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Effects of Participant-Selected Preferred versus Relaxing Music on GSR and Perceived Relaxation

Emily R. (Emily Ruth) Bruestle
EFFECTS OF PARTICIPANT-SELECTED
PREFERRED VERSUS RELAXING MUSIC
ON GSR AND PERCEIVED RELAXATION

By

EMILY R. BRUESTLE

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Emily Bruestle defended this thesis on July 13, 2015.
The members of the supervisory committee were:

John Geringer  
Professor Directing Thesis

Jayne Standley  
Committee Member

Dianne Gregory  
Committee Member

The Graduate School has verified and approved the above-named committee members, and certifies that the thesis has been approved in accordance with university requirements.
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ABSTRACT

The purpose of this study was to explore how asking for general music preferences compares to asking for music preferences that relate to the intended objective (in this case, relaxation), and to determine if one of these types of preferred music was more effective than the other in eliciting relaxation. Participants, who were undergraduate non-music majors (N = 71), took part in a music listening study in which their perceived relaxation and galvanic skin response (GSR) levels were recorded. Participants were placed in one of three groups: the participant-selected preferred music group (PM), the participant-selected preferred relaxing music group (PRM), or the unfamiliar, non-preferred music group (NPM). Results indicate that participants in the PM and PRM groups experienced significant increases in perceived relaxation and significant decreases in GSR levels, but there was not a significant difference between the two groups in the amount of change. Therefore, preferred music and preferred relaxing music appear equally effective in increasing relaxation responses. These findings provide support for the continued use of patient-preferred music in music therapy settings and offer alternative suggestions for assessing music preferences.
CHAPTER 1

INTRODUCTION

Patient-preferred music is frequently used in music therapy sessions. By providing music that the patient is familiar with, the music therapist can more easily build rapport, motivate the patient to work toward desired outcomes, distract the patient from negative environmental stimuli, introduce and oversee counseling topics, and structure a variety of interventions. For this reason it is important to assess music preferences as fully and as accurately as possible. Though patients may provide examples of genres and/or artists they prefer, they may have particular music in mind for certain situations or mood states. A music therapist is trained to use preferred music that is appropriate to the clinical situation, but it might be just as simple and beneficial to ask the patient directly for more specific music preferences. For instance, a patient might answer one way if she were asked for music she both enjoys and finds relaxing and another way if she were asked for her favorite music. Is this difference enough to change music preference assessment and therefore the effectiveness of the music in the intervention?

Purpose of Study

The purpose of this study was both to contribute to research about music and relaxation and to explore how asking for general music preferences compares to asking for music preferences that relate to the intended objective (in this case, relaxation). The main objective was to determine if participant-selected preferred-relaxing music was more effective than generally preferred music in eliciting relaxation. For a better understanding of a participant’s relaxation response, this study used both a self-report measure and a physiological measure of relaxation. There was also a control group in which participants listened to music that was unfamiliar and not preferred so outcomes from familiar and preferred music listening could be compared.
**Research Questions**

This study attempted to answer the following research questions related to types of music and possible effects on relaxation:

1) Will participants in the preferred music group (PM) experience changes in perceived relaxation and galvanic skin response (GSR)?

2) Will participants in the preferred relaxing music group (PRM) experience changes in perceived relaxation and GSR?

3) Will participants in the non-preferred music group (NPM) experience changes in perceived relaxation and GSR?

4) Will one type of participant-selected music elicit a greater change in perceived relaxation and GSR than the other?

5) Will there be a difference in perceived relaxation and galvanic skin response (GSR) between males and females?
CHAPTER 2

REVIEW OF LITERATURE

Music Preference

Price (1986) developed a definition of preference based on previous research in the area of music and affective response. Therefore, for the purpose of this study, preference is defined as “the act of choosing, esteeming, or giving advantage to one thing over another” through verbal or non-verbal actions (Price, 1986, p. 154). Understanding what influences music preference is difficult because of the many factors to consider, including culture, age, individual personality traits, social factors, education and training, context and environmental factors, and inherent musical characteristics. There are variations within these factors that are discussed below.

Factors Affecting Music Preference

Cultural influences include beliefs, values, traditions, languages, religious practices, social traits, racial background, and more. Killian (1990) found that junior high students generally preferred musical performers that share their gender and race. In a different study of white and black middle school and university students, black students gave stronger preference ratings for black performers (McCrary, 1993). These results appear consistent with a tendency to prefer something familiar or relatable.

Age influences music preferences differently. For instance, children are likely to be influenced by the music preferences of their parents and sometimes authority figures. Adolescents are mindful of the music preferences of their peers when considering their own (Hargreaves, 1986). Holbrook and Schindler (1989) found that preferences for popular music develop in an inverted-U shaped pattern that peaks around 24 years of age. This suggests that people continue to like music from late adolescence or early adulthood even as they move to
middle age and beyond. LeBlanc, Sims, Siivola, and Obert (1996) also found an inverted-U shaped pattern in terms of preferences for art music, traditional jazz, and rock within a population of grade-school students. It appears that preference levels are higher at grades 1 and 12 and decline at around grade 6.

Music preferences are also often linked to personality, and studies in this area often include comparisons between introverts and extroverts, liberals and conservatives, or other opposite pairings. Rentfrow and Gosling (2003) conducted a series of six studies and investigated links between music preferences and personality. They examined several factors of personality (such as extraversion, openness, interpersonal dominance, self-esteem, and more), self-views (such as politically liberal or conservative, physically attractive, intelligent, etc.), and cognitive ability (verbal and analytical). They found correlates between these factors and the four dimensions of music preferences established in a previous study (reflective and complex, intense and rebellious, upbeat and conventional, and energetic and rhythmic).

Peers and the media are social variables that have an influence on music preferences. North and Hargreaves investigated correlations between different lifestyle choices and music preferences in a series of studies in 2007. They included questions about relationships, living arrangements, beliefs, and crime (2007a), media, leisure time, and music (2007b), and travel, money, education, employment, and health (2007c). At the risk of over-generalizing, North and Hargreaves stated that differences in associations between music preferences and lifestyle choices tended to pare down to several different groupings. For instance, those most conservative in their relationships tended to be fans of country and western, opera, musicals, sixties pop, adult pop, classical music, and blues, while those least conservative in their relationships or those who fit between the two extremes tended to like hip-hop/rap, DJ-based music, and dance/house. Other
examples of groups that were compared included: those who were most conservative, least conservative, and those in between (not exclusively in terms of politics); those who preferred low-culture media and less formal settings and those who preferred high-culture media and more formal settings; and high-income and low-income individuals.

Education and training have an effect on music preferences as well. Results from some studies suggest that more music training leads to increased preferences for various music styles (Ginocchio, 2009; Peery & Peery, 1986). Results from an early study conducted by Farnsworth (1966) indicated that there has been a relatively stable preference for Bach, Beethoven, Mozart, Haydn, and Brahms for almost 30 years. These results came from several polls of American Musicological Society members between 1938 and 1964. The preferences of these musicologists are likely related to high regard for and familiarity with these composers because of their completion of a degree in musicology.

The context or the environment in which music is heard has a good deal to do with a listener’s preference for it. Some situations or environments are suitable for music with an optimal level of complexity and appropriateness for the situation (Hargreaves & North, 1997). North and Hargreaves (2000) believe there is an interaction between music preferences and the listening situation, and that music can be used to optimize our responses to a situation. After investigating the everyday uses of music of participants in their study, Sloboda, O’Neill, and Ivaldi (2001) reaffirmed that music is often used to accompany other activities.

Finally, music preferences are dependent on characteristics of the music itself. It is likely that liking for certain characteristics (such as complexity, form, tempo, etc.) is related to individual experiences. The music may also carry extra-musical associations that affect preference.
Theories of Music Preference

Theories of music preference have emerged in part because of the complexity of its assessment. One of the most widely known theories is Albert LeBlanc’s eight-level hierarchical model that encompasses several different musical and environmental variables (1982). His use of bi-directional arrows serves as a reminder that these variables continuously interact with each other and influence each other when a music stimulus is heard. At the first level, properties of the music and the environment are broken down into smaller parts. The next three levels, physiological enabling conditions, basic attention, and current affective state, are what LeBlanc calls “filters” or “gates” through which the information must travel before interacting with the individual’s own characteristics. Individual characteristics of the listener, many of which are the same as the factors listed above, make up the next level. Once musical information has passed through these levels, it is sent to the final three levels where the listener begins processing it (starting in the brain) and makes decisions about what to do next (such as making preference judgments, seeking more information, listening again, etc.). Once this process is complete, often including some repeated hearings, the individual decides if he does or does not prefer the music.

Theories of music preference related to complexity have also been proposed. In Walker’s theory (as cited in Radocy & Boyle, 2003) preference is regarded as a quadratic function of complexity and it can be illustrated by an inverted U-shaped curve. If a stimulus is too complex, the listener does not try to process it, but if it is too simple, the listener becomes bored. Both of these situations result in a lower preference for the stimulus. Therefore there is an optimal complexity level for each stimulus class, and a stimulus’s position on the curve may change due to repeated hearings or other factors.
Assessment of Music Preference

Several methods have been used for the assessment of music preference. The most common types of measures are static or continuous. Rating scales, Likert-type scales, free responses, self-report, rank order, and counting are all examples of static measurement. Sloboda et al. (2001) used pagers to signal participants to complete self-report forms about their experience with music at that time. This static measurement, called experience sampling was also used by North, Hargreaves, and Hargreaves (2004) but with mobile phones. LaMont and Webb (2010) conducted a study over the course of a month using a diary method to capture changes in music preferences over time.

Though the aforementioned methods of assessment are well known and generally easy to administer, participants’ responses are usually given in response to a prompt before or after the stimulus. Continuous assessment methods, such as the Continuous Response Digital Interface (CRDI), behavioral observations, and the Operant Music Listening Recorder (OMLR), allow the researcher to record responses constantly and in the moment. The CRDI, developed in the late 1980s, allows listeners to give non-verbal responses while music is playing by turning a dial over an arc that has parameters related to the variable being measured (Geringer, Madsen, & Gregory, 2004). Traditional behavioral observation methods are another way to record continuously, and a more recently developed software program called the Simple Computer Recording Interface for Behavioral Evaluation (SCRIBE) allows researchers to use these methods by coding video data in a continuous time format (Duke & Stammen, 2011). Having video data available allows other observers to review stimuli for reliability. Researchers have also used the Operant Music Listening Recorder (OMLR) to record the amount of time spent listening to different selections (Flowers, 1988; Sims & Cassidy, 1997).
Music preference assessments can also be adapted to specific needs. For instance, Chlan and Heiderscheit (2009) developed the Music Assessment Tool (MAT) to help professionals assess patient music preferences in the intensive care unit (ICU). It can be used with patients who have difficulty communicating due to endotracheal tube placement. Patients’ family members are also a helpful resource in determining music preferences.

Affective Responses to Music

According to Radocy and Boyle (2003), affect is “a broad term applied to a wide variety of human feeling behaviors, and the type or level of feeling resulting from an object, event, or experience may vary” (p. 313). These feeling responses, also known as affective responses, include more than just aesthetic experience. Physiological responses, psychological mood changes, and behaviors are all related to the study of affective response. The study of affective response to music is popular among several disciplines so there is a wide variety of research approaches. This research often includes more than one type of dependent variable in an attempt to validate the affective response being studied.

Physiological Responses to Music

Investigating physiological responses to music is a common approach in this area of research. Autonomic nervous system responses are reactions that are involuntary and reflexive. Examples of these variables include heart rate, respiration rate, electrodermal activity (skin responses), muscle tension (as measured by electromyography [EMG]), and brain wave response (as measured by electroencephalography [EEG]). Other types of brain imaging include magnetoencephalography (MEG), magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI), and positron emission tomography (PET).
Whether changes in the body are correlates of affective behavior appears debatable. In an attempt to better understand the relationship between physiological measures and musical affect, Sloboda (1991) asked participants to recall instances in which they experienced physical reactions while listening to music. He asked them to report what kinds of sensations they felt and what music elicited these reactions. Over 80% of the respondents recalled experiencing shivers down the spine, laughter, a lump in the throat, and/or tears. Though these results support the idea that music elicits physical reactions in the body, one could argue that the participants’ reports do not provide enough evidence that these were real physiological responses.

In this study, galvanic skin response (GSR) was investigated as a physiological response during music listening. GSR, also known as skin conductance, is a form of electrodermal activity. It is the tonic level of electrical conductivity of the skin measured in microsiemens (µS) (Dawson, Schell, & Filion, 2000). Electrodermal changes are a result of activity within the sympathetic axis of the autonomic nervous system (Critchley, 2002). Increased sympathetic activity is indicative of autonomic arousal, which is associated with emotion, cognition, and attention. Measurement of galvanic skin response is a sensitive and convenient way to monitor changes in arousal, and it may offer insight into emotional responses to different stimuli.

**Mood Changes in Response to Music**

Changes in perceived psychological mood state are also frequently investigated in this area of research. Over time, associations may be learned between patterns in music and mood states. It may be that specific elements of the music elicit a mood response or that a piece of music (or a type of music) has associations with an emotionally significant person, place, or event from the past. Specific elements of music, such as lyrics or very well known melodies, can carry social, political, or religious associations that affect mood. Music that is present in movies,
television shows, musicals, operas, special occasions, or moments in younger years also carries associations because of its connection to a story or memory.

To learn more about mood responses to music, researchers often use adjective checklists, semantic differentials (also known as bipolar adjectives such as happy-sad, light-heavy, humorous-solemn, etc.), rating scales, and other types of self-report. Mood changes have also been assessed using the Continuous Response Digital Interface (CRDI) (Goins, 1998) and the SCRIBE software (Waldon, 2001).

In addition to looking at the effects of music on GSR in this study, a visual analog scale (VAS) was used to assess the participants’ perceived relaxation. A VAS is typically a horizontal 100-millimeter line with anchors on either end that represent opposite sensations. For instance, in this case the phrases “completely relaxed” and “completely unrelaxed” were anchored on either side of the line (Appendix E). Participants were asked to make one vertical mark on the line to represent where they fit on the continuum. The main advantage of a VAS is that it is quick and simple to use (Pritchard, 2010). I was unable to find validity and reliability for VAS studies that measured perceived relaxation. However, Williams, Morlock, and Feltner (2010) performed a psychometric evaluation of a visual analog scale for the assessment of anxiety. They found that it correlated well with other anxiety measures, which demonstrates convergent validity, and that test-retest stabilities indicated it was a reliable measure.

Music and Relaxation

Many studies have been conducted concerning music and affective response. They often include one or more of the methods mentioned in the previous section for measuring affective response. Many of these studies focus on relaxation (or the reduction of anxiety or stress) as the dependent variable. Common areas of study for this type of research include music therapy,
music perception and cognition, psychology, psychophysiology, nursing, anesthesiology, behavioral medicine, and other related fields. It is clear that there is a need for effective methods that increase relaxation in various settings.

**Sources of Stress and Anxiety**

Adults in the work force and college students often experience long-term periods of stress, which can be unhealthy for the body both mentally and physically. Though the body’s stress-response is normal and self-regulating, its long-term activation can lead to anxiety, depression, digestive problems, heart disease, sleep problems, weight gain, and memory and concentration impairment (Mayo Clinic, 2013). According to the American Psychological Association (2013), a recent survey of college counseling directors revealed a growing concern about psychological problems among students with anxiety being the most common problem (41.6%). Beiter, Nash, McCrady, Rhoades, Linscomb, Clarahan, and Sammut (2015) discovered that academic performance, pressure to succeed, and post-graduation plans were the top three sources of depression, anxiety, and stress. The National Library of Medicine (2014) recommends self-implemented strategies such as exercising, monitoring diet, finding social support, getting adequate sleep, finding activities you enjoy, listening to music, changing your outlook, and using relaxation techniques such as deep breathing, meditating, or practicing yoga to manage anxiety and stress. The anxiety and stress present in the general population warrant a need for continued research on relaxation techniques.

There is also a need for anxiety and stress management in the medical environment. Patients often experience stress due to their condition, an upcoming medical procedure or surgery, the pain they are experiencing, and/or the hospital environment itself. High levels of preoperative anxiety are associated with a more painful, slower, and more complicated
postoperative recovery period (Kain, Mayes, Caldwell-Andrews, Karas, & McClain, 2006). For these reasons it is beneficial for the patient to have as little anxiety as possible. Standley (2000) conducted a meta-analysis of music research in medical/dental care that revealed many positive benefits for the use of music: to reduce anxiety or stress, to reduce pain, to reduce fear or trauma related to serious injury, to increase feelings of well-being, and more.

**Approaches to Using Music for Relaxation**

Many studies that use music for relaxation included music listening as one of the experimental conditions (Davis & Thaut, 1989; Scheufele, 2000; Smith & Joyce, 2004; Stratton & Zalanowski, 1984; Thaut & Davis, 1993; Walworth, 2003). A study by Thaut (1989) included progressive muscle relaxation (PMR) with music, and an experiment conducted by Robb (2000) used a combination of music listening and PMR with music. Other techniques combined with music include deep breathing and relaxation instructions (Strauser, 1997), guided imagery (Hammer, 1996), and vibrotactile stimulation (Standley, 1991). In 2004, Pelletier completed a meta-analysis of studies where music was used to decrease arousal due to stress. The overall mean effect size ($d = +.67$) indicates that music alone and music combined with relaxation has a substantive impact on decreasing stress.

Though this line of research suggests that music contributes positively to relaxation, it is worth considering the type of music being used. In Standley’s 2000 meta-analysis about music research in medical treatment, studies that included patients’ preferred music had the greatest effect (ES = 1.40, $n = 30$) of all the variables analyzed. The results of a three-part study organized by Tan, Yowler, Super, and Fratianne (2012) indicated that the participants’ preference for the music was highly correlated with their perception of relaxation and that the relationship between familiarity and degree of relaxation was significant. These results validate
recommendations made by past researchers who, based on its positive effects on relaxation, recommend using music that is familiar to the participant, that has positive associations for them, and that they have a preference for (Davis & Thaut, 1989; Strauser, 1997; Thaut & Davis, 1993; Walworth, 2003). Various elements of the current study were drawn from some of the studies just mentioned therefore they are described below.

Davis and Thaut (1989) investigated the effects of preferred relaxing music on state anxiety, relaxation, and physiological responses. Decreases in anxiety and increases in relaxation were found consistently across trials, but the change was only significant for state anxiety. According to the physiological data, music aroused and excited muscular activity. In 1993, Thaut and Davis conducted a similar study to compare the effects of subject-selected and experimenter-chosen music (music composed for the purpose of relaxing) on affect, anxiety, and relaxation. They used the Multiple Affective Adjective Checklist (MAACL) and a visual analog scale (VAS) to assess relaxation, but they did not measure physiological responses. Significant responses were reported for both music conditions and the control condition (no music), and according to the results, music specifically composed for relaxation is no more effective than other music selections.

Walworth’s study in 2003 was different from Davis and Thaut’s studies because she used experimentally induced anxiety. For one group the researcher selected specific music based on the participant’s preferred genre or artist for relaxation. In the other music condition, the participant chose a specific song they considered relaxing. Walworth compared the effects of these two types of music on anxiety levels as measured by the State Trait Anxiety Inventory (STAI) and a visual analog scale (VAS). Both music conditions resulted in significantly lower
anxiety levels than the no music control condition, however there were no significant differences between the two music conditions.

**Rationale for Study**

This review of literature provides evidence that the formation of music preferences is multi-faceted and that it is difficult to assess them completely. It also reveals that although many studies have been conducted to address affective responses to music, much remains to be known due to the many methodologies, operational definitions, musical selections, and measurement methods that have been used. Within the topic of music for relaxation (or anxiety reduction), researchers have compared the effects of different types of music, such as participant-selected preferred music versus experimenter-selected music, participant-selected relaxing music versus music composed for relaxation purposes, or participant-selected preferred music versus no music. To my knowledge, however, the effects of participant-selected preferred music have not been compared to the effects of participant-selected preferred relaxing music.
CHAPTER 3

METHOD

Participants

Participants ($N = 71$) were female ($n = 48$) and male ($n = 23$) undergraduate non-music majors. To seek student volunteers, I contacted instructors for music courses designed for students who are not majoring in music. These classes included Introduction to Music History, Modern Popular Music, Music in World Cultures, American Roots Music, Beginning Class Guitar, and Intermediate Class Guitar. After receiving permission from the instructors, I attended their class, spoke about the study, asked for volunteers, and passed out a sign-up sheet so students could choose one 30-minute time slot to participate during the final three weeks of the semester. Florida State University Institutional Review Board approval was obtained prior to the onset of the study (Appendix A).

Setting and Materials

The study was conducted in a quiet research room at a large university college of music in the southeastern United States. Participants sat in a padded chair that was slightly reclined. A dim pink lamp provided lighting during the experiment.

In this study, the Affectiva Q Sensor was used to measure galvanic skin response (GSR), sometimes called skin conductance or electrodermal activity (EDA). The device is worn comfortably on the wrist and it is not painful to the wearer. Data for GSR, measured in microsiemens ($\mu$S), were gathered using the Affectiva Q Software. The Q sensor technology was first developed at the Massachusetts Institute of Technology (MIT) and its data collection has been shown to be highly correlated with data from traditional skin conductance monitoring systems (Poh, Swenson, & Picard, 2010).
The Q Sensor took measurements four times per second. These data points were viewable on a Microsoft Excel spreadsheet. First, I found the beginning of each participant’s 10-minute music listening period by looking for the first event mark recorded on the sensor. From there I found the GSR reading that was taken exactly 30 seconds after the first event mark. I then selected the next 60 data points (15 seconds of readings) and averaged them to obtain the first GSR reading (GSR 1). Then I found the GSR reading that was taken exactly 5 minutes and 30 seconds after the event mark and averaged the next 60 data points to determine the second GSR reading (GSR 2). Finally I found the GSR reading taken exactly 9 minutes and 30 seconds after the event mark and averaged the next 60 data points for the third GSR reading (GSR 3). These three data points represent each participant’s GSR readings at the beginning, middle, and end of the music listening period.

Perceived relaxation was measured with a visual analog scale (VAS), which, according to Hersen and Bellack, is useful for rating subjective phenomena such as relaxation (as cited in Thaut & Davis, 1993). I used the same adapted form of the VAS that was used by Thaut and Davis (1993). Participants responded by making a mark along a horizontal 100-millimeter line with one end identified as “completely relaxed” and the opposite end labeled “completely unrelaxed” (Appendix E). Therefore in this study, a mark closer to the left end of the line was lower in number and indicated a more relaxed state than marks further to the right. The locations of participants’ marks were measured in millimeters with a clear 100-millimeter ruler.

A 120 GB Classic iPod (Model #: MB565LL) and studio quality over-the-ear headphones were provided for participants in the control group. The same headphones were offered to participants in the experimental groups but they were allowed to use their own if they preferred.
Design

This study featured a single-session pretest-posttest design to compare galvanic skin response (GSR) and perceived relaxation between conditions. Participant-selected preferred music was used for one experimental group (PM) \( n = 25 \) and participant-selected preferred relaxing music was used for the other experimental group (PRM) \( n = 24 \). Unfamiliar, non-preferred music was used for the control group (NPM) \( n = 22 \).

Procedure

Participants received an initial email four days before their session time that contained instructions about where to report and what to bring with them. These instructions were different for each group. Participants in the preferred music group (PM) were told to bring in a portable listening device, such as an mp3 player, smart phone, or tablet, on which they could access music. They were asked to create a playlist of at least 10 minutes of music that they prefer to listen to during their day-to-day activities. They were also told they could bring their own headphones or use those provided by the principal investigator. Participants in the preferred relaxing music group (PRM) were given the same instructions, with the exception of the type of music they were asked to bring. This group was told to create a playlist of at least 10 minutes of music that they prefer and consider relaxing. Participants in the control group (NPM) were not asked to bring any materials with them. All participants received a reminder email the day before their session.

On the day of the study, each participant signed a consent form (Appendix B). Following consent, participants filled out a short questionnaire with demographic information and, if they belonged to one of the experimental groups, information relating to the artist(s), group(s), or composer(s) they brought in to listen to (Appendix C and Appendix D). Participants then
completed the pretest visual analog scale (VAS) to indicate their perceived relaxation before any
intervention occurred (Appendix E).

After paperwork was complete, I placed the Q Sensor on the participant’s wrist. Once the
sensor made contact with the skin it powered on and began recording galvanic skin response
(GSR). Then I asked the participants to sit in a comfortable chair and prepare to listen to the
music they brought (PM or PRM groups) or to the music provided for them (NPM group). The
music selection for the control group (NPM) was *Threnody for the Victims of Hiroshima* by
Krzysztof Penderecki. The Polish National Radio Symphony Orchestra recorded it and the track
lasts 10:01 minutes. The selection of this piece was based on the results of a study conducted by
VanderArk and Ely (1993) who found that this piece effectively depicted tragedy and horror and
that non-music college students disliked it. Once the listening devices were set up, I informed the
participants in all groups that their job was to relax as much as possible while listening to the
music. I explained that I would be in the room during the 10-minute music listening but would
not be observing their behaviors. Once the music listening began, I pressed the button on the Q
sensor to create an event mark then started a timer for 10 minutes.

At the end of the 10-minute listening period, I turned up the lights and pressed the Q
sensor button again to create a second event mark. The participants were asked again to indicate
their perceived relaxation with the posttest visual analog scale (Appendix E). All participants
were then asked to indicate how relaxing the music itself was on a Likert-type scale (Appendix
F). Finally, participants in the control group (NPM) were asked if they were familiar with the
music they heard so I could exclude data from those who had heard the music before.
CHAPTER 4

RESULTS

Data from the visual analog scale (VAS) were analyzed using a Three-Way Repeated Measures Analysis of Variance (ANOVA) with one within-subjects variable (perceived relaxation before and after the music listening) and two between-subjects variables (gender and treatment group). Table 1 shows means and standard deviations for the pretest VAS and the posttest VAS for each treatment group. For this measure, a participant’s VAS number, measured in millimeters, can range from 1 to 100 with 1 being the most relaxed state and 100 being the least relaxed state. According to the mean pretest VAS ratings, all participants reported a similar initial level of relaxation regardless of group (range = 4.07). On the posttest VAS, however, the means of the PM group and the PRM group decreased by 18.6 and 21.54 respectively, while the mean of the NPM group increased by 15.54, resulting in a range of 39.03 between the groups’ mean posttest scores. These changes indicate that the participants in the PM and PRM groups perceived a more relaxed state after the 10-minute music listening period and the participants in the NPM group perceived they were less relaxed. Figure 1 illustrates the adjusted means for the pretest VAS and posttest VAS. As is evident in this visual, the mean scores for the PM and PRM groups decreased and the mean score for the NPM group increased.

Table 2 presents the ANOVA table. For all participants, there was a significant change in perceived relaxation from the pretest VAS to the posttest VAS, $F (1, 65) = 9.37, p = .003, \eta_p^2 = .126$. Gender did not have a significant effect on perceived relaxation, $F (1, 65) = .07, p = .80$, however, there was a significant difference in perceived relaxation between treatment groups, $F (2, 65) = 10.98, p < .001, \eta_p^2 = .253$. Scheffé post hoc comparisons indicated that VAS scores in the NPM group were significantly higher than those in the PM group and the PRM group with
mean differences of at least 21 points. The effect of treatment group on perceived relaxation (VAS) was not dependent on gender, $F(2, 65) = 1.23, p = .30$. The difference between the pretest VAS and the posttest VAS, however, was dependent on treatment group, $F(2, 65) = 33.38, p < .001, \eta^2_p = .507$ (see Figure 1).

Galvanic skin response (GSR) data from the Q Sensor, measured in microsiemens ($\mu$S), were analyzed using a Three-Way Repeated Measures ANOVA with one within-subjects variable (galvanic skin response [GSR] at three different points during the experiment) and two between-subjects variables (gender and treatment group). Table 3 shows means and standard deviations for the three GSR readings for each treatment group. The mean GSR readings for all treatment groups decreased over time with the greatest decrease occurring between the first and second readings. Participants in the PM group had the lowest average GSR readings and participants in the NPM group had the highest average GSR readings, though the range between these two groups was not very large. The GSR averages in the PRM and the NPM groups were very close together with the largest difference being only .04 $\mu$S. The largest standard deviations were in the first and second readings of the NPM group (4.20 $\mu$S and 3.44 $\mu$S). The aforementioned comparisons are illustrated in Figure 2 where the adjusted means for the three GSR readings are graphed.

Table 4 presents the ANOVA table. For all participants there was a significant decrease in GSR, $F(2, 130) = 11.08, p < .001, \eta^2_p = 146$. Gender did not have a significant effect on GSR, $F(1, 65) = .46, p = .50$, nor was there a significant difference in GSR between treatment groups, $F(2, 65) = .38, p = .68$. None of the two- or three-way interactions between variables were significant.
Data from ratings about how relaxing the music was were analyzed using a Two-Way ANOVA with two between-subjects variables (gender and treatment group). The higher the number, the more relaxing the music was rated by participants. Table 5 shows means and standard deviations for each treatment group. The mean ratings from the three groups indicate that participants in the PM group \( (M = 7.76) \) and the PRM group \( (M = 8.38) \) found the music more relaxing than those in the NPM group \( (M = 2.86) \). Participants in the PRM group rated the music as slightly more relaxing than participants in the PM group did \( (range = .62) \).

Table 6 presents the ANOVA table. There was a significant difference between the treatment groups’ ratings of how relaxing the music was, \( F(2, 65) = 56.70, p < .001, \eta^2_p = .636 \). Scheffé post hoc comparisons indicated that ratings of how relaxing the music was were significantly lower in the NPM group than those in the PM group and the PRM group with mean differences of at least 5 points. Gender did not have a significant effect on ratings of how relaxing the music was, \( F(1, 65) = .60, p = .44 \), nor did the effect of treatment group on relaxation ratings depend on gender, \( F(2, 65) = .88, p = .42 \).

The genres selected by the participants in the experimental groups (PM and PRM) are shown in Figure 3. Pop was the most frequently selected genre in the preferred music group (PM) and Alternative was the most frequently selected genre in the preferred relaxing music group (PRM). The researcher determined these categories by searching for the artist(s), band(s), or composer(s) and their genre on the iTunes Music Store.
Table 1

Means and Standard Deviations of the Pretest and Posttest Visual Analog Scale (VAS)

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest Mean (SD)</th>
<th>Posttest Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>28.84 (21.08)</td>
<td>10.24 (10.13)</td>
</tr>
<tr>
<td>PRM</td>
<td>30.96 (18.59)</td>
<td>9.42 (12.14)</td>
</tr>
<tr>
<td>NPM</td>
<td>32.91 (23.51)</td>
<td>48.45 (27.36)</td>
</tr>
</tbody>
</table>

Figure 1: Mean scores of pretest and posttest visual analog scales (VAS) for preferred music (PM), preferred relaxing music (PRM), and non-preferred music (NPM) groups.
Table 2

*Analysis of Variance (Pretest and Posttest Visual Analog Scale (VAS) by Gender and Treatment Group)*

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>41.83</td>
<td>1</td>
<td>41.83</td>
<td>.07</td>
<td>.800</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>14135.53</td>
<td>2</td>
<td>7067.77</td>
<td>10.98</td>
<td>&lt;.001</td>
<td>.253</td>
</tr>
<tr>
<td>Gender by Group</td>
<td>1586.79</td>
<td>2</td>
<td>793.40</td>
<td>1.23</td>
<td>.298</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>41846.66</td>
<td>65</td>
<td>643.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre/Post</td>
<td>1179.91</td>
<td>1</td>
<td>1179.91</td>
<td>9.37</td>
<td>.003</td>
<td>.126</td>
</tr>
<tr>
<td>Pre/Post by Gender</td>
<td>76.28</td>
<td>1</td>
<td>76.28</td>
<td>.61</td>
<td>.439</td>
<td></td>
</tr>
<tr>
<td>Pre/Post by Group</td>
<td>8412.42</td>
<td>2</td>
<td>4206.21</td>
<td>33.38</td>
<td>&lt;.001</td>
<td>.507</td>
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<tr>
<td>Pre/Post by Gender by Group</td>
<td>124.10</td>
<td>2</td>
<td>62.05</td>
<td>.49</td>
<td>.613</td>
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</tr>
<tr>
<td>Error</td>
<td>8189.59</td>
<td>65</td>
<td>125.99</td>
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</table>
Table 3

Means and Standard Deviations of the Three Galvanic Skin Response (GSR) Readings

<table>
<thead>
<tr>
<th>Group</th>
<th>GSR 1 Mean (SD)</th>
<th>GSR 2 Mean (SD)</th>
<th>GSR 3 Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>1.87 (2.29)</td>
<td>1.45 (2.26)</td>
<td>1.20 (2.12)</td>
</tr>
<tr>
<td>PRM</td>
<td>2.07 (3.08)</td>
<td>1.54 (2.71)</td>
<td>1.31 (2.61)</td>
</tr>
<tr>
<td>NPM</td>
<td>2.11 (4.20)</td>
<td>1.56 (3.44)</td>
<td>1.32 (2.99)</td>
</tr>
</tbody>
</table>

Figure 2: Means of galvanic skin response (GSR) taken three times during music listening period for preferred music (PM), preferred relaxing music (PRM), and non-preferred music (NPM) groups.
Table 4

*Analysis of Variance (Three Galvanic Skin Response (GSR) Readings by Gender and Treatment Group)*

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>( \eta_p^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>10.77</td>
<td>1</td>
<td>10.77</td>
<td>.46</td>
<td>.499</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>17.79</td>
<td>2</td>
<td>8.90</td>
<td>.38</td>
<td>.684</td>
<td></td>
</tr>
<tr>
<td>Gender by Group</td>
<td>75.16</td>
<td>2</td>
<td>37.58</td>
<td>1.61</td>
<td>.207</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>1515.31</td>
<td>65</td>
<td>23.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading 1, 2, 3</td>
<td>11.68</td>
<td>2</td>
<td>5.84</td>
<td>11.08</td>
<td>&lt;.001</td>
<td>.146</td>
</tr>
<tr>
<td>Reading 1, 2, 3 by Gender</td>
<td>.09</td>
<td>2</td>
<td>.05</td>
<td>.09</td>
<td>.918</td>
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</tr>
<tr>
<td>Reading 1, 2, 3 by Group</td>
<td>1.06</td>
<td>4</td>
<td>.27</td>
<td>.50</td>
<td>.734</td>
<td></td>
</tr>
<tr>
<td>Reading 1, 2, 3 by Gender</td>
<td>4.89</td>
<td>4</td>
<td>1.22</td>
<td>2.32</td>
<td>.060</td>
<td></td>
</tr>
<tr>
<td>by Group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>68.50</td>
<td>130</td>
<td>.53</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table 5

*Means and Standard Deviations of Relaxation Ratings of the Music*

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>7.76</td>
<td>1.76</td>
</tr>
<tr>
<td>PRM</td>
<td>8.38</td>
<td>1.58</td>
</tr>
<tr>
<td>NPM</td>
<td>2.86</td>
<td>2.19</td>
</tr>
</tbody>
</table>
Table 6

**Analysis of Variance (Relaxation Rating of Music by Gender and Treatment Group)**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1390.76</td>
<td>2</td>
<td>195.38</td>
<td>56.70</td>
<td>&lt;.001</td>
<td>.636</td>
</tr>
<tr>
<td>Gender</td>
<td>2.07</td>
<td>1</td>
<td>2.07</td>
<td>.60</td>
<td>.441</td>
<td></td>
</tr>
<tr>
<td>Group by Gender</td>
<td>6.04</td>
<td>2</td>
<td>3.02</td>
<td>.88</td>
<td>.421</td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>223.99</td>
<td>65</td>
<td>3.45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Genres chosen by participants in preferred music (PM) and preferred relaxing music (PRM) groups.
Answers to the research questions of this study are provided below to give an overview of the results.

Question 1

*Will participants in the preferred music group (PM) experience changes in perceived relaxation and galvanic skin response (GSR)?*

According to the mean ratings on the pretest and posttest visual analog scales (VAS), participants in the PM group experienced increases in perceived relaxation as evidenced by significant decreases in VAS scores. Additionally, the galvanic skin response (GSR) levels significantly decreased during the listening period which indicated a decrease in arousal.

Question 2

*Will participants in the preferred relaxing music group (PRM) experience changes in perceived relaxation and GSR?*

Similar to participants in the PM group, participants in the PRM group experienced significant increases in perceived relaxation and significant decreases in GSR levels.

Question 3

*Will participants in the non-preferred music group (NPM) experience changes in perceived relaxation and GSR?*

Means from the pretest and posttest VAS for the non-preferred music group (NPM) showed participants experienced decreases in perceived relaxation as evidenced by significant
increases in VAS scores. Scheffé post hoc comparisons also indicated that VAS scores in the NPM group were significantly higher than those in the PM group and the PRM group. This indicates that participants in the NPM group reported feeling significantly less relaxed than participants in the PM group and the PRM group. Though participants in the NPM group perceived that they became less relaxed, their GSR levels significantly decreased from beginning to end indicating a decrease in arousal.

**Question 4**

*Will one type of participant-selected music elicit a greater change in perceived relaxation and GSR than the other?*

Though participants in both the PM and the PRM groups experienced a significant increase in perceived relaxation, the Scheffé post hoc comparisons indicated that there was not a significant difference between these groups in the amount of increase. ANOVA results for GSR indicated that there was not a significant difference in GSR levels between the treatment groups, therefore participant-selected preferred music was no more effective than preferred relaxing music in increasing relaxation.

**Question 5**

*Will there be a difference in perceived relaxation and galvanic skin response (GSR) between males and females?*

According to the ANOVA results for the VAS and for GSR, there were no significant differences between males and females in either of these measures.

The answers to these research questions indicate that participant-selected preferred music that is specific to the objective is apparently no more effective than participant-selected generally
preferred music in contributing positively to the relaxation response. The results also indicate that although participants in the PM and PRM groups perceived an increase in relaxation and participants in the NPM group perceived a decrease in relaxation, the changes in GSR suggest that all participants became less aroused/more relaxed after the music listening regardless of the treatment group. The inconsistency between the self-report measure and physiological response indicates that the physiological measure did not reflect the participants’ perceived affective response.

**Limitations of Study**

Some of the main limitations of the study are related to the music listening for participants in the experimental treatment groups (PM and PRM groups). Despite requests for each participant to prepare a playlist of music ahead of time, many did not choose music until they arrived. When this was the case, some participants relied on internet-based services, such as Pandora or Spotify, and others used whatever music was accessible on their listening device at that time. For these reasons, listeners did not always put as much thought into their listening selections, did not have as much control over specific songs, and sometimes heard advertisements during listening if they were using an internet-based service. Additional distractions were present for participants who used their cell phone to listen to music. Examples of possible visual and auditory distractions from cell phones are phone calls, text messages, emails, and other types of notifications. Finally, by allowing participants in the experimental treatment groups to use their personal listening devices I was unable to control the volume they used for listening.

There were also limitations in the dependent measures for participants. Though participants experienced a decrease in GSR activity during the music listening, there were
differences between each participant in terms of their initial GSR level. These individual differences may have had an effect on the analysis of the results. Standard deviations of GSR were large relative to the means (see Table 3). An issue with using self-report measures such as visual analog scales (VAS) and Likert-type scales is that they are subject to individual participant interpretation. It seems likely that some participants had an idea what I was looking for in my research and therefore may have answered with what they thought I wanted to hear.

**Differences from Music Therapy Settings**

An additional important limitation to consider is the fact that the set-up of the study was experimental and did not simulate a typical music therapy session. No relaxation interventions or prompts were used in addition to the music listening. There are a number of different advantages of using music therapy interventions that are implemented by a board certified music therapist (MT-BC). A music therapist is able to provide live music that can be constantly adjusted according to the needs of the patient. She is also able to continuously assess the verbal and non-verbal behaviors of a patient to determine how effective the intervention is for the patient. These benefits of a live music therapy context were not present in this study.

**Suggestions for Future Research**

For future research, there are several recommendations to consider when designing subsequent studies. It could be helpful to include a relaxation intervention or even a prompt in addition to the music listening in order to help participants get their minds off of daily stressors. Some kind of stressor could also be used before the relaxation intervention to simulate the stress or anxiety a patient might feel. If time allows, future researchers could investigate each participant’s baseline GSR by taking several readings before the intervention.
To more thoroughly understand the influence of music preference, a future researcher could provide more detail when asking participants for different types of preferred music in case it helps them narrow down selections. I chose to make the request open-ended so as not to influence the music choices too much, but I realized this left a lot of room for different interpretations. Another suggestion for future research would be to ask participants to list specific songs instead of just artists, bands, or composers. Finally, the researcher should consider asking participants more questions about their music preferences. For instance, had they been in the other experimental group, would they have brought in the same music or different music? Also, what influenced them to choose the music that they did? What elements of the music appeal to them?

**Clinical Recommendations for Music Therapy with Relaxation**

Though these research findings do not necessarily provide a single way to go about choosing music for relaxation, they do give support for the continued use of patient-preferred music and offer alternative suggestions for assessing music preferences. It is also important to be careful when using unfamiliar music, if it is used at all, since the patient might not find it relaxing. Because there are inconsistencies with the relationship between physiological and affective responses, music therapists should continue to ask for verbal feedback from the patient and to observe their behaviors in response to relaxation interventions.

**Conclusions**

Aside from the limitations discussed above, there were some comments that are worth noting since they may have had an effect on the participants’ experiences in the study. Participants in the experimental treatment groups generally enjoyed the study and enjoyed
having the opportunity to take a break to relax. One student in particular said, “I feel very relaxed,” and “I am a firm believer in doing this.” Participants in the control group expressed that the music was not relaxing and a couple said it sounded like horror music. A few participants also said they tried to listen for different instruments and to understand how certain sounds were produced.

This research study is one of many that address music preferences and the use of music for relaxation. To my knowledge, no researchers have compared the effects of two different types of participant-selected music within the same study. Listening to preferred music is an effective way to both increase perceived relaxation and to decrease GSR levels. Researchers should continue to investigate the effects of different types of music on relaxation and the relationship between physiological and affective responses to music.
APPENDIX A

HUMAN SUBJECTS APPROVAL FROM FLORIDA STATE UNIVERSITY

Florida State University
Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-4073 • FAX (850) 644-4092

APPROVAL MEMORANDUM

Date: 03/18/2015

To: Emily Buerde

Address: 

Dept.: MUSIC SCHOOL

From: Thomas J. Jacobsen, Chair

Re: Use of Human Subjects in Research

The effect of subject-selected preferred music versus preferred relaxing music on relaxation as evidenced by measures of galvanic skin response (GSR) and perceived relaxation.

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(b) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 09/16/2015 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to ensure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000445.

Cc: John Gernitzer, Advisor

HSC No. 2013.14920
APPENDIX B

CONSENT TO PARTICIPATION

Student Participant Consent Form

My name is Emily Bruestle, and I am a master’s student from the College of Music at Florida State University. You are invited to participate in a research study regarding the effects of certain types of music on physiological and psychological responses. I am asking that you take part because previous research in this area has investigated responses of undergraduate students. Please read this consent form in its entirety before indicating whether or not you want to take part in this study.

The study: The purpose of this study is to determine if there is a difference between the effect of different types of music on relaxation as evidenced by measures of galvanic skin response (GSR) and perceived relaxation.

Procedures: If you agree to participate, you will be asked to consent to the following:
1. Sign up for a time-slot and provide an email for time, location, and further information.
2. Bring a portable music device (e.g. mp3 player, CD player) to the experiment if instructed. This device should allow you to access music you own without need for an Internet connection.
3. Complete a questionnaire that asks for demographic information (gender, major, and year in school).
4. Participate in an experiment that includes assessments of relaxation (galvanic skin response and perceived relaxation) and a period of music listening. This will take no more than 30 minutes of your time. The measurement of galvanic skin response is not painful and only requires the participant to wear a small bracelet-like device.

Risks and Benefits: There are no known risks to the participants of this study. The benefits are that music therapists and others will be informed about the relaxation response to different kinds of music. Participants may benefit from relaxing while listening to music, and this period of relaxation could decrease their current stress levels and contribute to their well-being.

Compensation: There is no compensation for this study.

Confidentiality: The records of this study will be kept confidential, to the extent permitted by law. No identifiable information will be collected. All data collected in this study will be anonymous, and participants will not be identifiable in any future reporting of results. Research data will be kept in a locked cabinet and a secured office.

Voluntary Participation: Your participation in this study is completely voluntary. If you decide not to participate in this study, your decision will not have any negative consequences. If you decide to take part, you are free to stop the study at any time. You may skip any session that you do not feel comfortable completing. You are also free to withdraw at any time without affecting your relationship with Florida State University. The researcher for this study is Emily Bruestle who is overseen by Dr. John Geringer, the faculty advisor for this study. You may reach Dr. Geringer at [contact information], or [contact information]. Please feel free to ask any questions you have now, or at any point in the future. If you have any questions or concerns about your rights as a research subject, you may contact the FSU Institutional Review Board (IRB) at [contact information] or you may access their website at http://www.fsu.research.edu. You will be given a copy of this consent form for your records.

I ACCEPT this offer to participate in this experimental study regarding music and relaxation.

Your name (print): ____________________________ Date: ____________________________

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APPENDIX C

QUESTIONNAIRE FOR PREFERRED MUSIC (PM) AND PREFERRED RELAXING MUSIC (PRM) GROUPS

Questionnaire

Gender: _____________

Major: _____________________________

Year in School: ______________________

Preferred music you selected for this experiment:

________________________________________

________________________________________

________________________________________

________________________________________
APPENDIX D

QUESTIONNAIRE FOR NON-PREFERRED MUSIC (NPM) GROUP

Questionnaire

Gender: ______________

Major: __________________

Year in School: __________________
APPENDIX E

VISUAL ANALOG SCALE (VAS) FOR PRETEST AND POSTTEST

Please make one vertical mark anywhere on this line to indicate how relaxed you feel at this time.

Completely Relaxed  Completely Unrelaxed
APPENDIX F

LIKERT-TYPE SCALE FOR RATINGS OF HOW RELAXING THE MUSIC WAS

On a scale of 1 to 10, how relaxing was the *music* you listened to today? (1 = not relaxing at all; 10 = very relaxing)

1              2              3              4              5              6              7              8              9              10
(not relaxing at all)  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - (very relaxing)
REFERENCES


BIOGRAPHICAL SKETCH

Name: Emily Ruth Bruestle

Education: The University of North Carolina at Chapel Hill
Chapel Hill, North Carolina
Bachelor of Music
Degree awarded May 2012

Florida State University
Tallahassee, Florida
Master of Music in Music Therapy
Degree awarded August 2015

Experience: Music Therapy Internship, Healthsouth Rehabilitation Hospital
Birmingham, Alabama
January 2014 – July 2014