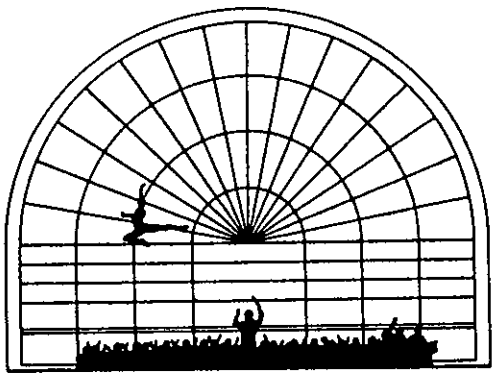

Medical Problems of Performing Artists

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Medical Problems of Performing Artists

An Exploratory Investigation into Auditory Style as a Correlate and Predictor of Music Performance Anxiety*

Warren Brodsky, M.C.A.T., John A. Sloboda, Ph.D., and Mitchell G. Waterman, B.Sc.

Abstract—The study explored auditory style among 57 professional orchestra musicians and 57 matched nonmusician control subjects, as measured by the Keele Assessment of Auditory Style (KAAS). The questionnaire was specifically designed to elicit information about developmental auditory life and orientation. Psychometric development and underlying factorial dimensions of the scale are described. The results demonstrate differences concerning auditory style between musicians and nonmusicians. State anxiety, as measured by the Spielberger State–Trait Anxiety Inventory, was found to be a significant correlate and predictor of high KAAS scores among the musicians but not among the nonmusicians. Further, auditory style was explored as a correlate and predictor of music performance anxiety, as measured by the Music Performance Stress Survey (MPSS) section 11, previously described as the Performance Anxiety Questionnaire (PAQ). The findings indicate that auditory style (KAAS) is a correlate and predictor of certain effects of music performance anxiety. More specifically, high-KAAS musicians (auditives) evidence significantly higher levels of state anxiety, as well as avoid performances and auditions more because of anxiety about performing, than do either mid-KAAS or low-KAAS musicians. Other research findings outlining trends among this musician subgroup are discussed. The study has direct implications to arts medicine practitioners regarding the prioritizing of therapeutic intervention modalities and highlights the need to develop auditive-specific interventions, environments, and therapeutic regimens. *Med Probl Perform Art 9:101–112, 1994.*

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The phenomenon of music performance anxiety (MPA) has been well documented, highlighting the debilitating symptomatology that affects many performing musicians. While some research has attempted to discover the etiology and dimensions of this phenomenon, other studies have investigated treatment procedures.[1–3] The main concern of this report is the exploratory investigation of auditory style as a possible correlate of MPA. We investigate the possibility that such a variable exists and may predict the extent to which some particular musicians will suffer from MPA while others will not. Such findings might have implications regarding referral practices and the prioritizing of therapeutic interventions. Moreover, the identification of correlates might raise our understanding of "at-risk musicians," and thus enhance the development of *preventive training* during the formative years of music skill development. Putting both of these into practice might decrease the incidence of MPA among present-day and future professional musicians.

THE SEARCH FOR CORRELATES OF MUSIC PERFORMANCE ANXIETY

Previous research has documented the fact that age and gender do not influence MPA. Though popular myths suggest that performance nerves dissipate as one gains

TABLE 1. Musicians' Personality Profile Traits and Temperaments

1. High degree of introversion and state of arousal
2. High levels of emotional instability and anxiety
3. A rather resigned attitude and unsociable outlook
4. A fastidious sense of empathy and pathemia
5. Psychological androgyny

experience, experience can also be ruled out as an influence. Music training and professional status seem not to alleviate MPA, as music college students and professionals both demonstrate adverse reactions to the stage. In addition, audition circumstances, that is, performing in front of a jury (open field of visual contact) or performing behind a screen (closed field of visual contact), do not seem to alter the effects of MPA. Moreover, contractual security does not offer relief from MPA, as our pilot research findings indicate that no significant difference exists between contract and free-lance orchestra players. It appears that musicians of all ages, both genders, novice and seasoned veteran, student and professional, contract and freelance, all seem to suffer to the same extent from the tensions of performance, whether the circumstance be an academic recital, a professional audition, or a performance on the stage or in the pit.[4] As these descriptive variables have not been productive as possible correlates, differences among musicians might be viewed as a result of personality factors.

Early research into personality traits of music performers[5] underlined the formative training years, when musicians develop traits resultant from specific "demand characteristics" of the instruments themselves, which emerge both from performance situations and independent of them. However, Kemp[6] found a stable group of primary personality traits that are present among all musicians, be they performers, composers, or educators, linked to introversion, "pathemia" (sensitivity and imagination), and intelligence. Further, Kemp[7] found that most musician-related traits were shared by the two sexes equally, and related to theoretical models in which masculinity and femininity exist as separate dimensions. He illustrated the fashion in which musicians move freely between male and female behaviors according to musical demands, and concluded that musicians are psychologically androgynous. Endowment of psychological androgyny might be a precursor to successful musicianship, as the wide range of temperaments needed to be a music performer are based on this trait. However, Kemp's most significant finding regards anxiety. Compared with the general population, musicians have higher levels of anxiety, and these are linked to introversion. Research that seems to confirm these findings was recently published by Marchant-Haycox and Wilson,[8] who found performing musicians to be introverted, inactive, cynical, unsociable, resigned, world-weary, unambitious, and unadventurous, but also empathetic.

Though many individuals are skeptical of the concept, it is intriguing that research has been able to identify temperaments and traits that seem to be stable throughout musicians' overall development (Table 1). However, personality factors such as introversion, cynicism, androgyny, and empathy do not in themselves significantly account for the variance between musicians, nor do these profiles assist health care professionals in a predictive–prognostic fashion regarding "at-risk musicians." However, one area that seems to have been overlooked concerns musicians' verbal and nonverbal emotional "auditory life." Especially in light of the likelihood that a rich auditory life may be the primary component of musicianship and the foundation of a musical career, it seems wise to assess whether this component can account for some of the variance seen between musicians. To do this, it makes sense to look at both musicians and nonmusicians in terms of their auditory lives.

LINKAGE TO AUDITIVITY: "AUDITORY STYLE"

Both the concept and the significance of auditory life among musicians are easily found in the annals of psychoanalytically oriented writers. Nass[9] described the world of the musician as a world of sound that "forms the basis of his unique sensory style around which he organizes his perception of the world . . ." (p. 431). Auditory life evolves from early listening and hearing experiences that serve to develop a sensory style in certain children, which he refers to as an "auditory style."[10] He argued that this style is used as a means of adapting to and mastering reality among some children who use the auditory apparatus as their primary sensory mode. Nass's theory was modeled on those of his predecessors, Charcot and Freud,[11] who believed that individuals could be differentiated by their sensory preferences, and hence labeled persons as "*visuels*," "*moteurs*," or "*auditifs*" (p. 47).

Is it likely that auditory style is unique to musicians? Some authors feel that general human fetal existence seems to be based on hearing, as there is little likelihood that seeing takes place. The primacy of hearing has been explored by Feldenkrais,[12] who points to evidence that the fetus is stimulated by environmental sounds and vibrations. He felt that the eyes of a newborn have not had as much stimulation or learning as have the ears. Thus, "it then stands to reason that the function of hearing is prior to seeing in each and every individual." (p. 19). A predominantly aural animal, the infant evidences an immediate ability to identify maternal voice, which significantly indicates that the newborn enters the world with specific perceptual acoustic experience from previous intrauterine life. Further, recent advances regarding both intrauterine research methods,[13], [14] and infant perception and infant cognition research techniques[15] clearly highlight the growing body of evidence regarding predispositions for infant musicality.

Other researchers[16] acknowledge that all infants are "biologically predisposed for musicality [but] the develop-

ment of their elementary musical competence seems to be nourished by intuitive parental care giving." (p. E-11). They raise the question as to whether predispositions fade away when infants are not sufficiently engaged in musical interchanges. Feldenkrais[12] highlights the normal course in our visually dominant world; as children begin preacademic training, they learn to pay increasing attention, at times exclusively, to the sector of space they see. In an environment void of musical interactions, the predisposition and sensitivity to hearing might follow a natural diminutive course.

However, some children may develop visual cognitive skills at no great expense to their auditory predispositions; they may find an equal balance between visual and auditory modes, while others may retain a slight dominance in the auditory sphere. This constitutional background is believed essential for developing musical giftedness.[17] According to a more traditional view, the primary correlate of musical giftedness is a "special sensory endowment which determines the perceptual organisation of the individual and later becomes [the] cognitive style." (p. 4).[18] Moreover, recent authorities feel that by implication, constitution might refer to genetic endowment, as there is some evidence of a likelihood that genetic factors order cortical structures in such a way as to predispose some individuals more acutely to auditory stimuli.[19]

Noy[20] refers to infants with a developed "auditory style." In an infant who related affectively to his surroundings through the auditory channel of communication and who 'received' the mother mainly through auditory stimuli, this channel may continue to play a prominent role in emotional exchange with the outside world." (p. 344). Noy views auditory style paramount to becoming a musician. Auditory style is defined as "a specific sensory sensitivity that is considered to be determined by a constitutional factor [that] is permanently subjected to environmental influences." (p. 345).

THE RESEARCH QUESTION

Predispositioned by genetic endowment, fetal temperament, pre/postnatal learning, maternal bonding, or a rich musical environment, the relationship with sound itself may be the core of differentiation between individuals who eventually become musically gifted and those who do not. Children who will become musically gifted attribute intense meaning to sound. These children may "hear and feel something in music that they could not articulate verbally and apparently experienced no where else, but which they occasionally appear addicted to repeating and re-experiencing." (p. 344).[17] But how does this sense of being different from others in our visually and verbal-language-oriented world affect personality development? At first assuming that all children have these perceptions and skills, they may come to discover as they grow older that they are different from their peers. This *gift* may in fact imply feeling special, distinguished, or part of an elite. However, it might be more of a *curse* than a blessing. Though auditory style on the one hand might be a prerequisite of musicality, on the other hand it may become a reminder of how one is distinct from others. This component may lead to feelings of anxiety. Is it possible that the most important motivator to become a music performer is also a factor in MPA? With the idea of investigating auditory style among both professional orchestra musicians and nonmusician control subjects, exploring differences and possible correlations between auditory style and state–trait anxiety, a survey questionnaire was developed. Further, the study explored auditory style as a correlate of MPA. The research questions posed in the study were: *Is auditory style more prevalent in a sample of musicians than in a sample of nonmusician control subjects?* and *Are musicians who score high concerning auditory style also members of an "at-risk" category and thus more prone to suffer from* MPA? As far as we are aware, these questions have not been previously investigated. Their answers could have implications for the design and implementation of innovative therapeutic interventions regarding the alleviation and management of MPA.

THE CORRELATIONAL STUDY

Method

After initial contacts were made with the managements of several professional symphony orchestras, four one-time introductory briefing meetings were held on-site in different rehearsal halls. Two months later questionnaires booklets were mailed to the managements for distribution to orchestra members. Each questionnaire was precoded with a personal identification number, ensuring complete anonymity. Self-administered in 60 minutes, the eight-page booklet was returned by mail (no postage required), with an overall 37% rate of response. Control participants were solicited by a "chain-recruitment" procedure, that is, initial researcher–control subject briefings led to further solicitation of control subjects by the control subjects themselves. The overall response rate among the control subjects was 25%.

Subjects

There were 114 participants involving 57 professional orchestra musicians and 57 nonmusician control subjects matched for age, gender, highest level of education, and employment status. The total sample was divided evenly by gender (55 women; 58 men) and had a mean age of 37 years (range = 18–65; SD = 10). The educational level for the majority of the sample (64%) was at the undergraduate level, while that for some individuals (12%) was at a postgraduate level. All the participants were employed either as professional orchestra musicians or in retail, secretarial, management, arts administration, education,

electronic engineering, judicial, or medical professions. The musicians were selected from a larger data pool in a stratified fashion, controlling their source orchestra as a variable. The musicians in the sample were primarily section players from the string section (73%), complemented by combined woodwind-and-brass players (21%).

Materials

The questionnaire booklet consisted of three independent measures: the Keele Assessment of Auditory Style (KAAS); the Spielberger State–Trait Anxiety Inventory (STAI); and the Music Performance Stress Survey (MPSS).

1. *Keele Assessment of Auditory Style (KAAS).* Developed by Brodsky and Sloboda (1993),[21] the KAAS was designed to elicit information about developmental auditory life and orientation. Self-administered in 25 minutes, this 78-item questionnaire uses a 5-point Likert scale to rate responses from *never* to *always*, with an additional option to specify "0" for items that are *not relevant* or for those items that the respondent *can't remember.* Items are presented according to developmental age group (early childhood, late childhood, adolescence, and adulthood) and three critical periods of music activity (as a child, as an adolescent, and as an adult). The majority of KAAS items were generated from a wide range of psychoanalytic and music psychology literature. The items represent an extensive scope of characteristics proposed as indicators of auditory style. As a survey instrument, the KAAS attempts to explore this psychological concept as a cognitive trait. The limitations of the KAAS as an instrument and a scale, at this early stage of development, are hereby acknowledged.

2. *Spielberger State–Trait Anxiety Inventory (STAI) Form Y.* Developed by Spielberger (1968/1977),[22] the STAI is self-administered in 10 minutes and consists of 40 questions answered on a 4-point scale from *almost never* to *almost always*. Widely used to assess two forms of anxiety, the S-scale (state) assesses anxiety as an emotional state evaluating immediate feelings of apprehension, while the T-scale (trait) assesses individual differences in anxiety proneness as a personality trait. The STAI is generalizable, cross-cultural, and unbiased by age or gender, and has high reliability and validity. The current study viewed the STAI as an appropriate format to assess psychological anxiety but believed that a more complete evaluation of musicians' situations and symptomology would be provided by the MPSS.

3. *Music Performance Stress Survey (MPSS) Version 1.0.* Developed by the Arts in Medicine Program, University of Louisville,[23] the MPSS was extracted from the ICSOM Survey[24] and the Performance Anxiety Questionnaire (PAQ).[2] The MPSS assesses the physical conditions, related symptoms, and involvement in various interventions for musicians' occupational medical and psychological problems. The PAQ, presented as an integral section of the survey, is a 20-item questionnaire using a 5-point scale that evaluates the somatic symptoms, emotional attitudes, and effects of MPA on the respondent's career. Reliability and validity levels of the MPSS have not yet been reported; however, the MPSS seems to bear more relevance to MPA than does any other general psychological instrument.

Post-hoc Analysis

Refinement of the KAAS as an exploratory scale was undertaken post-hoc, only then followed by full analysis of the comparative data. Initially, as several KAAS items concerning instrument activity left the majority of the control subjects out of the analysis, exploratory analysis was limited to the 55 more general items. Within this data set, nine items were dropped because they contained the missing data at a high level of frequency (> 10%). Scale reliability analysis recommended removal of a further 8 items, resulting in a 38-item scale reflecting Cronbach's alpha at the 0.8666 level (standardized item alpha = 0.8718). Appendix A contains a listing of all 38 items in the KAAS scale.

RESULTS

A total KAAS score was computed for all the participants in the sample reflecting a normal distribution (mean = 118.4; range = 63–168; median = 119; SD = 17.3). As can be seen in Table 2, the musicians had higher total KAAS scores than did the control subjects, and the mean difference was statistically significant ($t = 5.97$; $df = 112$; $p \leq 0.001$, 1-tailed).

To identify the fundamental components of the KAAS, the scale was subjected to a factor analysis for extraction of underlying dimensions. Twelve independent factors were extracted by principal components analysis (PCA), representing a total of 68.5% of the variance, with a first factor accounting for 20.3% of the total variance. The relationship between factors and item variables was adjusted for the most suitable fit through a Varimax orthogonal rotation. All 38 KAAS items loaded onto one of the 12 factors at 0.4 levels or more. Appendix A shows a distribution of KAAS items according to factors as indicated by PCA. These factors are described below. Summative scores that calculate the level of auditory style are referred to as KAAS. High KAAS indicates *most auditive*, while low KAAS indicates *least auditive.*

The first KAAS factor (KFac1) seems to be concerned with an individual's awareness of acute sensitivity to music, and self-appraisal or identification as a music personality (auditive). This acuteness was seen to be developmental, involving a sequence of items beginning in early childhood, through adolescence, to adulthood. The respondents who scored high were aware that their emotional experiences with music were very different from those with speech, and that these qualitative differences could not be

articulated verbally. They felt drawn to repeat and reexperience musical events that affected them and perceived that music offered them a somatic experience in addition to and beyond the auditory one. They felt that there was music in their minds, and identified themselves as being special or different. As can be seen in Table 2, the musicians obtained higher scores than did the nonmusicians, and the mean difference was statistically significant ($t = 9.84$; $df = 112$; $p \leq 0.001$, 2-tailed).

KFac2 seems to be concerned with an individual's sensitivity to sound, most specifically the human voice. The respondents who scored high viewed themselves to be particularly sensitive to voice tone and identified it as a major influence in developing trust and attraction to others. Moreover, sound quality was identified to be a major consideration when choosing a name for children or assessing a place of residence. As can be seen in Table 2, the musicians obtained higher scores than did the nonmusicians, and the mean difference was statistically significant ($t = 3.19$; $df = 112$; $p = 0.002$, 2-tailed).

KFac3 and KFac4 seem to be concerned with childhood music-related behaviors. The respondents who scored high felt that when listening to music as children, they were unable to sit still, often moving rhythmically, beating, or tapping, without full conscious awareness. No significant difference was seen between the groups.

KFac5 seems to be concerned with relationships such as between music and language, or aural and visual modalities. The respondents who scored high preferred as children to hear nursery rhymes, lullabies, and songs over hearing stories and having books read at nighttime. No significant difference was seen between the groups.

KFac6 seems to be concerned with the significance of hearing. The respondents who scored high felt that hearing was their most vital link with the external environment. They felt that access to information was dependent primarily on audition. As can be seen from Table 2, the musicians received higher scores than did the nonmusicians; however, these only approached statistical significance ($t = 1.85$; $df = 112$; $p = 0.067$, 2-tailed).

KFac7 and KFac8 do not lend themselves to interpretation at this time. However, as can be seen from Table 2, the musicians received higher scores than did the nonmusicians, and these mean differences were statistically significant (KFac7: $t = 5.15$; $df = 112$; $p \leq 0.001$, 2-tailed; KFac8: $t = 2.69$; $df = 112$; $p = 0.008$, 2-tailed).

KFac9 seems to be concerned with aspects of vocal development during adolescence. The respondents who scored high were as teenagers acutely aware of similarities and differences between their own voices and the voices of their parents. As can be seen in Table 2, the musicians obtained higher scores than did the nonmusicians, and the mean difference was statistically significant ($t = 3.03$; $df = 112$; $p = 0.003$, 2-tailed).

KFac10 seems to be concerned with the emotional nonverbal aspects of speech. The respondents who scored high felt that they were affected more by speech patterns and intonations than by the actual content during conversations, and that silences were more difficult to tolerate than were differences of opinion. They felt that auditory contact with a significant other was consequential in finding relief from melancholy. As can be seen in Table 2, the musicians received higher scores than did the nonmusicians, but the differences were not significant.

KFac11 and KFac12 do not lend themselves to interpretation at this time. However, as can be seen in Table 2, the musicians received higher scores than did the nonmusicians on KFac11, and the mean difference was statistically significant ($t = 2.22$; $df = 112$; $p = 0.028$, 2-tailed). The control subjects obtained higher scores on KFac12, however, these differences were not significant.

The underlying dimensions of the KAAS illustrate that although as yet auditory style is not fully comprehensible, it is not simply a matter of *musicality*. Clearly the data

TABLE 2. Keele Assessment of Auditory Style: Total Scale, Factors, and Correlations

		Descriptives				Significance of Difference		Correlations					
		Musicians (n = 57)		Controls (n = 57)				State Anxiety			Trait Anxiety		
Factor	Variance	mean	SD	mean	SD	t	p*	Group*	r	p	Group*	r	p
KAAS total		126.9	13.4	109.9	16.8	5.97	<0.001	M	0.4208	0.001	M	0.3652	0.01
KFac1	20.3%	33.87	3.90	24.22	6.27	9.84	<0.001	M	0.3962	0.01			
KFac2	6.9%	17.72	3.41	15.64	3.55	3.19	0.002						
KFac3	6.6%	13.62	2.97	13.56	3.07		NS						
KFac4	5.5%	06.98	1.72	06.73	1.44		NS						
KFac5	4.8%	04.54	1.93	04.78	1.68		NS	M	0.3666	0.01			
KFac6	4.2%	10.68	2.40	09.85	2.39	1.85	0.067						
KFac7	3.9%	10.35	2.20	08.13	2.39	5.15	<0.001	M	0.3219	0.01			
KFac8	3.8%	06.35	1.56	05.53	1.70	2.69	0.008						
KFac9	3.6%	05.86	2.17	04.73	1.78	3.03	0.003						
KFac10	3.1%	09.40	2.56	08.80	1.86		NS						
KFac11	3.1%	05.32	1.35	04.74	1.40	2.22	0.028	C	0.3676	0.01			
KFac12	2.7%	02.09	1.15	02.43	1.13		NS	C	0.3217	0.01			

*Note: Significance = 2-tailed; groups: M = musicians; C = control subjects.

TABLE 3. State–Trait Anxiety Scores by Group

	Musicians		Controls		Significance of Difference*	
	mean	SD	mean	SD	t	p
State anxiety	36.96	10.7	34.57	09.6	NS	
Trait anxiety	44.87	11.4	40.04	09.6	2.42	0.0085

*Significance = 1-tailed.

highlight a musician-based bias toward high auditory style, but the data also present a picture illustrating that musicians and nonmusicians share common distributions on many KAAS factors. In fact, the ranges on five factors were so similar that the mean scores did not differentiate between the groups. However, seven factors significantly differentiated musicians from nonmusicians, which raises questions concerning the nature of these differences. *Are the differences seen between musicians and nonmusicians simply differences of incidence?* Or, *Does auditory style among professional musicians yield characteristic dimensions that are not seen among nonmusicians?* Perhaps in reality the answer is more complex. Auditives might be more prevalent among musicians than among nonmusicians, and perhaps developmental circumstances leading to becoming a professional musician cause permutations of auditory style such that it adopts specific characteristic meanings that do not occur among nonmusicians.

Further analysis involving the STAI was undertaken to explore the possibility that auditory style and anxiety might be related. As can be seen in Table 3, consistent with other previously published accounts, the musicians in this study also received significantly higher trait anxiety scores than did the control subjects ($t = 2.42$; $df = 110$; $p = 0.0085$, 1-tailed). In addition, they obtained higher state anxiety scores; however, these differences were not significant.

Pearson correlation coefficients were used to evaluate relationships between KAAS (total score/factors) and state–trait anxiety. The findings show that KAAS total score significantly positively correlated with state anxiety ($r = 0.3074$; $p = 0.001$, 1-tailed) and trait anxiety ($r = 0.2347$; $p = 0.01$, 1-tailed) for the entire sample. However, as can be seen in Table 2, when analyzing the groups independently, only the musicians evidenced a significant correlation between KAAS total score and state anxiety, and evidenced significant correlations between state anxiety and KFac1, KFac5, and KFac7. In addition, they showed a significant correlation between trait anxiety and KFac1. The control subjects, on the other hand, demonstrated significant correlations only between state anxiety and KFac11 and KFac12.

Thus far, the associations between KAAS score and underlying dimensions of state anxiety seem to differ between musicians and nonmusicians. This observation is surprising because no significant difference in state anxiety scores was seen between musicians and control subjects. Thus, to ascertain whether some of the variance between musicians and nonmusicians could actually be attributed to state anxiety, KAAS total scores and KAAS factors were subjected to a between-group analysis of variance (ANOVA) with state anxiety controlled as a covariate. As can be seen in Table 4, the findings showed that in addition to the demonstration of state anxiety as a significant covariate of KAAS total score and several KAAS factors, when this covariance was taken into account there still remained a difference between musicians and nonmusician control subjects.

TABLE 4. Analysis of Variance between Groups with State Anxiety as a Covariate and Predictor of Auditory Style

	State Anxiety as a Covariate				State Anxiety as a Predictor							
	Effects of Group			Significance of State	Musicians				Controls			
Variable	f	df	p	p	B	β	p	Variance	B	β	p	Variance
KAAS total	33.69	1,109	<0.001	<0.001	0.5277	0.4208	0.001	4%		NS		
KFac1	91.03	1,109	<0.001	0.001	0.1445	0.3962	0.003	4%		NS		
KFac2	09.27	1,109	0.003	0.008	0.0857	0.2715	0.045	3%		NS		
KFac3		NS		0.015	0.0764	0.2759	0.042	3%		NS		
KFac4		NS		NS		NS				NS		
KFac5		NS		NS	0.1088	0.6001	0.001	4%*		NS†		
KFac6		NS		NS		NS				NS		
KFac7	26.32	1,109	<0.001	NS	0.0640	0.3219	0.016	3%		NS		
KFac8	07.14	1,109	0.009	NS		NS				NS		
KFac9	09.47	1,109	0.003	NS		NS				NS‡		
KFac10		NS		NS		NS				NS		
KFac11		NS		0.002		NS			0.0484	0.3377	0.009	4%§
KFac12	04.25	1,109	0.042	0.06		NS			0.0377	0.3218	0.017	3%

*Also age B = −0.0708, β = 0.2737, p = 0.029, 4% variance; and trait B = −0.0621, β = −0.3627, p = 0.043, 5% variance.
†Also trait B = −0.0536, β = −0.3015, p = 0.025, 3% variance.
‡Also age B = −0.0457, β = −0.3001, p = 0.026, 3% variance.
§Also age B = −0.0299, β = 0.2534, p = 0.048, 4% variance.

Multiple stepwise regression analysis was used to test for the best possible predictor of KAAS total and KAAS factors. The findings suggest that when analysing the entire sample, state anxiety is a significant predictor of KAAS total mean scores as well as KFac1, KFac2, Kfac3, Kfac11, and Kfac12 (KAAS total = β[state] + B in all cases). However, as can be seen in Table 4, when the groups were analyzed independently, what appeared to be a predictor among the musicians was not necessarily a predictor among the control subjects.

These two psychometric procedures clearly demonstrated the different relationship that comes to light between KAAS total and several KAAS factors, and state anxiety among musicians. This observation is interesting given that significant differences were not seen between the groups regarding state anxiety, and that KAAS factor distributions or frequency ranges for the two groups overlap considerably. This relationship between KAAS and state anxiety among musicians raises many questions; however, it was the intention of the study to explore these within the context of MPA. For the purposes of this exploration, the analysis centered exclusively on the professional musician group.

To identify the fundamental components of MPA, the PAQ was subjected to a factor analysis for extraction of underlying dimensions. Seven independent factors were extracted by PCA, representing a total of 74.6% of the variance, with a first factor accounting for 36% of the total variance. The relationship between factors and item variables was adjusted for the most suitable fit through a Varimax orthogonal rotation. All PAQ items loaded onto one of the seven factors at 0.5 levels or more. Appendix B provides a list of the items according to dimensions of the PAQ, as indicated by PCA.

The first factor, PAQFac1, seems to be concerned with the overall degree or level of MPA. Items relate to level of distress, impairment, and interference during actual performances, level of embarrassment, and effect on career. PAQFac2 seems to be concerned with the physical manifestations of MPA, including shortness of breath, rapid heart beat, nervousness, and dizziness. PAQFac3 seems to be concerned with preperformance anticipatory fear. Items on this factor include preperformance sweating, dry mouth, and quavering voice. The fourth factor, PAQFac4, seems to be concerned with avoidance of performances as a result of inability to concentrate and vasomotor temperature aberrations. PAQFac5 seems to be concerned with the environmental situations or events most likely to give rise to MPA, including small ensembles, private lessons, auditions, and solo performances. PAQFac6 seems to be concerned with pharmaceutical prescription and nonprescription drugs used as a means of coping. The last factor, PAQFac7, seems to be concerned directly with psychological interventions as daily coping methods, used more in orchestra circumstances. Table 5 lists musicians' PAQ factor mean scores.

A total MPA score was calculated through summation of all PAQ items. The frequency of MPA was normally distributed among the musicians. Pearson correlation coefficients were used to evaluate relationships between MPA and state–trait anxiety. As can be seen in Table 5, MPA significantly positively correlated to state anxiety ($r = 0.5366$; $p = 0.001$, 1-tailed) and trait anxiety ($r = 0.6651$; $p = 0.001$, 1-tailed). Significant correlations were also demonstrated between PAQ factors and state–trait anxiety. Using a Pearson correlation coefficient, the triangular relationship between KAAS, state–trait anxiety, and MPA was assessed. As can be seen in Table 6, both KAAS total and MPA scores significantly positively correlated to state anxiety, to trait anxiety, and to each other.

Though auditory style as measured by the KAAS has not yet attained a unidimensional definition and construct, the relationship between high KAAS and high MPA has been illustrated through the final analysis of the study. As can be seen in Table 7, the musicians were grouped according to their KAAS total scores, whereby those who obtained a score above 2 standard deviations from the means were classified as high KAAS (auditives), those

TABLE 5. Total Musician Performance Anxiety (MPA) and Performance Anxiety Questionnaire (PAQ) Factors

	Descriptives (n = 54)		*Correlations* (n = 40)	
Factor	*mean*	*SD*	*State*	*Trait*
MPA	60.24	17.4	0.5366*	0.6651*
PAQFac1	15.88	06.25	0.4860*	0.6166*
PAQFac2	08.33	03.61	0.5397*	0.5395*
PAQFac3	09.13	03.30	0.1813	0.3708†
PAQFac4	05.95	03.04	0.5403*	0.4662†
PAQFac5	13.36	03.09	0.2726	0.4682†
PAQFac6	02.64	01.46	0.2126	0.2513
PAQFac7	04.84	02.10	0.3636	0.5147*

*Significance = 0.01, 1-tailed.
†Significance = 0.001, 1-tailed.

TABLE 6. Correlational Relationships* (n = 40)

	MPA	*State*	*Trait*
KAAS total	0.3788†	0.4443‡	0.3842†
MPA	1.000‡	0.5366‡	0.6651‡

*MPA = musician performance anxiety; KAAS = Keele Assessment of Auditory Style.
†Significance = 0.01, 1-tailed.
‡Significance = 0.001, 1-tailed.

TABLE 7. Keele Assessment of Auditory Style (KAAS) Musician Subgroups (n = 57)

	mean	*SD*	*Cases*
Low KAAS	108.5	7.3	8
Mid-KAAS	125.0	6.1	39
High KAAS—auditive	148.7	8.9	10

within 1 standard deviation above or below the means as mid-KAAS, and those 2 standard deviations below the means as low KAAS. These musician subgroups were scrutinized in an exploratory comparative analysis to attempt to locate and isolate differences between these musician subgroups concerning performance-related stress and injury.

When comparing trends seen among the three musician subgroups, it was shown once again that *high-KAAS musicians evidenced higher levels of state anxiety than did either mid-KAAS or low-KAAS musicians*, as well higher trait anxiety and higher total MPA. A between-group one-way ANOVA showed that this difference concerning state anxiety was statistically significant ($f = 4.19$; $df = 2,53$; $p = 0.0205$). In addition, high-KAAS musicians scored higher than did the others regarding PAQ factors 1, 2, 3, and 4, though these differences were not significant, with the exception of PAQFac4. Regarding this factor, a between-group one-way ANOVA showed that *auditives avoid performances and auditions because of anxiety about performing more than do either mid-KAAS or low-KAAS musicians*, and this difference was statistically significant ($f = 3.03$; $df = 2,53$; $p = 0.0570$).

Another finding of importance points to differences concerning performance-related habits and behaviors. Accordingly, the total amounts of time spent performing, rehearsing, and teaching seem to be congruent for all musicians. However, *high-KAAS musicians spent more time practicing than did either mid-KAAS or low-KAAS musicians*, and a between-group one-way ANOVA showed this difference to be statistically significant ($f = 4.51$; $df = 2,53$; $p = 0.0156$). Whether the amount of practice is considered overuse or misuse, it was evident that *high-KAAS musicians reported a higher incidence of diagnosed and treated tendonitis than did either mid-KAAS or low KAAS musicians*, and a between-group one-way ANOVA showed that this difference was statistically significant ($f = 4.03$; $df = 2,54$; $p = 0.0234$). In general, high-KAAS musicians suffered from musculoskeletal problems of the elbows, fingers, and wrists more than did the other two groups, and reported the highest incidence of medically diagnosed eye problems and ulcers. In addition, they reported the highest incidence of playing-related musculoskeletal symptoms, including ganglion, numbness, restricted range of motion, tenderness, and weakness. Although these differences were not significant, a between-group one-way ANOVA showed that ulcers ($f = 2.47$; $df = 2,54$; $p = 0.0938$), eye problems ($f = 2.59$; $df = 2,54$; $p = 0.0844$), and tenderness ($f = 2.87$; $df = 2,53$; $p = 0.0656$) approached statistical significance.

Health interventions available to musicians vary considerably and run the gamut of both traditional and alternative therapies. Today's practitioners might be trained professionals or folk healers. The findings demonstrate that the high-KAAS musicians reported a general higher incidence of consultations with practitioners than did the low-KAAS or mid-KAAS musicians, although these differences were not significant. The consultations they reported included visits to general practitioners, medical specialists, nonphysician therapists, and healers, as well as consulting with other musicians and colleagues. The high-KAAS musicians reported a more diverse and higher incidence of interventions received for playing-related problems, such as the Alexander technique, application of heat and/or ice, biofeedback, braces and/or splints, nonprescription medications, occupational therapy and physical therapy, temporary rest or periodic cessation of playing, ultrasonography, and spiritual healing. *The high-KAAS musicians reported a higher incidence of receiving physical therapy and occupational therapy than did either the mid-KAAS or the low-KAAS musicians*, and a between-group one-way ANOVA showed that this difference was statistically significant ($f = 3.81$; $df = 2,54$; $p = 0.0283$). However, both biofeedback ($f = 2.47$; $df = 2,54$; $p = 0.0938$) and spiritual healing ($f = 2.47$; $df = 2,54$; $p = 0.0938$) were nearly significant. It is interesting to note that the high-KAAS musicians reported the lowest incidences of aerobic dancing, chiropractic manipulations, massage, meditation, yoga, and psychological counseling; however, these differences were not significant.

DISCUSSION

Though auditory style had been outlined as a conceptual construct in the psychoanalytic and music psychology literature, it has been overlooked in research studies concerning personality traits and profiles of musicians. Logically, if auditory style is vital to the general development of musicians, then an exploratory investigation is warranted, and it seems correct to attempt to isolate and scrutinize auditory style as a variable between musicians and nonmusicians, as well as among musicians themselves.

We might speculate whether auditory style is genetically based, already present at birth, and represents part of our constitutional make-up or whether it develops early in infancy when we begin interacting with external objects and environment. However, as a cognitive trait and orientation linked to other personality traits, auditory style is evident in individuals regardless of musical skill. Some nonmusician control subjects in the study had high KAAS scores similar to those of the musicians. In addition, a large proportion of the entire sample (musicians and nonmusicians) fell within the same KAAS total range. We might expect this finding if the construct under question is inherently psychological. Moreover, certainly some nonmusician control subjects enjoyed music enrichment and instrumental lessons in the past, and possibly are amateur players. However, given the nature of the bias, it is not surprising that the musicians had significantly higher KAAS scores as a group. The data reveal some musicians who received low KAAS scores, and we have yet to understand this phenomenon. But the fact that some KAAS factors do not even differentiate musicians and control subjects is ample evidence that, to some extent, we

all utilize audition as a sensory style in interpreting our internal and external worlds. The key word here is *extent.*

What seems to be clear is that KAAS (or particular items or factors of KAAS) is associated with and predicts state anxiety (or certain aspects of state anxiety) among musicians and nonmusicians differently. On the one hand, auditory style among musicians seems to be interlinked with or predictive of state anxiety, while on the other hand, KAAS is independent of state anxiety. The question that arises regards its predictive ability. To what extent are high-KAAS musicians afflicted by MPA more than are mid-KAAS or low-KAAS musicians?

Music performance anxiety is a complex syndrome. The components of MPA are multifaceted and thus the STAI might not be an adequate instrument for its evaluation. The PAQ as it appears on the MPSS supports seven independent factors representing 74.5% of the variance. Both MPA and state–trait anxiety demonstrate associations through highly significant positive correlations, with the exception of PAQFac6—the pharmaceutical coping factor. This indicates that the MPSS and the PAQ seem to have not only high face validity, but high concurrent validity as well. As can be seen in Table 5, the PAQ seems to be a more apt measure of MPA than is the STAI in that the dimensions of MPA relate to state and trait in different ways.

CONCLUSION AND IMPLICATIONS

The issues surrounding MPA are as diverse as the terminology and assessment measures used by arts medicine practitioners. MPA is often viewed as a set of behaviors, mental attitudes, and/or physical manifestations that are either *stage-specific* (referred to as performance anxiety or stage fright), *media-based* (referred to as music performance anxiety), or *due to residual personality and career factors* (referred to as music-related performance anxiety). It is a priority that arts medicine adopt a standardized differential diagnosis as well as diagnostic criteria. Perhaps it is time to shift the focus of attention from the *performance*—the artistic circumstance—to the *performer*—the artists themselves. In addition, there is a great need to standardize an acceptable assessment procedure to measure the effects and levels of MPA. Though some more general psychological instruments may have served arts medicine well during an inception and infancy period, more specific measures that developed from previous arts medicine research initiatives have significantly demonstrated their concurrent validity with more rigorously developed and tested psychometric instruments such as the STAI. Consequently, the PAQ and the MPSS might be considered a welcome alternative and a more suitable assessment measure assisting future arts medicine practitioners.

This study has investigated auditory style in an exploratory fashion. The findings demonstrate that this cognitive trait/orientation is an important yet often overlooked component of musicians' personality. Possibly the future will demonstrate important dimensions of auditory style related to nonmusicians as well. Perhaps future studies will highlight different characteristic dimensions of auditory style among university music majors prior to their entry into the profession. But, if auditory life is a component of musicianship and a motivator toward a music career, then it would seem logical to investigate its characteristics. The implications would be significant to parents and children, developmental psychologists, music educators, and music conservatories. Moreover, if, as previous research findings suggest, in concept all humans are biologically "wired," or predisposed for musicality through previous intrauterine vibroacoustic learning, then of even greater importance would be investigating the reasons why so few individuals become professional musicians.

However, as we have demonstrated, auditory style seems associated with state anxiety as a correlate and predictor of MPA among musicians. Those musicians who seem most "at-risk," those who are prone to suffer from the physical manifestations and maladaptive mental attitudes of anxiety, report the highest incidence of repetitive strain injury and tendinitis, and seek medical consultations and interventions more than do other musicians, are those who receive high(er) KAAS scores. The implications of these findings might highlight criteria leading to a heightened differential diagnosis regarding intervention and prognostic criteria. For example, perhaps not all musicians would benefit from the same types of intervention modality. The assessment of musicians according to characteristics such as auditory style might enhance referral practices of musicians by arts medicine practitioners by prioritizing therapeutic modalities. Further implications of the findings indicate the need to develop more auditive-specific therapeutic interventions. The future might point to the use of vibroacoustic, music-generated vibrotactile environments or music therapy as principal and supportive therapeutic regimens for musicians. The use of music or sound to treat musicians might someday become more commonplace, or even the accepted practice. When sound or music become a source of conflict and an arena for confrontation, then treatment interventions and environments must include these as components of the process. We cannot simply ignore musicians' auditory life or auditory style, and shrug these off as insignificant isolated skill-related gifts and talents. If we attempt to meet the occupational health needs of performing musicians, we must consider a more holistic approach that includes assessment of auditory style.

REFERENCES

1. Lehrer P, Goldman NS, Strommen EF: A principal components assessment of performance anxiety among musician. Med Problem Perform Art 5:12–18, 1990.
2. Wesner R, Noyes R Jr., Davis TL: The occurrence of performance anxiety among musicians. J Affect Dis 18:177–185, 1990.
3. Salmon PG: A psychological perspective on musical performance

anxiety: a review of the literature. Med Problem Perform Art 5:2–11, 1990.
4. Salmon PG, Meyer RG: Notes from the Green Room: Coping with Stress and Performance Anxiety. New York, Lexington Books, 1992.
5. Davies JB: The Psychology of Music. London, Hutchinson, 1978, Ch 13.
6. Kemp A: The personality structure of the musician: I. Identifying a profile of traits for the performer. Psychol Mus 9:3–15, 1981.
7. Kemp AE: Psychological androgyny in musicians. Bull Counc Res Mus Educ 85:102–108, 1985.
8. Marchant-Haycox SE, Wilson GD: Personality and stress in performing artists. J Pers Indiv Diff 13:1061–1068, 1992.
9. Nass ML: On hearing and inspiration in the composition of music. Psychoanal Q 44:431–447, 1975.
10. Nass ML: Some considerations of a psychoanalytic interpretation of music. Psychoanal Q 40:303–316, 1971.
11. Freud S: The Psychopathology of Everyday Life. Standard edition V1. Monograph. Berlin, 1901.
12. Feldenkrais M: On the primacy of hearing. Somatics 1:19–21, 1976.
13. Hepper PG, Shahidullah S: Habituation in normal and Down's syndrome foetuses. Q J Exp Psychol 44B:305–317, 1992.
14. Shetler DJ: Response of the prenatal infant to musical stimuli: a report of the Eastman Project 1980–1986. *In* Pratt RR, Moog H (eds): First Research Seminar of the ISME Commission on Music Therapy and Music in Special Education, Bad Honnef, W. Germany. St. Louis, MMB Music, 1986.
15. Hepper PG: An examination of foetal learning before and after birth. Irish J Psychol 12:95–107, 1991.
16. Papousek M: Musical elements in the infant's preverbal vocal environment: a naturalistic counterpart to the infant's precocity in music perception. ESCOM Newslett E.7-11 (European Society for the Cognitive Sciences of Music), 1993.
17. Pruett KL: Psychological aspects of the development of exceptional young performers and prodigies. *In* Sataloff RT, Brandfonbrener AG, Lederman RJ (eds): Textbook of Performing Arts Medicine. New York, Raven Press, 1991, Ch 11.
18. Rosen VH: Some effects of artistic talent on character style. Psa Q 33:1–24, 1964.
19. Reubart D: Auditory/kinaesthetic cognition and control of performance anxiety in piano playing. J Int Soc Stud Tension Perform 1:3–4, 1984.
20. Noy P: The development of musical ability. Psychoanal Stud Child 23:332–347, 1968.
21. Brodsky W, Sloboda JA: Keele Assessment of Auditory Style (KAAS): As a Primary Mode of Psychological Orientation and Development. Unpublished test. Unit for the Study of Musical Skill and Development, Psychology Department, Keele University, England, 1993.
22. Spielberger CD: Manual for the State–Trait Anxiety Inventory (STAI–Form Y). Palo Alto, CA: Consulting Psychologists Press, 1983.
23. Music Performance Stress Survey (MPSS) Version 1.0. Arts in Medicine Research Program, Department of Psychiatry and Behavioral Sciences, University of Louisville, Kentucky 40292.
24. Fishbein M, Middlestadt SE, Ottati V, Straus S, Ellis A: Medical problems among ICSOM musicians: Overview of a national survey. Med Probl Perform Art 3:1–8, 1988.

Appendix A

Distribution of Keele Assessment of Auditory Style (KAAS) Items by Factors as Indicated by Principal Components Analysis

Key to Age: *C = "as a child" T = "as a teenager" A = "as an adult"*

Loading	Age	Items of **KFac1** (Variance = 20.3%)
.8534	C	1. I felt as if I could experience my emotions far better through music than through speech.
.8424	C	2. I was aware that I felt and heard things in music that I could not articulate verbally.
.7589	C	3. I felt drawn to repeat and re-experience musical events that affected me.
.6393	T	4. I felt more comfortable within other social groups than musical social settings such as ensemble and choir.
.6130	T	5. I identified myself as having a special gift for music.
.5702	C	6. The role models I most wanted to be like were music performers.
.4562	T	7. I imagined music in my mind when bored.
.4547	A	8. When I listen to music I experience and perceive a kinaesthetic body "feeling" the music in addition to my ear "hearing" the music.
.4446	A	9. I am aware of an emotion depicted on the television/movie screen via the soundtrack before the screenplay action is revealed.
.4383	A	10. I feel as if there is a piece of music going through my mind.

Loading	Age	Items of **KFac2** (Variance = 6.9%)
.7881	A	1. Voice tone is a major influence on whether I am attracted to someone.
.7438	A	2. I find I tend to trust people more if their voices are pleasing to me.
.6208	A	3. I am very sensitive to the sound quality of other people's voices.
.5347	A	4. When I choose names (e.g. children, pets, etc.) I pay attention to their rhythmic and musical sound.
.4669	C	5. I remember feeling afraid when I heard loud noises.

Loading	Age	Items of **KFac3** (Variance = 6.6%)
.8195	C	1. When I listened to music I found myself unable to sit still.
.7603	C	2. Music caused me to move in a rhythmic way (e.g. tap fingers, stamp feet, move head, sway body, etc.).

.5467	C	3. I discovered myself making noise (such as humming, singing, or beating) or moving rhythmically throughout the day.
.5031	C	4. I was comforted by a familiar tune or melody when sad.

Loading	Age	Items of **KFac4** (Variance = 5.5%)
.7768	C	1. I found myself suddenly humming a piece of music or melody without realising that I'd started.
.7392	C	2. I would hum bits and pieces of music while walking along the way not especially aware of their source.

Loading	Age	Items of **KFac5** (Variance = 4.8%)
.8854	C	1. I liked stories more than nursery rhymes and songs.
.8254	C	2. I preferred stories and book reading at night time above lullabies and songs.

Loading	Age	Items of **KFac6** (Variance = 4.2%)
.8032	A	1. I have felt that I must protect my hearing as it is my most important link to the outside world.
.6723	A	2. I have noticed that I depend often on my sense of hearing for gaining information regarding where things might be (location).
.4218	A	3. The external sound environment (soundscape) is a major factor for me when choosing neighbourhoods where to live.

Loading	Age	Items of **KFac7** (Variance = 3.9%)
.7849	A	1. When improvising or humming to myself, I can decide whether I composed an original piece (phrase) or simply repeated one that I had heard previously.
-.4015	C	2. I found it easier to follow a written text if I or someone else read it aloud.

Loading	Age	Items of **KFac8** (Variance = 3.8%)
.7740	A	1. I find that "what" a person says to me is more important than the "way" (tone) they say it.
.5231	C	2. When listening to piece of music I imagined that I too was among the performers.

Loading	Age	Items of **KFac9** (Variance = 3.6%)
.7791	T	1. I heard my parents tell stories about my early vocal development.
.6650	T	2. I was aware of the similarities and/or differences in intonation (tone qualities) between my voice and my parents' voices.

Loading	Age	Items of **KFac10** (Variance = 3.1%)
.7815	A	1. I find silences in conversation more difficult to tolerate than actual differences of opinion.
.4818	A	2. During conversation I find myself listening or attending to the other person's speech patterns and vocal inflections more than the actual content itself.
.4226	A	3. I have felt that when I am away from my significant other(s), the mere sound of their voice will relieve me from melancholy and loneliness.

Loading	Age	Items of **KFac11** (Variance = 3.1%)
.8239	C	1. I found it both easy and enjoyable to fall asleep while on a train, bus, or motor car.
-.4725	A	2. When I find myself in new surroundings I am first aware of the landscape before the soundscape.

Loading	Age	Items of **KFac12** (Variance = 2.7%)
.7731	A	1. I become anxious when I become aware of a soundless environment (total quiet).

APPENDIX B

Distribution of Performance Anxiety Questionnaire (PAQ) Items by Factors as Indicated by Principal Components Analysis (PCA)

Loading	Items of **PAQFac1** (Variance = 36.1%)
.86269	1. How often do you feel that anxiety interferes with your performance?
.85742	2. To what extent is performance anxiety a source of embarrassment?
.79689	3. How much is your performance actually impaired by anxiety and/or its physical effects?
.70201	4. To what extent are you bother by the physical effects of anxiety such as trembling?
.66819	5. How much are you distressed by anxiety during performances?
.65618	6. How much of an effect has performance anxiety had on your musical career?

Loading	Items of **PAQFac2** (Variance = 9.2%)
.83007	1. To what extent are you bothered by the physical effects of anxiety such as dizziness or light-headedness?
.81767	2. To what extent are you bothered by the physical effects of anxiety such as nausea or abdominal distress?
.53562	3. To what extent are you bothered by the physical effects of anxiety such as shortness of breath?
.46660	4. To what extent are you bothered by the physical effects of anxiety such as rapid/pounding heart beat?

Loading	Items of **PAQFac3** (Variance = 7.6%)
.76130	1. To what extent are you bothered by the physical effects of anxiety such as quavering voice?
.71425	2. To what extent are you bothered by the physical effects of anxiety such as dry mouth?
.64250	3. To what extent are you bothered by the physical effects of anxiety such as sweating?
.51986	4. How much are you usually bothered by anxiety before you perform?

Loading	Items of **PAQFac4** (Variance = 7.1%)
.82363	1. To what extent are you bothered by the physical effects of anxiety such as poor concentration?
.78813	2. How often do you avoid performances or auditions because of anxiety about performing?
.51143	3. To what extent are you bothered by the physical effects of anxiety such as flushing or chills?

Loading	Items of **PAQFac5** (Variance = 5.5%)
.75059	1. How much anxiety do you experience in the following performance situation? Private Lessons.
.62917	2. How much anxiety do you experience in the following performance situation? Small Ensembles.
.57398	3. How much anxiety do you experience in the following performance situation? Auditions.
.50356	4. How much anxiety do you experience in the following performance situation? Solo Performances.

Loading	Items of **PAQFac6** (Variance = 4.7)
.84790	1. How often do you use prescription drugs to reduce performance anxiety?
.76072	2. How often do you use alcohol or recreational drugs to reduce performance anxiety?

Loading	Items of **PAQFac7** (Variance = 4.4%)
.76365	1. How often do you use psychological techniques to reduce performance anxiety?
.53504	2. How much anxiety do you experience in the following performance situation? Large Ensembles.