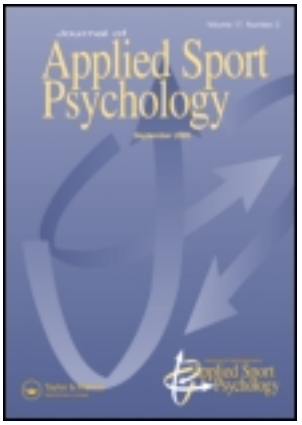

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Evaluation of a Mental Skills Training Program for Musicians

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This study explored the effects of a 9-week music-specific mental skills training program delivered to students at a music conservatoire in England ($n = 14$). Pre- and post-testing involved a battery of questionnaires, public performances, and participant feedback. In comparison with a control group ($n = 9$), the experimental group demonstrated significant changes in their views toward practice activities and specific practicing behaviors, a significant increase in self-efficacy for performing, and an increase in imagery vividness. Comments from participants in the experimental group revealed greater levels of self-awareness, confidence, facilitative views toward and heightened control over anxiety, and healthier perspectives toward music-making.

INTRODUCTION

It is becoming increasingly clear that musicians require a variety of musical, physical, and mental skills to prepare effectively for performances, as well as to manage the stressors and demands associated with performing (see Williamon & Thompson, 2006). Fundamentally, advanced music students can expect to receive training on the technique or mechanics of playing their instruments, as well as instruction on a range of practice, performing, ensemble, and professional skills. In addition, a broader range of programs are being increasingly employed to equip musicians with the skills necessary to prepare for performance effectively and manage their performance careers. Nevertheless, some of these programs are developed and implemented with little empirical support for their efficacy. From the viewpoint of researchers, performers, and those who train performers, it is important that these programs be subjected to empirical testing to provide an unbiased assessment of how they can be employed to enhance performance (Kimmerle & Côte-Laurence, 2003; Williamon, 2004).

Although targeted investigations have demonstrated the effects that specific mental skills can have upon experiences of performance anxiety and musicians' practice behaviors, broader functions for mental skills use are still largely unknown and under-researched. Given this, the present study sought to investigate the effects of a multi-faceted mental skills training program delivered to music students. In particular, the impact of the program upon musicians'

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practice attitudes and behaviors, music and mental skills, trait and state anxiety, self-efficacy, and performance ability was explored. Additionally, methods for evaluating the validity of the program were also examined.

Previous Employment of Mental Skills Training in Music

Although mental skills training programs are commonplace within sport and some other elite performance domains, they have yet to be widely applied within the performing arts (Hays, 2002). Partly due to the fact that such programs are not common within the performing arts, there are still a number of questions surrounding the potential for their use by musicians. Such questions include the range of functions and uses for which musicians may employ mental skills, as well as the possible benefits musicians stand to derive from structured mental skills training. Additionally, the most effective means of providing training in mental skills for musicians is not fully understood. In response to such questions, Gould (2002a) called for sport psychology researchers to expand their expertise and knowledge beyond sport, explaining that sport psychologists have already begun "transferring what they have learned about facilitating human performance in sport to other domains such as music, the arts, business, and the military" (p. 137). Doing so would allow for the testing of the generalization of theories and understanding related to performance excellence. In return, there is the potential for research from other areas of human performance to offer new insight for sport performance (Gould, 2002b).

Despite the above questions surrounding the use of mental skills training programs within the performing arts, use of mental skills by musicians is not a new or unfamiliar concept. A number of studies have employed mental skills with the aims of enhancing musicians' practice activities and performance quality, reducing the occurrence of performance anxiety, and providing musicians with skills to enable them to cope better with stress (for a review, see Smith, Maragos, & Van Dyke, 2000).

An area of considerable research within music has considered the content, quality, and quantity of musicians' practice. Central to the exploration of practice content and quality, and how they can influence the efficiency of practice, is self-regulated learning. McPherson and Zimmerman (2002) defined self-regulated learning as a situation "where learners acquire the tools necessary to take control of their own learning and thereby learn effectively" (p. 327). In other words, self-regulation occurs when students become "metacognitively, motivationally, and behaviorally active participants in their own learning process" (Zimmerman, 1989, p. 329). Highlighted as a key moderator in the effectiveness of musicians' practice (Jørgensen, 2004; McPherson & Zimmerman, 2002), Hallam (2001a) found that musicians with greater levels of experience employ higher levels of strategy use than less experienced musicians. Hallam (2001b) noted that one-to-one instrumental tuition can increase students' knowledge and use of self-regulated learning strategies, but whether such training can also be provided in group classroom-based contexts remains to be examined. The potential effects that might be obtained through such training also require investigation.

Among the studies aimed at enhancing practice and performance quality have been investigations into the use of imagery and mental rehearsal as a practice technique (Coffman, 1990; Driskell, Copper, & Moran, 1994; Highben & Palmer, 2004; Ross, 1985). In their meta-analysis of the mental practice literature, Driskell et al. (1994) concluded that mental practice is an effective means for enhancing performance. Rather than being a skill in which a person is immediately proficient, Rogers, Hall, and Buckolz (1991) noted that imagery ability, and subsequently imagery's effectiveness, can be increased through practice. Furthermore, the potential role of imagery vividness, or clarity, as a moderator of imagery's usefulness has

received strong support in the fields of applied psychology (e.g., Richardson 1994), sports science (e.g. Gregg & Hall 2006; Gregg, Hall, & Nederhof, 2005), and in music (Gregg & Clark 2007; Highben & Palmer, 2004). Beyond investigating the potential benefits of imagery as a practice technique, studies have yet to examine the implications inherent in providing imagery training to musicians and the impact such training might have upon musicians' imagery ability.

Through his work with elite classical musicians, Partington (1995) noted that during the last few days prior to a performance the musicians employed musical, physical, and mental preparation strategies in order to perform at their best. Their activities on the day of the performance were highly idiosyncratic, developed through personal experience. Within this, they all employed individualized, flexible pre-performance routines that incorporated physical activity, nutrition, and rest, as well as warming up using mental, emotional, technical, and musical strategies. Connolly and Williamon (2004) also noted that pre-performance routines were rated as particularly useful by music performance students. Other skills identified as particularly effective were mental and physical relaxation, imagery and mental rehearsal, focus and concentration, ideal performance states and simulation, and goal identification and setting. Beyond the works by Partington (1995) and Connolly and Williamon (2004), very few studies have actually explored pre-performance routines in any depth.

Although there is limited research in the music literature, pre-performance routines and the effect that pre-performance routines can have on anxiety experiences have been explored more thoroughly in other domains. A number of studies in sport (e.g. Hanton & Connaughton, 2002; Hanton & Jones, 1999; Hanton, Mellalieu, & Hall, 2004; Jones, Hanton, & Swain, 1994) and surgery (e.g. Wetzel, 2006) have found that elite performers commonly employ pre-performance routines comprised of goal-setting, imagery, and self-talk to develop and maintain facilitative interpretations of their anxiety symptoms. Given such support for the use of a variety of psychological skills as part of training and performance preparation found within other disciplines, further research seeking to understand the use and efficacy of such skills by musicians appears clearly warranted.

A number of studies incorporating mental skills have been directed at assisting musicians to manage stress and anxiety. The mental skills employed in these studies have included attention training and behavioral rehearsal (Kendrick, Craig, Lawson, & Davidson, 1982), self-talk with relaxation delivered under hypnosis (Stanton, 1994), visualization and guided imagery (Esplen & Hodnett, 1999; Gratto, 1998), and various breathing and relaxation exercises (Gratto, 1998). Throughout these studies, beneficial effects have been found for the control or alleviation of both state and trait anxiety, as measured by scales such as the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970). Incidentally, studies focusing on the impact of pre-performance routines on musicians' anxiety experiences are largely lacking.

Although, not a mental skill in and of itself, the role of self-efficacy in facilitating musical performance quality has also been explored. Across two studies involving nearly 800 children completing graded music examinations, self-efficacy emerged as the most reliable predictor of performance in the examinations (McCormick & McPherson, 2003; McPherson & McCormick, 2006). McCormick and McPherson noted that, although the influence of self-efficacy was apparent within the examination itself, self-efficacy was also found to impact upon the musicians' attitudes and practice behaviors leading up to the examination. Clearly, not only the types of activities musicians engage in when preparing for performances, but also their perceptions of themselves and the activities they engage in, can have a significant effect upon their performance experiences. However, whether structured mental skills training can be used to enhance musicians' self-efficacy beliefs remains to be investigated.

Although these investigations have expanded our understanding of musicians' use of mental skills and the benefits such skills may hold, they have raised a number of issues requiring further investigation. Many of the studies investigating the effects of mental skills employed just one or two skills or strategies. Although the use of one or two skills makes it easier to determine the effects of those skills, there is growing support for the use of multi-faceted training programs (Weinberg & Williams, 2006), particularly given that each musician may interact idiosyncratically to training of a specific skill. Many of the investigations mentioned above lacked a control group, making it difficult to ascertain whether changes noted in the study participants were in fact due to the skills investigated. Interestingly, many of the studies also provided little time for the participants to practice and become proficient at the new skills. Research has found that imagery ability, for instance, increases with practice (Rogers, Hall, & Buckolz, 1991), and it would make sense for other skills to respond in a similar manner. Finally, when investigating factors such as performance anxiety and performance quality, it is important that testing occur in realistic performance environments to ensure that what is being tested is as representative of the participants' real world experiences as possible.

Aims and Hypotheses

The objective of the present investigation was to examine the effects of a multi-faceted musician-specific mental skills training program delivered to advanced music students. In particular, this study sought to investigate whether mental skills training would enhance musicians' use of and ability with self-regulated learning behaviors and musical and mental skills, including imagery. Additionally, this study was interested in the impact a multi-faceted mental skills training program would have upon musicians' anxiety experiences, self-efficacy, and performance quality. Finally, the value of participant feedback as a means of elucidating the effects of and evaluating the program was also explored.

It was hypothesized that, in relation to a control group, the experimental group would demonstrate significant increases in their use of and ability with self-regulated learning behaviors and musical and mental skills as demonstrated by the various measures employed. Additionally, it was hypothesized that participation in the training program would result in the experimental group reporting decreases in their state and trait anxiety, enhanced self-efficacy, and increased performance quality in relation to the control group. As well, it was expected that feedback collected from the experimental group participants would provide a useful means of evaluating the effects and validity of the program.

METHOD

Participants

For this study, 27 undergraduate and postgraduate music performance majors were recruited from a music conservatoire in England. The researcher had had little to no experience with all of the participants prior to their participation in the study. Of the original 27, only 23 participants provided sufficient data through two rounds of data collection to be included in analyses. They were composed of 9 men and 14 women, ranging in age from 20 to 51 years ($M = 23.59$, $SD = 5.93$). Grouped by year of study, four were Year 1 undergraduates, six were Year 2, three were Year 3, four were Year 4, and six were postgraduates. Grouped by instrument, six were pianists, five were singers, seven were string players, and five were woodwind or brass players. Of these participants, 14 formed the experimental group and 9 the control group. The

two groups were comparable in terms of age (experimental group: $M = 24.13$, $SD = 7.47$; control group: $M = 22.82$, $SD = 2.56$), year of study, and instrument distribution.

It should be noted that the participants who formed the experimental group were not randomly assigned, but rather volunteered for the study specifically to receive the mental skills training. This design was chosen because involvement in the experimental group required a substantial commitment of time and effort on the participants' part, both within the training and testing sessions and outside, necessitating significant intrinsic motivation. Additionally, it could be argued that musicians who self-select into such a program would be most similar to the kind of musician that would choose to undertake mental skills training from a practitioner. As such, the experimental group of the present investigation would be likely to produce results indicative of typical applied settings.

Materials

Self-Regulated Learning

The participants' understanding and use of self-regulated learning behaviors within their practicing were assessed using a newly developed questionnaire adapted from the Self-regulated Learning Interview Schedule (Zimmerman & Martinez-Pons, 1988). This 10-item measure asks the participants to rate how important they feel it is for musicians to employ various strategies as part of their regular practice activities on a scale ranging from 1 (*not important*) to 7 (*extremely important*). The kinds of strategies assessed include setting goals for and evaluating practice and performances, manipulating practice procedures and environments, and seeking assistance and information from peers and auditory and written materials. For example, one of the items asks the following: "When practicing or learning music, how important is it for a musician to evaluate the quality or progress of learning?" The 10 scores from each of the items are summed and one overall score is produced, ranging from 10 to 70, with a higher score indicating a greater belief in the importance of employing self-regulated learning behaviors. Cronbach's alpha coefficient from the current sample for this measure was .65. Factor analysis to establish the validity of this measure is currently ongoing.

Musical and Mental Skills

Perception of Musical Skills. The Musical Skills Survey was employed to assess the participants' self-perceptions concerning their skill acquisition and technique, as well as attributes that relate to the processes of musical learning and performing (e.g., effectiveness of practice, stamina, management of everyday stress; Ritchie & Williamon, 2011). Comprised of 22 items, participants rate their own perceived proficiency, compared with others in their specialism of similar experience, on a scale from 1 to 7, with 7 representing "excellent ability." Each of the items is treated individually, rather than producing one summed score, resulting in each participant having 22 scores from this measure which can then be used in further analyses.

Mental Imagery. Imagery ability was assessed using the randomized short version of Betts' Questionnaire upon Mental Imagery (Betts QMI; Sheehan, 1967). The Betts QMI is a 35-item self-report questionnaire in which respondents are asked to rate on a 7-point scale the strength or vividness of various suggested sensory experiences, with 1 representing "perfectly clear and as vivid as the actual experience." This questionnaire addresses seven different senses through five items apiece: sight, sound, taste, smell, movement, and interoceptive and exteroceptive sensations. Interoceptive sensations refer to things like hunger, a sore throat, and fatigue while exteroceptive sensations refer to things like feeling sand, the prick of a pin, and the warmth of a tepid bath. This produces eight scores for each participant: one total score

(ranging from 35 to 245) and seven sub-scale scores for each of the senses addressed (ranging from 5 to 35). Lower scores indicate greater imagery vividness. Participants are instructed to conjure up or imagine a particular sensory experience and then rate the vividness of the image that they create. A lower score indicates a greater level of imagery vividness. Factor analysis during development confirmed the validity of the seven subcomponents within this questionnaire, producing eigernvalues ranging from 1.35 to 19.4 (Sheehan, 1967). Cronbach's alpha coefficients from the current sample for each of the sub-scales were the following: sight = .84; sound = .75; taste = .75; smell = .80; movement = .63; interoceptive sensations = .80; exteroceptive sensations = .67.

Anxiety, Self-Confidence, and Self-Efficacy

Trait Anxiety. Trait anxiety was assessed using the 20-item trait anxiety index from the State-Trait Anxiety Inventory (TAI; Spielberger, Gorsuch, & Lushene, 1970). Employing a 4-point scale ranging from 1 (*almost never*) to 4 (*almost always*), the scores from the 20 items are summed, producing one overall score per participant that can range from 20 to 80. Higher scores indicate higher levels of trait anxiety. Sample items include the following: "I feel nervous and restless" and "I make decisions easily." A number of studies have confirmed the validity of this measure (e.g. Kabacoff, Segal, Hersen, & Van Hasselt, 1997; Spielberger, Gorsuch, Luschene, et al., 1983; Vigneau & Cormier, 2008). Cronbach's alpha coefficient from the current sample for this measure was .88.

State Anxiety and Self-Confidence. The Revised Competitive State Anxiety Inventory-2 (CSAI-2R; Cox, Martens, & Russell, 2003) was used to assess the musicians' state anxiety prior to giving a live musical performance. In addition to assessing levels of cognitive (5-items) and somatic state anxiety (7-items), the CSAI-2R also assesses self-confidence (5-items). Using a scale ranging from 1 (*not at all*) to 4 (*very much so*), an overall summed score can be calculated per participant, as well as extracted summed scores for the three subcomponents. The score range for the subcomponents of cognitive anxiety and self-confidence is 5 to 20 and the range for the somatic anxiety subcomponent is 7 to 28. Higher scores represent higher levels of each state anxiety component and of self-confidence. Items on this questionnaire include the following: "I feel jittery," "I am concerned that I may not do as well in this performance as I could," and "I'm confident of coming through under pressure." Confirmatory factor analysis has established the factorial validity of the CSAI-2R ($CFI = .95$, $NNFI = .94$, $RMSEA = .05$; Cox et al., 2003). Cronbach's alpha coefficients for each of the sub-components of this measure from the current sample were the following: cognitive anxiety = .74; somatic anxiety = .84; self-confidence = .94.

Self-Efficacy. Self-efficacy was assessed using the Self-efficacy for Musical Performing questionnaire (Ritchie & Williamon, 2011). This 8-item questionnaire was developed to assess musicians' self-beliefs prior to and in correspondence to a specific task. In this respect, it differs from assessments of more global self-confidence. To achieve this, the questionnaire is oriented toward a particular event through the use of an introductory instruction that asks participants to recall a recent performance in which they held a prominent role (e.g., a soloist), to imagine that they will be taking part in a similar performance in the coming weeks, and then respond to the questions with this performance in mind. The questionnaire provides participants with eight performance-related statements to which they indicated their agreement or disagreement on a 7-point scale ranging from 1 (*disagree*) to 7 (*agree*). The potential range for this questionnaire is 8 to 56 and a higher score indicates a higher level of self-efficacy for performing. Sample

items on this questionnaire include the following: "I am confident that I can give a successful performance" and "If something unexpected happens during the performance, I will handle it well." Exploratory factor analysis during development confirmed a single underlying factor for this questionnaire, producing an eigenvalue of 3.52 (Ritchie & Williamon, 2011). Cronbach's alpha coefficient from the present sample for this measure was .84.

Performance Quality

To assess performance quality, the participants performed live in front of an audience of their peers and staff from the conservatoire at which they studied. The size of the audience for each of the performances was typically around 15 people. The participants were requested to perform two contrasting pieces of their choice, totaling 15 min in length. All performances were video recorded. To assess the performances, two professional musicians with internationally recognized performing careers were recruited. In addition to their performing careers, each had more than 10 years experience of professional assessment and adjudication. The assessors were external and had no previous association with the participants. The recordings of the performances from the two rounds of testing were randomized to mask whether they were from the first or second round, as well as to mask the participants' group allocation. The performances were given a mark ranging from 1 (*poor*) to 7 (*excellent*) for eight different components: overall quality, technical proficiency, musical understanding, communicative ability, level of preparedness, self-assuredness, interpretative imagination and originality, and ability to cope with the stress of the performance situation. This resulted in each participant receiving two sets of eight scores for each round of testing (one from each of the two assessors). For each participant, a mean was created of the two assessors' marks for each of the eight components, producing eight averaged scores for each participant for the first round of testing and eight for the second round. Correlations between the two assessors for the eight performance quality ratings ranged from $r = 0.212$ ($p > 0.05$) to $r = 0.462$ ($p < 0.001$). Such low correlations threw into question the validity of the performance quality ratings and, as a result, prevented their inclusion in subsequent analyses.

Participant Feedback

Written feedback was collected from the experimental group during and following the training program using open-response evaluation forms. On the evaluation forms, the experimental group was requested to comment on each of the nine topics covered and provided with the instructions: "Please comment on the extent to which you found this topic relevant and useful in your everyday engagement as a musician. If possible, please discuss what you liked and did not like about the topic, how it was delivered, and any other relevant topics you wished had been included." Eight months after the completion of the training and final testing phase, members of the experimental group took part in a focus group conducted by the first author. A semi-structured topic guide was created for the focus group, with questions addressing the participants' backgrounds and reasons for taking part in the project, perceived general effects of the program, issues in relation to particular topics and exercises, and suggestions for how to improve the program, both in terms of content and delivery. The focus group was recorded digitally and transcribed verbatim.

Procedure

Ethical clearance for this study was obtained from the relevant review board. Following recruitment, each participant was issued an information letter and signed an informed consent form before any further aspect of the study commenced. Prior to the delivery of the mental

skills training, a group session was set up in a classroom at the conservatoire at which the participants studied, during which all participants completed all but one of the above questionnaires. This session lasted approximately 1 hr. Following the questionnaire session, participants from both groups signed up to give their live performances at a specified time in one of the conservatoire's recital halls. Immediately prior to performing, the participants completed the CSAI-2R to assess their state anxiety and self-confidence.

Following the completion of the first round of testing, the experimental group took part in the 9-week mental skills training program discussed below. Throughout this, written feedback was collected from the experimental group on their thoughts regarding the program, as detailed above. During this time, the control group received no training beyond what they received otherwise as part of their studies.

Within the two weeks following the conclusion of the training program, a second round of testing, the procedure of which was identical to that of the first round, was conducted. Again, the participants completed all of the questionnaires, except the demographic questionnaire, in an hour-long session in one of the conservatoire's classrooms. As with the first round of testing, participants from both the experimental and control groups next gave their live performances in one of the conservatoire's recital halls.

Eight months following the second round of testing, members of the experimental group were asked to take part in a focus group. Given that the focus group occurred in the academic year following the delivery of the training program, some members of the experimental group were no longer studying at the conservatoire at which this research was conducted. Between some members having left and other members of the experimental group who were still at the conservatoire being unable to attend the focus group, 8 of the 14 who completed the full training program took part.

Mental Skills Training Program

The mental skills training program for the experimental group consisted of one 60-min group session and one 30-min individual session per week for 9 weeks. Drawing from relevant material within the music, education, and sport psychology literature, a musician-specific 9-week mental skills training program was developed. The objectives of the program were to facilitate increased refinement and understanding in the participants of their own practice behaviors and performance preparation activities, how they respond to various performance-related situations, and how such behaviors and responses could influence their abilities to learn and perform. To achieve this, systematic training was provided in a number of key mental skills that have particular relevance for performance preparation, such as goal-setting, relaxation strategies, and imagery and mental rehearsal. Specifically, the topics covered fell into three main categories: (a) motivation and effective practice, comprising goal-setting, peak performance awareness, and effective practice and time management; (b) relaxation and arousal control, comprising relaxation strategies, arousal control through cognitive restructuring, and self-talk; and (c) performance preparation and enhancement, comprising mental rehearsal and imagery, focus and concentration, and performance preparation and analysis. Each of the three categories of topics included three individual and three group sessions spread over 3 weeks.

The group sessions included a mix of the theoretical and empirical background information on the various topics, as well as group and individual exercises designed to assist the participants to integrate the skills into their daily musical activities. The individual sessions were an opportunity for the participants to discuss their personal experiences (previous and current) with the topics and exercises and provided an opportunity for the program to be tailored more specifically to their wants and needs.

Prior to delivery, a number of processes were undertaken to ensure that the program was valid and appropriate. To begin, three certified and practicing sport psychology consultants were asked for their feedback on the proposed program. Aspects including specific topic inclusion, the division of theoretical and applied content, appropriate exercises, and overall structure of the program and how it would be delivered were discussed. Fundamentally, the sport psychology consultants offered recommendations concerning the overall structure and progression of the different topics covered, stressed the over-arching importance of the goal-setting process for facilitating the learning and integration of the other topics into the musicians' practice behaviors, highlighted the usefulness of the one-to-one sessions, and advised on specific exercises that could be employed. Following this consultation, parts of the program were delivered to two undergraduate psychology of music classes at the conservatoire, using the same mixture of group and individual sessions as would be used in the full program. This piloting allowed for an assessment of the structure of delivery and reception of the topics. The students provided informal feedback on the content, exercises, and delivery, following which modifications and adjustments were made as necessary. As well, the two classes completed some of the assessment measures that were to be employed to develop and refine further the testing procedure.

All group and individual training sessions were delivered by the first author. In addition to having training and experience in providing mental skills training, this person was also an experienced classical music performer. Having experience in both allowed this person to present non-music-specific concepts in a contextually relevant manner to the participants, helping facilitate appropriate application.

Data Treatment and Analysis

Although every effort was made to ensure that a full data set from all of the participants was collected, one of the participants did not complete the Musical Skills Survey, hence the n for this survey is one less than the other measures. All quantitative data were entered into the Statistical Package for the Social Sciences and tested for normal distribution using the One Sample Kolmogorov-Smirnov test. Results of the test indicated that the scores for all of the measures employed demonstrated a normal distribution ($p > 0.05$).

Descriptive statistics for each of the assessment measures were first calculated. Initial analyses demonstrated that there were no significant differences between the experimental and control groups on any of the measures ($p > 0.05$). A one-way analysis of variance (ANOVA) with the difference scores between the two testing periods for each measure as the within-subjects variables and group membership as the between subjects factor was run to assess the extent of change between the two testing periods.

The objective of collecting feedback from the participants was to establish a contextualized perspective of the participants' subjective experiences as a result of having participated in the mental skills training program. To this end, content analysis of the written feedback and the transcript from the focus group was performed using interpretive phenomenological analysis (IPA). According to Smith and Osborn (2003), IPA "attempts to explore personal experiences and is concerned with an individual's personal perception or account of an object or event, as opposed to an attempt to produce an objective statement of the object or event itself" (p. 51). Specifically, the procedure developed for this study involved the following steps:

- Individual points of interest were identified within the written feedback and the transcript from the focus group.

- Points of interest were labeled and grouped into categories with other similar points of interest.
- Categories were then grouped together into general themes.

Pertinent quotes from the qualitative feedback have been included to help shed further light upon the quantitative findings. For the purposes of citing individuals' comments, the experimental group participants were numbered alphabetically (e.g., EG1, EG7).

RESULTS

Effects of the Program

The following section presents the results of the quantitative and qualitative measures pertaining to the effects that the experimental group participants derived from taking part in the training program. All results from the questionnaires, including mean scores from the two rounds of testing for the experimental and control groups and the results from the one-way ANOVA, are presented in Table 1. The benefits that the participants felt they gained as a result of taking part in the training, as collected via the participant feedback, grouped into four themes: (a) increased self-awareness of effective performance preparation, (b) improved practice efficiency, (c) a shift in views toward anxiety, and (d) positive impact on attitudes toward music making.

When comparing the scores achieved by the experimental and control groups on the two testing phases, a significant effect for the Musical Self-regulated Learning questionnaire emerged, $F_{(1,21)} = 16.22$, $p = .001$, $\eta^2 = .44$. The first theme of comments, as determined by the analysis of the qualitative data, expanded upon this significant effect. As a result of having taken part in the program, experimental group participants reported possessing greater levels of self-awareness in relation to their practice styles and factors affecting their abilities to perform. They also reported that this increased self-awareness facilitated heightened feelings of self-confidence when performing. These are highlighted by the following quotes: "Thinking about performances that I enjoyed and ones I didn't helped to point out factors which I could have overlooked, such as patterns in preparing myself" (EG7); "The exercises helped me to work out why certain factors could stop a performance from being a success" (EG8); "I have a more organized and clearer idea of what produces a better performance. This self-awareness helps improve my mindset towards public performances" (EG11).

Further to the above changes in attitudes toward and understanding of practice behaviors, significant differences were found for two of the 22 items on the Musical Skills Survey. The experimental group participants reported a significant increase beyond the control group for the musical skills items, quantity of practice, $F_{(1,20)} = 5.59$, $p = .039$, $\eta^2 = .22$, and technical proficiency, $F_{(1,20)} = 4.90$, $p = .028$, $\eta^2 = .20$.

Similar to the observed change in quantity of practice, the experimental group participants commented that their involvement in the program helped improve their practice efficiency; this comprised the second theme of comments. In particular, they felt that they were better able to organize their practice time: "Helped increase my practice efficiency" (EG1); "Prompted me to organize my practice time better" (EG7).

The participants also spoke of how the program helped them to identify clearer practice objectives together with strategies and methods for working toward them: "Helped me develop a clear idea of what I want to achieve in a practice session" (EG8); "Sped up my learning of new music when there was a lot of pressure and deadlines" (EG9).

Table 1
Mean Scores (Standard Deviation) for the Experimental (EG) and Control (CG) Groups and Results from the One-Way ANOVA for the Quantitative Measures

Questionnaire	Group	Pre-Intervention	Post-Intervention	df	F	*p*
Self-regulated learning	EG	49.29 (6.35)	50.36 (4.57)	1,21	**16.22**	**.001**
	CG	51.22 (6.63)	42.33 (4.90)			
Musical Skills Survey—Quantity of practice	EG	4.57 (1.16)	5.36 (0.63)	1,20	**4.90**	**.039**
	CG	4.75 (0.89)	4.63 (0.52)			
Musical Skills Survey—Technical Proficiency	EG	4.71 (0.61)	5.07 (0.73)	1,20	**5.59**	**.028**
	CG	5.12 (0.83)	4.88 (0.83)			
Betts QMI—Total	EG	103.29 (27.34)	100.21 (26.22)	1,21	**9.23**	**.006**
	CG	80.00 (18.08)	98.44 (21.93)			
Betts QMI—Sight	EG	14.36 (5.43)	12.50 (4.55)	1,21	2.49	.129
	CG	11.22 (4.49)	11.11 (5.06)			
Betts QMI—Sound	EG	12.21 (4.53)	11.79 (4.12)	1,21	1.29	.268
	CG	11.11 (4.70)	12.11 (5.95)			
Betts QMI—Taste	EG	13.43 (4.65)	14.64 (6.24)	1,21	3.516	.075
	CG	9.89 (3.62)	14.22 (4.27)			
Betts QMI—Smell	EG	19.07 (6.62)	17.79 (5.85)	1,21	3.98	.059
	CG	15.00 (3.87)	18.78 (4.02)			
Betts QMI—Movement	EG	12.43 (3.80)	13.50 (4.38)	1,21	2.52	.127
	CG	10.22 (2.99)	14.22 (6.67)			
Betts QMI—Interoceptive sensations	EG	15.71 (6.47)	14.57 (4.80)	1,21	**5.66**	**.027**
	CG	11.56 (3.56)	13.89 (3.89)			
Betts QMI—Exteroceptive sensations	EG	16.07 (4.61)	15.43 (5.43)	1,21	**6.75**	**.017**
	CG	11.00 (4.42)	14.11 (4.51)			
Trait Anxiety Inventory	EG	45.64 (9.12)	41.43 (7.65)	1,21	0.26	.616
	CG	49.00 (8.12)	43.44 (7.92)			
CSAI-2R—Cognitive anxiety	EG	11.29 (3.89)	10.36 (3.77)	1,21	0.08	.787
	CG	11.67 (4.09)	11.11 (3.98)			
CSAI-2R—Somatic anxiety	EG	13.71 (3.99)	11.86 (3.32)	1,21	0.06	.812
	CG	12.44 (3.43)	10.22 (3.56)			
CSAI-2R—Self-confidence	EG	12.36 (2.71)	13.21 (3.79)	1,21	0.39	.540
	CG	11.22 (2.73)	11.33 (2.35)			
Self-efficacy	EG	41.21 (4.64)	46.29 (5.03)	1,21	**6.88**	**.016**
	CG	45.44 (6.75)	43.78 (6.24)			

Note. The results from the one-way ANOVA presented are a comparison of the amount of change between the two rounds of testing as a function of group membership. These results include degrees of freedom (*df*), *F* values, and *p* values. *F* and *p* values that appear in bold are those that reached statistical significance. Also, although scores for 22 items from the Musical Skills Survey were collected, only the two that attained significance are presented in this table.

As well, following the training, the participants reported that they felt more confident, employing a broader range of practice strategies, such as goal setting and mental rehearsal in particular: "I began to set achievable goals and found I was able to achieve them which prompted me to set goals that I wasn't sure were possible. I feel more positive about setting goals to achieve my dream" (EG9); "I now engage in more mental practice" (EG2).

This latter quote was mirrored by the quantitative findings in which significant changes also emerged in relation to imagery ability. A significant change was found when comparing the experimental and control groups' total score from the Betts QMI, $F_{(1,21)} = 9.23$, $p = .006$, $\eta^2 = .31$, along with the subcomponents interoceptive sensations, and exteroceptive sensations, $F_{(1,21)} = 5.66$, $p = .027$, $\eta^2 = .21$; $F_{(1,21)} = 6.75$, $p = .017$, $\eta^2 = .24$ respectively.

In addition to changes in practice and performance preparation behaviors and imagery ability, the experimental group participants reported experiencing a shift in their self-efficacy for performing and their views surrounding anxiety and anxiety symptoms, as well as perceptions concerning their control over anxiety symptoms. The experimental group demonstrated a significant increase over the control group between the testing periods on the self-efficacy for Musical Performing questionnaire, $F_{(1,21)} = 6.88$, $p = .016$, $\eta^2 = .25$. No other significant changes emerged between the experimental and control groups.

Comments comprising the third theme derived from the qualitative measures expand upon these findings. The above-mentioned shifts in views surrounding anxiety appeared to have been achieved particularly through the use of self-talk and pre-performance routines, as evidenced by the following quotes: "I've started rationalizing anxiety symptoms as normal and facilitative" (EG2); "I find that focusing on my mental as opposed to physical state prior to a performance produces a more facilitative focus" (EG9).

Comprising the final theme of comments, the participants spoke of changes to their attitudes toward music making: "The program helped me develop a healthier perspective towards music making, in particular through distinguishing myself from my music, so one doesn't affect the other" (EG9).

While also tested, no other variables listed in Table 1 achieved a significant effect when comparing the scores from the two testing periods controlling for group membership via the one-way ANOVA.

Participant Feedback on Improving the Program

Suggestions for how the experimental group participants would modify or improve the program were also collected. The participants were largely not interested in typical research findings. Instead, they preferred examples of student and professional musicians, as noted by this participant: "I would have preferred more case studies from students and professionals so we may understand and benefit in a more direct way, rather than through research reports" (EG12).

Similar to the applicability of case studies, the participants requested a greater amount of practical, precise application of the skills presented, as opposed to discussion surrounding the theoretical underpinnings of mental skills: "Make the sessions even more practical" (EG2); "I would have liked more practical elements within the sessions" (EG8).

All of the group sessions involved various types of group activities exercises. The participants responded to these activities particularly well and, in fact, would have liked to have more as part of the program: "Make greater use of class interaction, discussion, and activities to facilitate learning from one another" (EG3).

The participants requested that there be more linking of the mental skills with performance and audition situations, with greater opportunities for debriefing: "In addition to the performances, I would have liked a series of mock auditions" (EG2); "I feel there could have been better integration of the skills into performance situations" (EG8); "I liked the lead-up to the last performance, but wished there were more opportunities to debrief performances and auditions that happened during the program" (EG10).

Finally, how the program fit in with the overall timetable of their studies was also commented on by the participants: "The program could run in conjunction with existing college exams and performances" (EG5).

DISCUSSION

The aim of the current study was to examine the impact of a multi-faceted mental skills training program delivered to musicians. This was done through analysis of quantitative measures, substantiated by qualitative feedback and comments collected from the experimental group.

Effects of the Program

A number of significant differences emerged in the experimental group's understanding of and behaviors surrounding practice and performance preparation. The experimental group reported a change in their views toward practice behaviors, as demonstrated by the significant increase in their scores on the Musical Learning and Self-regulation questionnaire when compared with the control group. This linked with one of the themes of feedback provided by the participants: increased self-awareness of effective performance preparation. Changes in the experimental group's practice behaviors, meanwhile, were noted within two items of the Musical Skills Survey. When compared with the control group, the experimental group reported a significant increase in the amount of practice they undertook following the training phase, as evidenced on the Musical Skills item quantity of practice. It is possible that the participants' increased sense of importance for, and understanding of, effective practice and performance preparation contributed to the significant effect found for the Musical Skills item technical proficiency. This significant effect might also be explained by the participants' self-reported increase in quantity of practice and practice efficiency, the second theme of qualitative feedback provided by the participants.

In addition to these changes, significant changes were noted for imagery ability when comparing the experimental and control groups. A significant change emerged for the total score of the Betts QMI, as well as the subcomponents of interoceptive sensations and exteroceptive sensations. At first, an enhanced ability for the experimental group to imagine internal sensations and what it feels like to touch objects may appear odd for musicians. Considering the content of the training program, however, a number of the imagery exercises urged the participants to incorporate a broad range of elements associated with musical performance into their imagery. These elements included the emotions typically felt prior to and when performing, as well as the tactile sensations experienced when playing their instruments. Given the content and focus of the imagery exercises employed within the training program, the emergence of significant changes in the experimental group's ability to imagine these types of sensations is promising and indicates that the imagery exercises employed did generate effects in terms of increasing imagery vividness for a diverse range of sensory experiences.

It is acknowledged that the significant effects found for the Betts QMI resulted, in part, from the control group reporting lower levels of imagery vividness on the post-test than the pre-test. Why the control group's self-reported imagery ability would have dropped between the two testing periods in unclear. Musicians have been found to engage in considerable amounts of imagery when learning new repertoire, through score study, memorization, and mental rehearsal of musical phrases during and in between practice sessions (e.g., Bailes, 2006; Holmes, 2005; Lehmann, 1997). Although musicians can certainly employ imagery as part of performance preparation (e.g. Connolly & Williamon, 2004), this function has received little attention and the extent to which musicians use imagery for this function is unknown. The second round of testing took place just prior to the participants' end-of-year performance assessments, and it is possible that the participants were engaging in different types of practice

behaviors, and potentially less or different kinds of imagery, during the time of the second round of testing compared with the first round of testing. It is possible that potential changes in practice behaviors and activities might have contributed to the control groups' decrease in imagery vividness. Such a situation may also have contributed to the control group's considerably lower score on the Self-regulated Learning questionnaire. Due to the exercises employed within the training program, meanwhile, members of the experimental group were able to increase their imagery vividness despite changes in practice behavior. Involvement in the training program may also have facilitated the experimental group with employing greater levels of self-regulated learning behaviors while, potentially due to pressures resulting from approaching end-of-year exams and performances, the control group's use of self-regulated learning behaviors decreased. It would be of benefit for future studies to investigate the influence that different musical behaviors and pressures has on musicians' imagery abilities, particularly for the development of mental skills training programs.

Lastly, a significant increase in self-efficacy emerged for the experimental group when compared with the control group. Self-efficacy has been found to be a strong predictor of performance quality (see McPherson & McCormick, 2006; Ritchie & Williamon, 2011), so to have had an effect upon self-efficacy is a point of note. It is possible that this change in self-efficacy is linked to, and potentially resultant from, feeling more in control of debilitating aspects of performance anxiety, the third theme of comments. Indeed, having healthy perspectives toward music making, the fourth theme of comments, would likely influence musicians' perceptions of their abilities to perform. Additionally, comments from the experimental group participants indicated that they engaged in greater amounts of practice following the program. This could have also influenced self-efficacy levels.

Non-Findings of Note

Despite anxiety and arousal control being addressed specifically within the training program, it was interesting to note that no significant differences or changes in trait or state anxiety, nor any of the latter's subscales, were found between groups. That said, the experimental group's self-efficacy scores did increase significantly. Additionally, members of the experimental group commented that, following the training program, they now felt that they had greater control over, and more facilitative views toward, performance anxiety and anxiety symptoms.

As mentioned above, research suggests that anxiety should be viewed as a multi-dimensional construct, comprised of intensity and direction components (Jones & Swain, 1992; Miller & Chesky, 2004; Roland, 1994). The anxiety questionnaires employed in the present investigation only measured the perceived intensity of anxiety symptoms, not the perceived direction of those symptoms. Comments provided by the experimental group indicated changes in their perceptions surrounding the direction and control of their anxiety symptoms. These comments would suggest that rather than alleviating the symptoms of anxiety, the present training program was able to influence the participants' views and perceptions surrounding their anxiety responses and help them develop skills to manage their anxiety symptoms. Jones, Hanton, and Swain (1994) suggested that how athletes perceive their anxiety symptoms (as either facilitative or debilitative to performance) can have a greater impact upon performance quality than the intensity of anxiety symptoms.

Of great concern to many musicians is whether or not an activity to which they devote time and effort will have an influence on their performance quality. Due to this preoccupation with performance quality, it was important to assess it when measuring the effects of this program. Unfortunately, the low inter-evaluator correlations in the present investigation prevented the

performance data from being used in any of the subsequent analyses. Research would suggest that using performance quality as a research measure can be problematic. Thompson and Williamon (2003) found inter-evaluator correlations of performance quality ratings to be only moderate and biases related to instrumental experience appeared to emerge. To deal with these issues, Thompson and Williamon provided recommendations for the development of more reliable assessment scales. These recommendations were taken into consideration when developing the scales for the present study, yet it is clear that challenges still emerged. Consequently, further work is needed to develop more reliable means of measuring performance enhancement, together with ensuring that evaluators taking part in such assessments are sufficiently briefed concerning the assessment criteria employed for consistency (further discussion on the challenges inherent in musical performance assessment can be found in McPherson and Schubert, 2004).

Conclusions and Directions for Future Research

The present investigation demonstrated a number of beneficial effects resulting from participation in a musician-specific mental skills training program. In addition, the inclusion of quantitative and qualitative methods within the evaluation protocol provided a wealth of insight into the effects of the program, rich in both breadth and depth. The implementation of multifaceted mental skills training programs for musicians is a practice not yet widely researched or understood. Although this study contributed to the understanding of the effects and efficacy of such programs, it also brought to light aspects that would be worth addressing in subsequent studies.

In the present study, the control group received no form of training beyond what would typically be received as part of studying at a music conservatoire. Training at a music conservatoire is, by nature, multifaceted and diverse. A musician's training typically involves elements such as individual and group instruction on instrument-specific mechanical and performance issues, large and small ensemble coaching, individual and group training on somatic practices such as Alexander Technique, and academic lectures and seminars of varying group sizes. Given the extent of individual and small group training already provided to the control group, they were, in effect, a comparison group.

There is also the issue that recruiting sufficient numbers of students to participate in a study as lengthy and time-consuming as that reported here is particularly challenging, let alone recruiting enough participants for multiple programs. Many music students are reluctant to commit to activities that encroach on the time they have available for practicing, even if the objective of the activity is to enhance the effectiveness of their musical activities. There are two ways the issue of participant recruitment could be addressed. First, the programs offered to music students could be reduced down as much as possible so as to require minimal time commitment. Second, the usefulness of such activities for the enhancement of musical performance could be stressed to potential participants even more so in the hope that they come to view such activities as a worthwhile use of their time. Needless to say, the latter option would by no means be quick and easy, but it is ultimately the approach necessary if diverse programs, such as mental skills training, are ever to become a regular part of musicians' training.

Finally, a range of feedback was collected from the experimental group participants, during and following the training phase. Previous studies have also sought feedback from the teachers or coaches of those involved in training programs (cf. Curry & Maniar, 2003, 2004). As well as providing another dimension by which to evaluate the changes and effects of training programs,

such feedback could also be used as a form of triangulation to validate results collected from the participants.

A substantial amount of content was covered within the present program and although considerable information, both quantitative and qualitative, was collected from the participants on the perceived effects of each of the individual skills, drawing specific cause and effect conclusions is not possible statistically. In addition to the further research objectives discussed above, more targeted investigations exploring the effects of individual skills would further the understanding of the influence of those skills tremendously. The findings of such research stand to have significant bearing upon musicians' experiences and for those in charge of musicians' training, further contributing to the growing body of evidence-based research supporting new initiatives aimed at enhancing musical performance.

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