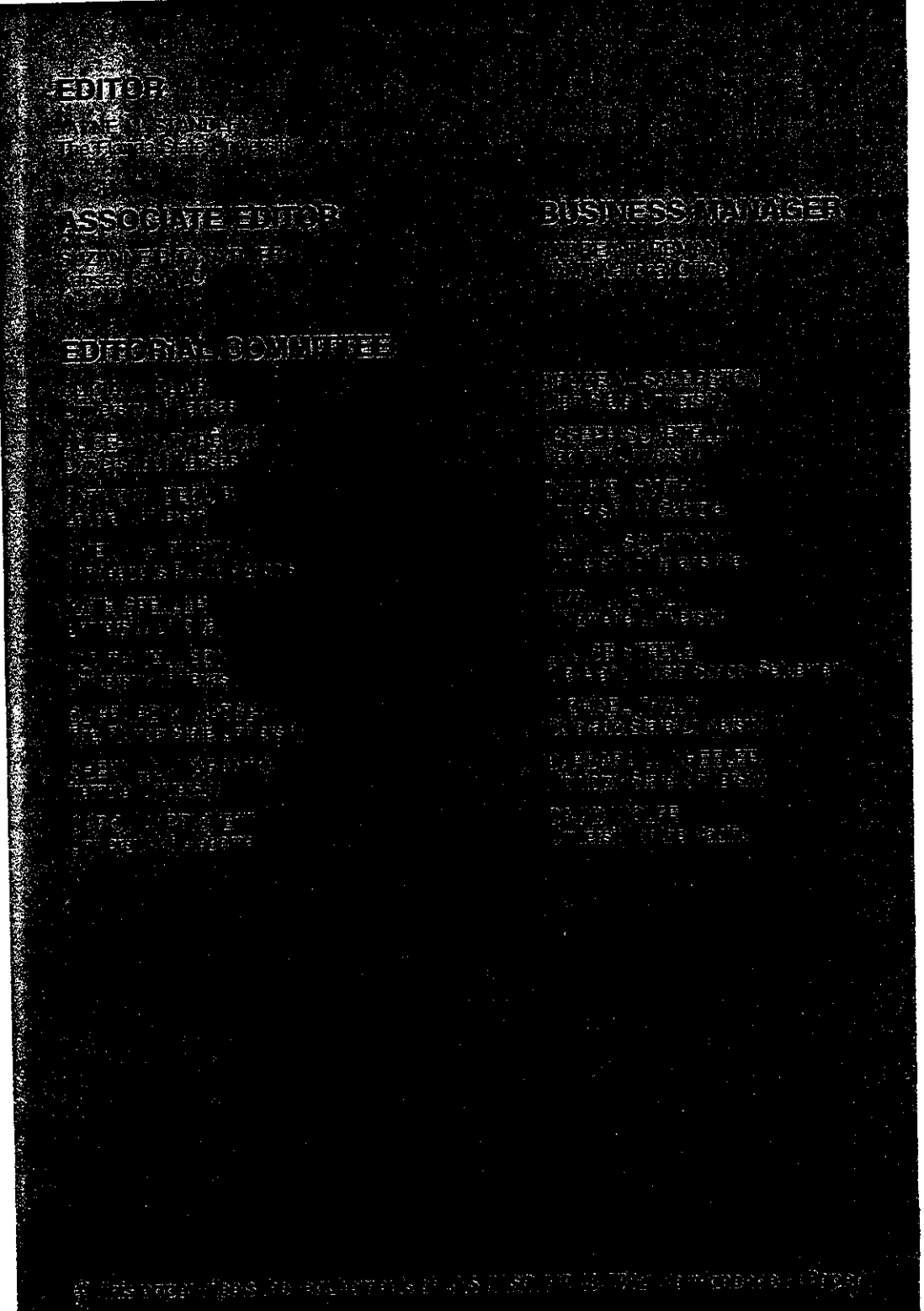

journal of
music therapy

CONTENTS

Vol. XXXIV No. 1 **Spring 1997**

ARTICLES

The JOURNAL OF MUSIC THERAPY (ISSN 0022-2917) is published quarterly, one volume per year, by the National Association for Music Therapy, Inc., 8455 Colesville Road, Suite 1000, Silver Spring, MD 20910. Printed in the U.S.A. Periodicals postage paid at Silver Spring, MD and at additional mailing offices.

Subscription rates are $95.00 (domestic, Canada, Mexico) and $105.00 (foreign) per year; single copy rates are $35.00 (domestic, Canada, Mexico) and $35.00 (foreign). All memberships in NAMT include a subscription to the JOURNAL OF MUSIC THERAPY.

Statements and opinions in the JOURNAL OF MUSIC THERAPY are the responsibility of the authors and do not necessarily reflect the views of the National Association for Music Therapy, Inc.

POSTMASTER: Send address changes to JOURNAL OF MUSIC THERAPY, 8455 Colesville Road, Suite 1000, Silver Spring, MD 20910.

The JOURNAL is being listed in EXCEPTIONAL CHILD EDUCATION RESOURCES, PSYCHOLOGICAL ABSTRACTS, PSYCINFO, PSYCLIT, THE HOSPITAL LITERATURE INDEX, MUSIC ARTICLE GUIDE, THE SELECTED LIST OF TABLES OF CONTENTS OF PSYCHIATRIC PERIODICALS, dsh ABSTRACTS, SOCIAL SCIENCES CITATIONS, EDUCATION INDEX, MUSIC THERAPY INDEX, and MUSIC PSYCHOLOGY INDEX.

Journal of Music Therapy, XXXIV (1), 1997, 2–32

Clinical Trial of a Music Generated Vibrotactile Therapeutic Environment for Musicians: Main Effects and Outcome Differences Between Therapy Subgroups

Warren Brodsky, PhD CMT/RMT-BC
Ben-Gurion University of the Negev, Israel

John A. Sloboda, PhD, ATLC, FBPS, CPsychol
Keele University, Staffordshire, England

Music performance anxiety (MPA) has been documented as affecting over 60% of all performing musicians. Clinical studies have shown that cognitive-behavioral psychotherapeutic interventions are highly effective in reducing such anxiety. However, the proportion of musicians seeking amelioration from MPA that enter therapy is low, and thus in reality, traditional counseling environments have been less than fertile in mediating the high incidence of this problem. This study investigates music-enhanced therapeutic regimes as compared to standard traditional verbal counseling and psychotherapy in order to evaluate a potentially attractive therapeutic option designed especially with musicians in mind. Fifty-four professional symphony orchestra musicians were first matched in a stratified fashion and then randomly assigned to one of three treatment interventions: traditional psychotherapeutic counseling, counseling supplemented with music, or counseling supplemented with music plus vibrotactile sensations. Treatment conditions were based on cognitive-behavioral techniques including relaxation training and imagery. The Somatron® *Acoustic Massage™ power recliner served as the therapeutic environment for all musicians. Results indicated that music-enhanced therapies were just as effective as traditional counseling. The study's unique features include a dismantling strategy utilized in therapy evaluation studies, comparison between active treatments, and conceptualization of the underlying psychological problems faced by musicians as career-based within an occupationally-related context.*

Warren Brodsky, Post-Doctoral Research Fellow of Music Neuropsychology at Ben-Gurion University of the Negev, and Lecturer of Music Psychology/Music Therapy Levinsky College of Education, and Kibbutzim College of Education, Israel. John A. Sloboda, Professor of Psychology and Founding Director, Unit for the Study of Musical Skill and Development, Department of Psychology, Keele University, England.

This paper is based on the first author's PhD Dissertation completed June 1995 at Keele University, Staffordshire, England.

The authors wish to thank Mr. Byron Eakin, President, *Somatron* Corporation (formerly Somasonics Inc.) in Tampa Florida for providing the *Somatron*® Recliner which was used in the Clinical Trial Intervention.

Correspondence concerning this article should be sent to Warren Brodsky, Department of Behavioral Sciences, Ben-Gurion University of the Negev, POB 653, Beer-Sheva 84105, Israel.

Career stress and music performance anxiety (MPA) affects over 60% of performing musicians, but the effectiveness of traditional counseling interventions in mediating the incidence of this problem has been low. In this paper we review relevant research literature on sources of musician stress and evaluated interventions. We then examine the proposal that a music-enhanced therapeutic regime may be a fruitful environment to counsel musicians for their occupationally-based anxieties. Further, we explore the suggestion that enhanced therapeutic outcomes may be achieved in an environment where music-generated vibrotactile sensations are experienced. To test these proposals we report a clinical trial of a music-generated vibrotactile therapeutic environment—known as the *Somatron*® Acoustical Massage™ power recliner—with samples of professional symphony orchestra musicians.

Music-Related Medical Problems of Musicians

A comprehensive picture of the medical and psychological problems that orchestra musicians face has been presented by several authors (Habboushe & Maranto, 1991; Janiszewski, 1992; Manchester, 1988; Norris, 1993; Ostwald, 1994; Ostwald, Baron, & Wilson, 1994; Sataloff, Brandfonbrener, & Lederman, 1991). The majority of studies suggest that at least half of all musicians experience at least one playing-related medical problem which may threaten or actually end their career (Caldron, 1986; Fishbein, Middlestadt, Ottati, Straus, & Ellis, 1988; Fry, 1986; Hiner, Brandt, Katz, French, & Beczkiewicz, 1987; Lockwood, 1989). From a theoretical point of

view, these medical problems can be understood as pertaining to either conditions and aberrations which are not specific to musicians but are detrimental to their performance, or as conditions that are somewhat exacerbated by performance-related behavior, and thus, may be unique to music-making (Clark, 1989; Habboushe & Maranto, 1991). One study in particular, which is considered to contain the most representative sample of the orchestral population at large, suggests that 82% of orchestra musicians experience musically-related medical problems; while 76% stated that at least one medical condition was severe enough to affect and interfere with their performance, 36% reported suffering from four problems or more (Fishbein et al., 1988). Perhaps it is to be expected that problems of the lower back (22%), neck (21%), shoulder (20%), and upper back (16%) would be the most prevalent problems to be reported by orchestra performers. However, mental health problems such as stage fright (24%), depression (17%), sleep disturbances (14%), acute anxiety (13%), and severe headaches (10%) were also commonly reported. A range of studies from different countries have confirmed this general picture (Gordon, 1994; James, 1984; Marchant-Haycox & Wilson, 1992; Middlestadt & Fishbein, 1989; Pratt, Jessop, & Niemann, 1992; Wesner, Noyes, & Davis, 1990; Whelan, 1994).

In the past, many studies have suggested personality factors (such as deficiencies and residual inclinations) which might predispose musicians to mental health problems. However, the stressful nature of the occupation itself may account for much of the incidence of these psychological problems. The lifestyle of professional musicians may be uniquely stressful (Sternbach, 1993). In a comparative study between several occupational groups, Kivimaki and Jokinen (1994) found that though the musicians in their sample reported the highest levels of job satisfaction, they also demonstrated the highest levels of exhaustion, stomachaches, headaches, and sleep disturbances. In a Swedish study which compared symphony musicians to air traffic controllers, aircraft mechanics, freight handlers, physicians, and waiters, the musicians demonstrated significantly higher levels of blood pressure during working hours; these levels were equal only to freight handlers (Gabrielsson, in press). Over 60 types of workplace hazards and stressors attributed to music performance have been documented, and research findings attest to the fact that the music profession is among

the top five life-threatening professions; professional musicians seem to die 22% sooner than the general population (Sternbach, 1993). The ill effects of stress and anxiety among musicians is clearly a serious matter, and the promotion of a healthier performance environment should be top priority for every orchestra management and music conservatory.

Recently a number of publications have appeared which aim to help educate and guide the professional musician through the everyday stressors of a performance career (Evans, 1994; Green & Gallwey, 1986; Lieberman, 1991; Norris, 1993; Salmon & Meyer, 1992; F. Wilson, 1986; G. Wilson, 1984). However, these "self-help" publications are no substitute for professionally administered therapeutic interventions designed to assist musicians in developing the appropriate coping mechanisms within a clinically-oriented framework.

Various strategies for coping with stress have been developed and applied by both individual musicians and by mental health practitioners. Though these methods may primarily be instrumental or palliative in nature, most involve both elements. Instrumental strategies imply direct action in an attempt to change the troubled transaction through the alteration of environmental demands or one's self-capacity, while palliative approaches attempt to regulate the emotions and responses associated with stress through managing tension and thus minimizing distress (Hanser, 1985). The list of methods or "coping therapies" musicians have used include: Alexander and Feldenkrais body techniques; aerobic exercise; anxiety management training; attention focusing techniques; autogenic training; cognitive behavioral therapy; cognitive restructuring; cognitive systematic desensitization; development of interests and hobbies outside the realm of music; exposure to performance-related situations; goal imaging; hypnotic suggestion; imagery; meditation; mental rehearsal; muscle tension and finger temperature biofeedback; nutrition therapy; positive self-statements; prayer; relaxation training; self-hypnosis; stress inoculation therapy; systematic rehearsal; and yoga (Cox & Kenardy, 1993; Evans, 1994; Fetter, 1993; Fogle, 1982; Lehrer, Goldman, & Strommen, 1990; Niemann, Pratt, Maughan, 1993; Salmon & Meyer, 1992; Steptoe, 1982; Wilson, 1984).

Despite this multiplicity of coping strategies, most clinical intervention trials reported in the literature point to the overall thera-

peutic effectiveness of an approach based on cognitive-behavioral therapy to ameliorate the effects of career stress and music performance anxiety (Clark & Agras, 1991; Craske & Rachman, 1987; Kendrick, Craig, Lawson, & Davidson, 1982; Montello, Coons, & Kantor, 1990; Nagel, Himle, & Papsdorf, 1989; Nieman et al., 1993; Norton, Maclean, & Wachna, 1978; Rider, 1987; Stanton, 1993; Sweeney & Horan, 1982). The approach utilizes the combined components of cue-controlled progressive muscle relaxation, breathing awareness, cognitive restructuring, behavioral rehearsal, and imagery. In clinical trials this approach has been shown to be significantly more effective than either control group conditions (such as musical analysis training, wait-list control, and non-treatment groups) or pharmaceutical agents (such as placebo and beta adrenaline blockers).

It would seem, therefore, that musicians have a proven means of effectively addressing the psychological problems of the performing career. It appears, however, that musicians do not seem to be utilizing traditional psychotherapeutic and counseling treatments to the extent that they utilize drugs and other substances. For example, Fishbein et al. (1988) indicated that, in general, at least 27% of all musicians report to have resorted to pharmaceutical solutions. Further, in regard to musicians who specifically related stage fright as a severe problem, prescription medication was reported to be the most popular (40% tried) and most effective (92% success rate) intervention method, and although psychological counselling was reported to be the second most frequently tried intervention (25% tried) it was found only to be moderately effective (60% success rate). Similar figures from other studies document the use (or perhaps nonuse) of psychological treatments to alleviate career stress and MPA (Clark & Agras, 1991; James, 1984; Wesner et al., 1990). Perhaps musicians' own rating of therapeutic success should not be trusted; there may be other reasons why pharmaceutical and recreational substances seem to appeal more to musicians than counseling. For example, drugs require less effort, are easier to schedule, and seem to be financially more palatable than counseling. Therefore, no matter how many clinical intervention trial studies demonstrate that cognitive-behavioral therapies are effective, and are in fact more effective than chemical solutions, it seems to be an unfortunate circumstance that neither therapists (Evans, 1994) nor therapeutic environments (Salmon & Meyer, 1992) are recognized by the majority of musicians as applicable, nor thought to be effective.

Moreover, in spite of the clinical success of cognitive-behavioral interventions for treating the psychological problems of professional musicians, some authors (Clark, 1989) feel that "performance anxiety is generally considered a normal discomfort not suitable for traditional psychological or psychopharmaceutical approaches" (p. 33), and state that "adequate treatment methods for music performance anxiety are lacking, with the same behaviour and cognitive therapies used to treat other disorders being used to treat music performance anxiety . . . [and thus, we advocate] the development and implementation of treatment programmes that are better suited to the needs of the musician . . ." (Cox & Kenardy, 1993, p. 59). One solution this paper investigates involves the adaptation of the counseling environment utilizing a cognitive-behavioral therapeutic intervention specifically for musicians. That is, supplementing traditional counseling and psychotherapeutic conditions with music itself implemented by a music therapist. Music therapists are experts on the influence of music on health, and uniquely skilled in using music to achieve biomedical and psychosocial goals at various levels of intervention (Maranto, 1992a).

The use of music as a component in stress management treatment has been reviewed by Hanser (1985). In this context the use of music refers to prerecorded music tapes whereby the main mode of music activity is listening. Under the appropriate conditions, music can facilitate changes in emotions, mood, and physiological states; it can be a powerful agent in promoting a relaxation response and thus reduction of anxiety (Scartelli, 1989). Although there has been a great deal of controversy over the exact effects of music (Hanser, 1988), in general there is a great deal of evidence that music is a powerful emotional stimulus which can elicit physiological responses, psychological (mood/affective) responses, and cognitive responses simultaneously. Further, music has the potential for physiological and psychological entrainment, and may evoke imagery and associations by either or both the specific elements of music or the general characteristics portrayed in a piece. Further still, music may provide cues for physiological aspects of relaxation by serving to focus attention, thus reducing distractions and anxiety-provoking thinking; these may be interpreted as blocking left-hemispheric activity through enhancement of right-hemi-

spheric processes (Hodges, 1980; Maranto, 1993). Music has been successfully employed to reduce stress and tension in a range of therapeutic contexts (Lee, 1989; Maranto, 1991, 1993; Scartelli, 1989; Spintge & Droh, 1987, 1992). It is somewhat ironic that the last people to receive some benefit from formal therapy including music have been professional musicians themselves.

Music-Enhanced Therapeutic Regimes for Musicians

Maranto (1993) states that "although the idea may seem paradoxical, music may be influential in reducing anxiety associated with performance" (p. 418). By using the music setting as a model for the environment in which the stress-evoking interactions and events may occur, the music therapist can efficiently identify problems and attempt to solve them within the confines of the session (Hanser, 1985). It is clear that through the various techniques available to music therapy (such as listening activities, improvisation, performance, cognitive awareness techniques, and verbal processing) significant reductions in anxiety coupled with significant gains in confidence can occur. Salmon and Meyer (1992) feel that the ability of music performers to move between verbal and nonverbal modes of communication is the most valuable tool which therapists can utilize to clarify and deal with the problems of musicians.

Music-based therapy is a means of capitalizing on the unique relationship the musician has with music. Maranto (1992b) points out that considering how musicians are involved with music as a career from a very early age of development, they may also be very aware of the influence music has had on their personalities and in shaping their lives. By virtue of witnessing the reactions of the audience to their appearances, musicians may also be aware of the intense power of music and its therapeutic ramifications. Music-based therapy may be a very effective treatment for musicians because they may have a belief in how music can gain access to their emotions. Thus, the use of music in a therapeutic regime is a logical treatment environment for musicians whose own belief systems support its efficacy. Finally, not only is music-based therapy safe, non-invasive, and accessible, but it is also a stigma-free treatment which may complement their lifestyle.

Only a few intervention studies have been reported in the literature which describe the use of music-based therapy with musicians.

Rider (1987) presented a clinical case study as a vignette demonstrating an intervention for a debilitated musician. The intervention utilized a combined therapeutic package consisting of progressive muscle relaxation, biofeedback, cognitive-behavioral techniques (such as systematic desensitization and positive affirmations), guided imagery and music (GIM), and piano improvisations with an orchestra player afflicted by muscle fatigue and performance anxiety. After the eight-session course of therapy, the musician was reported to have returned to performing with less pain, and experienced more personal satisfaction through increased self-confidence. Montello et al. (1990) and Montello (1992) described a study which utilized group music therapy sessions as a mode of treatment for performance stress in professional musicians. Twenty-seven free-lance musicians of various genres (classical, jazz, rock, and pop) were randomly assigned to either (a) group music therapy treatment, (b) attentional, or (c) wait-list control groups. Pretreatment baseline data was collected including an in vivo pretreatment performance. Group music therapy sessions, implemented over a 12-week period, consisted of relaxation and breathing exercises, unstructured group improvisations, verbal free association to improvisations, and either individual/group music therapy interventions or rehearsal performances. End of therapy data was collected including an in vivo posttherapy performance. Results indicated that musicians participating in group music therapy demonstrated significantly more self-confidence and less anxiety than musicians participating in either attentional or wait-list control groups (which did not significantly differ).

Both of the above mentioned studies offer additional empirical evidence that music therapy is effective, and in fact, that music therapy is more effective than the non-specific effects of treatment such as being allocated to a treatment group (wait-list control group) or maintaining contact with a therapist (attentional control group). Nevertheless, both fall short of providing evidence that music-enhanced therapeutic regimes are as effective (or more effective) for musicians than traditional psychotherapeutic and counseling treatment interventions. There are no published studies which have undertaken comparisons between controlled intervention procedures using matched professional musician samples, such that one therapeutic regime was enhanced with music while the other used a traditionally verbal counseling format. The cur-

rent study aims to remedy this deficiency, while at the same time investigating a further potential therapeutic procedure which may be combined with music, that is, music-generated vibrotactile sensations.

It has long been acknowledged that a combination of auditory and tactile imagery is very positive in nature with regard to the enhancement of musicians' performance skills. More recently, Salmon and Meyer (1992) have pointed to musicians' unique sense of vibrotactile imagery as a contributing factor in relation to distressful anxiety (referred to as adaptive facilitating anxiety). They highlight clinical evidence that musicians who incorporated combined vibrotactile imagery within their array of psychological coping methods and stress management techniques, found it to be effective in enhancing their practice and rehearsal regimes, as well as improving their performance abilities. Vibrotactile imagery experiences, therefore, can be seen not only in their value as a supportive technique, but as a measure of prevention and intervention towards the effects of debilitating anxiety.

The vibrotaction system is as much related to our sense of hearing music as is the auditory system, as both are activated by mechanical displacements of sensory receptors by energy from the environment—and music, from a physics/acoustics viewpoint, is simply a mechanical displacement of the environment. The most comprehensive review of vibration sensation in humans relating to musicians was presented by Verrillo (1992). Verrillo illustrates that vibrotactile sensitivities are within the frequency ranges of most orchestra instruments, although the human is most sensitive to vibrations between 40–250 Hz which represents a music spectrum from the lowest tones of the double basses to approximately *middle C* on the piano. Verrillo concludes that although the primary sensations utilized by the musician are auditory, that is not to say that vibrotactile feedback is unimportant; it seems that the receptors on the cutaneous tissue are biologically secondary and supportive to the auditory system.

Both Standley (1991) and Madsen, Standley, and Gregory (1991) used a commercially available environment for presenting music-generated vibrotactile stimulation—the *Somatron*® Acoustic Massage™ system—to investigate psychophysiological responses to vibrotactile stimuli. Both studies concluded that participants perceived the tactile-musical experience as relaxing yet stimulating.

Further, Madsen et al. concluded that "vibrotactile use in all of its various ramifications merits careful attention. Aspects relating to whole body masking effects, entrainment of possible physiological changes, and increased relaxation or stimulation caused by various frequencies without, or in combination with, various musical selections are all fertile areas for investigation" (p. 21). Listing several future applications of the *Somatron*®, including performance anxiety reduction among musicians, Madsen et al. reiterate that "while it has been known for some time that music vibrations do more than stimulate the hearing system and actually penetrate the body, specific effects and cautious detailed research will provide a more solid basis for this burgeoning area of music-based vibrotactile therapy" (p. 22).

The Intervention Study

The purpose of the present study was foremost to evaluate the effectiveness of a music-enhanced therapeutic environment for musicians. That is, is the enhancement of traditional counseling or psychotherapy with music as effective a therapy with musicians as the standard traditional verbal psychotherapeutic counseling interventions? In addition, the study explored the impact of two different formats with which music can be presented to musicians engaged in therapy in order to evaluate whether or not the enhancement of traditional counseling or psychotherapy with music-generated vibrotactile sensations is as effective a therapy with musicians as traditional counseling or psychotherapy enhanced by music alone.

Method

Therapeutic environment. The *Somatron*® Acoustical Massage™ power recliner was the central feature of the therapeutic environment. The recliner converts music into stimulation which is perceived by the ears as well as felt by the entire body via a system of "floating" resonator chambers. A push-button control reclines the *Somatron*® to any desired position. The full extension of the chair reclines to the Trendelerberg position which elevates the legs higher than the heart; a position that enhances the relaxation response by altering circulation, pulse rate, and rhythmicity of breathing. The recliner is supplied with six full-range (40–20,000

Hz) speakers. These include two 8" body speakers, two 5" foot speakers, and two 5" head speakers. The recliner reproduces music from industry-standard commercially available audio cassette tapes and/or compact disks (CDs). Transmitting hundreds of different vibrating frequencies to match the music simultaneously, the total power capacity of the *Somatron*® is 100W. In the current study a hybrid of two existing models was used; the base came from a former design while the seat and top section were of the current available model at the time of the study (1992). The base used was both wider and heavier than that on the more recent models, thereby increasing the overall stability of the chair. The current commercially available model features a seat and top section that incorporates an "isolation hood;" this was considered to be quite a favorable feature as it effectively reduced visual distractions during therapy. In addition, the recliner was supplied with improved electronic components; the standard 8" speakers were upgraded to 10" woofers with mid-range tweeters for both seat and back sections, as well as with two wider range speakers for the foot and head sections. Thus, the full range was increased to include responses between 20–20,000 Hz, and the power capacity was widened to handle a total 130W.

Further development and adaptation of the *Somatron*® recliner was directly related to specific empirical requirements of the research project. As some musicians in the sample were to hear only music without the benefit of simultaneous vibrations, the rewiring of input/output channels was required; an essential adaptation as the *Somatron*® is designed solely to supply the combined stimuli of music and vibration. It should be pointed out that the separation of the speakers in the head section (for the music alone condition) from the speakers in the feet, seat, and body sections (which supply the "acoustic massage") necessitated twin sound systems; each with an individual power amplifier and equalizer. The Hi-Fi sound system used in the current study consisted of a Kenwood (KA 5040R) integrated amplifier @95W, a Nakamichi (Amp 2) integrated amplifier @50W, a Kenwood (GE 4030) 7-band graphic equalizer [one per amplifier], a Marantz (CD 42) compact disk player, and a Pioneer (CT540) cassette deck. The components were wired in sequence so as to activate either the cassette tape player or CD as drivers for both the music alone or music with simultaneous vibration conditions (see Figure 1). The Hi-Fi equipment was locked into a wood cabinet console which concealed it from those musi-

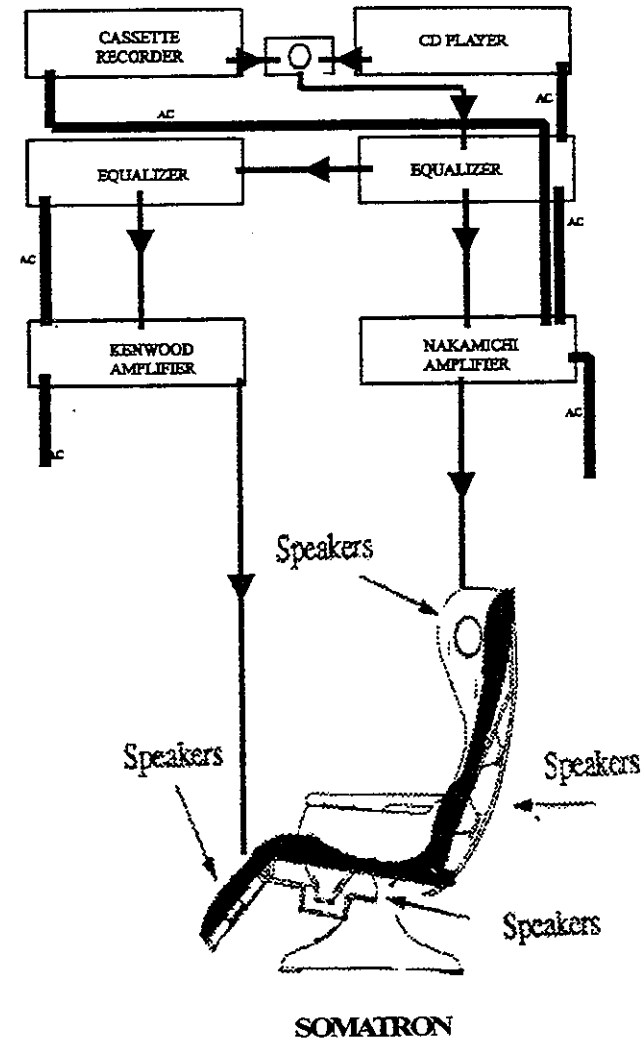

FIGURE 1.
Block diagram of hi-fi system.

cians who were not intended to know about the music features of the *Somatron*® as part of the empirical experimental controls of the project. Because the recliner physically and acoustically engulfs the listener's body, and the sound level of the music and/or music generated vibration masks the external environment, a third indepen-

dent system was added to the recliner for the provision of verbal instructions.

Standard use of the *Somatron®* recliner reproduces music comfortably from 55–65 dB while the vibrotactile sensations become apparent to the listener from 70–80 dB taken approximately one meter from the recliner. While seated in the recliner, musicians may be exposed to sound levels between 80–100 dB for short intervals of approximately 5 to 10 minutes. It should be pointed out that noise exposure standards documented by the USA Occupational Safety and Health Administration deem sound levels above 85 dB for an 8-hour period as hazardous (Clark, 1989). Thus, the *Somatron®* did not seem to present any threat to a musician's hearing (especially in light of the relatively short duration of exposure used within a 55-minute therapy session). Moreover, this exposure is not nearly as hazardous as those sound levels measured on the concert platform itself; the typical professional orchestra player is exposed to an average 102–130 dB every minute of a full concert program, lasting between 2–4 hours per night, 4 nights per week, over a 40-week work year (Haider & Groll-Knapp, 1981).

Therapeutic orientation and approach. The current investigation was primarily a *Psychological Clinical Trial* (Johnson, 1989) based on methodology utilized in traditional psychotherapy outcome studies. However, the study can also be seen as a *Prima Facie Exploratory Investigation* (Robson, 1993) of a new approach to therapy with musicians. The intervention used in the study was modelled on an approach combining relaxation exercises, cognitive-behavioral therapy techniques, and music therapy. The relaxation exercises used were originally devised by Jacobson in 1938, however, subsequently modified and drastically abbreviated; referred to as Abbreviated Progressive Relaxation Training (APRT) (Bernstein & Carlson, 1993). APRT seeks to reduce the autonomic activation of anxiety by reducing skeletal muscle tension. The cognitive-behavioral techniques used in the therapeutic intervention focused on reducing hyperactivity of the controlling cognitive schema by supporting more adaptive functions through examining internal factors such as thoughts, impulses, and feelings (Beck, 1993; Meichenbaum, 1993). As these internal schema contribute to the stress response, subjects were encouraged to become more aware of the meanings they had given to events which lead up to certain reactive behaviors. The intervention conveyed the message that stress training would not eliminate stress, but, rather encourage more flexible and adaptive responses to everyday situations. Music enhanced this therapeutic regime and supported relaxation responses, as well as evoked imagery and associations which corresponded to physiological, cognitive, and psychological processes. The intervention conformed to the more popular view that stimulative music will increase physiological response levels of arousal and cognitive involvement, while sedative music will decrease them. The approaches and techniques utilized in the intervention were formalized through a *Manual of therapy* (Brodsky, 1993, 1995). Manualization of the intervention, its techniques and process, were viewed as imperative for empirical control of variables within this current experimental research study. The manual specified a progression of interventions to be offered and issues explored over a course of 8 weekly 1-hour individual sessions.

Structure of the therapeutic intervention study. The investigation followed the procedures of a randomized pretest-posttest three-group therapeutic intervention. Six stages were implemented during the study spanning a total of 18 months. The six stages were (a) screening, (b) baseline (T1-testing); (c) three-group intervention; (d) outcome (T2-testing); (e) follow-up (T3-testing); and (f) debriefing. Potential subjects signed a consent form, and filled in the General Health Questionnaire (28-item scaled version). The GHQ-28 was used as a screening device to ensure that the sample met specific criteria representing a normal healthy working professional population. All subjects initiating therapy filled in a pretherapy assessment booklet containing six independent measures. This baseline T1-testing consisted of the Spielberger State Trait Anxiety Inventory (STAI), Derogatis Stress Profile (DSP), Profile of Mood States (POMS), Maslach Burnout Inventory (MBI), the Appraisal of Music Performer's Stress (AMPS), and the Music Performance Stress Survey (MPSS). The subjects received on-site individual therapy, for 1 hour per week over an 8-week period; subjects completed pre and postsession POMS for each hour of therapy received. The format of all sessions offered in the investigation conformed to a four-part template which increased the participants' level of inner security as it provided a consistent framework. It also allowed the therapist a consistent framework in which to fulfill the *Manual of*

TABLE 1
Template Used for Therapy Sessions

No.	Description	Duration
1	Presession POMS (Form A)	6–10 min
2	Relaxation exercises	10–20 min
3	Sequenced Prescribed activity	30–40 min
4	Postsession POMS (Form B)	6–10 min
	Total Session Time	58 min

therapy while offering adequate flexibility to meet the specific needs and preoccupations of each individual musician-client (see Table 1).

All subjects completing therapy filled in a posttherapy assessment booklet containing six independent measures; outcome T2-testing was identical to the pretherapy test booklet. All subjects who participated in therapy filled in a 2-month postintervention assessment booklet; follow-up T3-testing was identical to the posttherapy test booklet. Finally, participants attended a debriefing session. As musician-subjects scheduled individual therapy sessions prior to, in between, and after rehearsals or performances in three different cities in North West England, an overall *staggered design* of therapeutic intervention was implemented at four research sites.

Subjects. Participants in the study were professional symphony orchestra musicians ($N = 54$). The criteria used to demonstrate the status of professional musician was a declaration that 90% of their weekly preoccupation was engaged in musical activity, and that no significant financial earnings for any other activity were paid. The musicians in the study were both contract and freelance orchestra musicians; a difference which in the UK does not reject assumptions about homogeneity. The majority of the participants [68.5%] were string players, with all other major orchestral instruments being represented by a minimum of three players. The average age of the players was 36 [range = 22–55 years] with an almost equal number of males and females. Forty-eight of the participants had completed formal training (degree or diploma) at the undergraduate level.

Procedures of the therapeutic intervention. The majority of the participants in the study were recruited via a survey questionnaire sent to orchestra managements in North West England; approximately 400 orchestra players received questionnaires. Other musicians

heard about the project through other sources and initiated contact independently. All potential subjects were sent an information packet which included a consent form. The participants from each research site were assigned a personal identification number (PIN) and listed according to descriptive criteria such as gender, age, orchestra section, principal instrument, and status (contract/freelance). These listings were supplied to the second author for random assignment to intervention conditions; the first author/therapist was not party to this assignation procedure. This procedure, referred to as *stratification before randomization,* is considered highly effective and ensures to minimize the bias from known descriptive factors by the therapist (Johnson, 1989; McLeod, 1994, Robson, 1993). The procedure was two-fold. First, three subjects were matched according to descriptive criteria. Then each one of the three matched subjects was randomly assigned to one of the three intervention conditions. This procedure of matching subsamples has been used in several outcome studies described by Shapiro (1989). It should be pointed out that musician-subjects were not only matched *within* sites, but also *between* sites.

The three-group intervention represented three different therapeutic modalities, each unique in content as well as each conforming to a bona fide therapeutic approach. However, in the context of the current investigation, the three conditions were related to one another by a dismantling strategy, described by Margison and McGrath (1989) as a treatment evaluation strategy which attempts to separate particular components of therapy. In the current study, some subjects received the whole therapeutic package while others received the package minus one or more of the specific parts. The three therapeutic conditions were (a) *Somatron* (S). Participants were offered traditional verbal psychotherapeutic counseling, APRT relaxation exercises, and prerecorded music, supplemented with music-generated vibration sensations; (b) music (M). Participants were offered traditional verbal psychotherapeutic counseling and APRT relaxation exercises, supplemented with prerecorded music; and (c) counseling (C). Participants were offered traditional verbal psychotherapeutic counseling and APRT relaxation exercises.

It is well established that non-specific therapeutic effects are found among all psychological therapies regardless of type, orientation, or character (Margison & McGrath, 1989). Accordingly,

these effects account for approximately 10% of the overall improvement that participants in therapy seem to exhibit (Lambert, Shapiro, & Bergin, 1986). Thus, it seems very important to utilize comparative or control groups when conducting psychotherapy research. Borkovec (1990) outlines many comparative control groups including: no-therapy or wait-list control groups, placebo or non-specific control groups, best available treatment, and treatment-as-usual control groups. However, there is an ethical dilemma in non-treatment, wait-listed, placebo, or non-specific control groups. For example, McLeod (1994) states that for a quasi-experimental counseling research design to work, that is, to demonstrate the efficacy of counseling compared to an equivalently matched sample who do not received therapy, clients must be allocated to participate in treatments which are non-existent, less effective, and possibly bogus. Shapiro (1988) states outright that the "conceptual distinction between 'active' and 'placebo' treatments that is so clear with pharmacological treatments is blurred when we consider psychotherapeutic treatment" (p. 6). He concludes that, as a result of this dilemma, much recent psychotherapy research resolves the issue by comparing between two or more active treatments within the same study. "To the extent that all active treatments share the same non-specific benefits arising from the participant's belief in their value, this design reduces the need for a placebo condition" (p. 6). In the context of the current study, the counseling subgroup (C) was considered the 'standard traditional treatment' which acted as a control and comparison for the two more experimental therapeutic conditions—the music (M) and *Somatron* (S) subgroups.

Every session of the intervention opened and closed with the musician-subjects completing a Profile of Mood States (POMS) form. Then, after an initial APRT relaxation exercise, the session focused on a specific activity; activities included cognitive appraisals and imagery. For example, a goal of therapy was for the musicians to examine and become more aware of the gains, risks, and costs of their chosen vocation (the music performance career) as well as concerning the stage performances themselves. Further, musicians were asked to evaluate and describe any personal meaning music had had in their lives prior to and during the developmental process of becoming a musician. The use of imagery was implemented as means for the musicians to widen their awareness about themselves and their thought processes associated to motivational issues. An area of imagery that the musicians responded to well was that of the audience. Using the metaphor of a drama, the role of the audience as a 'participant' was explored. Another area in which imagery contributed greatly concerns mental rehearsal. In addition to these cognitive techniques, the intervention took on an educational stance by reviewing the pertinent theories connected to arousal, action tendencies, inner dialogue, and self-belief systems.

Measures. Five published psychometric instruments were used to assess issues surrounding general psychological outcomes: (a) the General Health Questionnaire, 28-item scaled version (GHQ-28) (Goldberg, 1978/1981; Goldberg & Williams, 1988); (b) the Spielberger Statè Trait Anxiety Inventory Form Y (STAI, 1968/1977) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983); (c) the Derogatis Stress Profile (DSP) (Derogatis, 1984/1986, 1987); (d) the Profile of Mood States (POMS) monopolar form (McNair, Lorr, & Droppleman, 1971/1981); and (e) the Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1981/1986).

Two questionnaire surveys were used to address musicians' specific concerns: (a) the Appraisal of Music Performer's Stress (AMPS) (1993, in Brodsky, 1995), an adaptation of the Musician's Questionnaire, Section B (Wills & Cooper, 1988); and (b) the Music Performance Stress Survey (MPSS—Version 1.0) (see Brodsky, Sloboda, & Waterman, 1994).

Therapy research laboratory. One of the challenges about carrying out the current investigation in the real world rehearsal and performance halls of the professional orchestra musicians in the sample, was simply to organize and control this otherwise complex, relatively poorly controlled, and generally disordered milieu. For the current study, the clinical laboratory facilities used at each site as well as the physical set-up in the room were standardized.

Statistical analysis. The purpose of the statistical analysis was to highlight the therapeutic outcome or the efficacy of therapy. Specific aspects of the analysis referred to the more general effects of therapy or time across all treatment intervention conditions, as well as different outcome effects which indicated differences between therapy subgroups.

To analyze the changes that occurred as a result of the therapeutic process, the complete set of baseline data (T1) was compared to the outcome data (T2). In order to assess whether thera-

peutic outcomes were intensified, maintained, or lost after the cessation of therapy, outcome data (T2) were compared to the follow-up data taken 2 months postintervention (T3). The six measures used for this assessment yielded a test set totalling 52 variables which included global total scores, subscales, domains, dimensions, components, and factors.

The analysis utilized a 3 × 2 × 2 repeated measures analysis of variance (ANOVA). Mean scores of each variable in the 52-variable test set were compared between (a) the three therapy subgroups (counseling/music/*Somatron*); (b) two levels of auditivity (low/high); and (c) across two periods of time (T1–T2 or T2–T3). This particular approach has been referred to as the *Analysis of Interaction Comparisons* (see Keppel, 1982). The study investigated both the immediate effects of short-term therapeutic intervention (T1–T2), as well as effects occurring during the 2-month postintervention period (T2–T3). These are both quite independent and different types of outcome effects. Postintervention effects (T2–T3) included delayed effects, maintenance of therapeutic gains, continued intensification of therapeutic gains, as well as rebound effects indicating that therapeutic gains reverted back to previously measured baseline levels.

Significant levels of change were assessed on two fronts. First were changes in the total sample which indicated the main effects of time, and second were outcome differences for a specific treatment condition which indicated interactions between subgroup × time. Thus, post hoc analyses of variance were utilized to assess and identify subgroups which demonstrated the greatest significant difference over time, among all interactions that had been indicated in the main ANOVA as significant interactions. The analysis isolated each therapy subgroup. As a precautionary measure, Hartley's F_{MAX} Test of Homogeneity of Variance (Kirk, 1982) was used as a screening device to assure that the subgroups were within the accepted levels of homogeneity.

Results

Outcome studies have illustrated that while some therapeutic effects demonstrate statistical significance, not all are clinically meaningful (Lambert et al., 1986). Further, as positive therapeutic change is usually seen as a reduction in a negative trait or behavior, *outcome* seems to be based on the presence or absence of symptoms—hence reflecting the movement from dysfunctional to functional behavior. Many authors feel that being able to show clients moving from distress to normal is a most powerful demonstration of effectiveness for any form of counseling or psychotherapy (McLeod, 1994). In order for therapy to be considered successful in a clinically meaningful way, therefore, both the direction and longevity of therapeutic effects must be considered. For example, one needs to examine whether behaviors which indicated positive change measured at cessation of therapy (T1–T2) revert back to the pretherapy baseline levels during the postintervention follow-up period (T2–T3). More stable long term effects are indicated if the achieved reduction is maintained throughout the follow-up period (T3).

Statistically significant main effects of therapy were observed on 14 out of the 52 variable test set. It should be noted that all these effects were not only significant psychometric differences, but represent positive therapeutic changes which are clinically meaningful. Significant therapeutic change affected the total sample immediately at cessation of sessions as demonstrated by 12 variables in the comparative analysis of T1–T2 data. Further, the positive therapeutic gains observed at the cessation of therapy were also maintained postintervention throughout the follow-up 2-month period. It was noted in the comparative analysis of T2–T3 data that no other significant effects were demonstrated by these 12 variables, that is, there was no further subsequent intensification of therapeutic effects, nor were there any reversions back to baseline levels (see Table 2).

As can be seen in Table 2, there were two additional significant therapeutic changes for the total sample which surfaced during the 2-month postintervention period (T2–T3). These variables were Music Performance Anxiety Total Score, and Degree of Impairment.

No main effects of subgroup (therapeutic condition) were observed. This indicated that the overall subgroups did not differ in symptomology either at the beginning or end of therapy. All groups improved to much the same extent. However, a significant interaction effect (subgroup × time) was found for one variable out of the 52 variable test set measured at follow-up (T2–T3). Post hoc analysis on this variable (MPSS-BPAQ/venues) demonstrated that this was due to a statistically significant reduction in perceived pres-

TABLE 2

Therapeutic Outcome and Effects: Significance of Time

Measure	Dimension	χ Score T1	χ Score T2	χ Score T3	Main Effects: Omnibus F	Omnibus df	Post-hoc T1–2 p*	Post-hoc T2–3 p*
STIA	Trait anxiety	46.4	43.5	43.0	9.00	1,47	.004	NS
POMS	TMD	37.7	16.3	17.7	15.48	1,47	.000	NS
	Tension-Anxiety	13.8	7.7	8.4	25.12	1,47	.000	NS
	Depression-Dejection	11.7	6.1	7.1	14.35	1,47	.000	NS
	Anger-Hostility	10.4	6.4	5.3	9.32	1,47	.004	NS
	Fatigue-Inertia	10.3	7.0	8.3	13.74	1,47	.001	NS
	Confusion-Bewilderment	7.6	5.1	5.4	15.15	1,47	.000	NS
AMPS	Psychological stress	41.4	38.1	37.2	8.34	1,47	.006	NS
	Work overload	21.7	20.3	19.9	6.49	1,47	.014	NS
	Work relations	9.4	8.3	8.2	7.19	1,47	.010	NS
	Performer's stress	22.7	20.8	20.2	7.42	1,47	.009	NS
MPSS/ BPAQ	MPA total	60.2	62.5	59.7	8.65	1,46	NS	.005
	Degree of impairment	17.0	16.5	15.4	7.05	1,46	NS	.011
	Venue circumstances	14.0	15.4	15.1	5.99	1,477	.018	NS

Note. Total number of cases = 54.
* = 2-tailed Probability.

sure for the musician-participants in the music subgroup during the postintervention period regarding the number of performance venue types (i.e., circumstances) in which performance anxiety is felt. These venues include small ensembles, large ensembles, private lessons, recitals, and auditions (see Table 3).

Discussion

The first finding that the study reports concerns real-world professional orchestra musicians' willingness to participate in therapy. The study found that real world professional orchestra musicians are sincerely interested in developing coping methods to alleviate and manage career stress and music performance anxiety. Under favorable circumstances, such as implementation of interventions by a music therapist, on-site in rehearsal/practice halls, and with no financial cost to the musician-clients themselves, significant numbers of professional musicians seem willing to participate in clinical therapy/research and engage in a therapeutic process. By legitimizing the musicians' suffering and projecting the concept

TABLE 3

Differences of Therapeutic Outcome & Effects: Significance of Interaction Between Subgroup Condition × Time, Measured Two Months Post-Intervention (T2–T3)

Measure	Dimension	Omnibus Test: Significant Interactions F	df	p*	Therapeutic Outcomes: Subgroup	N	χ Scores T2	χ Scores T3	Post-hoc Test: Significance of Interaction F	df	p*
MPSS-BPAQ	Venues	4.16	2,46	0.22	C	19	14.4	14.59	0.41	1,16	NS
					M	16	14.85	13.68	7.01	1,15	<.025
					S	19	15.74	15.92	0.26	1,18	NS

Note. Total number of cases = 54.
* = 2-tailed probability.

that to some extent every performer suffers as it is the nature of the vocation, seems to have led the musicians to feel that they are among the norm. Perhaps, then, those who are not affected by performance nerves are actually statistical outsiders. Further, this attitude promoted a feeling that it is part of the everyday healthy aspects of the profession for performers to feel anxious. Through this curative factor of universality, feelings of inferiority were reduced. By depersonalizing the effects of performance anxiety, projecting it away from the performer and onto the occupation, feelings of self-guilt and self-condemnation were reduced. Both of these resulted in an increased ability for musicians to let down their defenses, to openly discuss and communicate their problems and concerns, to be more readily available to learn and gain insights, as well as to try-on more adaptive behaviors.

The general effects of therapy for all musician-participants regardless of their treatment conditions were observed on 12 variables at the end of therapy, and on 14 variables 2 months postintervention at follow-up testing. The above mentioned effects of therapy may be seen as common factors and outcomes as they cannot be attributed to any treatment condition. It should be pointed out that all of these general effects were maintained during the 2-month postintervention follow-up period despite the fact that relapse following successful treatment has been reported to be very common especially among therapies shorter than 16 sessions (Steenbarger, 1994).

Neither end of therapy (T2) or follow-up (T3) testings indicated a significant reduction of variables of the Derogatis Stress Profile

(DSP) or the Maslach Burnout Inventory (MBI). Perhaps the levels of stress and burnout as measured by these two instruments were within the accepted normal range prior to therapy. Thus, any further slight reduction in stress and burnout at the end of therapy or at follow-up were not significant enough to indicate main effects. On the other hand, perhaps the DSP and MBI are simply not sensitive to the effects of the 8-week intervention under investigation. Nevertheless, the general effects of therapy were found on four other of the six measures which formed the test set. First of all, concerning State-Trait Anxiety (STAI), the study only found the Trait Anxiety subscale to be sensitive to therapeutic change. Similar findings were reported by Nagel et al. (1989) who did not find State Anxiety to be sensitive to therapy among musicians but only observed significant reductions in Trait Anxiety. All subjects in the current study demonstrated improved reduced levels of Trait Anxiety at the end of therapy; and these were maintained throughout the two months that followed the intervention. Secondly, there was general reduction in levels of the five identifiable debilitating affective mood states measured by the POMS, in addition to the reduction of Total Mood Disturbance. The only POMS mood state not attributed to the effects of common factors is a facilitating affective mood state—vigor/activity. Thirdly, therapy influenced the degree to which all musician-participants perceived levels of pressure arising from music performance-related occupational stressors. For example, some variables from all three AMPS domains were reduced, including perceived pressure intrinsic to the job (work overload), pressure intrinsic to the career (work relations), and pressures intrinsic to the person (performance anxiety, performers stress, and postperformance depression). Finally, the common factors of therapy also include a significant reduction in levels of music performance anxiety (as measured by the BPAQ) for all musician-participants regardless of treatment condition. With respect to the BPAQ, it is of note that a statistically significant reduction in MPA for all musicians was only observed 2 months after therapy had ceased. Discussing duration and outcome in psychotherapy, Steenbarger (1994) concludes that there is a tendency for symptom-based measures to yield changes prior to trait-centered instruments. Accordingly, this would also suggest that there is a correlation between duration and outcome; that is, some variables are more likely to be affected by the timing of the outcome

assessment testing than other variables. In the case of the current study, for example, the perception of the degree to which one is impaired by MPA, as well as the perceived total effect that MPA has on one's performance and career, simply took longer than 8 weeks to surface as a positive therapeutic outcome since these perceptions are somewhat based on how the musician copes in the actual real-world performances outside of the therapy room.

Beyond the general effects of time, there was only one significant two-way interaction; an effect of therapy attributed to a specific treatment condition—the music subgroup. In their review of meta-analyses concerning psychotherapy outcome research studies, Lambert et al. (1986) found clear evidence that usually there is "no difference between [psychotherapeutic] techniques in the amount of change produced. . . . Research carried out with the intent of contrasting two or more bona fide treatments shows surprisingly small differences between the outcomes for patients who undergo a treatment that is fully intended to be therapeutic" (p. 106). Other overviews of outcome research such as Whiston and Sexton (1993) report this same conclusion. The findings of the current study conform to this general trend of comparative studies and overviews. For example, no differences among treatment conditions were observed at the end of therapy (T2). Further, only one variable out of the 52 variable test-set demonstrated a two-way interaction attributed to a therapy subgroup after cessation of therapy. The musicians participating in psychotherapy supplemented with music alone demonstrated a significantly improved reduced perception of anxiety concerning the number of venue circumstances that are most likely to trigger MPA. Moreover, although not statistically significant, the other two groups (Counseling and *Somatron* subgroups) increased their perceived anxiety concerning these venue circumstances (see Table 2). A similar result to this timed effect was achieved by Kendrick et al. (1982) where differences between musician-subjects of two treatment conditions were not seen at the termination of treatment but only at the follow-up assessment. It is difficult to interpret why this interaction occurred; the musicians in the music subgroup did not undergo procedures or stimuli significantly different from the musicians in the *Somatron* subgroup. Perhaps, then, this interaction is simply a statistical "fluke." Although possible, we feel however, that it is unlikely as the musicians contributing to this group effect were spread-out over four sites

(different orchestras), in four locations (different cities), at four different times of the year.

The current study is the first attempt to apply a full deconstructive model to a random clinical trial study of a music-enhanced therapeutic regime. More specifically, the current study is the first controlled outcome study where matched samples of professional orchestra musicians were randomly assigned to three active treatments whereby one of the interventions serves as a comparative group in that it is the accepted standard traditional treatment most commonly prescribed and offered. The study highlights a unique conception of the psychological problems faced by professional orchestra musicians; these have been placed within a career-based occupationally-related context rather than the more accepted mental health and social psychology orientations presented by previous clinical intervention studies reported in the literature. The study applied a wider array of psychometric instruments than in previous studies, the majority of which are related to multidimensional stress as opposed to unidimensional anxiety. In addition, unlike all other clinical intervention studies which exclusively recruited musician-subjects who scored within pathological levels on their screening criteria, the current study solicited everyday real-world professional orchestra musicians who scored within the accepted norms of general health for working adults.

Recognizing a discrepancy between findings of clinical intervention studies and the actual coping practices of musicians, the current study explored new methods of therapeutic enhancement. Supplementing traditional cognitive-behavioral therapy with music in an exploratory fashion to investigate if this combination of components provides a more effective and adaptive therapeutic environment for professional orchestra musicians, the current study further investigated the impact of isolated auditory stimuli versus a combined music-generated vibrotactile stimuli on therapeutic outcomes. This is a very timely question as vibrotactile imagery has recently been clinically reported to have an impact on enhanced performance skills and coping abilities. The current study is the initial exploratory investigation of the *Somatron*® Acoustic Massage™ power recliner as an environment and approach to intervene and manage the effects of career stress and music performance anxiety among professional orchestra musicians.

The study showed that while there were therapeutic gains for all

musician-participants on a subset of the psychometric measures and scales used, differences in overall levels of improvement between treatment sub-groups were not found. On the basis of this we can conclude one of three things:

1. There are effects of the three different regimes but that due to personality or other predisposing factors, some individuals respond differently and oppositely to the regimes such that these differential effects cancel one another out when looking only at the whole subgroup.
2. There are qualitative effects of the different therapies which do not reflect themselves in differences in psychometric outcomes, but which affect the quality of the therapeutic experience or the nature of the interactions between counselor/therapist and client.
3. Music-enhanced therapeutic regimes based on cognitive-behavioral therapy are equally but no more effective than standard traditional counseling and psychotherapy at reducing career stress and performance anxiety among musicians.

In the event that the last case is the correct conclusion, then we may still justify offering music-enhanced therapeutic regimes to professional orchestra musicians as standard psychotherapeutic interventions and verbal counseling treatments have not been as successful as they might have been in recruiting musicians to partake in their benefits.

References

Beck, A. T. (1993). Cognitive approaches to stress. In P. M. Lehrer & R. L. Woolfolk (Eds.), *Principles and practices of stress management* (2nd ed.) (pp. 3–88). New York: The Guilford Press.

Bernstein, D. A., & Carlson, C. R. (1993). Progressive relaxation: Abbreviated methods. In P. M. Lehrer & R. L. Woolfolk (Eds.), *Principles and practices of stress management* (2nd ed.) (pp. 3–88). New York: The Guilford Press.

Borkovec, T. D. (1990). Control groups and comparison groups in psychotherapy outcome research. *National Institute on Drug Abuse Research. 140,* 50–65.

Brodsky, W. (1993). *Manual of therapeutic intervention/protocol of treatment: Clinical trial investigation of a therapeutic intervention with respect to the efficacy of a music generated vibrotactile treatment environment for career stress and performance anxiety of professional orchestra musicians.* Unpublished manuscript, Department of Psychology, University of Keele, Staffordshire, England.

Brodsky, W. (1995). *Career stress and performance anxiety in professional orchestra musicians: A study of individual differences and their impact on therapeutic outcomes.* Un-

published Doctoral Dissertation, Department of Psychology, University of Keele, Staffordshire, England.

Brodsky, W., Sloboda, J. A., & Waterman, M. G. (1994). An exploratory investigation into auditory style as a correlate and predictor of music performance anxiety. *Medical Problems of Performing Artists, 9,* 101–112.

Caldron, P. H. (1986). A survey of musculoskeletal problems encountered in high-level musicians. *Medical Problems of Performing Artists, 1,* 136–139.

Clark, D. B. (1989). Performance-related medical and psychological disorders in instrumental musicians. *Annals of Behavioral Medicine, 11,* 28–34.

Clark, D. B., & Agras, W. S. (1991). The assessment and treatment of performance anxiety in musicians. *American Journal of Psychiatry, 148,* 598–605.

Cox, W. J., & Kenardy, J. (1993). Performance anxiety, social phobia, and setting effects in instrumental music students. *Journal of Anxiety Disorders, 7,* 49–60.

Craske, M. G., & Rachman, S. J. (1987). Return of fear; perceived skill and heart-rate responsivity. *British Journal of Clinical Psychology, 26,* 187–199.

Derogatis, L. R. (1984/1986). *The Derogatis Stress Profile (DSP): A summary report.* Baltimore, MD: Clinical Psychometric Research, Inc.

Derogatis, L. R. (1987). The Derogatis Stress Profile (DSP): Quantification of psychological stress. *Advances in Psychosomatic Medicine, 17,* 30–54.

Evans, A. (1994). *The secret of musical confidence: How to maximise your performance potential.* London: Thorsons, Harper Collins.

Fetter, D. (1993). Life in the orchestra. *Maryland Medical Journal 42,* 289–292.

Fishbein, M., Middlestadt, S. E., Ottati, V., Straus, S., & Ellis, A. (1988). Medical problems among ICSOM musicians: Overview of a national survey. *Medical Problems of Performing Artists, 3,* 1–8.

Fogle, D. O. (1982). Toward effective treatment for music performance anxiety. *Psychotherapy: Theory, Research and Practice, 19,* 368–375.

Fry, H. J. H. (1986). Incidence of overuse syndrome in the symphony orchestra. *Medical Problems of Performing Artists, 1,* 51–55.

Gabrielsson, A. (in press). Music performance. In D. Deutsch (Ed.), *The psychology of music* (2nd ed.). New York: Academic Press.

Goldberg, D. (1978/1981). *Manual of the General Health Questionnaire.* Windsor, Berkshire, UK: Nefer-Nelson.

Goldberg, D., & Williams, P. (1988). *A user's guide to the General Health Questionnaire.* Windsor, Berkshire, UK: Nefer-Nelson.

Gordon, C. (1994). An investigation into musculoskeletal disorders among professional violin and viola players. *Newsletter of the British Association for Performing Arts Medicine,* 30–37.

Green, B., & Gallwey, W. T. (1986). *The inner game of music.* London: Pan Books/Doubleday & Co.

Habboushe, F. P., & Maranto, C. D. (1991). An overview of medical and psychological problems of musicians. In C. D. Maranto (Ed.), *Applications of music in medicine* (pp. 201–221). Washington, DC: National Association for Music Therapy.

Haider, M., & Groll-Knapp, E. (1981). Psychophysiological investigation into the stress experience by musicians in a symphony orchestra. In M. Piperek (Ed.), *Stress and music: Medical, psychological, sociological, and legal strain factors in a symphony orchestra musician's profession* (pp. 15–34). Germany: Braumuller.

Hanser, S. B. (1985). Music therapy in stress reduction research. *Journal of Music Therapy, 22,* 193–206.

Hanser, S. B. (1988). Controversy in music listening/stress reduction research. *The Arts in Psychotherapy, 15,* 211–217.

Hiner, S. L., Brandt, K. D., Katz, B. P., French, R. N., & Beczkiewicz, T. J. (1987). Performance related medical problems among premier violinists. *Medical Problems of Performing Artists, 2,* 67–71.

Hodges, D. A. (1980). *Handbook of music psychology.* Lawrence, KS: National Association for Music Therapy.

James, I. (1984). How players show stress symptoms. *Classical Music, 3,* 7.

Janiszewski, M. (1992). *The music performance; physiology, pathology, hygiene.* Lodz: Advertising Agency Modus.

Johnson, T. (1989). Methodology of clinical trials in psychiatry. In C. Freeman & P. Tyrer (Eds.), *Research methods in psychiatry: A beginner's guide* (pp. 12–45). London: Gaskell.

Kendrick, M., Craig, K. D., Lawson, D. M., & Davidson, P. O. (1982). Cognitive behavioral therapy for musical-performance anxiety. *Journal of Consulting and Clinical Psychology, 50,* 353–362.

Keppel, G. (1973/1982). *Design and analysis: A researcher's handbook* (2nd ed.). Englewood Cliffs, New Jersey: Prentice-Hall, Inc.

Kirk, R. E. (1982). *Experimental design: Procedures for the behavioral sciences.* Belmont, CA: Brooks/Cole Publishing Company, a division of Wadsworth, Inc.

Kivimaki, M., & Jokinen, M. (1994). Job perceptions and well-being among symphony orchestra musicians: A comparison with other occupational groups. *Medical Problems of Performing Artists, 9,* 73–76.

Lambert, M. J., Shapiro, D. A., & Bergin, A. E. (1986). The effectiveness of psychotherapy. In S. L. Garfield & A. E. Bergin (Eds.), *Handbook of psychotherapy and behavioral change* (3rd ed.) (pp. 157–211). New York: Wiley.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal and coping.* New York: Springer.

Lee, M. H. W. (1989). *Rehabilitation, music and well-being.* St. Louis, MO: MMB Music, Inc.

Lehrer, P. M., Goldman, N. S., & Strommen, E. F. (1990). A principal components assessment of performance anxiety among musicians. *Medical Problems of Performing Artists, 5,* 12–18.

Lieberman, J. L. (1991). *You are your instrument: The definitive musician's guide to practice and performance.* New York: Huiksi Music.

Lockwood, A. H. (1989). Medical problems of musicians. *The New England Journal of Medicine, 320,* 221–227.

Madsen, C. K., Standley, J. M., & Gregory, D. (1991). The effect of a vibrotactile device, Somatron, on the physical and psychological responses: Musicians versus nonmusicians. *Journal of Music Therapy, 28,* 14–22.

Manchester, R. A. (1988). Medical aspects of musical development. *Psychomusicology, 7,* 147–152.

Maranto, C. D. (1991). *Applications of music in medicine.* Washington, DC: National Association for Music Therapy.

Maranto, C. D. (1992a). A comprehensive definition of music therapy with an integrative model for music medicine. In R. Spintge & R. Droh (Eds.), *MusicMedi-*

cine. Conference proceedings from the Sixth International MusicMedicine Symposium in Annenberg Center for Health Sciences at Eisenhower Rancho Mirage, CA, October 25–29, 1989 (pp. 19–29). St. Louis, MO: MMB Music, Inc.

Maranto, C. D. (1992b). Music therapy in the treatment of performance anxiety in musicians. R. Spintge & R. Droh (Eds.), *MusicMedicine.* Conference proceedings from the Sixth International MusicMedicine Symposium in Annenberg Center for Health Sciences at Eisenhower Rancho Mirage, CA, October 25–29, 1989 (pp. 273–284). St. Louis, MO: MMB Music, Inc.

Maranto, C. D. (1993). Music therapy and stress management. In P. M. Lehrer & R. L. Woolfolk (Eds.), *Principles and practice of stress management* (2nd ed.) (pp. 407–442). New York: The Guilford Press.

Marchant-Haycox, S. E., & Wilson, G. D. (1992). Personality and stress in performing artists. *Personality and Individual Differences, 13,* 1061–1068.

Margison, F., & McGrath, G. (1989). Research in psychotherapy. In C. Freeman & P. Tyrer (Eds.), *Research methods in psychiatry: A beginner's guide* (pp. 105–119). London: Gaskell.

Maslach, C., & Jackson, S. E. (1981/1986). *Maslach Burnout Inventory manual* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press, Inc.

McLeod, J. (1994). *Doing counselling research.* London: Sage Publications.

McNair, D. M., Lorr, M., & Droppleman, L. F. (1971/1981). *EITS manual for the Profile of Mood States (POMS).* San Diego, CA: Educational an Industrial Testing Service-EDITS.

Meichenbaum, D. (1993). Stress inoculation training: A twenty-year update. In P. M. Lehrer & R. L. Woolfolk (Eds.), *Principles and practice of stress management* (2nd ed.) (pp. 3–88). New York: The Guilford Press.

Middlestadt, S. E., & Fishbein, M. (1989). The prevalence of severe musculoskeletal problems among male and female symphony orchestra string players. *Medical Problems of Performing Artists, 4,* 41–48.

Montello, L. (1992). Exploring the causes and treatment of music performance stress: A process oriented group music therapy approach. In R. Spintge & R. Droh (Eds.), *MusicMedicine.* Conference proceedings from the Sixth International MusicMedicine Symposium in Annenberg Center for Health Science at Eisenhower Rancho Mirage, CA, October 25–29, 1989. St. Louis, MO: MMB Music, Inc.

Montello, L., Coons, E. E., & Kantor, J. (1990). The use of group music therapy as a treatment for musical performance stress. *Medical Problems of Performing Artists, 5,* 49–57.

Nagel, J. J., Himle, D. P., & Papsdorf, J. D. (1989). Cognitive-behavioral treatment of music performance anxiety. *Psychology of Music, 17,* 12–21.

Niemann, B. K., Pratt, R. R., & Maughan, M. L. (1993). Biofeedback training, selected coping strategies, and music relaxation interventions to reduce debilitative musical performance anxiety. *International Journal of Arts Medicine, 2,* 7–15.

Norris, R. (1993). *The musician's survival manual: A guide to preventing and treating injuries in instrumentalists.* International Conference of Symphony and Opera Musicians (ICSOM) St. Louis, MO: MMB Music, Inc.

Norton, G. R., Maclean, L., & Wachna, E. (1978). The use of cognitive desensitization and self-directed mastery training for treating stage fright. *Cognitive Therapy and Research, 2,* 61–64.

Ostwald, P. F. (1994). Historical perspectives on the treatment of performing and creative artists. *Medical Problems of Performing Artists, 9,* 113–118.

Ostwald, P. F., Baron, B. C., & Wilson, F. R. (1994). Performing arts medicine. *Western Journal of Medicine, 160,* 48–52.

Pratt, R. R., Jessop, S. G., & Niemann, B. K. (1992). Performance-related disorders among music majors at Brigham Young University. *International Journal of Arts Medicine, 1,* 7–20.

Rider, M. S. (1987). Music therapy for debilitated musicians. *Music Therapy Perspectives, 4,* 40–43.

Robson, C. (1993). *Real world research: A resource for social scientists and practitioner-researchers.* Oxford, UK: Blackwell.

Salmon, P. G., & Meyer, R. G. (1992). *Notes from the Green Room: Coping with stress and anxiety in musical performance.* New York: Lexington Books, MacMillan.

Sataloff, R. T., Brandfonbrener, A. G., & Lederman, R. J. (1991). *Textbook of performing arts medicine.* New York: Raven Press.

Scartelli, J. P. (1989). *Music and self-management methods: A physiological model.* St. Louis, MO: MMB Music, Inc.

Shapiro, D. A. (1988). *Outcome research.* SAPU Memo 899, University of Sheffield: MRC/ESRC Social and Applied Psychology unit, Department of Psychology.

Shapiro, D. A. (1989). Outcome research. In G. Parry & F. N. Watts (Eds.), *Behavioural and mental health research: A handbook of skills and methods* (pp. 163–188). East Sussex, London: Lawrence Erlbaum Associates, Ltd.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State-Trait Anxiety Inventory (Form Y—Self-evaluation questionnaire).* Palo Alto, CA: Consulting Psychologists Press, Inc.

Spintge, R., & Droh, R. (1987). *Music in medicine: Neurophysiological basis, clinical applications, aspects in humanities.* Berlin: Springer-Verlag.

Spintge, R., & Droh, R. (1992) *MusicMedicine.* Conference proceedings from the Sixth International MusicMedicine Symposium in Annenberg Center for Health Sciences at Eisenhower, Rancho Mirage, CA, October 25–29, 1989. St. Louis, MO: MMB Music, Inc.

Standley, J. M. (1991). The effect of vibrotactile and auditory stimuli on perception of comfort, heart rate, and peripheral finger temperature. *Journal of Music Therapy, 28,* 120–134.

Stanton, H. (1993). Research note: Alleviation of performance anxiety through hypnotherapy. *Psychology of Music, 21,* 78–82.

Steenbarger, B. N. (1994). Duration and outcome in psychotherapy: An integrative review. *Professional Psychology: Research and Practice, 25,* 111–119.

Steptoe, A. (1982). Performance anxiety: Recent developments in its analysis and management. *The Musical Times, 123,* 537–541.

Sternbach, D. (1993). Addressing stress-related illness in professional musicians. *Maryland Medical Journal, 42,* 283–288.

Sweeney, G. A., & Horan, J. J. (1982). Separate and combined effects of cue-controlled relaxation and cognitive restructuring in the treatment of musical performance anxiety. *Journal of Counselling Psychology, 29,* 486–497.

Verrillo, R. T. (1992). Vibration sensation in humans. *Music Perception 9,* 281–302.

Wesner, R. B., Noyes, J. R., & Davis, T. L. (1990). The occurrence of performance anxiety among musicians. *Journal of Affective Disorders, 18,* 177–185.

Whelan, N. M. (1994). Physical stress in orchestral musicians. *Newsletter of the British Association for Performing Arts Medicine,* 19–30.

Whiston, S. D., & Sexton, T. L. (1993). An overview of psychotherapy outcome research: Implications for practice. *Professional Psychology: Research and Practice, 24,* 43–51.

Wills, G. I., & Cooper, C. L. (1988). *Pressure sensitive: Popular musicians under stress.* London: Sage Publications.

Wilson, F. R. (1986). *Tone deaf and all thumbs? An invitation to music-making.* New York: Vintage Books, Random House.

Wilson, G. D. (1984). The personality of opera singers. *Personality and Individual Differences, 5,* 195–201.

Journal of Music Therapy, XXXIV (1), 1997, 33–45

The Effects of Heavy Metal Music on Arousal and Anger

William Neil Gowensmith, M.S. and
Larry J. Bloom, Ph.D.
Colorado State University

Despite the controversy surrounding heavy metal music and its effects on listeners' levels of arousal and anger, a methodologically sound experimental study has not tested this relationship. This study incorporated an experimental design in order to utilize individual differences of subjects as a moderating variable in determining the effect of heavy metal music on listeners' self-reported levels of arousal and anger. It was found that heavy metal music aroused all subjects but that increases in subjects' anger levels were due to an interaction of heavy metal music and the listener's musical preference. Overall, subjects who identified themselves as heavy metal fans did not show higher levels of anger than subjects who were not heavy metal fans. It is suggested that the effects of heavy metal music are mediated by subjects' individual differences and that examination of the effects of heavy metal music should take individual factors of the listeners into account.

A quick glance at the 1995 million-selling release of "Divine Intervention" by the heavy metal rock band Slayer clearly shows why heavy metal music continues to be a source of controversy. Songs concentrating on themes of killing and sadistic torture fill the album, while the record sleeve depicts newspaper clippings linking heavy metal music to real-life suicides and homicides. One of the more disturbing images is a photograph of an adolescent's forearms, covered with blood spilling from the word "SLAYER" which he has carved into his arms with a razor.

Popular music, especially rock and roll music, has been subject to increasing criticism in recent years. Many parents, police, and groups like the Parent-Teacher Association (PTA) and the Parents' Music Resource Center (PMRC) have targeted one branch of rock