

THE EFFECTS OF PREFERRED VERSUS NONPREFERRED MUSIC
WITH AEROBIC DANCING ON STATE ANXIETY
OF ADOLESCENT FEMALES

A THESIS
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF ARTS
IN THE GRADUATE SCHOOL OF THE
TEXAS WOMAN'S UNIVERSITY
COLLEGE OF ARTS AND SCIENCES

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DENTON, TEXAS
DECEMBER 1991

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To the Dean for Graduate Studies and Research:

I am submitting herewith a thesis written by Melinda Marshall entitled "The Effects of Preferred Versus Nonpreferred Music with Aerobic Dancing on State Anxiety of Adolescent Females." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Music Therapy.

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ACKNOWLEDGMENTS

Several people were significant in assisting with this research. To them I express deepest appreciation: to my advisor, Dr. Nancy Hadsell, who helped brainstorm this project into existence and continually offered her expertise and resources for the two-year duration in which this thesis was written; to committee member Dr. Donald Michel, who offered his knowledge of music therapy principals and research at key times in the writing of this paper; and to committee member Norma Davidson, whose encouragement and focus guided me along the way.

Thanks is also extended to coaches Angie Nichols and Annette Baumgartner as well as to the 8th-grade girls sports students at Wilkinson Middle School. Their willing participation and cooperation in every aspect of the study greatly encouraged me and helped the experiment to progress smoothly.

I would also like to express thanks to my mother who stayed up with me countless nights working through the details of using the computer and proofreading my many rough drafts.

Mostly, thanks to the Lord for giving me the perseverance, strength, and motivation to accomplish this project.

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December 1991

Abstract

The purpose of this study was to determine the effect of music and aerobics on state anxiety. Twenty-three adolescent females enrolled in girls sports at a middle school were subjects for the study. Using their preference ratings of 30 musical selections, the researcher ascertained whether the selections were preferred or nonpreferred. On the first day of the study, the subjects participated in an aerobics class with their nonpreferred music and, 10 days later, in an aerobics class with their preferred music. The subjects took Spielberger's (1970) State-Trait Anxiety Inventory, State Form, as a pre, post, and follow-up test to each aerobics class. The data analysis of change scores of pre/post, pre/follow-up, and post/follow-up tests yielded no significant differences in state anxiety changes between the two conditions. However, according to a repeated measures t-test analysis, state anxiety was significantly reduced for the nonpreferred music condition.

TABLE OF CONTENTS

ACKNOWLEDGMENTS.....	iii
ABSTRACT.....	iv
LIST OF TABLES	vii
Chapter	
I. INTRODUCTION.....	1
Effects of Music on Mood	1
Effects of Exercise on Mood.....	3
Purpose of the Study	5
Need for the Study.....	5
Definition of Anxiety.....	7
Limitations of the Study.....	7
II. REVIEW OF THE LITERATURE.....	9
Effects of Music on Anxiety	9
Effects of Exercise on Anxiety.....	15
Effects of Music and Exercise on Mood.....	17
III. METHOD.....	19
Subjects.....	19
Design	19
Experimenter.....	20
Setting	20
Music Selection.....	21
Aerobics.....	22
Dependent Measures.....	23
Procedure.....	24
Null Hypotheses	26

IV. RESULTS.....	27
Change Score Data Analysis.....	27
Means of Change Scores.....	29
V. CONCLUSIONS.....	31
REFERENCES	36
A. Music Preference Questionnaire.....	43
B. Music Used for the Aerobics Classes.....	45
C. Music Excerpts Used For The Preference Test.....	47
D. Results of the Music Questionnaire.....	50
E. Explanations of the Aerobics Movements.....	53
F. Parent/Guardian Permission Form.....	57
G. Agenda for the Aerobics Study.....	59
H. Debriefing Form.....	61
I. Change Scores for Pre/Post, Pre/Follow-up, and Post/Follow-up STAI tests for the Nonpreferred Music Condition and for the Preferred Music Condition.....	63

LIST OF TABLES

Table		page
1.	Repeated Measures Analysis of Variance for Pretest/Posttest Change Scores on the STAI, State Form (N=23)	27
2.	Repeated Measures Analysis of Variance for Pretest/Follow-Up Test Change Scores on the STAI, State Form (N=23)	27
3.	Repeated Measures Analysis of Variance for Posttest/Follow-Up Test Change Scores on the STAI, State Form (N=23)	28
4.	Means of Change Scores of Pre/Post, Pre/ Follow-Up, and Post/Follow-Up STAI Scores for the Nonpreferred Music Aerobics Condition and for the Preferred Music Aerobics Condition	29

CHAPTER I

Introduction

Effects of Music on Mood

Since Biblical days, music has been used to change the mood of its listeners. David was recorded in the Old Testament as playing a harp to soothe the ill spirits of King Saul (The Bible). It is written that "David would take a harp and play it with his hand. Then [King] Saul would become refreshed and well, and the distressing spirit would depart from him" (I Samuel 16:23). Centuries later, the Greeks also utilized music to bring healing for persons having distressed spirits. The Greeks believed that the impact of music was so powerful that it actually formed a person's character (Grout, 1980).

In the Twentieth Century, the healing power of music continued to be utilized by professionals who worked with veterans from World War II (Peters, 1987). In 1944, the Commanding General at Walter Reed General Hospital issued a statement authorizing music therapists to apply music in the treatment of the patients (Music Research Foundation, 1952). While treating the patients, music therapists were to determine the specific effects of music under controlled conditions. The knowledge gained from this research laid the foundation for the practice of music therapy, providing useful information for music therapists in treating patients

in a variety of settings. At the same time, it began a trend of scientific study on the effects of different types of music with varied populations. As researchers learned more about the physical and psychological effects of listening to and creating music, music therapists have been able to apply music in treating divergent populations more accurately.

One area of study involving the effects of listening to music has focused on the role of music in emotional wellness. This phenomenon was investigated by researchers Middleton, Fay, Kerr, and Amft (1944). They determined that listening to music reduced feelings of tiredness and unpleasantness for 160 undergraduate students.

Shatin (1970) also studied the effect of music on mood change. In his study, subjects who listened to music which changed from sad to happy, restless to serene, bored to active, and active to majestic, changed their mood as the music changed.

In a study of the effect of applied music relaxation on college women, Howard (1985) administered a combination of sedative music and applied relaxation training to 54 college students. She found no significant differences in anxiety between groups according to an analysis of the Multiple Affect Adjective Checklist (Zuckerman, 1965).

Pignatiello, Camp, and Rasar (1986) also tested a music mood induction. They found that subjects who listened to elated music

scored significantly lower on a depression scale than those who listened to depressing music.

In a similar study, Kenealy (1988) determined that music's ability to influence mood was significant despite verbal indicators which suggested an opposite effect of the mood change. The effect of relaxing background music has also been determined to provide a more conducive atmosphere for social interactions (Prueter & Mezzano, 1973) and academic situations (Caspy, Peleg, Schlam, & Goldberg, 1988).

Thus, the research to date shows that music often does change the mood of its listeners. It has been shown to increase pleasant feelings, lower depression, and provide a relaxing atmosphere in stressful situations.

Effects of Exercise on Mood

The effect of exercise on mood is a phenomenon which many researchers have investigated during the past century. The rise of spas and health clubs in the '80s shows that Americans have a growing interest in fitness. Many business people as well as homemakers routinely visit a gym. One may ask, "What motivates people to spend their time, money, and energy in exercising?"

The answer may be found by looking at research conducted by exercise enthusiasts and specialists such as the husband-wife team, Mildred Cooper and Kenneth Cooper. In their book, Aerobics for Women (1972), they expounded on several benefits of aerobic exercise including losing inches, losing weight, controlling appetite,

lessening tension, increasing energy, heightening sleep, decreasing resting heart rate, positively affecting self-image, and increasing the pride of the marital partner. These researchers strongly espouse the belief that cardiorespiratory exercise has psychological as well as physical benefits.

Other researchers have focused exclusively on the psychological benefits of exercise. Among these researchers are Morgan, Roberts, Brand, and Feinerman (1970) who found that 11 depressed subjects were significantly less depressed after participating in a six-week exercise program. Other researchers (Gary and Guthrie, 1972) found that exercising improved the body-image concept of 20 adult alcoholics. Carter (1977) surveyed 116 people and found that exercise was significantly correlated with happiness. In a study by Heaps (1978), physically-fit males scored higher on self-acceptance and lower on anxiety of body functions than did nonfit males. Hoiberg (1978) found that men who did not pass the physical requirements of the Marines increased their self-esteem after participating in a physical fitness program.

In other research, adolescent females who participated in sports training 3 days a week significantly increased their sociability over a four-month period (Vanfraechem and Vanfraechem-Raway, 1978). In a study by Jones and Weinhouse (1979), 12 volunteers who participated in a year-long jogging program became significantly more assertive, intelligent, and relaxed according to measures of the

Sixteen Personality Factors Questionnaire (Catell, Eber, & Tatsuaka, 1970).

Browman (1981), in reviewing the literature, determined that exercise had mixed results from its participants. He reported that exercise did not significantly affect the mood of its participants; however, he stated that a minimum amount of exercise was necessary for psychological health. Plummer and Koh (1987) found that college women who participated in aerobic dance for a semester scored significantly higher in self-satisfaction, identity, and behavior tests than women in a nonexercising control group.

In summarizing the research on the effect of exercise on mood, most studies indicate that exercise positively affects one's mood. It has been shown to be correlated with happiness; to increase self-esteem, sociability, and relaxation; and to lower depression.

Purpose of the Study

The purpose of this study was to determine the combined effect of music and exercise on mood of adolescent females. The mood factor considered in the study was state anxiety; it was assessed by Spielberger's State-Trait Anxiety Inventory, State Form, (STAI Form Y-1; Spielberger, Gorsuch, & Lushene, 1970).

Need for the Study

Stress-produced anxiety has been an integral part of American life in the Twentieth Century. Stress invades every aspect of life spanning work to entertainment and affects relationships with family, co-workers, and friends. Although a certain amount of stress

is healthy, many people have become overloaded with too many stressors from school, jobs, marriage, the environment, and physical ailments. The result is distress or strain, which produces anxiety (Spielberger, 1979).

Another cause of anxiety can be repressed emotions from childhood (Kahn, 1985). In some instances, an adult may become anxious for no apparent reason. This may be the result of a traumatic childhood experience which is similar in some way to the current situation. The adult may not remember the childhood experience or be able to determine the cause of the anxiety. No matter the cause, too much anxiety can be pathological to both physical and psychological health. For example, too much stress has resulted in cases of depression and heart disease (Kelly, 1980).

In trying to deal with the problem of anxiety, professionals have sought many avenues for therapy, including drug therapy, cognitive therapies, and relaxation methods. However, because society is apparently becoming more violent and the future may be less predictable, a need exists for studying alternate methods of treating anxiety.

The use of music as well as participation in exercise have been shown to decrease anxiety. However, literature which addresses the effects of the combination of music and exercise on mood is scarce. Meddaugh's study (1987) focuses on the use of music-to-exercise for lowering the anxiety of nursing home patients. Wade (1987) discusses the selection of music for an exercise class of geriatric

subjects. More research is needed to determine the combined effects of music and exercise on anxiety for various populations.

Definition of Anxiety

Anxiety may be classified in several different ways. For example, one author mentions some distinctions of anxiety as being "oral anxiety," "free-floating anxiety," "sexual anxiety," "separation anxiety," "interpersonal anxiety," and "social anxiety" (Lesse, 1970). Anxiety may also be distinguished as state anxiety or trait anxiety, referring to its presence over time. Spielberger (1983) discusses the difference between these two types of anxiety in his STAI manual. According to his school of thought, state anxiety is a transitory emotional condition. He specifically defines it as "an emotional reaction that consists of subjective feelings of tension, apprehension, nervousness and worry, and heightened activity of the autonomic nervous system" (1979, p. 17). Trait anxiety, on the other hand, is a characteristic of individuals who are more apt to respond with anxiety in a given situation as compared with other individuals. It may be thought of as a more lasting personality disposition. The present study will involve state anxiety only; no attempt will be made to determine the cause of the anxiety.

Limitations of the Study

This study involved adolescent females from lower to middle class families and cannot be generalized to other populations. Also, the aerobics classes were held only twice--once for the preferred music condition and once for the nonpreferred music condition.

Thus, the anxiety of the subjects may have been affected by the new class situation. A more valid measurement might have been gained from repeated studies. Lastly, the music used for the aerobics classes was rated as preferred or nonpreferred by the subjects. The effects of the music on anxiety was not assessed prior to the aerobics classes.

CHAPTER II

Review of the Literature

Effects of Music on Anxiety

During the past century, studies have confirmed the phenomenon of anxiety reduction as a result of music listening. In one study, Fisher and Greenberg (1972) studied the effects of listening to exciting music versus listening to calm music. Ninety females, divided into groups of 30, listened to either exciting, calm, or no music for an hour. Results of five pre and posttests indicated a significant difference in anxiety levels between subjects in the exciting music group versus subjects in the calm/no music groups. Calm music subjects showed the least anxiety of all the groups. Fisher and Greenberg thus concluded that listening to calm music decreased the anxiety of the subjects.

In other research, Biller, Olson, and Breen (1974) tested 60 undergraduate students to determine the effects of happy music; sad music, and no music on anxiety. A second variable in the study was whether or not the subjects played rhythm instruments as they listened to the music. The subjects were divided into six groups: (a) happy music--percussive accompaniment (HM-PA); (b) happy music--no percussive accompaniment (HM-NPA); (c) no music--percussive accompaniment (NM-PA); (d) no music--no percussive

accompaniment (NM-NPA); (e) sad music--percussive accompaniment (SM-PA); and (f) sad music--no percussive accompaniment (SM-NPA). After listening to the music or sitting silently in a room, subjects were administered the STAI. Results of the study showed that state anxiety was significantly lower for the SM-NPA group than for the other groups. Subjects in both of the happy music groups as well as those in the SM-PA group had a higher level of anxiety after treatment. The researchers concluded from their study that (a) listening to sad music without playing percussive accompaniment reduced anxiety, and (b) listening to sad music while playing percussive accompaniment or listening to happy music (with or without percussive accompaniment) increased anxiety.

In another study, Peretti and Swenson (1974) researched the effects of music on anxiety as measured by physiological skin responses. Their subjects consisted of 100 music majors and 100 nonmusic majors, evenly divided between males and females. The subjects were blindfolded and given a pencil maze to complete. Afterwards, they were told that their responses were wrong and were asked to do it again. This procedure continued until their galvanic skin response (GSR) readings showed an increase in anxiety. When the scores began to maintain a peak, they were recorded and the experiment progressed to the next phase. During phase two, subjects first listened to six musical selections to determine which one most significantly decreased their GSR's. Then, they were

blindfolded again and given the mazes until their GSR's began rising. At this time the previously determined musical selection which had most significantly decreased their GSR's was played. Results of this study were that the GSR averages of all subjects were significantly lower after the music condition than after the no-music condition. Thus, the researchers concluded that, according to differences in the subjects' GSR readings, listening to relaxing music lowered their anxiety.

Stoudenmire (1975) compared the effectiveness of muscle relaxation training and music listening in reducing anxiety. One hundred and eight undergraduate female psychology students were subjects for this study. They were randomly assigned to either music listening or muscle relaxation groups and were tested in groups of six. During three testing sessions, subjects in the music groups listened to relaxing music whereas subjects in the muscle relaxation groups listened to a phonograph of a male narrating relaxation instructions. Following each session, subjects completed the STAI. Results of the study showed that state anxiety from the first to the last session was significantly reduced for both the music and muscle relaxation groups. The researcher thus concluded that relaxing music was as effective as muscle relaxation in lowering state anxiety.

One hundred and sixty-two students at Flinders University served as subjects for Stanton's (1975) study on the effects of music on test anxiety. First, the students completed Sarason's Test Anxiety

Scale (TAS; Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960) for adults and were categorized as having low or high test anxiety. Then they were randomly assigned to one of three conditions during a testing situation: (1) no background music, (2) background music played during preparation for the test, and (3) background music played for the duration of the test. Analyses of the tests showed no significant differences in performances of students between the three testing conditions. However, highly anxious students performed better under the music conditions than under the no-music condition. Thus, in this study, the researchers concluded that music may or may not increase performance for anxious test takers.

In further research of the effects of music on test anxiety, Smith and Morris (1976) compared the effects of stimulative music, sedative music, and no music. Subjects for the study, 66 undergraduate psychology students, were randomly assigned to one of three groups--stimulative music, sedative music, or no music (control). During a psychology test, the background music was played for the first two groups while the control group took the test in silence. The subjects completed a self report of their emotionality, worry, and expectancy before and after each of five sections of the test. Results of the tests showed that subjects in the sedative music and control groups significantly decreased their emotionality from pre to posttest levels. Conversely, worry was significantly higher for the stimulative music than for the other two groups. Thus, these

researchers concluded that listening to background sedative music or to no music while taking a test decreased anxiety whereas listening to background stimulative music increased test anxiety.

In another study a year later, Smith and Morris (1977) studied the effects of music on anxiety and cognitive processes. Sixty students (30 psychology majors and 30 music majors) were randomly assigned to one of five music groups--classical, country, jazz, rock, and easy listening. Subjects first took the Digits Backward Test (Wechsler, 1955) and were assigned to a level based on their individual scores. Then they retaken the test three times while listening first to sedative music, secondly to stimulative music, and lastly to no music. After each test, they answered questions assessing their concentration, emotionality, worry, and expectancy. Results of the study were that subjects' emotionality and worry were significantly higher when they listened to stimulative rather than sedative music. All groups scored significantly higher on concentration when they did not listen to any music. Between the music conditions, concentration was significantly higher for the sedative than for the stimulative music condition. Thus, Smith and Morris concluded that music affects mood because of its effects on cognition such as worry, concentration, and expectancy.

Rohner and Miller (1980) researched the effects of familiar music on state anxiety. One hundred and fifty-seven undergraduate psychology students served as subjects for the study. They were divided into five music groups: (a) familiar-stimulating (FS);

(b) familiar-sedative (FD); (c) unfamiliar-stimulating (US); (d) unfamiliar-sedative (UD); and (e) no music (NM). Subjects were tested in each of the groups. They completed the first part of the Eight-State Questionnaire (Cattell, 1976), took a 10 minute "break" in which music was played, and then completed the second part of the 8SQ. Results of the study showed no significant differences in state anxiety among any of the five groups. However, the variable of stimulative/sedative music had more impact than that of familiar/unfamiliar music in affecting relaxation.

Gross and Swartz (1982) studied the effects of music therapy on anxiety of 11 patients who were chronically ill. These subjects participated in music therapy once a week for 8 weeks. During the sessions they sang, improvised, and discussed their feelings about certain musical selections. Compared to a control group which received no music therapy, subjects in the experimental group significantly lowered their state anxiety according to analyses of STAI's taken before and after the fifth session.

Fagen (1982) also reported that music therapy reduced anxiety in terminally ill pediatric patients. He gave examples of children in the hospital whose anxiety decreased because they were allowed to express their fears through the avenue of music.

Thayer and Levenson (1983) studied the effects of different types of background music played during a stress-inducing film. The three viewing conditions were (1) scary music as background for the film, (2) nonscary music as background for the film, and (3) no music

as background for the film. The researchers found that the scary music condition significantly increased the anxiety of the viewers as measured by their skin conductance levels.

Hanser (1985) reviewed the effects of music therapy on stress reduction. According to this researcher, one of the greatest changes in reducing anxiety was facilitated by both biofeedback and background music as opposed to either one alone. In a similar study, Davis and Thaut (1989) researched the effects of applied music relaxation on the anxiety of 18 psychology students. The students participated in music relaxation sessions once a week for 3 weeks, listening to 20 minutes of preferred relaxing music during each session. Subjects completed the STAI before and after each relaxation session. Results of the study were that state anxiety was significantly decreased from pre to posttest levels for all sessions.

In summary, most research shows that listening to relaxing music tends to decrease state anxiety. This was true for relaxation sessions as well as for testing situations. Music was found to be as effective as deep muscle relaxation training in lowering anxiety. The literature also indicates that listening to stimulative music seems to increase or maintain anxiety.

Effects of Exercise on Anxiety

Many researchers have studied the effects of exercise on anxiety. For example, McPherson, Paivio, Yuhasz, Rechnitzer, Pickard, and Lefcoe (1967) studied the psychological effects of exercise on both healthy males and those recovering from heart attacks. Their

subjects were divided into five groups--cardiac control, noncardiac control, cardiac exercisers, noncardiac exercisers, and experienced exercisers. The three exercise groups met twice a week for 24 weeks. The cardiac control group met once a week and engaged in recreational swimming, while the noncardiac control group did not meet. Subjects completed inventories measuring short mood changes before and after each session. They also completed a Manifest Anxiety Scale (Bendig, 1956) at the beginning and end of the 24-week period. According to the test scores, anxiety was significantly reduced at the end of the study for the cardiac exercise group, noncardiac exercise group, and cardiac control group. The non-exercising controls increased their anxiety, while the anxiety of the experienced exercisers remained constant. Thus, the researchers concluded that exercise as well as social contact was effective in lowering anxiety in both cardiac and noncardiac populations.

Long and Haney (1988a, 1988b) compared the effectiveness of aerobic exercise and relaxation in lowering stress in working women. In their original study, they recruited 61 sedentary working women from the community to serve as subjects. Fifty of the women were randomly assigned to relaxation or exercise groups which met once a week for 8 weeks. In a follow-up study 14 months later, surveys which included the STAI were mailed to the participants. Results of these surveys showed that both groups significantly maintained their lowered anxiety scores. Thus, the researchers concluded that both

exercise and relaxation training were viable methods for reducing anxiety in women.

Felts (1989) studied the relationship between ratings of perceived exertion and decrease in state anxiety as a result of exercise. Subjects for this study were 24 females who took a bicycle test once a week for two weeks. They cycled for 24 minutes while being tested for their ratings of perceived exertion (RPE) every 3 minutes after the first 9 minutes of exercise. Subjects completed the STAI before each bicycle test, immediately following each test, and 50 minutes after each exercise test was completed. One result of the study was that anxiety was significantly lowered from pre to posttest measures. However, RPE's were not significantly related to actual decrease in anxiety. Thus, the researcher concluded that lowered anxiety as a result of exercise was not dependent upon perceived exertion.

In summary, a review of literature regarding the effects of exercise on anxiety shows that exercise does significantly decrease anxiety. This effect was consistent across various populations including men, women, cardiac recoverers, and those with no cardiac problems. In one study, the benefits of exercise were found to be significant a year after the exercise program had been completed. In comparison to relaxation, exercise was found to be equally effective in reducing anxiety. Thus, the effects of exercise on state anxiety seem to be consistent across a variety of conditions.

Effects of Music and Exercise on Mood

Few studies have concerned the combined effect of music and exercise on anxiety. Meddaugh (1987), however, addressed the issue in her study of nine abusive patients in a nursing home. In this study, patients who regularly abused staff were chosen to attend 9 weeks of exercise-to-music classes. During the sessions, staff praised the patients for their positive behaviors and quietly talked to them about their unacceptable behaviors.

Results of the experiment showed that the patients improved in their social interactions, willingness to try the exercises, ability to perform the exercises, and acceptable behaviors. In addition, they decreased their unacceptable behaviors. As a side-effect, it was found that, as the behaviors of the patients improved, staff morale increased. Thus, the exercise-to-music experiment was deemed successful in improving the behaviors of the patients.

Wade (1987) discussed the relation between music and exercise in geriatric clients. Although the author did not relate the music to the mood of the person, she did discuss the selection of music for an exercise class. She stated that the music should be chosen carefully, using the preferred music of the participants.

In summary, the literature is scarce concerning the combined effects of music and exercise on mood. Much research is needed to determine the psychological benefits of these two factors combined.

CHAPTER III

Method

Subjects

Subjects for the study were students from the eighth-grade girls sports class at Wilkinson Middle School in Mesquite, Texas. Thirty-four students completed the Music Preference Questionnaire (Appendix A), although only 31 participated in the aerobics classes. Of the 31 who participated in the classes, only 23 could be used for the change score data analysis because of insufficient completion of the STAI questionnaires. For the pretest/posttest data analysis, all students who were present on each day were considered in the computation. This was $N=31$ for the nonpreferred music aerobics condition and $N=28$ for the preferred music aerobics condition. The students ranged from 13-14 ($\bar{x}=13.2$) years of age and were 64.5% White ($N=20$), 22.6% Black ($N=7$), 9.7% Hispanic ($N=3$), and 3.2% Oriental ($N=1$). They were from the lower to middle socioeconomic class.

Design

The treatment by subjects design of the study, as described by Bruning and Kintz (1963), involved repeated measures under two testing conditions. The first condition was an aerobics class with the nonpreferred music of the subjects and the second was an aerobics class with the preferred music of the subjects (Appendix B). Three

inventories of Spielberger's STAI were given to the subjects during each testing condition. These included a pretest given before the aerobics classes, a posttest given immediately following the aerobics classes, and a follow-up test given 30 minutes after the aerobics classes. Change scores between pre/post, post/follow-up, and pre/follow-up tests were calculated for each testing condition. These change scores were then analyzed according to the method outlined by Bruning and Kintz. Differences were considered to be significant at the alpha level, $p \leq .05$.

Experimenter

The experimenter, who was also the researcher for this study, was a music therapy student pursuing a Master's Degree in Music Therapy at Texas Woman's University in Denton, Texas. She was a certified aerobics instructor through The Health Instructor's Network (THIN) with 6 months experience. She choreographed and taught both of the aerobics classes for the study.

Setting

The study was conducted in the gymnasium of Wilkinson Middle School. On the first day of the study, students took the STAI in the girls' locker room which is attached to the gym by a short hallway. The aerobics classes, however, were held in the gymnasium. On the second day of the study, the gymnasium was available for both the administration of the STAI's as well as for the aerobics class. The schedule for both days of the study was as follows:

- 7:45 arrive at school
- 7:50 administration of the pretest
- 8:00 beginning of the aerobics class
- 8:30 ending of the aerobics class and administration of
the posttest
- 8:40 free time / snacks / dress
- 9:00 administration of the follow-up test

The experiment was conducted during the regular time period in which the students were registered for sports class. The gymnasium floor was tile, and the temperature was suitable for exercise.

Music Selection

Music for the aerobics classes was chosen through a Music Preference Questionnaire given to the subjects during the third week of the 1991 Fall semester. A total of 34 students in the class completed the questionnaires. These girls listened to 30 excerpts of music (Appendix C), each 16-46 seconds in duration, and rated their preferences on a 9-point Likert Scale. The musical excerpts were chosen by the researcher from her personal tape and album collection. Various styles of music were selected which included Blue Grass, Classical, Folk, Rock, Funk, and Easy Listening. After the subjects completed the questionnaires, the responses were tallied (Appendix D) and charted by the researcher and an assistant. Selections chosen for the preferred music condition were rated as 7, 8, or 9 by at least 25 of the students. Selections chosen for the

nonpreferred music condition were rated as 1, 2, or 3 by at least 20 students.

Aerobics

The aerobics classes were held once during the fifth week of school and once during the seventh week of school. Each 30-minute aerobics session consisted of 7 minutes of warming up and stretching, 18 minutes of low-impact aerobics, and 5 minutes of cooling down.

During the warming up period, movements included side steps, toe pushes, and marching. Various arm movements were used to increase the blood flow including scissor arms, bicep curls, tricep pushes, and reaches (Appendix E).

The low-impact aerobics portion consisted of basic traditional aerobics moves such as grapevines, hustles, 2-steps, half-jacks, and lunges (Appendix E). Arm movements were similar to those used in the warm-up period. A heart rate check was taken after 20 minutes to ensure that the subjects' rates were within a normal range. The target heart rate zone for these subjects was calculated as being 148-177 beats per minute (BPM) according to the Karvone Method (Scott, 1990). Most of the students' heartrates were within this range, with only one being lower (90 BPM) and one being higher (180 BPM). Advice was given to these two students to increase or decrease their heartrates to target levels.

After the aerobics portion of the exercise class, the cool-down phase began. The movements were smaller, including such footwork

as toe taps, low marches, and heel presses (Appendix E). The arms were kept below the heart at all times. All parts of the body including neck, shoulders, arms, torso, and legs were stretched to lengthen the muscles to their previous condition. Finally, a cool-down heart rate check was taken to ensure that the subjects' heart rates were at or below 120 BPM. The heart rates of three subjects were above 120 BPM; the experimenter instructed them to continue walking until they were reduced.

Dependent Measures

State anxiety was measured by means of the State-Trait Anxiety Inventory, Form Y-1 (Spielberger, 1970). This form lists 20 present feeling statements with which the client agrees or disagrees on a scale of 1-4. The STAI assesses either state or trait anxiety, is written on a 6th-grade level, and can be used with individuals or groups. Approximately 10 minutes should be allowed for the administration of the STAI.

The reliability of the State Form of the STAI has been tested and found to be internally consistent at the .93 coefficient level for the State Form (Spielberger, 1983). This reliability coefficient was obtained from testing with adults, military recruits, and students. The STAI has also been tested for its validity (Spielberger, 1983). The State Form was tested with military recruits involved in stressful training programs as compared to students in college and high school who were not under stressful circumstances. The anxiety

scores of the military recruits were much higher than those of the students attending school.

The STAI has also been compared with other tests which measure anxiety. For example, a .70 correlation was shown between measures of state anxiety on the STAI and those on the Minnesota Multiphasic Personality Inventory. Other tests such as the Cornell Medical Index and the U.S. Army Beta tests also show a correlation of .70 with the STAI, State Form (Spielberger, 1983).

Procedure

The researcher first talked with the students during one of their sports classes during the third week of the Fall semester. She explained the study to them, distributed Parent/Guardian Permission Forms (Appendix F), and administered the Music Preference Questionnaires.

The first aerobics session was held on a Friday two weeks later. Students had been told that they must return their permission slips in order to participate in the study. Notes informing the students of the schedule (Appendix G) had been given to the students to take home to their parents/guardians. They were to arrive at school at 7:45, take the pretest of the STAI at 7:50, do the aerobics class from 8:00-8:30, take the posttest of the STAI at 8:30, and take the follow-up test of the STAI at 9:00. Class was dismissed at 9:10. On the nonpreferred music/aerobics day, the STAI's were administered in the girls locker room with the aerobics taking place in the gymnasium. On the preferred music/aerobics day both the

administration of the STAI's and the aerobics class took place in the gymnasium.

A 10-second heart rate check was taken at 8:20 to ensure that no one was higher than 177 BPM, the maximum heart rate exercise intensity for these subjects. Another heart rate check was taken at 8:30 to ensure that everyone was below 120 BPM, which is the maximum for recovery heart rate (Scott, 1990). Between the posttest and the follow-up test, the students were allowed to shower, change clothes, socialize, and eat snacks provided by the researcher.

The second aerobics class was held on the Monday of the seventh week of school. The schedule was identical to that of the previous session. Following the tests, the students were given a short debriefing explanation (Appendix H) and were allowed to ask questions about the study. They could also request to receive an explanation of the final results of the study. Test scores were tabulated by the researcher and checked by an assistant.

Null Hypotheses

The null hypotheses for the study were as follows:

- H₀ 1: There will be no significant differences between the pretest/posttest state anxiety change scores for nonpreferred and preferred music aerobics conditions.
- H₀ 2: There will be no significant differences between the pretest/follow-up test state anxiety change scores for nonpreferred and preferred music aerobics conditions.
- H₀ 3: There will be no significant differences between the posttest/follow-up test state anxiety change scores for nonpreferred and preferred music aerobics conditions.

CHAPTER IV

Results

Change Score Data Analysis

Pre/post, pre/follow-up, and post/follow-up STAI change scores were computed for both the preferred music aerobics condition and the nonpreferred music aerobics condition (Appendix I). The pre/posttest change scores were computed by finding the differences between pretest and posttest anxiety scores. Similarly, pre/follow-up test change scores were computed by finding the differences between pretest and follow-up test anxiety scores, and post/follow-up test change scores were computed by finding the differences between post and follow-up test anxiety scores.

The change scores were then analyzed using a repeated measures design as described by Bruning and Kintz (1977). The results are summarized in Tables 1, 2, and 3. No significant differences ($p > .05$) were found between any of the preferred music change scores as compared to the nonpreferred music change scores.

Table 1

Repeated Measures Analysis of Variance for Pretest/Posttest Change Scores on the STAI, State Form (N=23)

Source	SS	df	ms	F	p
Between	56.54	1	56.54	.9028	>.05
Within	1377.96	22	62.63	--	--
Subjects	1518.30	22	--	--	--
Total	2952.80	45	--	--	--

Table 2

Repeated Measures Analysis of Variance for Pretest/Posttest Change Scores on the STAI, State Form (N=23)

Source	SS	df	ms	F	p
Between	14.69	1	14.69	.3058	>.05
Within	1056.81	22	48.04	--	--
Subjects	2364.80	22	--	--	--
Total	3436.30	45	--	--	--

Table 3

Repeated Measures Analysis of Variance for Posttest/Follow-Up Test Change Scores on the STAI, State Form (N=23)

Source	SS	df	ms	F	p
Between	14.70	1	14.70	.3694	>.05
Within	875.30	22	39.79	--	--
Subjects	1911.48	22	--	--	--
Total	2801.48	45	--	--	--

Means of Change Scores

Means of change scores were computed for each music condition (Table 4). The largest change (-3.042) in anxiety was noted in the pre/posttest measurement for the nonpreferred music condition. Only slight differences were effected for all three measurements of the preferred music condition. All changes, except for that of the post/follow-up test measure for the nonpreferred music condition, showed a decrease in anxiety.

Table 4

Means of Change Scores of State Anxiety for Pre/Post, Pre/Follow-Up, and Post/Follow-Up Tests for the Nonpreferred Music Aerobics Condition and for the Preferred Music Aerobics Condition

	Pre/Post	Pre/Follow-up	Post/Follow-up
Nonpreferred Music	-3.042	-2.130	1.0869
Preferred Music	-.8260	-.8695	-.0434

CHAPTER V

Conclusions

This study explored the effects of the combination of aerobics and music on mood. Twenty-three adolescent females were tested for state anxiety using Spielberger's STAI (1970) under two conditions--preferred music with aerobics, and nonpreferred music with aerobics. They took the STAI's three times during each testing situation--before the aerobics, immediately following the aerobics, and 30 minutes after the aerobics. The two aerobics classes, which were scheduled 10 days apart, took place during the students' regularly scheduled sports class. The aerobics class using nonpreferred music was held first, while the aerobics class using preferred music was held second. The setting for the study was the locker room/gymnasium of Wilkinson Middle School in Mesquite, Texas. The ethnicity of the students included White, Black, Hispanic, and Oriental. The socioeconomic status of their families was primarily lower to middle class.

An analysis of variance for repeated measures was calculated on the STAI change scores of anxiety for pre/post, pre/follow-up, and post/follow-up tests using the method outlined by Bruning and Kintz (1977). No significant change score differences were found between the two conditions on any of the three analyses. Therefore, the null hypotheses that there would be no significant differences in

change scores of state anxiety between the two conditions were not rejected. The hypotheses were accepted as follows:

H₀ 1: There will be no significant differences between the pretest/posttest state anxiety change scores for nonpreferred and preferred music aerobics conditions.

H₀ 2: There will be no significant differences between the pretest/follow-up test state anxiety change scores for nonpreferred and preferred music aerobics conditions.

H₀ 3: There will be no significant differences between the posttest/follow-up test state anxiety change scores for nonpreferred and preferred music aerobics conditions.

Several variables are important in interpreting the results of this study. Because the researcher was a substitute teacher at the middle school the students attended, they had frequent contact with her. Between the initial contact of the researcher with the sports students and the first day of the study, several girls commented to the researcher about the upcoming aerobics sessions. They showed enthusiasm about their participation and asked questions about what they would be doing.

Another variable is that the aerobics were held in the school gymnasium, a setting which lacked suitable acoustics for music listening. During the aerobics classes, the music could be heard echoing throughout the gymnasium, causing it to lack a clarity of tone. Thus, the students may not have been able to discriminate between the differences of musical style used in the two conditions.

Another variable is that only a few (4 or 5) students had had previous aerobics experience. It is possible that the majority who had not had training were concentrating more on the movements than on the music during their participation. Because the routine used in the study was originally choreographed by the researcher, those who did have aerobics experience were not familiar with this particular routine. Thus, they too may have been concentrating on the movements rather than on the music. Perhaps a more accurate measure of the effect of music on anxiety might have been determined under the condition that the subjects were already familiar with the aerobics routine.

In any case, when looking at individual change scores, one might say that the music and aerobics definitely affected some of the subjects more than others (Appendix H). One subject (#13) lowered her anxiety 31 points from the pretest to the posttest during the preferred music condition, while another (#2) increased hers by 15 points on the same tests. No pattern of anxiety reduction or enhancement was noted in the change scores of either condition. However, considering the group as a whole, there was a greater decrease in anxiety from pretests to posttests and from pretests to follow-up tests for the nonpreferred music condition. According to a t-test performed on the pre to posttest scores, a level of significance was obtained. This result may indicate that the nonpreferred music of the students more positively affected their anxiety. A related assumption would be that the preferred music of the subjects was

that which they found to be arousing. Further research is needed to test this assumption.

Overall scores of state anxiety increased from posttests to follow-up tests for the nonpreferred music aerobics condition and decreased from posttests to follow-up tests for the preferred music aerobics condition, though not significantly. This may have been influenced by a scheduling situation in which the students were rushed to dress and complete the STAI's on the nonpreferred music day. Because the session was more organized on the preferred music day, the students had more time to eat their snacks, dress, and take the follow-up STAI's.

The means of the change scores were also computed (Table 4) for the two conditions. Means for the preferred music condition were all less than 1 point. This small change partly resulted from some students increasing their anxiety and other students decreasing their anxiety for every given measure. In effect, the positive scores cancelled the negative ones, and vice versa. No group pattern towards increase or decrease in anxiety was found. Means for the nonpreferred music condition were somewhat greater than those for the preferred music condition. The largest mean was that for the pretest to posttest measurement ($\bar{x} = -3.042$). This showed a significant reduction in state anxiety.

Thus, the results of the music and aerobics study indicate no significant differences between nonpreferred music with aerobics and preferred music with aerobics on changes of state anxiety.

However, within the nonpreferred music condition, state anxiety significantly decreased from the pretest to posttest measurement. Although individual change scores measured up to 31 points for the preferred music condition, group means were low and nonsignificant. One assumption was that the preferred music of the subjects actually produced more anxiety. Further research is needed to examine this phenomenon and other effects of exercise and music on mood.

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APPENDICES

APPENDIX A
Music Preference Questionnaire

Music Preference Questionnaire

Please listen to the music excerpts played on the tape and circle a number from 1 to 9 which shows how much you liked it. A "1" means you disliked it a lot, and a "9" means you really liked it a lot.

Disliked A Lot No Opinion Liked A Lot

1. 1 2 3 4 5 6 7 8 9

2. 1 2 3 4 5 6 7 8 9

3. 1 2 3 4 5 6 7 8 9

.

30. 1 2 3 4 5 6 7 8 9

APPENDIX B

Music Used for the Aerobics Classes

Music Used for the Aerobics Classes

Nonpreferred Music

1. Amy Grant, "Sharayah"
2. Beethoven's Fifth Symphony
3. Celtic Stone, "A Bunch of Ugly Polkas"
4. Rossini's "William Tell Overture"
5. Amy Grant, "Wise Up"
6. Leon Patillo, "Dance, Children, Dance"
7. Jim Chappell, "June Dance"

Preferred Music

1. Power Funk, side 1, excerpt 2
2. Power Funk, side 1, excerpt 5
3. Power Funk, side 1, excerpt 6
4. Quick, Quick, excerpt 1
5. Michael Jackson, "Beat It"
6. M. C. Hammer, "U Can't Touch This"

APPENDIX C

Music Excerpts Used For The Preference Test

Music Excerpts Used For The Preference Test

1. Power Funk, side 1, excerpt 1
2. Leon Patillo, "Dance, Children, Dance" from *Live Experience*
3. Power Funk, side 1, excerpt 2
4. Michael Jackson, "Beat It" from *Thriller*
5. Power Funk, side 1, excerpt 3
6. M. C. Hammer, "U Can't Touch This" from
Please Hammer, Don't Hurt 'Em
7. Power Funk, side 1, excerpt 4
8. Gloria Estefan, "Oli Mi Canto" from *Cuts Both Ways*
9. Gloria Estefan, "Get On your Feet" from *Cuts Both Ways*
10. Jerome Olds, "Sing Out" from *Rejoice*
11. "Quick Quick", excerpt 1
12. Power Funk, side 1, excerpt 5
13. Celtic Stone, "A Bunch of Ugly Polkas" from *Natural Bridges*
14. Power Funk, side 1, excerpt 6
15. Power Funk, side 2, excerpt 1
16. Neil Diamond "America" from *Jazz Singer*
17. Power Funk, side 2, excerpt 2
18. Petra "It Is Finished" from *Beat The System*
19. Amy Grant "Wise Up" from *Unguarded*
20. Power Funk, side 2, excerpt 2

21. Amy Grant "Sharayah" from *Unguarded*
22. Power Funk, side 2, excerpt 3
23. 'D-Boy, "King David" from *Plantin' A Seed*
24. Jim Chappell, "June Dance" from
Living The Northern Summer
25. John Denver, "Season Suite: Late Winter, Early Spring" from
Rocky Mountain High
26. Beethoven's Fifth Symphony, Movement 1
27. Jessy Dixon, "Destined To Win" from *Silent Partner*
28. William Tell Overture
29. M. C. Hammer, "Pray" from *Please Hammer, Don't Hurt 'Em*
30. Petra, "Pied Piper" from *Not Of This World*

APPENDIX D

Results of the Music Questionnaire

Results of the Music Questionnaire

Selection	Number of Ratings		
	1-3	4-6	7-9
Power Funk, side 1, excerpt 1	6	6	22
Leon Patillo, "Dance, Children, Dance"	22	6	6
Power Funk, side 1, excerpt 2	5	4	25
Michael Jackson, "Beat It"	3	6	25
Power Funk, side 1, excerpt 3	7	10	17
M. C. Hammer, "U Can't Touch This"	1	1	32
Power Funk, side 1, excerpt 4	0	1	33
Gloria Estefan, "Oli Mi Canto"	31	3	0
Gloria Estefan, "Get On your Feet"	6	8	20
Jerome Olds, "Sing Out"	24	8	2
"Quick Quick"	0	2	32
Power Funk, side 1, excerpt 5	1	4	29
Celtic Stone, "A Bunch of Ugly Polkas"	32	2	0
Power Funk, side 1, excerpt 6	0	3	31
Power Funk, side 2, excerpt 1	12	9	13
Neil Diamond "America"	19	5	10
Power Funk, side 2, excerpt 2	9	19	6

Selection	Number of Ratings		
	1 - 3	4 - 6	7 - 9
Petra "It Is Finished"	29	3	2
Amy Grant "Wise Up"	20	8	6
Power Funk, side 2, excerpt 2	12	14	8
Amy Grant "Sharayah"	25	7	2
Power Funk, side 2, excerpt 3	2	5	27
D-Boy, "King David"	8	13	13
Jim Chappell, "June Dance"	26	6	2
John Denver, "Season Suite"	23	8	3
Beethoven's Fifth Symphony	27	4	3
Jessy Dixon, "Destined To Win"	24	7	3
William Tell Overture	32	2	0
M. C. Hammer, "Pray"	3	3	28
Petra, "Pied Piper"	27	7	0

APPENDIX E

Explanations of the Aerobics Movements

Explanations of the Aerobics Movements

1. Scissor Arms--With arms straight and crossed and fingers pointing towards the floor, alternate crossing right over left, left over right, etc. While doing this, move the arms upward so that the fingers are pointed towards the ceiling.
2. Bicep Curls--With arms in front, hands toward the floor and in fists, flex the forearms upward, bending the elbows.
3. Tricep Pushes--With arms by the side and elbows slightly bent, push backwards with the hands. Keep the elbows by the side, using only the forearm.
4. Reaches--Reach one hand up and towards the opposite side of the body so that the arm is fully extended. Alternate right and left.
5. Grapevine--Standing with feet slightly apart, step towards the right with the right foot, cross back with the left, step right with the right foot, and step together with the left. To return to the starting position, reverse the feet--step left with the left foot, cross back with the right, step left with the left foot, and step together with the right.
6. Hustle--Start in a standing position with feet slightly apart. Step forward with the right, forward with the left, forward with the right, and together with the left. To return to the

starting position, step back with the right, back with the left, back with the right, and together with the left. This movement can also be done diagonally across the room.

7. 2-Step--Start in a standing position with the knees slightly bent and the feet slightly apart. Step right with the right foot, together with the left, right with the right, and together with the left. To return to the starting position, step left with the left foot, together with the right, left with the left, and together with the right.
8. Half-Jacks--This is similar to a jumping jack, except that only one side of the body moves at a time. First take the right hand up and the right foot out to the side. Then, alternate to the left side, etc.
9. Lunges--Start facing the front. Turn to the right and step back with the left foot while raising both arms overhead. Then turn to the left and step back with the right foot while raising both arms overhead. Alternate from side to side.
10. Toe Taps--Standing shoulder width apart, tap the right toe by the inside of the left foot, then tap the left toe by the inside of the right foot, etc.
11. Low Marches--March in place, with the feet barely coming off the floor.
12. Heel Presses--Standing with feet shoulder width apart and knees slightly bent, press the heel of the right foot forward so

that the heel touches the floor while the toe points up. Repeat with the left and alternate heels.

APPENDIX F
Parent/Guardian Permission Form

Parent/Guardian Permission Form

Dear Parent/Guardian,

I am requesting permission for your daughter to participate in a music/aerobics study at Wilkinson Middle School. The teacher will supervise this study during sports class. The study will consist of doing aerobics with different types of music. It will occur during class on two different days. Before and after each aerobics session, each student will complete a feelings questionnaire. Please read and sign the waivers below. Also, one parental/guardian signature is required on the last page of the attached Consent Form A. Thank you for your cooperation in this matter.

Sincerely,

Mindy Marshall
Aerobics Instructor, *Texas Lady Spa*
(certified through *The Health Instructor Network*)

I consent for my daughter, _____, to complete the feelings questionnaire before and after each aerobics session.

Parent/Guardian signature

My daughter, _____, has no physical disabilities that would limit her participation in an exercise class.

Parent/Guardian signature

APPENDIX G

Agenda for the Aerobics Study

Agenda for the Aerobics Study

Date: September 17, 1991

To: Students in 8th-grade Girls Sports--Wilkinson Middle School

This is a reminder that we will be doing aerobics during Sports Class on Friday, September 20. Please be here at 7:45. The schedule will be as follows:

- 7:45--Arrive and prepare for the aerobics class
- 7:50--1st administration of the mood checklist
- 8:00--Aerobics class
- 8:30--2nd administration of the mood checklist
- 8:40--Free time, snacks
- 9:00--Final administration of the mood checklist

Thank you for your cooperation in being a part of this study!!!!

The second and final day of the aerobics will be scheduled next week.

Sincerely,

Mindy Marshall

APPENDIX H
Debriefing Form

Debriefing Form

This study was about how your feelings changed after exercising with music which you did like and music which you did not like. Confidentiality will be maintained. However, if you would like to receive the results of this study please leave your test number, name, and address below. Your participation in this study is greatly appreciated. THANK YOU!!!!!!

Name: _____

Address: _____

Test number: _____

APPENDIX I

**Change Scores for Pre/Post, Pre/Follow-up, and Post/Follow-up STAI
Tests for the Nonpreferred Music Condition and for
the Preferred Music Condition**

Change Scores for Pre/Post, Pre/Follow-up, and Post/Follow-up STAI
Tests for the Nonpreferred Music Condition and for
the Preferred Music Condition

NonPreferred Music			Preferred Music		
Pre-Post	Pre-F	Post-F	Pre-Post	Pre-F	Post-F
1. +9	+12	-3	+2	+3	+1
2. -13	-1	+12	+15	+12	-3
3. -3	-1	+2	+8	+5	-3
4. -11	-14	-3	-2	-1	+1
5. -6	-3	+3	0	+5	+5
6. -15	+12	+27	+6	+21	+15
7. +1	-9	-10	+5	-7	-12
8. +4	-5	-9	+2	-10	-12
9. -16	-13	+3	+6	+6	0
10. +4	+5	+1	0	0	0
11. +3	-1	-4	+3	+6	+3
12. -13	+5	+18	-7	-13	-6
13. -9	-10	-1	-31	-28	+3
14. -6	-8	-2	-1	-3	-2
15. -6	-7	-1	-12	-17	-5
16. +8	-3	-11	+2	+3	+1
17. -1	-3	-2	-1	-3	-2

NonPreferred Music

Preferred Music

	Pre-Post	Pre-F	Post-F		Pre-Post	Pre-F	Post-F
18.	+1	-2	-3		-1	+5	+6
19.	+2	+10	+8		-4	-1	+3
20.	-1	-8	-7		-1	-11	-10
21.	-5	-1	+4		+3	+2	-1
22.	+5	0	+5		+1	+1	0
23.	-2	-4	-2		-12	+5	+17