-A

The original version of the MPAI-A was translated into Portuguese by a bilingual translator and a back-translation was performed by an independent bilingual translator. The research team analysed the translated version and decided, by consensus, the final version of the items, taking into consideration their conceptual, content, semantic, cultural, and social equivalence to the original version.

Data Analysis Overview

The sociodemographic data were analysed using descriptive statistics.

The MPAI-A psychometric properties were examined for validity and reliability. An exploratory factor analysis (EFA) using the principal components analysis (PCA; Oblimin rotation, assuming a possible correlation between the factors) was carried out to determine the factor structure of the data. The suitability of the sample's data to perform the EFA was evaluated using the Kaiser-Meyer-Olkin tests (KMO; a

measure of sampling adequacy) and Bartlett's test of sphericity (general significance of all correlations, Field, 2017). The Pearson's r correlation coefficient was used to assess concurrent validity by comparing the MPAI-A results with the STAI-C (trait anxiety) results.

Internal consistency was examined through Cronbach's α.

The analysis of differences between groups with normally distributed data was performed using the independent-samples t-test for gender differences. This analysis allowed to test known-group validity, as differences in MPA are expected to occur between male and female participants, with female students scoring higher than males.

RESULTS

Validity: Factorial Structure of the MPAI-A

The KMO value was 0.904, suggesting adequacy of the sample for factor analysis (Field, 2017). The Bartlett's Test of Sphericity reported a significant value, $\chi^2(105) = 763.420$, $p < .001$, confirming that the correlation matrix was appropriate (Field, 2017).

The three-factor solution identified in the original validation study (Osborne & Kenny, 2005) was not a suitable option in terms of the items' factor loadings. Furthermore, the analysis of the scree plot suggested the need to retain two factors. Then, a two-factor structure was assessed. This structure explained 47.88% of the variance. The first factor included items related to the cognitive/somatic dimension of MPA (e.g., Item 5: "When I perform in front of an audience, I am afraid of making mistakes," Item 6: "When I perform in front of an audience, my heart beats very fast"). The second factor included items related to the performance dimension of MPA (e.g., Item 3: "I would rather play on my own, than in front of other people," Item 11: "I try to avoid playing on my own at a school concert"). Since several items loaded simultaneously on the two factors, item content analysis and internal consistency analysis were complementarily used to determine the final structure (Janda, 1998). The two-factor model (Factor 1, with 10 items, and Factor 2, with five items) are shown in Table 1.

Internal Consistency

The Portuguese version of MPAI-A showed high overall internal consistency for the total 15 items (Cronbach's α =.88). For the factors individually, this coefficient was higher than 0.70, with Cronbach's α = .84 for Factor 1 and α = .76 for Factor 2. Item-total correlations ranged between .44 and .66 for Factor 1, between .41 and .64 for Factor 2, and between .35 and .70 for the total 15 items.

Concurrent Validity: Correlation of MPAI-A Scores with STAI-C Scores

Results of the Pearson correlation between the MPAI-A and the STAI-C indicated a significant positive association between the scores of the two measures, showing that participants who presented higher levels of trait anxiety in STAI-C also presented greater MPA according to MPAI-A scores. The Pearson correlation analysis is shown in Table 2.

TABLE 1.
Results of Exploratory Factor Analysis for the MPAI-A (Oblimin Rotation, with Kaiser Normalization) and Factor Loadings of the 15 Items

MPAI-A Items	Factor 1 Cognitive/ Somatic	Factor 2 Performance
12. Just before I perform, I feel nervous	.716	-.428
5. When I perform in front of an audience, I am afraid of making mistakes	.714	-.369
6. When I perform in front of an audience, my heart beats very fast	.701	-.541
1. Before I perform, I get butterflies in my stomach	.656	-.338
9. When I perform in front of an audience, I get sweaty hands	.621	
13. I worry that my parents or teacher might not like my performance	.598	-.211
4. Before I perform, I tremble or shake	.579	-.571
2. I often worry about my ability to perform	.561	-.234
3. I would rather play on my own, than in front of other people	.427	-.771
11. I try to avoid playing on my own at a school concert	.249	-.743
14. I would rather play in a group or ensemble, than on my own	.454	-.676
7. When I perform in front of an audience, I find it hard to concentrate on my music	.516	-.664
8. If I make a mistake during a performance, I usually panic	.645	-.653
10. When I finish performing, I usually feel happy with my performance*		.626
15. My muscles feel tense when I perform	.492	-.623
R^2 (%)	38.92%	8.96%

Note. * = reverse-scored item

TABLE 2.
Pearson Correlation between STAIC c-2 and MPAI-A

	Cognitive/somatic	Performance	MPAI-A Total Score
STAIC_C2	0.55***	0.37***	0.53***

***$p < 0.001$

TABLE 3.
Gender Differences in MPA

	Male (*n*) Mean (*SD*)	Female (*n*) Mean (*SD*)	
Cognitive/ somatic	(72) 33.82 (11.58)	(89) 41.46 (10.44)	$t(159) = -4.40$***
Performance	(72) 13.57 (5.83)	(89) 16.15 (6.05)	$t(159) = -2.73$**
Total Score	(64) 47.72 (15.63)	(84) 58.20 (15.36)	$t(146) = -4.08$***

*$p < 0.05$; **$p < 0.01$; *** $p < 0.001$

Music Anxiety Performance: Group Differences

Female participants showed higher levels of symptoms related to the cognitive/somatic dimension of MPA (Factor 1), higher levels of performance related MPA (Factor 2) and higher levels of MPA in general (total score) compared to male participants (see Table 3).

DISCUSSION

The main goal of the current study was to contribute to the validation of MPAI-A for Portuguese adolescent music students.

An EFA was conducted on the 15 MPAI-A items. The original three-factor solution reported in previous studies did not appear to be suitable for the Portuguese sample data. Specifically, the original structure included one factor related to cognitive and somatic features of MPA, and two factors related to performance, with one focused on the performance context and the other on performance evaluation (Osborne & Kenny, 2005). The Portuguese three-factor structure did not discriminate the two different dimensions of performance, and two of the factors included items related to both cognitive/somatic symptoms and performance conditions. Then, a two-factor structure was tested. This structure – Cognitive and Somatic dimension (Factor 1) and Performance dimension (Factor 2) – considering the percentage of the variance explained and item loadings on each factor, ensures the construct validity of this version. The results showed that the five items loading on Factor 2 (performance dimension) are directly related with the conditions where young musicians perform (e.g., "I would rather play on my own, than in front of other people"); the other 10 items (Factor 1) are all clearly associated with cognitive or somatic symptoms of MPA. In addition, the Portuguese version of the MPAI-A demonstrated adequate levels of reliability in the two factors and total score.
As shown in previous studies (Osborne et al., 2005), higher levels of trait anxiety assessed with the STAI-C were significantly associated with higher levels of MPA, supporting the concurrent validity of this version of the MPAI-A.

As expected, female participants showed higher levels of MPA when compared with male participants. These results are consistent with the literature indicating that adult women tend to report more MPA than men (e.g., Dias et al., 2022; González et al., 2018). This pattern seems to be identical in adolescent music students (Osborne et al., 2005; Papageorgi, 2020). This known-group difference reinforces the construct validity of the Portuguese version of the MPAI-A.

CONCLUSION

The current study examined the psychometric properties of the MPAI-A with a sample of Portuguese adolescent music students. Results concerning validity and reliability were appropriate, highlighting the suitability of a two-factor solution of this measure in European Portuguese. Construct validity was also examined through correlation analysis with a trait anxiety measure and through known-group (gender) differences. Results supported the Portuguese version's validity.

This study's main limitation was the use of a sample from only one music school. Future research should consider data from larger and more heterogeneous samples, allowing the use of other psychometric analyses, including confirmatory factor analysis (CFA) and invariance analysis. The preliminary analyses reported in this study suggest a possible reorganization of the MPAI-A item structure around two factors, one of them including items related to cognitive and somatic features of MPA, and the other focusing on the performance conditions related to MPA. However, CFA and invariance analyses are needed to validate this possible new factor structure of this measure.

The Portuguese version of the MPAI-A appears to be a valid and reliable tool for screening MPA in adolescent music students, also contributing to examine the efficacy of psychosocial interventions focused on the prevention and management of MPA in this population.

ACKNOWLEDGEMENTS

This publication was partially funded by the Portuguese Foundation for Science and Technology (UIDB/04872/2020).

The authors would like to thank all the students who accepted to participate in the study.

DATA AVAILABILITY

The datasets generated and/or analyzed during the current study, and the study materials applied, are available from the corresponding author upon reasonable request.

REFERENCES

Barlow, D. H. (2000). Unravelling the mysteries of anxiety and its disorders from the perspective of emotion theory. *American Psychologist, 55*, 1247–1263. doi: 10.1037/0003-066x.55.11.1247

Braden, A. M., Osborne, M. S., & Wilson, S. J. (2015). Psychological intervention reduces self-reported performance anxiety in high school music students. *Frontiers in Psychology, 6*, 195. doi: 10.3389/fpsyg.2015.00195

Burin, A. B., & Osorio, F. L. (2017). Music performance anxiety: A critical review of etiological aspects, perceived causes, coping strategies and treatment. *Archives of Clinical Psychiatry, 44*, 127–133. doi: 10.1590/0101-60830000000136

Dempsey, E., & Comeau, G. (2019). Music performance anxiety and self-efficacy in young musicians: Effects of gender and age. *Music Performance Research, 9*, 60–79.

Dias, P., & Gonçalves, M. (1999). Avaliação da ansiedade e da depressão em crianças e adolescentes (STAIC-C2, CMAS-R, FSSC-R e CDI): Estudo normativo para a população portuguesa. In: A. P. Soares, S. Araújo & S. Caires (Orgs.). *Avaliacao Psicologica: Formas e Contextos (vol. VI)*. APPORT.

Dias, P., Veríssimo, L., Figueiredo, N., Oliveira-Silva, P., Serra, S., & Coimbra, D. (2022). Kenny Music Performance Anxiety Inventory: Contribution for the Portuguese validation. *Behavioral Sciences, 12*, 18. doi: 10.3390/bs12020018

Dobos, B., Piko, B. F., & Kenny, D. T. (2019). Music performance anxiety and its relationship with social phobia and dimensions of perfectionism. *Research Studies in Music Education, 41*, 310–326. doi: 10.1177/1321103X18804295

Eğilmez, H. O. (2015). Pre-service music teachers' piano performance self-efficacy belief inversely related to musical performance anxiety levels. *Educational Research and Reviews, 10*, 2558–2567. doi: 10.5897/ERR2015.2439

Faur, A. L., Vaida, S., & Opre, A. (2020). Kenny Music Performance Anxiety Inventory: Exploratory factor analysis of the Romanian version. *Psychology of Music*, 49, 777–788. doi: 10.1177/0305735619896412

Fehm, L., & Schmidt, K. (2006). Performance anxiety in gifted adolescent musicians. *Journal of Anxiety Disorders, 20*, 98–109. doi: 10.1016/j.janxdis.2004.11.011

Field, A. (2017). *Discovering statistics using SPSS (5nd ed.)*. Sage.

González, A., Blanco-Piñeiro, P., & Díaz-Pereira, M. P. (2018). Music performance anxiety: Exploring structural relations with self-efficacy, boost, and self-rated performance. *Psychology of Music, 46*, 831–847. doi: 10.1177/0305735617727822

Kalenska-Rodzaj, J. (2020). Pre-performance emotions and music performance anxiety beliefs in young musicians. *Research Studies in Music Education, 42*, 77–93. doi: 10.1177/1321103X19830098

Kenny, D. T. (2011). *The psychology of music performance anxiety.* Oxford University Press.

Kenny, D. T., & Osborne, M. S. (2006). Music performance anxiety: New insights from young musicians. *Advances in Cognitive Psychology, 2*, 103–112. doi: 10.2478/v/10053-008-0049-5

Kenny, T., Driscoll, T., & Ackermann, B. (2014). Psychological well-being in professional orchestral musicians in Australia: A descriptive population study. *Psychology of Music, 42*, 210–232. doi: 10.1177/0305735612463950

Janda, L.H. (1998). *Psychological testing: Theory and applications.* Allyn & Bacon.

Michiko, Y., Kazutoshi, K., Takayuki, M., & Tatsuyuki, O. (2009). Music performance anxiety in skilled pianists: Effects of social-evaluative performance situation on subjective, autonomic, and electromyographic reactions. *Experimental Brain Research, 199*, 117–126. doi: 10.1007/s00221-009-1979-y

Osborne, M. S., & Kenny, D. T. (2005). Development and validation of a music performance anxiety inventory for gifted adolescent musicians. *Journal of Anxiety Disorders, 19*, 725–751. doi: 10.1016/j.janxdis.2004.09.002

Osborne, M. S., Kenny, D. T., and Holsomback, R. (2005). Assessment of music performance anxiety in late childhood: a validation study of the music performance anxiety inventory for adolescents (MPAI-A). *International Journal of Stress Management, 12*, 312–333. doi: 10.1037/1072-5245.12.4.312

Papageorgi, I., Hallam, S. & Welch, G. F. (2007). A conceptual framework for understanding musical performance anxiety. *Research Studies in Music Education, 28*, 83–107. doi: 10.1177/1321103x070280010207

Papageorgi, I. (2020). Prevalence and predictors of music performance anxiety in adolescent learners: Contributions of individual, task-related and environmental factors. *Musicae Scientiae, 26*, 101.122. doi: 10.1177/1029864920923128

Papageorgi, I. (2021). Typologies of adolescent musicians and experiences of performance anxiety among instrumental learners. *Frontiers in Psychology, 12*, 645993.doi: 10.3389/fpsyg.2021.645993

Patston, T., & Osborne, M. S. (2016). The developmental features of music performance anxiety and perfectionism in school age music students. *Performance Enhancement & Health, 4*, 42–49. doi: 10.1016/j.peh.2015.09.003

Reynolds, C. R., & Richmond, B. O. (1978). What I think and feel: A revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology, 6*, 271–280. doi: 10.1007/BF00919131

Ryan, C. (2005). Experience of musical performance anxiety in elementary school children. *International Journal of Stress Management, 12*, 331– 342. doi: 10.1037/1072-5245.12.4.331

Spielberger, C. D., Edwards, C. D., Lushene, R. E., Montuori, J., & Platzek, D. (1973). *State-trait anxiety inventory for children.* Consulting Psychologists Press.

Thomas, J. P., & Nettelbeck, T. (2014). Performance anxiety in adolescent musicians. *Psychology of Music, 42*, 624–634. doi: 10.1177/0305735613485151

RECEIVED 04.03.2021 | ACCEPTED 06.07.2022