

# Developing evidence-based interventions to enhance performance

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Increasingly, a broader range of training programs and evidence-based interventions are being employed within music education contexts. It is important that these programs are empirically tested to provide an unbiased assessment of their impact and efficacy. This article highlights methods for developing and testing intervention programs. A nine-week musician-specific mental skills training program was developed and delivered to performance students from the Royal College of Music (RCM). Pre- and post-testing involved a battery of questionnaires, public performances, and performance-related tasks. Feedback from these students was collected throughout concerning their views on the relevance and usefulness of the program. In comparison with a control group, this experimental group demonstrated significant changes in their views toward practice activities and specific practicing behaviors. A significant increase in self-efficacy for performing was also found for the experimental group, as was an increase in imagery vividness. These results are further supported by comments from students in the experimental group revealing greater levels of self-awareness and confidence, facilitative views toward and heightened control over anxiety, and healthier perspectives toward music making. Feedback from the participants also provided insight into issues pertaining to content and delivery.

*Keywords:* evidence-based training; imagery; mental skills; performance science; music education

Training methods within the performing arts have typically been based upon tradition and personal experience. In addition to these, within many areas of performance, a broader range of programs are becoming increasingly employed with the aim of equipping performers with skills necessary for effective performance preparation and career management. However, some of

these programs are developed and implemented with little empirical support for their efficacy. In dance, for instance, educators are being encouraged to review and assess how training is provided (Kimmerle and Côte-Laurence 2003). From the viewpoint of researchers, performers, and those who train performers, it is important that these programs be subjected to empirical testing in order to provide an unbiased assessment of how they can be employed to enhance performance, not to mention a level of quality assurance regarding their efficacy.

This paper highlights methods for empirically developing and testing intervention programs with a focus on evidence-based outcomes. In particular, a musician-specific mental skills training program is evaluated qualitatively and quantitatively in terms of its potential to enhance learning and performing skills.

## METHOD

### Participants

Twenty-three undergraduate and postgraduate performance students were recruited from the RCM. Of these, 14 were assigned to an experimental group while 9 formed a control group. Ages ranged from 20-28 years (mean=22.3, median=22.0, SD=2.2). In terms of the participants' year of study, 4 were year 1 undergraduates, 6 were in year 2, 5 were in year 3, 3 were in year 4, and 5 were postgraduates. For their instrument groupings, 7 were pianists, 4 were vocalists, 7 were string players, and 5 were woodwind or brass players.

### Materials

A battery of quantitative and qualitative methods was employed to assess the training program. Quantitative measures addressed the participants' practice attitudes and behaviors (adapted from an interview schedule on self-regulated learning by Zimmerman 1986), assessing how important the participants felt it was to engage in a variety of self-regulated learning behaviors as well as how often they actually employed the different types of learning behaviors. The participants were also asked to self-rate their proficiency on a selection of musical skills. In addition, imagery ability was assessed using the randomized short version of Betts Questionnaire upon Mental Imagery (Betts QMI, Sheehan 1967). Personality characteristics were assessed, including self-efficacy for performing, in reference to both a live performance and a hypothetical performance. The Revised Competitive State Anxiety Inventory (CSAI-2R, Cox *et al.* 2003) was employed to measure self-confidence and

state anxiety prior to performing, while trait anxiety was measured using the trait anxiety index from the Spielberger State-Trait Anxiety Inventory (TAI, Spielberger *et al.* 1970). Lastly, each participant gave a 15-minute public performance comprising two contrasting pieces of their choice in order to measure performance ability.

Qualitative methods involved feedback from the experimental group collected during and following the training phase concerning students' views on the relevance and usefulness of the program, focus groups conducted with the experimental group following the training and final testing phase, and case notes kept by the first author throughout the project.

## **Procedure**

Participants from both the experimental and control groups first attended a session during which they completed most of the questionnaires. Following this, each participant performed their chosen pieces in a public performance. Immediately prior to performing, the participants completed the self-efficacy for performing questionnaire and the CSAI-2R. The performances were videoed and assessed for quality by two external adjudicators. Upon completion of the first round of testing, a musician-specific mental skills training program was delivered to the experimental group. The topics covered fell in three main categories: (1) motivation and effective practice, (2) relaxation and arousal control, and (3) performance preparation and enhancement. The training phase involved one 60-minute group session and one 30-minute individual session per week for nine weeks. The control group, meanwhile, received no additional training. Following the training phase, the experimental and control groups again completed the questionnaires and public performances, using a procedure identical to the first round of testing. Descriptive statistics for the questionnaires were initially calculated from the two rounds of testing, following which repeated-measures analyses of variance (ANOVAs) were employed to elucidate changes occurring from one testing phase to the next.

## **RESULTS**

### **Quantitative results**

The assessment protocol employed in this study yielded a number of significant findings (see Table 1). In comparison with the control group, the experimental group demonstrated significant changes in their views toward practice activities and in their specific practicing behaviors. This was evidenced by a

*Table 1.* Significant results from repeated-measures ANOVAs. The mean scores (and standard deviations) for the experimental (EG) and control groups (CG) for both phases of testing are provided, as are the resulting F values.

		<i>Pre-test</i>	<i>Post-test</i>	<i>F</i>
Self-regulated learning	EC	48.69 (6.21)	48.69 (4.51)	$F_{1,21}=6.22, p<0.01$
	CG	51.18 (6.34)	51.18 (4.90)	
Quantity of practice	EC	4.39 (1.15)	4.39 (1.35)	$F_{1,21}=9.64, p<0.01$
	CG	4.27 (1.35)	4.27 (1.06)	
Technical proficiency	EC	4.81 (0.66)	4.81 (0.73)	$F_{1,21}=5.59, p<0.01$
	CG	5.18 (0.75)	5.18 (0.83)	
Self-efficacy	EC	41.94 (5.09)	41.94 (5.03)	$F_{1,21}=6.88, p<0.01$
	CG	45.00 (6.18)	45.00 (6.24)	
Betts QMI: Total	EC	105.44 (26.13)	105.44 (26.22)	$F_{1,21}=9.26, p<0.01$
	CG	78.36 (16.63)	78.36 (21.92)	
Betts QMI: Sensations	EC	16.00 (6.09)	16.00 (4.80)	$F_{1,21}=5.66, p<0.01$
	CG	11.09 (3.18)	11.09 (3.89)	
Betts QMI: Touch	EC	15.63 (4.65)	15.63 (5.43)	$F_{1,21}=6.75, p<0.01$
	CG	10.64 (4.06)	10.64 (4.51)	

significant increase in the experimental group's scores on the self-regulated learning questionnaire compared with the control group. The increase in practicing behaviors over the control group also emerged on the musical skills items of "quantity of practice" and "technical proficiency." Increased practice effectiveness appeared to enhance the experimental group's self-efficacy as well, as demonstrated by their significant increase beyond that of the control group. The experimental group's imagery ability also increased significantly over the control group's, specifically within the total score from the Betts QMI, along with the scores for the subcomponents of touch and interoceptive sensations.

### **Qualitative feedback**

The results in Table 1 were further supported by comments from the participants revealing that, as a result of taking part in the training program, they were experiencing improved practice efficiency, greater levels of self-awareness and confidence when performing, facilitative views toward and a heightened sense of control over anxiety, and healthier perspectives toward music making.

Feedback from the participants also provided insight into issues pertaining to the content and delivery of the program. The participants felt that the training program could have been strengthened with the inclusion of more case studies and less information on research findings, more examples of practical application, and a greater use of class discussion and activities to facilitate learning from one another.

The case notes, as well as information derived from the follow-up focus group, suggest that people may respond to a training program individually, particularly in terms of their willingness to engage with some of the content areas. Given this, prior to program implementation, it would seem instructive to develop a sense of participants' willingness to engage in change so that the program could best be designed and delivered based on the participants' wants and needs.

## DISCUSSION

While evidence-based training programs are commonplace within sport, similar empirical backing is largely lacking for many programs within the performing arts. Partly due to this, there is still little scientific evidence to indicate the range of benefits performers stand to gain from such programs, as well as the most efficacious means of providing training and education. The mixture of quantitative and qualitative investigation employed in the present study provides one means of addressing these questions.

In addition, a few issues arose as a result of the employment of this particular assessment protocol that are worth noting. Quantitative results derived from questionnaires could potentially be somewhat misleading given that the questionnaires employed may not be adequately sensitive, or even appropriate, to pick up changes. This could account for the fact that while anxiety intensity scores did not change significantly in the present investigation, the experimental group participants reported frequently how their perceptions toward anxiety had changed. Moreover, while assessment of performance quality is often important to many within performers' training, using it as a dependent measure to gauge program effectiveness could be challenging, particularly given how slowly performance quality improves and the somewhat subjective methods available for measuring improvement. When employing new training methods and techniques, changes may be slow to occur. This refers to both the participants' willingness to engage in new methods, as well as their abilities to engage with the methods presented. This should be borne in mind by those implementing new interventions and training programs.

In the present investigation, the importance of employing a mixed-methods approach to generate a more complete understanding of the effects of a training program was reaffirmed. Through the knowledge gained, this study aims to impact on performers' training and education and, subsequently, on their performance experiences. In doing so, it contributes to the growing body of evidence-based research supporting novel programs for enhancing performance.

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