Development of a Performance Anxiety Scale for Music Students

Okan Cem Çırakoğlu, PhD, and Gülce Coşkun Şentürk, PhD

In the present research, the Performance Anxiety Scale for Music Students (PASMS) was developed in three successive studies. In Study 1, the factor structure of PASMS was explored and three components were found: fear of stage (FES), avoidance (AVD) and symptoms (SMP). The internal consistency of the subscales of PASMS, which consisted of 27 items, varied between 0.89 and 0.91. The internal consistency for the whole scale was found to be 0.95. The correlations among PASMS and other anxiety-related measures were significant and in the expected direction, indicating that the scale has convergent validity. The construct validity of the scale was assessed in Study 2 by confirmatory factor analysis. After several revisions, the final tested model achieved acceptable fits. In Study 3, the 14-day test-retest reliability of the final 24-item version of PASMS was tested and found to be extremely high (0.95). In all three studies, the whole scale and subscale scores of females were significantly higher than for males. *Med Probl Perform Art* 2013; 28(4):199–206.

Music performance anxiety (MPA) is a frequent problem among musicians, and an excessive level of MPA may threaten a musician's career by decreasing actual performance at all ages.[1–4] As in the other performance anxiety problems, MPA is characterized by fear of failure and negative evaluation from the audience in a real or perceived threatening situation which triggers both psychological and physiological responses.[5,6] A body of research indicates that people with MPA complain of a wide range of psychological and bodily symptoms, such as hot or cold sensations in hands, muscle tension, sweaty hands, hyperventilation, increased heart rate, uncontrollable shakiness in muscles, dry mouth, and gastrointestinal problems.[7,8] The other category of symptoms includes the cognitive component of MPA, which is mostly related to dysfunctional thinking or self-defeating cognitions about performing, such as the fear of making mistakes.[9]

Previous studies have suggested that MPA is a widespread problem among musicians.[1,9] In one study, it was stated that nearly 15 to 25% of musicians suffer from different levels of MPA.[10] In a large survey among professional musicians, it was also found that 19% of female and 14% of male performers experienced MPA.[11] As for gender differences, previous studies revealed conflicting findings. While several studies indicated no difference between males and females,[12] several of them found gender differences.[13,14]

Research has indicated that MPA is affected by some situational factors which may increase the likelihood of experiencing psychological arousal and bodily sensations.[15,16] For most performers, the stage is the main place where anxiety increases, and this feeling is usually called *stage fright*. However, Nagel[17] has stated that "stage fright is a misnomer" because performers are not actually afraid of the stage itself. Instead, the performer is afraid of potential or real mistakes and their catastrophic consequences before or during the performance. Literature suggests that situational factors such as exposure to an audience, its size, and its status affect the level of MPA.[14,18] Cox and Kenardy[19] found that MPA increases in certain performance settings such as solo concerts as opposed to group performances, in which a higher sense of exposure is experienced. In another study, MPA was explored in different performance settings: alone in a practice room, in a practice room with one researcher present, and in the rehearsal room with all researchers, a peer group, and a tape recording being made.[20] The study revealed that self-reported anxiety increased at each step. In a recent study, skilled pianists reported greater anxiety in competition conditions compared to nonstressful (rehearsal) conditions.[16]

MPA and its measurement have also attracted many researchers over the years. Osborne and Kenny[21] found that 20 different tools measuring MPA were published in peer-reviewed journals. The authors stated that most of these scales were developed and utilized in a wide variety of research projects, but many of them did not satisfy the criteria required for a well-designed scale. According to the authors, only the Kenny Music Performance Anxiety Inventory (K-MPAI),[22] Personal Report of Confidence as a Performer (PRCP),[23] and Performance Anxiety Inventory (PAI)[24] assess MPA by covering all three components of anxiety (cognitive, behavioral, and physiological). Although many of these scales have some problematic issues related to psychometrics, such as sample size, lack of complete measurement of reliability, and validity, certain scales satisfy all the criteria in terms of methodology (e.g., Music Performance Anxiety Inventory for Adolescents).[21]

A body of research has proposed that avoidance is an important component of anxiety-related problems[25,26] and

Dr. Çırakoğlu is Assistant Professor in the Department of Psychology, Faculty of Science and Letters, Başkent University, Ankara; and Dr. Coşkun Şentürk is Assistant Professor in the Department of Music, Faculty of Education, Muğla Sıtkı Koçman University, Kötekli-Muğla, Turkey.

Presented in part at the VIth International Congress of Clinical Psychology, Santiago De Compostela, Spain, 6–8 June 2013.

Address correspondence to: Dr. Okan Cem Çırakoğlu, Department of Psychology, Faculty of Science and Letters, Başkent University, Room F-412, Eskisehir Yolu 20 Km, Baglica Kampusu, 06530 Ankara, Turkey. Tel +90 312 246 66 66 – 1646, fax +90 312 246 66 30. okanc@baskent.edu.tr.

may be manifested at both behavioral and cognitive levels.[27] Although avoiding situations where public performance takes place leads to a feeling of relief and decrease in anxiety, avoidance behaviors actually worsen the fear. However, avoidance behaviors seem to be underrepresented in existing measurement tools.

The purpose of the present study was to develop a reliable and valid measure of MPA for university-level musicians. To our knowledge, no scale that measures performance anxiety with well-established psychometric properties was developed in Turkish. For instance, in one study with piano students, items in Music Performance Anxiety Inventory by Kenny and Osborne[13] were utilized, but no adaptation information was provided.[28] Therefore, it is obvious that there is a significant need for a scale that measures performance anxiety for student musicians in Turkish. The Performance Anxiety Scale for Student Musicians (PASMS), aims to measure MPA in a holistic manner by adding an avoidance component to existing cognitive and physiological components of anxiety. In addition, the scale aims to measure avoidance as a complementary component of MPA.

STUDY 1

Methods

Scale Development

The development of PASMS was carried out in three successive studies and used three independent samples. Those three samples shared some common characteristics. The samples consisted of students who are getting an education on various instruments and vocal training in the Department of Music Education under the Faculty of Education in different universities. Most of them are graduates of fine arts high schools, where students follow the regular curriculum while being trained on a musical instrument of their choice. These students are accepted to music education departments by an entrance exam, depending either on their vocal or instrument performance. They study for 4 years to become music teachers, and their curricula include courses in both music and education.

All three studies in this paper were reviewed and approved by the Scientific Research and Application Ethical Board, at Baskent University, Faculty of Science and Letters, Department of Psychology.

Participants

Data for Study 1 were gathered from three music education departments in Turkey. The sample consisted of 181 females (64.65 %) and 99 males (35.35 %) who were being trained in various instruments. The females were overrepresented in the study because the number of males and females being trained in these departments was not equally distributed. The mean age was 21.68 yrs (SD 2.07) for females, 22.15 (SD 2.28) for males, and 21.88 (SD 2.17) for the entire sample. The major professions of the participants consisted of 12 instruments and vocal training. Since the sample consisted of students, nearly one third of the (35.70 %) participants reported no solo concert experience. On the other hand, most of them (96.40 %) reported that they had played in a concert within a group or ensemble at least once. Table 1 provides the descriptive information for instruments and concert experiences for the samples in Study 1 and Study 2.

Procedure and Instrumentation

All data were collected during class sessions or during the individual practice sessions on a voluntary basis. All participants were informed about the purpose of the study and ethical rules such as confidentiality. The following scales were utilized in the study:

Demographic Information Questionnaire (DIQ): Participants were asked to indicate their year of birth, gender, instruments, and concert experiences on the DIQ.

Social Anxiety Scale (SAS): The SAS was developed by Palancı and Özbay[29] to assess university students' social skills and anxieties under a wide variety of social circumstances. The scale consisted of 30 four-point Likert-type items rated from 0 (never) to 4 (always). The SAS has three subscales: social avoidance (SA), worry of being criticized (WBC), and worthlessness (WT). In the original study, three subscales explained 32.9% of the total variance. In the present study, the internal reliability of the total scale was 0.93. Higher mean scores on the SAS and its subscales indicate higher social avoidance from social situations.

State-Trait Anxiety Inventory (STAI): Since previous studies revealed that trait anxiety was associated with MPA,[21,22] the trait form of STAI (STAI-T) was utilized in the present study. STAI was originally developed by Spielberger, Gorsuch, and Lushene[30] and adapted to Turkish by Öner and Le Compte.[31] STAI-T is a 20-item self-report scale which measures individuals' general response tendency and individual differences in experiencing anxiety in the face of threatening or stressful situations. Items on STAI-T were designed as Likert type and rated 1 to 4 (1, almost never; 4, almost always). Seven items were reversed before scoring. Higher mean scores on the STAI-T indicate a higher level of trait anxiety. The internal consistency of the scale in this study was found to be 0.85.

Performance Anxiety Scale for Music Students (PASMS): In order to assess MPA in university-level students, 46 items were generated by the authors (a psychologist and a flute player) with agreement. Most of the items were generated on the basis of the clinical and musical experiences of the authors, and several of them were adapted from existing scales. During the item generation process, a holistic approach was adopted in order to cover the cognitive, emotional, physiological symptoms of anxiety, avoidance behaviors, and thoughts about performance context. The scale was designed as Likert type, in which items were rated between 0 (certainly disagree) and 5 (cer-

TABLE 1. Descriptive Data for Participants in Study 1 and Study 2

	Study 1			Study 2		
Variables	Female *n* (%)	Male *n* (%)	Total *n* (%)	Female *n* (%)	Male *n* (%)	Total *n* (%)
Instrument						
Violin	78 (43.10)	18 (18.2)	96 (34.30)	62 (28.20)	24 (14.20)	86 (22.10)
Viola	18 (9.40)	9 (9.10)	26 (9.30)	19 (8.60)	5 (3.00)	24 (6.80)
Cello	15 (8.30)	7 (7.10)	22 (7.90)	14 (6.40)	19 (11.20)	33 (8.50)
Flute	30 (16.60)	11 (11.10)	41 (14.60)	45 (20.50)	12 (7.10)	57 (14.7)
Clarinet	1 (0.60)	4 (4.00)	5 (1.80)	—	2 (1.20)	2 (0.50)
Oboe	1 (0.60)	1 (1.00)	2 (0.70)	1 (0.50)	1 (0.60)	2 (0.50)
Piano	3 (1.70)	4 (4.00)	7 (2.50)	11 (5.00)	10 (5.90)	21 (5.40)
Lute (*ud*)	2 (1.10)	6 (6.10)	8 (2.90)	12 (5.50)	13 (7.70)	25 (6.40)
Bağlama	2 (1.10)	15 (15.20)	17 (6.10)	6 (2.70)	16 (9.50)	22 (5.70)
Voice training	19 (10.50)	7 (7.10)	26 (9.30)	33 (15.00)	22 (13.00)	55 (14.10)
*Kanun**	1 (0.60)	1 (1.00)	2 (0.70)	5 (2.30)	4 (2.40)	9 (2.30)
Guitar	12 (6.60)	14 (14.10)	26 (9.30)	10 (4.50)	34 (20.10)	44 (11.30)
Contrabass	—	2 (2.00)	2 (0.70)	2 (0.90)	7 (4.10)	9 (2.30)
Solo concert						
None	60 (33.10)	40 (40.40)	100 (35.70)	67 (30.50)	66 (39.10)	133 (34.20)
1	40 (22.10)	20 (20.20)	60 (21.40)	49 (22.30)	26 (15.40)	75 (19.30)
2–5	56 (30.90)	29 (29.30)	85 (30.40)	73 (33.20)	43 (25.40)	116 (29.80)
6+	25 (13.80)	10 (10.10)	35 (12.50)	31 (14.10)	34 (20.10)	65 (16.70)
Group concert						
None	5 (2.80)	5 (5.10)	10 (3.60)	14 (6.40)	25 (14.80)	39 (10.00)
1	3 (1.70)	4 (4.00)	7 (2.50)	24 (10.90)	27 (16.00)	51 (13.10)
2–5	46 (25.40)	19 (19.20)	65 (23.20)	65 (29.50)	35 (20.70)	100 (25.70)
6+	127 (70.20)	71 (71.70)	198 (70.70)	117 (53.20)	82 (48.50)	199 (51.20)
Total	181 (64.65)	99 (35.35)	280 (100)	220 (56.55)	169 (43.45)	389 (100)

tainly agree). Higher scores in PASMS indicated higher performance anxiety.

Results—Study 1

Factor Analysis

A very conservative data analysis procedure was followed in Study 1 in order to eliminate items that did not have a higher discriminative value. A reliability analysis with 46-item PASMS was performed before Principal Component Analysis (PCA), and 10 items were eliminated from the scale because their corrected item total correlations were lower than 0.50. Prior to PCA, the factorability of the data was also assessed. An anti-image correlation matrix was used to assess the sampling adequacy of items. Since Bartlettt's test of sphericity was large and significant and the Kaiser-Meyer Olkin measure of sampling adequacy was very high (KMO 0.95), factorability was assumed.

A PCA with an oblique rotation of the remaining 36 items of PASMS was conducted on data gathered from 280 participants. The examination of the number of eigenvalues >1.00 and factor loadings revealed that the scale had a multi-dimensional structure. In order to obtain an error-free solution, 6 items that had communalities lower than 0.50 were eliminated from the analyses and a new PCA was performed. A similar strategy was utilized and 3 items were also removed from the analysis.

The final PCA with the remaining 27 items revealed a three component solution (Table 2 presents items PCA results, eigenvalues, internal consistencies, and variance explained by each component of PASMS). The first component consisted of 11 items and explained 47.76 % of the total variance. Since this component consisted of items related to musicians' negative feelings and evaluations of performance and its consequences, it was named *fear of stage* (FES). Cronbach's alpha for the component was 0.91. The second component, *avoidance* (AVD), consisted of 8 items related to cognitive and behavioral avoidance (e.g., trying not to think about the performance or wishing not to play in front of others). This component explained 7.20 % of the variance with a Cronbach's alpha value of 0.89. The final component was named *symptoms* (SMP) because it consisted of cognitive, emotional, and bodily symptoms of performance anxiety. This component consisted of 8 items and explained 4.80% of the total variance. Cronbach's alpha for the component was 0.89. These three

TABLE 2. Means, Standard Deviations, Reliabilities, and Principal Component Analysis Results for PASMS

PASMS Items	M	SD	Component FES	AVD	SMP
22. If I make a mistake in my solo concert, it will be the end of my career.	1.31	1.60	0.83		
27. I am so anxious during concerts that sometimes I cannot even read the notes.	1.93	1.90	0.72		
19. If I cannot perform well on the stage, people will think I am not talented.	2.38	1.77	0.68		
02. If I make a mistake during concerts, I will lose face.	2.25	1.75	0.60		
16. While playing to an audience, I have difficulty concentrating.	1.90	1.76	0.59		
25. Whenever I need to go on stage, I always think of bad scenarios.	1.78	1.80	0.55		
15. When I am on stage, I become so anxious that even the audience can notice it.	1.77	1.70	0.55		
23. If I make a mistake during a performance on stage, I panic.	2.51	1.74	0.54		
18. I am so anxious on stage that my mind is a mess.	1.83	1.73	0.54		
20. Talking about an important performance before it begins makes me so nervous that I try to keep away from such discussions.	1.75	1.77	0.51		
17. Feeling anxious while playing the pieces during concerts makes me angry.	2.50	1.91	0.46		
07. Whenever the idea of playing on stage comes to my mind, I try to think of something else.	1.44	1.69		0.81	
06. I wish I did not have to play in front of others.	1.74	1.80		0.78	
04. Whenever people ask me to bring along my instrument to a meeting I have to attend, I pretend to have forgotten to do so.	1.27	1.66		0.71	
12. Whenever my friends or teachers talk about a concert where I am also playing, I try to think of other things.	1.29	1.61		0.69	
11. Concerts make me feel so anxious that I try not to think about them.	1.42	1.67		0.68	
13. The thought of appearing on stage frightens me.	1.99	1.78		0.59	
08. I get so tense before concerts that I cannot sleep.	1.80	1.74		0.47	
03. Before I go on stage, I feel like a prisoner waiting for his sentence.	1.56	1.72		0.43	
05. Before or during concerts my hands or feet shake.	2.94	1.78			0.80
21. Before or during concerts I start to have a faster heart rate.	3.47	1.66			0.77
14. The idea that people will evaluate my talents based only on my performance makes me feel anxious.	2.96	1.76			0.62
26. While playing the pieces during concerts, I think that I am going to panic.	2.77	1.76			0.58
10. Feeling highly anxious while playing the pieces during concerts upsets me.	2.90	1.80			0.57
09. Appearing on stage makes me feel nervous.	2.43	1.83			0.46
24. During concerts I constantly wish it will be over as soon as possible.	2.44	1.90			0.46
01. I feel very helpless before each concert performance.	1.91	1.74			0.41
Eigenvalue			12.89	1.94	1.29
Variance (%)			47.76	7.20	4.80
Alpha			0.91	0.89	0.89

n = 280.

components explained 59.78 of the total variance. Cronbach's alpha for the whole scale was found to be 0.95.

Convergent Validity

The convergent validity of the scale was demonstrated by calculating the correlations among variables. Trait anxiety (measured by STAI-T) and social anxiety (measured by SAS) were utilized in order to assess convergent validity. As predicted, all the subscales of PASMS were positively correlated with the subscales of SAS. The correlations among mean total scores of PASMS, SAS, and STAI-T were also positively significant. (The correlations among the PASMS subscales and other variables are presented in Table 3.) In sum, the relationships among PASMS and other anxiety-related measures indicated that PASMS has high convergent validity as a measure of MPA.

Descriptive Statistics

Females and males were compared on all variables in the study by independent samples *t*-tests. No significant difference was observed on SAS and its subscales in terms of gender. However, PASMS-Total, fear of stage, avoidance, symptoms, and STAI-T scores of females were significantly higher than those of males (Table 4). The gender differences on PASMS and its subscales were expected because many studies indicated that girls usually have higher levels of MPA than boys.[13]

Summary of Study 1

In the present study, the factor structure of PASMS and its construct validity were assessed. A PCA with the remaining 27 items of the scale produced a three-component solution.

TABLE 3. Correlations among the PASMS Subscales and Other Variables

Variables	1	2	3	4	5	6	7	8	9
1. Fear of stage (FES)	—								
2. Avoidance (AVD)	0.76	—							
3. Symptoms (SMP)	0.79	0.69	—						
4. PASMS–Total	0.94	0.88	0.90	—					
5. Social avodiance (SAV)	0.55	0.44	0.43	0.52	—				
6. Fear of being criticized (FBC)	0.56	0.44	0.47	0.54	0.77	—			
7. Unworthiness (UWT)	0.61	0.48	0.42	0.56	0.74	0.72	—		
8. SAS–Total	0.62	0.49	0.48	0.59	0.94	0.91	0.87	—	
9. STAI-T	0.50	0.40	0.45	0.50	0.55	0.57	0.52	0.59	—
Mean	1.99	1.56	2.72	2.08	1.29	1.59	1.02	1.32	2.24
SD	1.30	1.31	1.34	1.21	0.81	0.77	0.77	0.72	0.47

n = 280. All correlations are significant at $p < 0.01$.

These components were named as *fear of stage*, *avoidance*, and *symptoms*. Analyses revealed that PASMS and its subscales have higher internal consistencies. The correlations among PASMS and other measures were also significant. These results indicated that PASMS has satisfactory psychometric properties in terms of internal reliability (ranging between 0.89 and 0.91) and convergent validity. The descriptive statistics indicated gender differences on PASMS-Total, fear of stage, avoidance, symptoms, and STAI-T, with women having higher scores on all variables. This finding is consistent with the previous research and may be interpreted as the discriminative value of PASMS as well.

STUDY 2

Methods

In Study 2, we used Confirmatory Factor Analysis (CFA) in order to assess the construct validity of PASMS. CFA is a powerful tool to refine and revise scales, and it is widely utilized in scale development.[32] As the name implies, CFA is used to test prior theoretical notions, such as the number of the factors in a scale or the nature of hypothesized factors. Although exploratory and confirmatory factor analyses can be thought of as complementary techniques on a spectrum, one of the most important issues is to collect data from independent samples.[33] In assessing the construct validity of a scale (or other models to be tested), CFA provides a wide variety of fit indices. Among these x^2/df ratio, Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Normed Fit Index (NFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Root-Mean-Square Error of Approximation (RMSEA), Root Mean-Square Residual (RMR), and Standardized Root Mean-Square Residual (SRMR) are mostly reported.

Participants

The sample of Study 2 was similar to that of Study 1. However, the sample in the present study was chosen from three other music education departments in Turkey. The sample consisted of 220 females (56.60 %) and 169 males (43.40 %) who were being trained in various instruments. Similar to Study 1, females were overrepresented in the sample because of the unequal number of males and females being trained in the faculty. The mean age for females was 19.94 yrs (SD 1.50), for males was 21.52 (SD 4.25), and for the entire sample was 20.50 (SD 2.89). The distribution of solo and group concert experiences of the sample in the present study was also similar to the distributions in Study 1. Table 1 provides the frequencies and percentages regarding instruments and concert experiences.

Procedure and Instrumentation

In the present study, the data collection strategy used in Study 1 was utilized. Therefore, all data were collected during class sessions or during individual practice sessions on a voluntary basis. The 27-item PASMS resulting from PCA in Study 1 and the same demographic data sheet were used.

Results—Study 2

Confirmatory Factor Analysis (CFA)

In the present study, CFA was performed with 27-item PASMS. The first analysis with three-factor model did not achieve acceptable fit: $x^2(321, n{=}389) = 1485.91$, $p<0.0001$, $x^2/df = 4.62$, GFI = 0.77, AGFI = 0.73, RMSEA = 0.10, CFI = 0.94, NFI = 0.93, IFI = 0.94, RMR = 0.17, SRMR = 0.06.

Three items—"If I make a mistake during concerts, I will lose face" (FES), "Whenever my friends or teachers talk about a concert where I am also playing, I try to think of other things" (AVD), and "Appearing on stage makes me feel nervous" (SMP)—were removed from the scale because they reduced model fit. CFA with the remaining 24 items produced a better but not satisfactory improvement in the tested model: $x^2(249, n{=}389) = 1016.05$, $p<0.0001$, $x^2/df = 4.08$, GFI = 0.82, AGFI = 0.78, RMSEA = 0.09, CFI = 0.95, NFI = 0.94, IFI = 0.95, RMR = 0.15, SRMR = 0.06. Analysis of the modification indices indicated that placing three items—"If I make a mistake during a per-

TABLE 4. Independent-Groups t-Test Results in Study 1 to 3

	Males	Females	*t*-value	*df*
Study 1 (*n*=280)				
FES	1.78	2.10	1.93*	278
AVD	1.25	1.73	2.97*	278
SMP	2.16	3.03	5.38*	278
PASMS-Total	1.74	2.26	3.55*	278
STAI-T	1.28	1.39	2.41*	278
Study 2 (*n*=369)				
FES	2.29	2.58	2.63*	387
AVD	2.04	2.43	3.30*	387
SMP	2.44	2.87	3.95*	387
PASMS-Total	2.29	2.66	3.63*	387
Study 3—Pretest (*n*=53)				
FES	1.28	1.91	1.92*	51
AVD	0.84	1.50	2.46*	51
SMP	1.29	2.35	3.35*	51
PASMS-Total	1.17	1.99	2.86*	51
Study 3—Posttest (*n*=53)				
FES	1.30	1.95	1.98*	51
AVD	0.90	1.78	2.95*	51
SMP	1.39	2.44	3.16*	51
PASMS-Total	1.23	2.11	2.87*	51

* $p<0.05$.

formance on stage, I panic" (FES), "Whenever I need to go on stage, I always think of bad scenarios" (FES), and "Before I go on stage, I feel like a prisoner waiting for his sentence" (AVD)—under "symptoms" would result in considerable improvement in the model.

Although CFA produces modification indices, it allows the researcher to make decisions based on theoretical considerations regarding item and scale content.[34] It was concluded that two items of the FES component included stage-related anxiety symptoms and may have been evaluated by participants in this way. Similarly, the participants may have responded to the item of the AVD component by taking its emotional outcomes into consideration. Therefore, a new CFA was performed after making the proposed changes. The new model achieved certain improvements in x^2/df ratio and SRMR indices: $x^2(249, n=389) = 993.33$, $p<0.0001$, $x^2/df = 3.98$, GFI = 0.82, AGFI = 0.78, RMSEA = 0.09, CFI = 0.95, NFI = 0.94, IFI = 0.95, RMR = 0.15, SRMR = 0.05.

The final analysis of modification indices indicated notable error covariances between item couples (15–16, 17–18, 05–21, 21–23, 20–22, 24–25, 25–26, 01–03, 05–25, and 21-25). Adding error covariances between these items resulted in a satisfactory level of model fit: $x^2(239, n=389) = 659.01$, $p<0.0001$, $x^2/df = 2.75$, GFI = 0.88, AGFI = 0.85, RMSEA = 0.06, CFI = 0.97, NFI = 0.96, IFI = 0.97, RMR = 0.13, SRMR = 0.04. (Standardized parameters for the final CFA model of PASMS are presented in Fig. 1.) Cronbach's alpha for FES, AVD and SMP subscales were 0.84, 0.80, and 0.86 respectively. Cronbach's alpha for the whole scale was found to be 0.93.

Descriptive Statistics

In Study 2, females and males were compared on all variables of PASMS by independent samples *t*-tests. Similar to the results of Study 1, significant gender differences were observed on FES, AVD, SMP, and PASMS-Total. As expected, females had/obtained significantly higher scores than males on all variables (Table 4). The correlations among variables in the present study varied between 0.73 and 0.93, and all of them were found to be significant ($p<0.01$).

Summary of Study 2

In Study 2, the construct validity of PASMS was assessed by CFA. A series of CFA was performed in accordance with the examination of fit and modification indices. In the first CFA, three items were removed from the analyses because of their low factor loading. In the second CFA with the remaining 24 items, 3 items were placed under different factors. The overall fit of the final model was satisfactory after adding error covariances between certain item couples. The independent *t*-tests revealed gender differences on FES, AVD, SMP, and PASMS-Total. The finding that females had higher mean scores on all measures was replicated in Study 2. Although the factor structure was slightly different (3 items) in Study 1 and Study 2, evidence indicated that the psychometric properties of PASMS were satisfactory.

STUDY 3

Study 3 was designed to assess the test-retest reliability of PASMS in a 14-day period. The data of the present study were collected in another music education department in Turkey in order to prevent contamination of data because of sample overlaps.

Methods

Participants

The sample of Study 3 consisted of 53 music education students. The sample consisted of 33 females (62.30%) and 20 males (37.70%) who were being trained in various instruments. However, the majority of the sample (83.01%) was training on four instruments (violin, flute, guitar and cello). Similar to the two previous studies, females were overrepresented in sample. The mean age for females was 21.91 yrs (SD 1.68), for males 23.10 (SD 3.02), and for the entire sample 22.26 (SD 2.33). Fifty students (94.30%) in the sample had had group concert experience six or more times. As for the solo concert experience, 16 (30.20%) did not have a solo concert experience. The rest of the sample had solo concert experience in different frequencies: one time, 6 (11.30%); two to five times, 23 (43.40%); and six or more times, 8 (15.10%).

Procedure and Instrumentation

In Study 3, a data collection strategy similar to those of the previous studies was utilized. The 24-item PASMS resulting from CFA in Study 2 and the same demographic data sheet were used. All pre- and post-test data were collected during class sessions or during individual practice sessions on a voluntary basis.

Results—Study 3

Pearson's correlation coefficients for pre- and post- measures of PASMS were computed, and an extremely high correlation was obtained (r=0.96, p<0.01). This result indicated that PASMS measured MPA over a 14-day period with a high consistency. In the present study, females and males were again compared on all variables of PASMS by independent samples t-tests for pre- and post-test measures. Similar to the results of Study 1 and Study 2, significant gender differences were observed on all variables in both pre- and post-test measures. Consistently, females had significantly higher scores than males on all variables (Table 4).

DISCUSSION

The present research aimed to develop a valid and reliable measure of MPA. In Study 1, the factor structure of PASMS was explored and three components were found: *fear of stage* (FES), *avoidance* (AVD), and *symptoms* (SMP). The internal consistency of the subscales of PASMS, which consisted of 27 items, varied between 0.89 and 0.91. The internal consistency for the whole scale was found to be 0.95. The correlations among PASMS, STAI-T, and SAS were significant and in line with expectations. These findings indicated that PASMS has convergent validity. The construct validity of the scale was assessed in Study 2 by CFA. In CFA three items that did not fit the tested model were removed, and the components of three items were changed based on modification indices and theoretical background. As a result, the finally-tested model achieved acceptable fits. In Study 3, the 14-day test-retest reliability of the final 24-item version of PASMS was found to be extremely high (0.95). In the light of these findings, it was decided that PASMS has satisfactory psychometric properties for measuring MPA.

One of the major purposes of developing such a scale was the underrepresentation of the avoidance component in measuring MPA in previous scales. In the literature, avoidance is usually conceptualized as negative and unwanted behaviors that mostly emerge in anxiety-inducing situations, preventing confrontation with these situations.[27] In this study, the items that constituted the avoidance component included both behavioral and cognitive forms of avoidance. However, when the final form of the scale was analyzed, it was noticed that items referring to behavioral avoidance were mostly eliminated in the factor analyses. On the other hand, items referring to cognitive avoidance remained in the scale (e.g., "Whenever the idea of playing on stage comes to my mind, I try to think of something else" or "I wish I did not have to play in front of others").

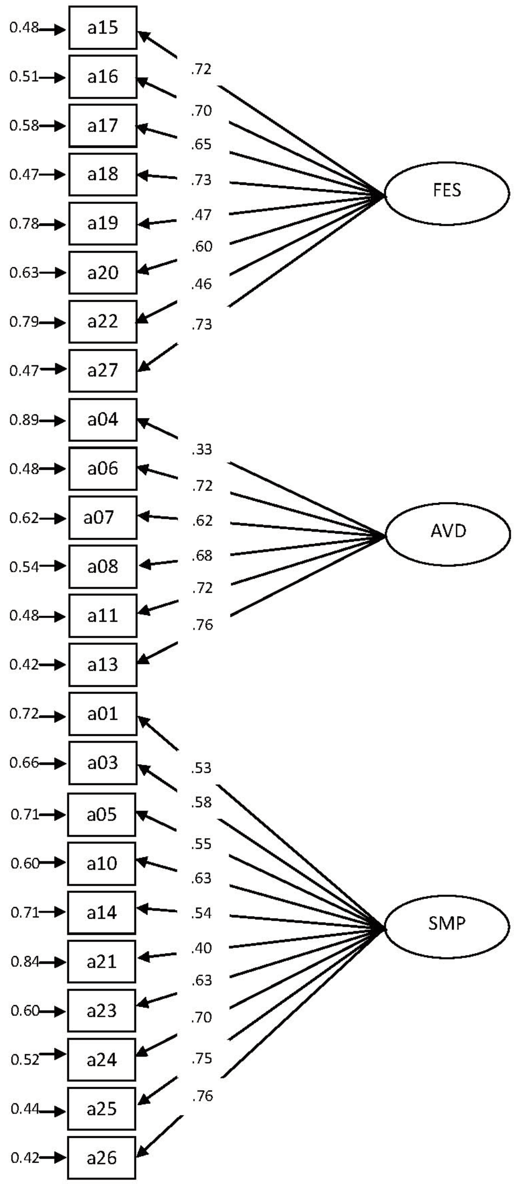

FIGURE 1. Standardized parameters for the final CFA model of PASMS: χ^2 = 652.33, df = 239, p=0.001, RMSEA = 0.06.

This is probably related to the characteristics of the sample that the research data was collected from. All of the participants in each of the three studies were university students who were studying music. This suggests that they would not have the chance to show behavioral avoidance in most cases. For instance, they were expected to perform in classes and exams very frequently. They were also expected to participate in one-to-one practice sessions with their instructors. In addition, throughout their education they were expected to perform in solo or group concerts. Because of all these reasons, they may have rated cognitive avoidance items with a higher agreement compared to behavioral avoidance items.

In these three successive studies, gender differences in PASMS and its subscales were tested by independent-groups *t*-tests. In all of these studies, females had significantly higher mean scores than males in both the subscales and in whole scale scores (Table 4). These findings are consistent with those of previous studies.[13,14] Furthermore, the fact that the scale consistently differentiates between genders may be indicative of its discriminative value.

The present study has certain limitations. The first important limitation is that although convergent validity was assessed in this study, no attempt was made to assess discriminant validity. The second limitation with all three studies is related to the high percentages of participants who had never had solo concert experience (Study 1 to Study 3: 35.70, 34.20, and 30.20%, respectively). Since the solo concerts can be considered as one of the most anxiety-provoking situations for musicians, it might be argued that higher mean scores on PASMS components might be obtained with other student musicians who had solo concert experiences.

The final limitation is related to norms. Although the present study indicated that PASMS has satisfactory psychometric properties and that it was developed mainly for research purposes, it can be used in clinical practice as well. However, the available data do not allow clinicians to interpret PASMS scores to reach a decision about the level of anxiety. Therefore, future research may focus on establishing norms for PASMS. The role of situational factors that may affect MPA, such as performance context, audience, and perceived importance of the performance, needs to be studied in future research.

REFERENCES

1. McGinnis AM, Milling LS: Psychological treatment of musical performance anxiety: current status and future directions. Psychother Theory Res Pract Train 2005; 42:357–373.
2. Merrit L, Richards A, Davis P: Performance anxiety: loss of the spoken. J Voice 2001; 15:257–269.
3. Ryan C: Experience of music performance anxiety in elementary school children. Int J Stress Manage 2005; 12:331–342.
4. Yoshie M, Shigemasu K, Kudo K, Ohtsuki T. Multidimensional anxiety and music performance: an exploratory application of the zones of optimal functioning model. In: Buchwald P, Ringeisen T, Eysenck M (eds): *Stress and Anxiety: Application to Lifespan Development and Health Promotion*. Berlin: Logos Verlag; 2008: pp163–171.
5. Fehm L, Schmidt K: Performance anxiety in gifted musicians. J Anxiety Disord 2006; 20:98–109.
6. Hopko DR, McNeil DW, Zvolensky MJ, Eifert GH: The relation between anxiety and skill in performance-based anxiety disorders: a behavioral formulation of social phobia. Behav Ther 2001; 32:185–207.
7. Brugués AO: Music performance anxiety–Part 1. A review of its epidemiology. Med Probl Perform Art 2011; 26:102–105.
8. Demirbatir RE: Undergraduate music students' depression, anxiety and stress levels: a study from Turkey. Proc Soc Behav Sci 2012; 46:2995–2999.
9. Levy JJ, Castille CM, Farley JA: An investigation of musical performance anxiety in the marching arts. Med Probl Perform Art 2011; 26:30–34.
10. Steptoe A. Negative emotions in music making: the problem of performance anxiety. In Juslin PN, Sloboda JA (eds): *Music and Emotion: Theory and Research*. New York: Oxford University Press; 2001: pp291–308.
11. Fishbein M, Middlestadt SE, Ottati V, et al: Medical problems among ICSOM musicians—overview of a national survey. Med Probl Perform Art 1988; 3(1):1–8.
12. Van Kemenade JF, van Son MJ, van Heesch NC: Performance anxiety among professional musicians in symphonic orchestras—a self-report study. Psychol Rep 1995; 77:555–562.
13. Kenny DT, Osborne MS: Music performance anxiety—new insights from young musicians. Adv Cogn Psychol 2006; 2(2–3): 103–112.
14. Ryan C: Exploring musical performance anxiety in children. Med Probl Perform Art 1998; 13(3):83–88.
15. Harmat L, Theorell T: Heart rate variability during singing and flute playing. Music Med 2010; 2:10–17.
16. Yoshie M, Shigemasu K, Kudo K, Ohtsuki T: Effects of state anxiety on music performance: relationship between the Revised Competitive State Anxiety Inventory-2 subscales and piano performance. Music Sci 2009; 13:55–84.
17. Nagel JJ: Treatment of music performance anxiety via psychological approaches: a review of selected CBT and psychodynamic literature. Med Probl Perform Art 2010; 25:141–148.
18. Fredrikson M, Gunnarsson R: Psychobiology of stage fright: the effect of public performance on neuroendocrine, cardiovascular and subjective reactions. Biol Psychol 1992; 33:51–61.
19. Cox WJ, Kenardy J: Performance anxiety, social phobia, and setting effects in instrumental music students. J Anxiety Disord 1993; 7:49–60.
20. LeBlanc A, Jin YC, Obert M, Siivola C: Effect of audience on music performance anxiety. J Res Music Educ 1997; 45:480–496.
21. Osborne MS, Kenny DT: Development and validation of a music performance anxiety inventory for gifted adolescent musicians. J Anxiety Disord 2005; 19:725–751.
22. Kenny DT, Davis P, Oates J: Music performance anxiety and occupational stress amongst opera chorus artists and their relationship with state and trait anxiety and perfectionism. J Anxiety Disord 2004; 18:757–777.
23. Appel SS: Modifying solo performance anxiety in adult pianists. J Music Ther 1976; 13:2–16.
24. Nagel JJ, Himle D, Papsdorf J. Cognitive-behavioral treatment of musical performance anxiety. Psychol Music 1989; 17:12–21.
25. Clark DM, Wells A. A cognitive model of social phobia. In: Heimberg RG, Liebowitz MR, Hope DA, Schneier FR (eds). *Social Phobia: Diagnosis, Assessment, and Treatment*. New York: Guilford; 1995:69–93.
26. Wong QJ, Moulds ML: The relationship between the maladaptive self-beliefs characteristic of social anxiety and avoidance. J Behav Ther Exp Psychiatry 2011, 42(2):171–178.
27. Çırakoğlu OC: The investigation of swine influenza (H1N1) pandemic related perceptions in terms of anxiety and avoidance variables. Turk J Psychol 2011; 26:65–69.
28. Eğilmez HO: Music education students: view related to the piano examination anxieties and suggestions for coping with students' performance anxiety. Proc Soc Behav Sci 2012; 46:2088–2093.
29. Palancı M, Özbay Y: Social anxiety scale: reliability and validity study. Presented at the VI National Congress of Counseling and Guidance. Ankara, 2001.
30. Spielberger CD, Gorsuch RL, Lushene RE: *Manual for State-Trait Anxiety Inventory* (self-evaluation questionnaire). Palo Alto, CA: Consulting Psychologist Press; 1970.
31. Öner N, LeCompte A: *State-Trait Anxiety Inventory Manual*. İstanbul: Boğaziçi University, 1985.
32. Floyd FJ, Widaman KF: Factor analysis in development and refinement of clinical instruments. Psychol Assess 1995; 7:286–299.
33. Reise SP, Waller NG, Comrey AL: Factor analysis and scale revision. Psychol Assess 2000, 12:287–297.
34. Steger MF: An illustration of issues in factor extraction and identification of dimensionality in psychological assessment data. J Pers Assess 2006, 86:263–272.