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NONLINGUISTIC COMMUNICATION OF EMOTION

BY

MARTHA ESTINA BANKS

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

CLINICAL PSYCHOLOGY

UNIVERSITY OF RHODE ISLAND

1978

ABSTRACT

This study is an investigation of the components of sound outside of recognized language which elicit emotion. The stimulus sounds consisted of music written by the experimenter with carefully organized and controlled variations in tempo, instrumentation, and mode. Subjects reported reactions to the stimuli through rating scales of eight groups of emotions. Results of the study indicate that nonlinguistic sound does elicit emotions and that tempo is important with respect to INTEREST-EXCITEMENT, ENJOYMENT-JOY, DISTRESS-ANGUISH, and FEAR-TERROR emotional groups; instrument is important for INTEREST-EXCITEMENT, ENJOYMENT-JOY, DISTRESS-ANGUISH, SHAME-HUMILIATION, and FEAR-TERROR emotional groups; and mode is important for INTEREST-EXCITEMENT, SURPRISE-STARTLE, DISTRESS-ANGUISH, ANGER-RAGE, and FEAR-TERROR emotional groups. In addition to the influence of individual components of sound, several interactions among those components and context were found to be important in explaining emotional responses to nonlinguistic sound.

ACKNOWLEDGMENTS

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Massachusetts and Mrs. Donna Boulmetis provided training in the use of computers. Dr. Daniel Hurley of the University of Rhode Island provided the idea for the final format of the response questionnaires. Dr. Henry Biller, Mr. Paul Cassarino, Ms. Sarah Golden, Mr. Francis Sparadeo, and Mr. Michael Obelensky of the University of Rhode Island offered valuable psychological feedback about the experimental situation. Data analysis was facilitated through the use of the IBM-370 computer at the University of Rhode Island Academic Computer Center. A special thanks goes to my family and many friends who offered interest, encouragement, and much-needed support throughout this project.

PREFACE

This thesis is formatted under the STANDARD PLAN. The combined History and Literature Review chapter includes the emotional, musical, psycholinguistic, and psychology of music studies, which serve as a background for the present study, as well as an overview of music therapy which provides the justification for and significance of this experiment. In the Method chapter, the experimenter outlines the practical details of the study. The chapter entitled results was formatted through the use of a computer to include the most meaningful results within the text. The Discussion chapter addresses issues which might explain the results of the experiment and includes a Summary which contains possible future research directions and uses of nonlinguistic sound in therapy.

There are many significant results, too numerous to include in the text; those tables are in the Appendix. According to the format outlined in Kate Turabian's A Manual for Writers of Term Papers, Theses, and Dissertations, Fourth Edition, tables in the Appendix are numbered consecutively with those in the text.

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CHAPTER I

INTRODUCTION

History and Literature Review

Much human interaction occurs through the use of sounds. In order to use sound for communication, one must have a perception of meaning, particularly of emotion. The use of ambiguous auditory stimuli should provide a measure of the emotional impact of specific components of sound.

A large part of communication occurs outside the realm of recognized language. That has been studied with the use of visual stimuli (Izard 1971); the present study attempts to measure perception of emotion systematically through the use of organized sound, i.e., music.

In an attempt to define emotion, several sources were used (Plutchik 1962; Harvey 1965; Messick 1965; Tompkins 1965; Alloway, Krames, and Pliner 1972; Strongman 1973; Young 1973; Candland 1977; Fell 1977; and Plutchik 1977). During the fifteen-year period reviewed, there was a great deal of controversy over the definitions of emotions.

The physiological aspects of emotion were described in detail by Tarpy (1977) and Leshner (1977). Communication of emotions (Spigel 1972 and Meinong 1975) and specifically nonlinguistic emotional communication (Ehman 1965; Exline,

with Winters 1965; Levanthal and Sharp 1965) are essential to the present study. The studies dealing with nonlinguistic communication focussed on visual, rather than aural, aspects of communication.

In the search for a method of measuring emotions, the studies of Nowlis (1965), Izard (1971), and Orne (1973) were reviewed. The context of the experimental situation was described by Orne (1973) and was taken into account when the data of the present experiment was analyzed. Nowlis' (1965) review of the Mood Adjective Check List led to the decision to look elsewhere for an instrument with which to collect the emotional data.

Young (1973, p. 440) provided the working definition of emotion for the present study:

"An emotion may be defined as a strongly visceralized, affective disturbance originating within the psychological situation, and revealing itself in bodily changes, in behavior, and in conscious experience."

The actual emotional groups for the study were selected from Plutchik (1962) as modified by Izard (1971):

INTEREST-EXCITEMENT:

Concentrating, Attending, Attracted, Curious

ENJOYMENT-JOY:

Merry, Delighted, Joyful

SURPRISE-STARTLE:

Sudden Reaction to Something Unexpected,
Astonished

DISTRESS-ANGUISH:

Sad, Unhappy, Miserable, Feels Like Crying

DISGUST-CONTEMPT:

Sneering, Scornful, Disdainful, Revulsion

ANGER-RAGE:

Angry, Hostile, Furious, Enraged

SHAME-HUMILIATION:

Embarrassed, Ashamed, Guilty, Shy

FEAR-TERROR:

Scared, Afraid, Terrified, Panicked

Those emotional groups were chosen because they are easily recognized (Izard 1971).

In 1910 (p. 1), Bingham wrote that "...melody is a unity, a whole, no mere succession of tones...an aesthetic unity in which the constituent tonal elements are subordinated to a single dominating element, the tonic..." Although Schoenberg was introducing atonal music at the

time, Bingham considered only tonal music. By 1926 (p. 1), Ortmann expanded the definition of melody (used here as a synonym for music):

"Melody, in its broadest connotation, means any succession of single tones. Such a definition includes many examples of tonal combinations not considered melody by the musician, layman, or by the psychologist. The inclusion is necessary, however, in order to explain certain reactions to tones."

Other literature, which generally agreed with the above definitions of music, included Watt (1919), Petram (1932), Bugg (1933), Gernet (1940), Levy (1955), Cannon (1960), Forte (1962), Levarie and Levy (1968), Delone (1971), Banks (1972), and Pike (1974).

Several aspects of the music literature were closely linked with those of emotion. Physiology was described by Moore (1914), Washco (1933), Schoen (1940), Meyer (1956), Seashore (1967), Ries (1969), Milner (1970), Banks (1972, 1973), and Peretti (1975). The findings of the physiological research on the effects of music were either insignificant or inconsistent, so that the decision was made to eliminate physiological measures from the present study; recognition of the importance of physiology and its link with emotions (Leshner 1977 and Tarpy 1977) was a basic premise underlying the study. Mursell (1937) described the process of perception of music as "...music depends essentially not on the stimuli which reach the external ear,

nor even upon the responses which the structures of the the inner ear make to those stimuli, but rather upon the organizing and transforming operation of the mind upon them."

In addition to the physiology, the communicative aspects of music (Colwell 1966) and the importance of context (Williams 1942) were linked with the emotional studies.

The working definition of music for the present study is taken from Banks (1973, p. 6):

"...a combination of periodic tones with chordal, progressive, and temporal restrictions, leading to an overall perceived organization."

In examining how communication occurs, the field of psycholinguistics offered an organized approach. The search revealed that, like music, language is organized from small units to larger ones. Briefly, the individual sounds, known as phones, are equivalent to notes in music. Phonemes, "...often called the smallest unit of speech that 'makes a difference' to the listener or speaker (Brown 1958, p. 27), are the smallest cognitive category for communication. At the present time, there is no nonlinguistic parallel to the phoneme (Brown 1958, Fudge 1970, Halliday 1970, Matthews 1970, Dale 1972, and Deese 1973).

As with the reviews of the emotional and music

literature, the psycholinguistic literature revealed a great deal of attention to physiology (Lenneberg 1960, Brain 1961, and Taylor, Gandy, and Dark 1974) with particular emphasis on cerebral dominance (Milner, Branch, and Rasmussen 1964 and Moscovitch 1973) .

Specific aspects of communication included the importance of association and context (Clark 1970 and Taylor, Gandy, and Dark 1974) . Berlyne (1972) examined communication of emotion and Premack (1972) discussed the role of cognition in communication.

Other general psycholinguistic literature which served as a background for the study included Sapir (1949), Bloomfield and Hoijer (1965), Lieberman (1965), Merrifield, Naisch, Rensch, and Story (1965), Miller (1965), Fry (1970), Lyons (1970), and Whorf (1971) .

Cooper (1965) reviewed means of measuring perception and production of phonemes; that consisted primarily of an elaborate feedback system that might, in the future, be an interesting addition to the experiment at hand.

Interest in the psychology of music began in the late nineteenth century when Edmund Gurney published his Power of Sound. In that book (1880, pp. 27, 120) he described a system of classification of sounds:

"...when we think of various sounds, when we recall what the sense-impressions really are in the several cases, they seem to separate themselves into two classes which, though they may not merge into one another, are in nature quite distinct, the class of

tones and the class of noises; these may be provisionally distinguished as the class where that quality of sound exists which is generally described as musical, and the class where that quality is missing."

"...the prime characteristic of Music...[is] its perpetual production in us of an emotional excitement of a very intense kind, which yet cannot be defined under any known head of emotion."

The similarity between perception of speech and music was described in 1933 (p. 3) by Seashore:

"...music and speech have so many elements in common that the sciences of these two arts have virtually become one: first, in that they both deal with hearing; second, in that both may be expressed in whole or in part through the voice; and third, in that they are intimately associated as media of communication and social intercourse."

Mursell (1937, pp. 50-51) described perception of music as depending "...not on the stimuli which reach the external ear, nor even upon the responses which the structure of the inner ear make to those stimuli, but rather upon the organizing and transforming operation of the mind upon them." In addition to the studies which defined the link between music and emotion, other general literature included Watt (1919), Trotter (1924), Hevner (1934, 1935, 1936), Schoen (1940), Hampton (1945), Howes (1948), Gaston (1951), Fisicnielli and Paperte (1952), Rogge (1952), Pepinsky (1954), Podolsky (1954), Revesz (1954), Ginn (1955), Meyer (1956), Sears and Sears (1964), Cody (1965), Lundin (1967),

Seashore (1967), Schneider (1968), Farnsworth (1969), and Banks (1973). Aesthetic studies of the same sort were done by Goddard (n.d.), Ostwald (1966), Coker (1972), and Swanswick (1973).

Physiological links between emotions and music were examined by Hyde (1924), Washco (1933), Ruppenthal (1948), Sears (1951), Ellis and Brignouse (1952), Slaughter (1952), Grunewald (1953), Sears (1954), Walters (1954), Shatin (1957), Bierbaum (1958), Vyl (1968), Ries (1969), Clynes (1972, 1974), Lowe (1973), and Peretti and Swenson (1974). Podolsky (1939) discussed healthful uses of music to increase metabolism, muscle energy, and respiration, while decreasing pulse, blood pressure, and the threshold to nonaural stimulation. Reese (1948) reported on musicogenic epilepsy; that was particularly interesting from a neuropsychological perspective and as a consideration in running experiments of this sort. Webster (1973) examined music as a relaxer after myocardial infarcts.

In the search for a musical parallel to the phoneme, the literature revealed that past studies have been limited in the scope of musical components examined. Consonance and dissonance were examined by Lipps (1926); Hevner (1935) looked at the importance of mode; Rigg (1940b) studied tempo; Rigg (1940a), Swinchoski (1947), and Taylor (1974) examined specific tones or keys; repetition was under study by Krugman (1943) and Bartlett (1973); Hanson (1944) and

Hudson (1973) experimented with rhythm; and Kinnear (1960), Van Stone (1960), and Galizio and Hendrick (1972) examined timbre.

Some studies made assumptions about the emotional content of the music and analyzed responses with respect to those assumptions. Among those were Heckel (1949), Simon, Holzerg, Alessi, and Garrity (1951), Shatin (1970), Fisher and Greenberg (1972), Taylor (1973), Clynes (1974), and Biller, Olson, and Breen (1974). Psychoanalytic interpretation of music was made by Pratt (1931, 1952), Coriat (1945), and Wang (1968). Somewhat related to the prior assumptions and the interpretation studies were those on attitude by Rigg (1948) and Galizio and Hendrick (1948).

Rather than examine emotions elicited by music, some experiments (Cattell and Anderson 1953, Rubin 1953, Cattell and Saunders 1954, Biller 1973, and Peretti 1975) focussed on musical preferences or whether subjects liked or disliked the music under study.

Several studies mixed the aural sense with other senses. Odbert, Karwoski, and Eckerson (1942) examined perception of color in the presence of music. Ehrenzweig (1965) was interested in precise attention to form both visually and aurally. The effect of music as sound stimulus was studied in task and no task situations by Iwata (1972). Cantor and Zillman (1973) attempted to manipulate emotional state with the use of movie films seen before hearing

stimulus music. Peretti and Swenson (1974) measured difference in anxiety between subjects who did or did not hear music while performing pencil maze tasks.

Familiarity and unfamiliarity with music as discussed by Odbert, Karwoski, and Eckerman (1942), Krugman (1943), Fisher and Fisher (1951), Birnbaum (1955), Reinke (1956), Burns (1960), Hart and Cogan (1973), and Schiff and Frances (1974) led to the decision to use unfamiliar music in the present study. The studies by Burns (1960) and Schiff and Frances (1974) were confounded by the use of music associated with specific words which dictate the emotional responses to those pieces of music. Clark (1970) and Taylor, Gandy, and Dark (1974) reviewed the importance of such associations in communication.

Most of the above studies which examined music and emotions used several pieces of music by different composers and in different styles. Those which were confounded in that manner included Hevner (1934, 1935, 1936), Odbert, Karwoski, and Eckerson (1942), Williams (1942), Middleton, Fay, Kerr, and Amft (1944), Hampton (1945), Rigg (1946), Mitchell and Zanker (1949), Sopchak (1955), Shatin and Zinet (1958), Burns (1960), Lundin (1967), Iwata (1972), Wedin (1972), and Hart and Cogan (1973). The present study attempts to overcome such confounding by using one basic piece of unfamiliar music.

The importance of order effect was addressed by

Williams (1942). In that study, "logical" and "illogical" orders of presenting musical stimuli were examined. The present study includes no assumptions about order but, instead, seeks to examine the effect of context.

Farnsworth (1954) and Wedin (1972a,b) discussed instruments used to gather emotional responses in musical experiments; the decision of the experimenter is to use a modification of an instrument used in a study of emotional responses to facial expressions (Izard 1971).

The field of music therapy is a large one and the literature is widely varied in its subject matter. Much of the use of music in therapy has been done with little reference to studies of music and emotions; to date there has been little research in the area that did not contain confounding factors. Of particular interest to this study are the uses of music to improve communication, as a projective test, and as a background for nonmusical activities. (Fifty-seven studies, which did not fall into those categories, were read as preparation for the present study and are included in the bibliography.)

One of the goals of music therapy is the improvement of communication skills. That has been a part of group therapy (Altshuler 1941, Illing 1952, Kaplan 1955, Shatin and Kotter 1957, Shatin and Zimet 1958, Christman 1967, Lehrer-carle 1971, and Espinos 1974). Galloway (1974) sought, in an essay, to dispel the "myth" that music

provides a cure for stuttering. Lathom (1971) and Michel and May (1974) described the use of music, as an organized medium with parallels to the structure of language, in teaching people with severe communication disturbances. Much of the focus of music therapy is on the socialization of autistic children (Sherwin 1953, Taylor 1969, Mahlberg 1973, Saperston 1973, Hollander and Juhrs 1974, and McLean 1974). The use of music, as an implement to improve communication skills, can be greatly facilitated with a knowledge of the musical equivalent of the phoneme.

Music has been perceived as an ambiguous stimulus available for projective testing. Heckel (1949) examined that possibility by comparing subjects' responses with intended meanings as described by the composers. In 1955, Birnbaum considered the use of known music to elicit childhood memories to facilitate therapy. Crocker (1956) cited several case studies with children. Jenkins (1956) and Reinke (1956) published essays on the difficulties and possible uses, respectively, of music as a projective test. In 1957, Sopchak found a nonsignificant relationship between the hypomanic scale of the Minnesota Multiphasic Personality Inventory and music feeling, but noted that further investigation was necessary.

Soibelman (1948) stated that therapy could be facilitated with background music through awareness of the important elements of the music and the history of the

clients. Gutheil (1954) drew a parallel between the "driving force" of music and libido, and concluded that the therapeutic value of music lay in the physiological tension and relaxation responses to the music. In 1957, Roter surveyed enjoyment of music by patients in medical waiting rooms. Preuter and Mezzano (1973) used soothing and stimulating music as background for therapy. They concluded that "(1) soothing background music promoted more counselor and client interaction than did stimulating background music or a lack of music, (2) stimulating background music and a lack of music had about the same effect upon counselor-client interaction, (3) soothing music promoted more affective interaction than did stimulating background music or a lack of music, and (4) a lack of background music provided more affective interactions than did stimulating music."

Shatin (1970) discussed matching the music to the mood of the patient with the idea of gradually changing the music to effect a change in mood; that study, like many others, is confounded by the use of several different pieces of music and prior assumptions about the emotional content of the stimulus music. Context, described as important for the vectoring effect, was not taken into account as all of the subjects were run through the experiment simultaneously and heard the stimuli in only one order. The Shatin (1970) study was of particular importance for the present study as

it presented several obstacles to be overcome in similar experiments.

Present Study

The purpose of the present study is to attempt to discover those characteristics of sound which carry emotional impact. Organization of sound for ease of analysis is accomplished through the use of music.

Specific emotional groups were selected for the study from the research of Plutchik (1962) and Izard (1971). The experimenter composed the stimulus music and determined the musical variables to be examined.

The study is designed to overcome problems with similar previous research. In collecting data, the grouping of emotions is tested. Assumptions about music are brought into question. Interactions among components of music can be analyzed as well as the emotional effects of the individual components. The music in the study is unfamiliar removing previous associations of the music as a whole with specific emotions, thus allowing examination of the parts as well as the whole. Order effect is addressed directly with no assumptions about musical logic (Williams 1942). Emotional content of the music is not presumed.

Results of this study can be applied to music therapy as a significantly correlated set of musical components and emotional groups, which, hopefully, can be used in the

selection of appropriate music for therapy on a model similar to that of Shatin (1970).

Hypothesis

Rather than stating a hypothesis, the experimenter is asking the questions:

1. Can nonlinguistic sound elicit emotions?
2. Do specific components of sound elicit specific emotions?

CHAPTER II

METHOD

Experimental Situation

The subjects each listened to cassette recordings of musical selections and circled emotional responses on printed questionnaires.

Subjects

The subjects consisted of twenty-three members of Providence Singers, Incorporated of Providence, Rhode Island, fifty-four undergraduate students enrolled in an introductory psychology course at the University of Rhode Island, one graduate student in the Clinical Psychology program at the University of Rhode Island, and one undergraduate student from Amory College. Four additional undergraduate students participated in the study, but their

responses were not included in the analysis because they had participated in the pilot study and were, therefore, familiar with the stimulus music. Fifty-four of the subjects were female and twenty-six were male. The racial breakdown was two Black, seventy-seven white, and one Oriental. Ages of the subjects ranged from 18 years to 50 years, with a mean age of 24.8 years.

Table 1

STIMULUS MUSIC

©1975

Major

Voice

Handwritten musical score for Major mode, Voice part. The score is written on three staves in treble clef with a key signature of one sharp (F#). The music is composed of quarter and eighth notes. Measure numbers 1, 5, 10, 15, 20, 25, and 30 are indicated above the staves.

Handwritten musical score for Minor mode, Voice part. The score is written on three staves in treble clef with a key signature of two flats (Bb, Eb). The music is composed of quarter and eighth notes. Measure numbers 1, 5, 10, 15, 20, 25, and 30 are indicated above the staves.

Table 1 (continuel)

Major -

English horn

Handwritten musical notation for the Major scale on the English horn. It consists of three staves. The first staff is in G major (one sharp) and common time, showing the first 10 notes with fingerings 1, 2, 3, 4, 5, 1, 2, 3, 4, 5. The second staff continues the scale with fingerings 1, 2, 3, 4, 5, 1, 2, 3, 4, 5. The third staff concludes the scale with fingerings 1, 2, 3, 4, 5, 1, 2, 3, 4, 5.

Minor -

Handwritten musical notation for the Minor scale on the English horn. It consists of three staves. The first staff is in G minor (one flat) and common time, showing the first 10 notes with fingerings 1, 2, 3, 4, 5, 1, 2, 3, 4, 5. The second staff continues the scale with fingerings 1, 2, 3, 4, 5, 1, 2, 3, 4, 5. The third staff concludes the scale with fingerings 1, 2, 3, 4, 5, 1, 2, 3, 4, 5.

Equipment

Stimulus music for the experiment consisted of the first thirty measures of the soprano line of the "Credo" from Mass in G, c. 1475 by Martha Estina Banks (see table 1). (Although the music is copyrighted, it has not been submitted for publication.) The music was chosen because it is unknown and thereby not associated with specific words, tempi, and/or instruments.

Preparation of the music as suitable stimulus material consisted of transposition down an octave into a middle range both vocally and instrumentally, removal of the harmonic lines of the original music, and addition of the melodic minor to the original major mode. The end of the segment of music was chosen due to its lack of resolution as it is the preparation for a key change.

The music was recorded on a Scotch C-45 cassette on a Sears Solid State monaural portable cassette recorder by an alto singer and an English horn player. Pitch was controlled with a Master Key chromatic pitchpipe and tempo with a Heathkit electronic metronome. Volume was controlled by the automatic recording level of the condensor microphone on the cassette recorder. The major and minor variations were each recorded at tempi $\text{♩} = 90$ and $\text{♩} = 152$, separately by the alto singer and the English horn player. Instructions for the performance included phrasing at four-measure

intervals with the exception of the last six measures, accuracy of notes in both pitch and tempo, a conscious lack of expression to reduce as much as possible communication of the performers' emotional interpretations of the music, and, for the alto singer, singing "ooh" with the mouth open.

In addition to the music, a relaxation exercise was recorded by the experimenter on the same cassette recorder using a Scotch Highlander C-120 cassette.

The rooms in which the experiment was run were arranged with the subjects sitting with their backs to the experimenter to eliminate visual cues, and beside each other in a row to reduce communication among the subjects. The two rooms were checked with a sound level meter so that the stimuli were measured at 65 to 75 decibels with the cassette recorder in a specific place and the volume and tone controls set at a specific level.

The data was collected through a demographic questionnaire (see table 2) designed by the experimenter and a response packet based on the measures used by Izard (1971) (see table 3). Modification of Izard's instrument included the use of a Likert scale with each group of emotions and the use of one page per stimulus rather than one page for all stimuli.

The data analysis was achieved through the use of Hewlett-Packard-65 and -91 Commodore-100, Melcor SC-635 calculators and the IBM-370 computer at the University of

Rhode Island Academic Center.

Appendix C of Winer (1971) was used to determine significance levels of data analyzed on the calculators.

Table 2

Martha E. Danks Master's Thesis
DEMOGRAPHIC QUESTIONNAIRE

(Office use only:

(Date:

(Group size:

(Tape #:

(Site:

(Experimenter:

(Identification:

1. Name

2. Date of Birth Month Day Year

3. Sex () Female () Male

4. Race

5. Educational Background: What is the highest grade of formal education you have completed?

6. Occupation: What is your present or most recent occupation? If you are a student, what is your major?

7. Musical Background:

a. What is your favorite kind of music?

b. What is your least favorite kind of music?

c. Where do you hear music? Please place a "1" next to the place where you most frequently hear music, "2" by the second most frequent, etc.

() Live (concerts, rehearsals, bars, parties, religious institutions, dances, etc.)

() Radio

() Television

() Recordings (records, tapes, cassettes, 8-track, etc.)

() Other, please specify

d. How often do you actively listen to music?

() Daily () 2 or 3 times a week

() Once a week () 2 or 3 times a month

() Once a month () Never () Other, please specify

e. Do you sing or play music? () Yes () No

If yes, what instrument(s) do (have) you play(ed)? Please include voice if you sing (have sung).

Do (have) you play(ed) or sing (sung) in any groups?

() Yes () No

If yes, how many years?

Do (have) you take(n) private lessons? () Yes () No

If yes, for what instruments?

If yes, how many years?

f. Have (Are) you taken (taking) any music courses?

() Yes () No

If yes, how many years of each of the following?

() Appreciation () Composition

() History () Theory

() Other, please specify

g. Do you write music? () Yes () No

If yes, what kind?

Table 3

Martha E. Banks Master's Thesis

Name :

Please describe your present mood:

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to your present mood.

1. INTEREST-EXCITEMENT:

Concentrating, Attending, Attracted, Curious

```

*      not at all 0      1      2      3      4, very much
*      *          *      *      *      *      *      *      *
*      *          *      *      *      *      *      *      *

```

2. ENJOYMENT-JOY:

Merry, Delighted, Joyful

[illegible]

3. SURPRISE-STARTLE:

Sudden Reaction to Something Unexpected, Astonished

[illegible]

4, DISTRESS-ANGUISH:

Sad, Unhappy, Miserable, Feels Like Crying

[illegible]

5. DISGUST-CONTEMPT:

Sneering, Scornful, Disdainful, Revulsion

[illegible]

6. ANGER-RAGE.

Angry, Hostile, Furious, Enraged

[illegible]

7. SHAME-HUMILIATION:

Embarrassed, Ashamed, Guilty, Shy

[illegible]

3. FEAR-TERROR:

Scared, Afraid, Terrified, Panicked

[illegible]

Table 3 (continued)

Martha E. Banks Master's Thesis

INITIAL EXERCISE

Please describe your mood after relaxing:

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to your mood.

1. INTEREST-EXCITEMENT:

Concentrating, Attending, Attracted, Curious

not at all 0 1 2 3 4 very much

* * * * *

2. ENJOYMENT-JOY:

Merry, Delighted, Joyful

not at all 0 1 2 3 4 very much

* * * * *

3. SURPRISE-STARTLE:

Sudden Reaction to Something Unexpected, Astonished

not at all 0 1 2 3 4 very much

* * * * *

4. DISTRESS-ANGUISH:

Sad, Unhappy, Miserable, Feels Like Crying

not at all 0 1 2 3 4 very much

* * * * *

5. DISGUST-CONTEMPT:

Sneering, Scornful, Disdainful, Revulsion

not at all 0 1 2 3 4 very much

* * * * *

6. ANGER-RAGE:

Angry, Hostile, Furious, Enraged

not at all 0 1 2 3 4 very much

* * * * *

7. SHAME-HUMILIATION:

Embarrassed, Ashamed, Guilty, Shy

not at all 0 1 2 3 4 very much

* * * * *

8. FEAR-TERROR:

Scared, Afraid, Terrified, Panicked

not at all 0 1 2 3 4 very much

* * * * *

Table 3 (continued)

Martha E. Banks Master's Thesis

SELECTION #1

Selection #1:

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to the music you just heard.

1. INTEREST-EXCITEMENT:

Concentrating, Attending, Attracted, Curious

not at all 0 1 2 3 4 very much

* * * * *

2. ENJOYMENT-JOY:

Merry, Delighted, Joyful

not at all 0 1 2 3 4 very much

* * * * *

3. SURPRISE-STARTLE:

Sudden Reaction to Something Unexpected, Astonished

not at all 0 1 2 3 4 very much

* * * * *

4. DISTRESS-ANGUISH:

Sad, Unhappy, Miserable, Feels Like Crying

not at all 0 1 2 3 4 very much

* * * * *

5. DISGUST-CONTEMPT:

Sneering, Scornful, Disdainful, Revulsion

not at all 0 1 2 3 4 very much

* * * * *

6. ANGER-RAGE:

Angry, Hostile, Furious, Enraged

not at all 0 1 2 3 4 very much

* * * * *

7. SHAME-HUMILIATION:

Embarrassed, Ashamed, Guilty, Shy

not at all 0 1 2 3 4 very much

* * * * *

8. FEAR-TERROR:

Scared, Afraid, Terrified, Panicked

not at all 0 1 2 3 4 very much

* * * * *

* * * * *

Please describe any thoughts you had while listening to Selection #1.

Table 3 (continued)

Martha E. Banks Master's Thesis

SELECTION #2

Selection #2:

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to the music you just heard.

1. INTEREST-EXCITEMENT:

Concentrating, Attending, Attracted, Curious

not at all 0 1 2 3 4 very much

* * * * *

2. ENJOYMENT-JOY:

Merry, Delighted, Joyful

not at all 0 1 2 3 4 very much

* * * * *

3. SURPRISE-STARTLE:

Sudden Reaction to Something Unexpected, Astonished

not at all 0 1 2 3 4 very much

* * * * *

4. DISTRESS-ANGUISH:

Sad, Unhappy, Miserable, Feels Like Crying

not at all 0 1 2 3 4 very much

* * * * *

5. DISGUST-CONTEMPT:

Sneering, Scornful, Disdainful, Revulsion

not at all 0 1 2 3 4 very much

* * * * *

6. ANGER-RAGE:

Angry, Hostile, Furious, Enraged

not at all 0 1 2 3 4 very much

* * * * *

7. SHAME-HUMILIATION:

Embarrassed, Ashamed, Guilty, Shy

not at all 0 1 2 3 4 very much

* * * * *

8. FEAR-TERROR:

Scared, Afraid, Terrified, Panicked

not at all 0 1 2 3 4 very much

* * * * *

* * * * *

Please describe any thoughts you had while listening to Selection #2.

Table 3 (continued)

Martha E. Banks Master's Thesis

SELECTION #3

Selection #3:

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to the music you just heard.

1. INTEREST-EXCITEMENT:

INTEREST-EXCITEMENT:
Concentrating, Attending, Attracted, Curious

[illegible]

2. ENJOYMENT-JOY:

ENJOYMENT-JOY:
Merry, Delighted, Joyful

[illegible]

3. SURPRISE-STARTLE:

URPRISE-STARTLE:
Sudden Reaction to Something Unexpected, Astonished

[illegible]

4. DISTRESS-ANGUISH:

STRESS-ANGUISH:
Sad, Unhappy, Miserable, Feels Like Crying

[illegible]

5. DISGUST-CONTEMPT:

DISGUST-CONTEMPT:
Sneering, Scornful, Disdainful, Revulsion

[illegible]

6. ANGER-RAGE:

ANGER-RAGE:
Angry, Hostile, Furious, Enraged

[illegible]

7. SHAME-HUMILIATION:

HAME-HUMILIATION:
Embarrassed, Ashamed, Guilty, Shy

[illegible]

8. FEAR-TERROR:

EAR-TERROR:
Scared, Afraid, Terrified, Panicked

[illegible]

* * * * *

please describe any thoughts you had while listening to Selection #3.

Table 3 (continued)

Martha E. Banks Master's Thesis

SELECTION #4

Selection #4

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to the music you just heard.

1. INTEREST-EXCITEMENT;

Concentrating, Attending, Attracted, Curious

not at all 0 1 2 3 4 very much

* * * * *

2. ENJOYMENT-JOY;

Merry, Delighted, Joyful

not at all 0 1 2 3 4 very much

* * * * *

3. SURPRISE-STARTLE;

Sudden Reaction to Something Unexpected, Astonished

not at all 0 1 2 3 4 very much

* * * * *

4. DISTRESS-ANGUISH;

Sad, Unhappy, Miserable, Feels Like Crying

not at all 0 1 2 3 4 very much

* * * * *

5. DISGUST-CONTEMPT;

Sneering, Scornful, Disdainful, Revulsion

not at all 0 1 2 3 4 very much

* * * * *

6. ANGER-RAGE;

Angry, Hostile, Furious, Enraged

not at all 0 1 2 3 4 very much

* * * * *

7. SHAME-HUMILIATION;

Embarrassed, Ashamed, Guilty, Shy

not at all 0 1 2 3 4 very much

* * * * *

8. FEAR-TERROR;

Scared, Afraid, Terrified, Panicked

not at all 0 1 2 3 4 very much

* * * * *

* * * * *

Please describe any thoughts you had while listening to Selection #4.

Table 3 (continued)

Martha E. Banks Master's Thesis

SELECTION #5

Selection #5:

On a scale of zero (0) to four (4), please circle the number which describes how each of the adjective groups below applies to the music you just heard.

1. INTEREST-EXCITEMENT:

Concentration, Attending, Attraction, Curious

not at all 0 1 2 3 4 very much

* * * * *

2. ENJOYMENT-JOY:

Merry, Delighted, Joyful

not at all 0 1 2 3 4 very much

* * * * *

3. SURPRISE-STARTLE:

Sudden Reaction to Something Unexpected, Astonished

not at all 0 1 2 3 4 very much

* * * * *

4. DISTRESS-ANGUISH:

Sad, Unhappy, Miserable, Feels Like Crying

not at all 0 1 2 3 4 very much

* * * * *

5. DISGUST-CONTEMPT:

Sneering, Scornful, Disdainful, Revulsion

not at all 0 1 2 3 4 very much

* * * * *

6. ANGER-RAGE:

Angry, Hostile, Furious, Enraged

not at all 0 1 2 3 4 very much

* * * * *

7. SHAME-HUMILIATION:

Embarrassed, Ashamed, Guilty, Shy

not at all 0 1 2 3 4 very much

* * * * *

8. FEAR-TERROR:

Scared, Afraid, Terrified, Panicked

not at all 0 1 2 3 4 very much

* * * * *

Please describe any thoughts you had while listening to Selection #5.

What function does music serve in your life?

Procedure

The subjects, who participated in groups of one to four people, each filled out a demographic questionnaire prior to receiving the response packet. As practice, and to familiarize the subjects with the actual questionnaire used for the collection of data, the first page of the response packet was a baseline measure, about which subjects could ask questions. After the baseline data was collected, the subjects had practice in listening to the cassette recorder with the following relaxation exercise:

"Sit quietly in a comfortable position."
(7-second pause)

"Close your eyes." (8-second pause)

"Deeply relax all your muscles, beginning at your feet and progressing up to your face." (12-second pause)

"Keep them deeply relaxed." (14-second pause)

"Breathe through your nose." (8-second pause)

"Become aware of your breathing." (9-second pause)

"As you breathe out, say the word 'nine' silently to yourself." (7-second pause)

"Count down from 'nine' to 'one'. When you reach 'one', continue to repeat 'one' on the out breath." (3 minute, 10-second pause)

"I am going to count from 'one' to 'ten'. As I count from 'one' to 'ten', gradually open your eyes

and sit up straight." (9-second pause)

"One." (5-second pause)

"Two." (5-second pause)

"Three." (5-second pause)

"Four." (5-second pause)

"Five." (5-second pause)

"Six." (5-second pause)

"Seven." (5-second pause)

"Eight." (5-second pause)

"Nine." (5-second pause)

"Ten." (14-second pause)

"Please turn to the page in your response packet that is labelled 'Initial Exercise', and fill it out as directed."

After the subjects completed the "Initial Exercise" page, they were told:

"What you will hear from now on are some short selections of music. There is a page in the response packet, similar to the ones you have already filled out, to be filled out after each piece of music. I will announce before and after each piece of music which selection number it is. After the music has ended, please turn to the corresponding page, read the directions at the top of the page, and fill it out as directed."

After the first selection, the experimenter said, "Please note that there is a place at the bottom of the page to record any thoughts or comments you have." When the fifth selection was completed, the experimenter said, "Please note that there is an additional question at the bottom of this page, and please answer it." When all

subjects stopped writing, the questionnaires were collected and the experimenter thanked each subject and asked for feedback.

After each session, the information from the questionnaires was coded and entered into a data file in the computer.

Experimental Conditions

The musical variations were randomly assigned one of eight orders for presentation to the subjects. In order to ensure that each musical variation was heard by an equal number of subjects, and that each of the musical components was heard at least twice by each subject, a minimal amount of intentional juggling was done before the final orders were reached. The orders of the musical selections are in table 4.

The experimenter had a list of numbers which corresponded to the numbers on the counter of the cassette recorder at the beginning of each of the pieces of music. That served the dual purposes of facilitating ease in turning the cassette from one selection to another and of keeping the experimenter from knowing which pieces would be played during a particular experimental session. The actual assignment of subjects to specific orders of music was

controlled so that the Providence Singers were distributed among all eight orders, and, at the end of the experiment, so that there were ten subjects who had heard each order and thereby fifty subjects who heard each of the musical selections.

Table 4

Orders of Musical Selections

1.	slow alto major	fast E h * major	fast E h * minor	slow E h * major	fast alto minor
2.	slow alto minor	slow alto major	fast alto major	slow E h minor	fast E h minor
3.	slow E h major	fast E h minor	fast E h major	fast alto minor	slow alto major
4.	slow E h minor	fast alto minor	slow E h major	slow alto minor	fast alto major
5.	fast alto minor	slow E h major	slow alto major	fast E h minor	slow E h minor
6.	fast alto major	slow E h minor	fast alto minor	fast E h major	slow alto minor
7.	fast E h major	slow alto minor	slow E h minor	fast alto major	slow E h major
8.	fast E h minor	fast alto major	slow alto minor	slow alto major	fast E h major

* E h in this and all other tables represents the English horn.

Pilot Study

The pilot run for the present consisted of a mass administration of the experiment to 147 undergraduate students in a University of Rhode Island introductory psychology course. Stimulus music for the pilot run was the same as in the actual experiment (see table 1). The order of the music was:

1. fast alto minor
2. fast E h minor
3. slow E h minor
4. fast E h major
5. slow alto major
6. fast alto major
7. slow E h major
8. slow alto minor

A multiple-choice questionnaire (table 19 in the Appendix) was used to collect the emotional responses to the music.

Several problems were revealed through the pilot study. The method of data collection was inadequate as some subjects did not seem to be able to understand the directions for filling out the response questionnaire, resulting in multiple responses which were not described as a hierarchy. Several subjects inserted emotional choices which overlapped those under study.

The mass administration necessitated the use of a large room; in this case, a lecture hall with an

amphitheater design was used and the stimulus music amplified. As a result, there was no control over the sound level and there are, therefore, no grounds for assuming that acoustic conditions were similar for all subjects.

Analysis of the data collected in the pilot study was virtually impossible. Factor analysis of the responses yielded no significant results. A visual examination of the response distributions led to the untestable conclusion that tempo seemed to have an effect on the responses.

The experimental situation was less than ideal. Use of a large group led to distraction as subjects complained about laughter and talking, both while the music was playing and while the subjects were writing responses. The experimenter was not able to control the manner in which subjects responded; i.e., the questionnaires were a single page with spaces for responses to ten musical selections and five subjects gave responses to nine or ten selections, when only eight were played.

The responses to the fifth, sixth, seventh, and eighth selections contained many references to disgust or boredom.

As a result of the problems encountered in the pilot study, the response questionnaire was revised with the use of a Likert scale and groupings of emotions, rather than multiple choice with a limited description of the emotional groups. Acoustics were controlled to maintain similarity among experimental sessions. Data analysis was facilitated

with the use of eight orders of the musical selections so that proper statistical analysis could be made. Smaller numbers of subjects in the experimental sessions and imposed restrictions on communication removed some of the confounding factors. The number of musical selections was reduced from eight to five with the expectation that the responses would be most meaningful if there were little opportunity for confounding of results due to fatigue.

CHAPTER III

RESULTS

The data was collected in five groups as each subject heard five selections of the musical stimuli. That method of data collection made three levels of analysis necessary: (1) the five groups of emotional responses were analyzed individually, (2) context was taken into account as changes in the musical variables occurred from one selection to the next, and (3) the emotional responses were summed across selections and analyzed as one large group.

Initially, all of the data was entered into the Statistical Package for the Social Sciences (SPSS) frequencies program for a quick examination of bad elements and the distributions of the emotional responses. A second set of distributions was run with the corrected data (see table 14 in the Appendix).

Response distributions with restricted range and extreme skewness were noted as possibly inappropriate for the study; the affected emotional groups included DISGUST-CONTEMPT, ANGER-RAGE, SHAME-HUMILIATION and FEAR-TERROR.

An SPSS stepwise (using Wilks' lambda) discriminant

analysis was done to determine if all of the emotional responses formed adequately differing patterns to accurately discriminate among the groups of musical selections each subject heard. The discriminant analysis resulted in the correct classification of 77.5% of the eighty subjects, as shown in table 5.

The response data was then entered into an SPSS reliability analysis to determine if each of the five groups of emotional responses was measuring the same basic emotions (see table 6).

Table 5

DISCRIMINANT ANALYSIS, ALL RESPONSES

Prediction Results

Predicted Group Membership

	gp. 1	gp. 2	gp. 3	gp. 4	gp. 5	gp. 6	gp. 7	gp. 8
Actual Group								
group 1	9.	0.	0.	1.	0.	0.	0.	0.
group 2	1.	8.	0.	0.	0.	1.	0.	0.
group 3	0.	1.	8.	0.	0.	0.	0.	1.
group 4	3.	0.	0.	6.	0.	0.	1.	0.
group 5	1.	0.	0.	0.	7.	2.	0.	0.
group 6	1.	1.	0.	0.	0.	8.	0.	0.
group 7	1.	0.	0.	0.	1.	0.	7.	1.
group 8	1.	0.	0.	0.	0.	0.	0.	9.

percent of "grouped" cases correctly classified: 77.50%

Table 6

Reliability Analysis for INTEREST-EXCITEMENT

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	7.89873	14.29731	0.47822	0.81883
Selection #2	7.82278	11.66050	0.74592	0.73629
Selection #3	7.86076	12.89062	0.76829	0.73834
Selection #4	7.62025	14.05907	0.55289	0.79727
Selection #5	7.88608	13.66634	0.52609	0.80663

alpha = 0.81741

Reliability Analysis for ENJOYMENT-JOY

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	5.27848	9.53684	0.36024	0.66497
Selection #2	5.51899	8.81694	0.50129	0.60804
Selection #3	5.46835	8.89322	0.52979	0.59942
Selection #4	5.16456	8.11360	0.46187	0.62405
Selection #5	5.40506	8.83382	0.36640	0.66855

alpha = 0.68372

Table 6 (continued)

Reliability Analysis for SURPRISE-STARTLE

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	2.54430	7.63583	0.34066	0.76375
Selection #2	2.27848	5.94710	0.60983	0.67369
Selection #3	2.41772	6.78481	0.59918	0.68950
Selection #4	2.16456	5.78027	0.57075	0.69051
Selection #5	2.34177	6.20221	0.50672	0.71533

alpha = 0.75304

Reliability Analysis for DISTRESS-ANGUISH

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	3.01266	8.62804	0.27212	0.58619
Selection #2	2.73418	6.65920	0.42535	0.50631
Selection #3	2.67089	6.63389	0.57087	0.42996
Selection #4	2.77215	8.79357	0.13148	0.65483
Selection #5	2.58228	6.70789	0.41921	0.51019

alpha = 0.60129

Table 6 (continued)

Reliability Analysis for DISGUST-CONTEMPT

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	1.39241	5.44661	0.47580	0.73615
Selection #2	1.29114	4.72184	0.58210	0.69783
Selection #3	1.37975	5.11035	0.55086	0.71168
Selection #4	1.39241	5.29276	0.42871	0.75109
Selection #5	1.22785	4.10127	0.62886	0.68038

alpha = 0.76003

Reliability Analysis for ANGER-RAGE

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	0.62025	2.03343	0.28505	0.70508
Selection #2	0.54430	1.37942	0.66356	0.53522
Selection #3	0.53165	1.38040	0.64762	0.54362
Selection #4	0.64557	2.25738	0.26010	0.70951
Selection #5	0.54430	1.68711	0.42056	0.66051

alpha = 0.69457

Table 6 (continued)

Reliability Analysis for SHAME-HUMILIATION

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	0.92405	4.12236	0.67226	0.79700
Selection #2	0.82278	3.63486	0.76282	0.76721
Selection #3	0.82278	3.86563	0.68126	0.79216
Selection #4	0.91139	5.15871	0.31065	0.87396
Selection #5	0.77215	3.22947	0.78927	0.75899

alpha = 0.83711

Reliability Analysis for FEAR-TERROR

	Mean If Item Deleted	Variance If Item Deleted	Item- Total Correl.	alpha If Item Deleted
Selection #1	1.13924	4.19831	0.36155	0.66352
Selection #2	0.84810	2.82278	0.48880	0.60143
Selection #3	0.93671	2.80364	0.65201	0.51030
Selection #4	1.13924	4.27524	0.35923	0.66758
Selection #5	0.84873	2.86141	0.43059	0.64080

alpha = 0.67572

Table 7

DISCRIMINANT ANALYSIS, MOST RELIABLE RESPONSES

Prediction Results

Predicted Group Membership

	gp. 1	gp. 2	gp. 3	gp. 4	gp. 5	gp. 6	gp. 7	gp. 8
Actual Group								
group 1	7.	0.	0.	3.	0.	0.	0.	0.
group 2	1.	7.	1.	1.	0.	0.	0.	0.
group 3	1.	0.	3.	0.	0.	0.	0.	1.
group 4	3.	0.	0.	7.	0.	0.	0.	0.
group 5	0.	0.	1.	0.	8.	1.	0.	0.
group 6	0.	2.	2.	0.	0.	6.	0.	0.
group 7	2.	0.	0.	0.	1.	0.	6.	1.
group 8	1.	0.	0.	1.	0.	0.	0.	8.

percent of "grouped" cases correctly classified: 71.25%

The responses which lowered the reliability were removed from the discriminant analysis with the percentage of correctly classified subjects decreasing from 77.5% to 71.25% (see Table 7). The level of correct classification and the reliability levels were high, signalling that continued analysis was warranted.

The next step was the actual beginning of the first level of analysis. An SPSS crosstabulation of each emotional response with the corresponding characteristics of the music was obtained (e.g., the first INTEREST-EXCITEMENT responses were crosstabulated with the tempi, instruments, modes, and combinations of tempi and instruments, tempi and modes, instruments and modes, and tempi, instruments, and modes of the first selections heard). In addition to examining the responses with corresponding selections of music, the immediate changes in tempo, instrument, and mode were examined for the second, third, fourth, and fifth groups of emotional responses, in order to account for the importance of context in the prediction of responses (the second level of analysis). Statistics obtained from the crosstabulation included the significance of chi square. The significant crosstabulations of emotional responses and musical components are in table 15 in the Appendix. The significant crosstabulations of changes in musical components are in table 16 in the Appendix.

An SPSS three-way analysis of variance was run to

determine the significance of interaction among the tempo, instrument, and mode of the musical selections heard immediately before each of the emotional responses was made, for the first level of analysis.

The analyses of variance indicate that the fast tempo elicits INTEREST-EXCITEMENT and ENJOYMENT-JOY emotions; slow tempo elicits DISTRESS-ANGUISH and FEAR-TERROR emotions; voice elicits SHAME-HUMILIATION responses; English horn elicits INTEREST-EXCITEMENT emotions; minor mode elicits SURPRISE-STARTLE and ANGER-RAGE emotions; combinations of fast tempo and voice elicit INTEREST-EXCITEMENT, ENJOYMENT-JOY, and SURPRISE-STARTLE emotions; fast tempo and minor mode elicit ENJOYMENT-JOY emotions; slow tempo and minor mode elicit SHAME-HUMILIATION emotions; fast tempo and minor mode played on the English horn elicit INTEREST-EXCITEMENT emotions; and fast tempo and minor mode sung by an alto elicit ENJOYMENT-JOY emotions.

Those responses which showed significance at a probability level of .05 or less in the analysis of variance were entered into an SPSS stepwise multiple regression analysis with the tempi, instruments, and modes of all of the musical selections heard previous to the emotional response to check for the importance of context of the various musical components. The multiple regression analysis indicated that the INTEREST-EXCITEMENT responses to the fourth and fifth selections, the ENJOYMENT-JOY responses

to the fifth selections, the SURPRISE-STARTLE responses to the third selections, and the FEAR-TERROR responses to the second selections were definitely contextual responses. Analysis of variance was repeated using the contextually important musical variables as derived from the multiple regression analyses as well as the immediately preceding tempo, instrument, and mode changes. (The SPSS analyses of variance suppressed the interaction effects in all of the contextual analyses with the message "Due to empty cells or a singular matrix, higher order interactions have been suppressed." Nevertheless, it is clear that context is important although it is not possible to ascertain any of the contextual interactions which occurred.)

The significant contextual analyses of variance indicated that changes in tempo affect ENJOYMENT-JOY and DISTRESS-ANGUISH groups of emotions; changes in instrumentation affect INTEREST-EXCITEMENT, ENJOYMENT-JOY, SURPRISE-STARTLE, DISTRESS-ANGUISH, SHAME-HUMILIATION, and FEAR-TERROR groups; and changes in mode affect INTEREST-EXCITEMENT, SURPRISE-STARTLE, and DISTRESS-ANGUISH groups of emotions. More complex contextual relationships included tempo of the first selection and the ENJOYMENT-JOY responses to the second selection; instrument of the first selection and tempo of the second selection with FEAR-TERROR responses to the second selection; instrument of the second selection and INTEREST-EXCITEMENT responses to the fifth

selection; and the combination of instrument of the second selection and tempo of the third selection with ENJOYMENT-JOY responses to the fifth selection. In addition to musical context, emotional context was examined through multiple regression analysis and analysis of variance.

Table 8

SIGNIFICANT INDIVIDUAL ANALYSES OF VARIANCE

ENJOYMENT-JOY Responses to Selection #1
by Tempo1
Instrument1
Model1

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo1	6.612	1	6.612	6.696	0.012
Instrument1	0.112	1	0.112	0.114	0.737
Model1	0.312	1	0.312	0.316	0.575
Tempo1 Instrument1	2.112	1	2.112	2.139	0.148
Tempo1 Model1	0.112	1	0.112	0.114	0.737
Instrument1 Model1	0.012	1	0.012	0.013	0.911
Tempo1 Instrument1 Model1	1.012	1	1.012	1.025	0.315
Residual	71.099	72	0.987		
Total	81.387	79	1.030		

ANGER-RAGE Responses to Selection #1
by Tempo1
Instrument1
Model1

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo1	0.050	1	0.050	0.305	0.582
Instrument1	0.050	1	0.050	0.305	0.582
Model1	0.800	1	0.800	4.881	0.030
Tempo1 Instrument1	0.200	1	0.200	1.220	0.273
Tempo1 Model1	0.050	1	0.050	0.305	0.582
Instrument1 Model1	0.050	1	0.050	0.305	0.582
Tempo1 Instrument1 Model1	0.200	1	0.200	1.220	0.273
Residual	11.800	72	0.164		
Total	13.200	79	0.167		

Table 8 (continued)

PEAK-TERROR Responses to Selection #1
by Tempo1
Instrument1
Mode1

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo1	0.200	1	0.200	1.469	0.229
Instrument1	0.050	1	0.050	0.367	0.546
Mode1	0.050	1	0.050	0.367	0.546
Tempo1 Instrument1	0.050	1	0.050	0.367	0.546
Tempo1 Mode1	0.050	1	0.050	0.367	0.546
Instrument1 Mode1	0.200	1	0.200	1.469	0.229
Tempo1 Instrument1 Mode1	0.800	1	0.800	5.878	0.018
Residual	9.800	72	0.136		
Total	11.200	79	0.142		

INTEREST-EXCITEMENT Responses to Selection #2
by Tempo2
Instrument2
Mode2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo2	1.250	1	1.250	0.791	0.377
Instrument2	0.800	1	0.800	0.506	0.479
Mode2	1.250	1	1.250	0.791	0.377
Tempo2 Instrument2	0.050	1	0.050	0.032	0.859
Tempo2 Mode2	5.000	1	5.000	3.163	0.080
Instrument2 Mode2	0.450	1	0.450	0.285	0.595
Tempo2 Instrument2 Mode2	7.200	1	7.200	4.555	0.036
Residual	113.799	72	1.581		
Total	129.799	79	1.643		

Table 8 (continued)

ENJOYMENT-JOY Responses to Selection #2
by Tempo2
Instrument2
Mode2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo2	2.450	1	2.450	2.706	0.104
Instrument2	0.800	1	0.800	0.883	0.350
Mode2	0.050	1	0.050	0.055	0.815
Tempo2 Instrument2	0.200	1	0.200	0.221	0.640
Tempo2 Mode2	4.050	1	4.050	4.472	0.038
Instrument2 Mode2	1.800	1	1.800	1.988	0.163
Tempo2 Instrument2 Mode2	5.000	1	5.000	5.522	0.022
Residual	65.199	72	0.906		
Total	79.549	79	1.007		

DISTRESS-ANGUISH Responses to Selection #2
by Tempo2
Instrument2
Mode2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo2	21.012	1	21.01	20.30	0.000
Instrument2	1.012	1	1.012	0.979	0.326
Mode2	0.612	1	0.612	0.592	0.444
Tempo2 Instrument2	2.112	1	2.112	2.042	0.157
Tempo2 Mode2	0.012	1	0.012	0.012	0.913
Instrument2 Mode2	3.612	1	3.612	3.491	0.066
Tempo2 Instrument2 Mode2	5.512	1	5.512	5.328	0.024
Residual	74.499	72	1.035		
Total	108.387	79	1.372		

Table 8 (continued)

FEAR-TERROR Responses to Selection #2
by Tempo2
Instrument2
Mode2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo2	3.612	1	3.612	6.618	0.012
Instrument2	0.612	1	0.612	1.122	0.293
Mode2	1.012	1	1.012	1.855	0.177
Tempo2 Instrument2	0.012	1	0.012	0.023	0.880
Tempo2 Mode2	2.812	1	2.812	5.153	0.026
Instrument2 Mode2	1.012	1	1.012	1.855	0.177
Tempo2 Instrument2 Mode2	6.612	1	6.612	12.12	0.001
Residual	39.300	72	0.546		
Total	54.987	79	0.696		

INTEREST-EXCITEMENT Responses to Selection #3
by Tempo3
Instrument3
Mode3

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo3	5.000	1	5.000	4.737	0.033
Instrument3	0.200	1	0.200	0.189	0.665
Mode3	0.200	1	0.200	0.189	0.665
Tempo3 Instrument3	5.000	1	5.000	4.737	0.033
Tempo3 Mode3	1.800	1	1.800	1.705	0.196
Instrument3 Mode3	0.800	1	0.800	0.758	0.387
Tempo3 Instrument3 Mode3	0.200	1	0.200	0.189	0.665
Residual	76.000	72	1.056		
Total	89.200	79	1.129		

Table 8 (continued)

ENJOYMENT-JOY Responses to Selection #3
by Tempo3
Instrument3
Mode3

Source of Variation	Sum of Squares	df	Mean Square	Mean F	Significance of F
Tempo3	12.800	1	12.80	17.59	0.000
Instrument3	0.200	1	0.200	0.275	0.602
Mode3	0.800	1	0.800	1.099	0.298
Tempo3 Instrument3	4.050	1	4.050	5.565	0.021
Tempo3 Mode3	0.450	1	0.450	0.618	0.434
Instrument3 Mode3	0.450	1	0.450	0.618	0.434
Tempo3 Instrument3 Mode3	0.800	1	0.800	1.099	0.298
Residual	52.399	72	0.728		
Total	71.949	79	0.911		

SURPRISE-STARTLE Responses to Selection #3
by Tempo3
Instrument3
Mode3

Source of Variation	Sum of Squares	df	Mean Square	Mean F	Significance of F
Tempo3	0.200	1	0.200	0.351	0.555
Instrument3	0.050	1	0.050	0.088	0.768
Mode3	0.450	1	0.450	0.790	0.377
Tempo3 Instrument3	2.450	1	2.450	4.302	0.042
Tempo3 Mode3	0.050	1	0.050	0.088	0.768
Instrument3 Mode3	0.800	1	0.800	1.405	0.240
Tempo3 Instrument3 Mode3	0.800	1	0.800	1.405	0.240
Residual	41.000	72	0.569		
Total	45.800	79	0.580		

Table 8 (continued)

DISTRESS-ANGUISH Responses to Selection #3
by Tempo3
Instrument3
Mode3

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo3	14.450	1	14.45	17.17	0.000
Instrument3	1.250	1	1.250	1.485	0.227
Mode3	0.200	1	0.200	0.238	0.627
Tempo3 Instrument3	2.450	1	2.450	2.911	0.092
Tempo3 Mode3	0.000	1	0.000	0.000	1.000
Instrument3 Mode3	0.200	1	0.200	0.238	0.627
Tempo3 Instrument3 Mode3	0.800	1	0.800	0.951	0.333
Residual	60.600	72	0.842		
Total	79.950	79	1.012		

SHAME-HUMILIATION Responses to Selection #3
by Tempo3
Instrument3
Mode3

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo3	1.012	1	1.012	2.730	0.103
Instrument3	2.812	1	2.812	7.584	0.007
Mode3	0.112	1	0.112	0.303	0.583
Tempo3 Instrument3	1.012	1	1.012	2.730	0.103
Tempo3 Mode3	0.112	1	0.112	0.303	0.583
Instrument3 Mode3	0.112	1	0.112	0.303	0.583
Tempo3 Instrument3 Mode3	0.612	1	0.612	1.652	0.203
Residual	26.700	72	0.371		
Total	32.487	79	0.411		

Table 8 (continued)

INTEREST-EXCITEMENT Responses to Selection #4
by Tempo4
Instrument4
Mode4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo4	5.512	1	5.512	4.697	0.034
Instrument4	5.512	1	5.512	4.697	0.034
Mode4	0.612	1	0.612	0.522	0.472
Tempo4 Instrument4	0.112	1	0.112	0.096	0.758
Tempo4 Mode4	0.112	1	0.112	0.096	0.758
Instrument4 Mode4	0.112	1	0.112	0.096	0.758
Tempo4 Instrument4 Mode4	1.012	1	1.012	0.863	0.356
Residual	84.500	72	1.174		
Total	97.487	79	1.234		

ENJOYMENT-JOY Responses to Selection #4
by Tempo4
Instrument4
Mode4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo4	22.050	1	22.05	18.55	0.000
Instrument4	2.450	1	2.450	2.061	0.155
Mode4	1.250	1	1.250	1.051	0.309
Tempo4 Instrument4	0.450	1	0.450	0.379	0.540
Tempo4 Mode4	2.450	1	2.450	2.061	0.155
Instrument4 Mode4	1.250	1	1.250	1.051	0.309
Tempo4 Instrument4 Mode4	2.450	1	2.450	2.061	0.155
Residual	85.600	72	1.189		
Total	117.950	79	1.493		

Table 8 (continued)

SURPRISE-STARTLE Responses to Selection #4
by Tempo4
Instrument4
Mode4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo4	2.450	1	2.450	2.564	0.114
Instrument4	0.000	1	0.000	0.000	1.000
Mode4	5.000	1	5.000	5.233	0.025
Tempo4 Instrument4	0.200	1	0.200	0.209	0.649
Tempo4 Mode4	0.200	1	0.200	0.209	0.649
Instrument4 Mode4	0.050	1	0.050	0.052	0.820
Tempo4 Instrument4 Mode4	1.250	1	1.250	1.308	0.257
Residual	68.799	72	0.956		
Total	77.949	79	0.987		

DISTRESS-ANGUISH Responses to Selection #4
by Tempo4
Instrument4
Mode4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo4	14.450	1	14.45	16.84	0.000
Instrument4	1.800	1	1.800	2.097	0.152
Mode4	0.200	1	0.200	0.233	0.631
Tempo4 Instrument4	0.800	1	0.800	0.932	0.338
Tempo4 Mode4	0.800	1	0.800	0.932	0.338
Instrument4 Mode4	1.250	1	1.250	1.456	0.231
Tempo4 Instrument4 Mode4	0.450	1	0.450	0.524	0.471
Residual	61.800	72	0.858		
Total	81.550	79	1.032		

Table 8 (continued)

INTEREST-EXCITEMENT Responses to Selection #5
by Tempo5
Instrument5
Mode5

Source of Variation	Sum of Squares	df	Mean Square	Mean F	Significance of F
Tempo5	3.200	1	3.200	2.299	0.134
Instrument5	0.050	1	0.050	0.036	0.850
Mode5	1.800	1	1.800	1.293	0.259
Tempo5 Instrument5	1.800	1	1.800	1.293	0.259
Tempo5 Mode5	0.450	1	0.450	0.323	0.571
Instrument5 Mode5	0.800	1	0.800	0.575	0.451
Tempo5 Instrument5 Mode5	8.450	1	8.450	6.072	0.016
Residual	100.200	72	1.392		
Total	116.750	79	1.478		

ENJOYMENT-JOY Responses to Selection #5
by Tempo5
Instrument5
Mode5

Source of Variation	Sum of Squares	df	Mean Square	Mean F	Significance of F
Tempo5	13.612	1	13.61	11.79	0.001
Instrument5	3.612	1	3.612	3.130	0.081
Mode5	1.512	1	1.512	1.310	0.256
Tempo5 Instrument5	6.612	1	6.612	5.729	0.019
Tempo5 Mode5	0.612	1	0.612	0.531	0.469
Instrument5 Mode5	0.312	1	0.312	0.271	0.604
Tempo5 Instrument5 Mode5	1.012	1	1.012	0.877	0.352
Residual	83.099	72	1.154		
Total	110.387	79	1.397		

Table 3 (continued)

DISTRESS-ANGUISH Responses to Selection #5
by Tempo5
Instrument5
Mode5

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo5	13.612	1	13.61	10.98	0.001
Instrument5	0.312	1	0.312	0.252	0.617
Mode5	1.012	1	1.012	0.816	0.369
Tempo5 Instrument5	0.112	1	0.112	0.091	0.764
Tempo5 Mode5	2.112	1	2.112	1.703	0.196
Instrument5 Mode5	0.012	1	0.012	0.010	0.920
Tempo5 Instrument5 Mode5	1.012	1	1.012	0.816	0.369
Residual	89.300	72	1.240		
Total	107.487	79	1.361		

SHAME-HUMILIATION Responses to Selection #5
by Tempo5
Instrument5
Mode5

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo5	2.112	1	2.112	3.812	0.055
Instrument5	0.112	1	0.112	0.203	0.654
Mode5	1.012	1	1.012	1.827	0.181
Tempo5 Instrument5	0.312	1	0.312	0.564	0.455
Tempo5 Mode5	2.812	1	2.812	5.075	0.027
Instrument5 Mode5	0.012	1	0.012	0.023	0.881
Tempo5 Instrument5 Mode5	0.112	1	0.112	0.203	0.654
Residual	39.900	72	0.554		
Total	46.387	79	0.587		

Table 8 (continued)

FEAR-TERROR Responses to Selection #5
 by Tempo5
 Instrument5
 Mode5

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo5	6.612	1	6.612	8.166	0.006
Instrument5	1.512	1	1.512	1.868	0.176
Mode5	1.012	1	1.012	1.250	0.267
Tempo5 Instrument5	4.512	1	4.512	5.573	0.021
Tempo5 Mode5	1.012	1	1.012	1.250	0.267
Instrument5 Mode5	0.012	1	0.012	0.015	0.901
Tempo5 Instrument5 Mode5	0.012	1	0.012	0.015	0.901
Residual	58.299	72	0.810		
Total	72.987	79	0.924		

Table 9

MULTIPLE REGRESSION ANALYSES

INTEREST-EXCITEMENT Responses to Selection #4

	Multiple r	Variance	r ² Change	Simple r
Tempo2	0.23779	0.05655	0.05655	0.23779
Instrument2	0.33629	0.11309	0.05655	0.23779
Mode4	0.34551	0.11937	0.00628	0.07926
Tempo3	0.35048	0.12284	0.00346	-0.16985
Tempo1	0.36022	0.12976	0.00692	-0.07926
Mode2	0.36182	0.13091	0.00115	0.03397
Instrument3	0.36500	0.13322	0.00231	-0.16985

INTEREST-EXCITEMENT Responses to Selection #5

	Multiple r	Variance	r ² Change	Simple r
Instrument2	0.16556	0.02741	0.02741	-0.16556
Tempo3	0.31065	0.09650	0.06909	-0.14486
Mode5	0.34967	0.12227	0.02577	0.12417
Mode2	0.36319	0.13191	0.00964	-0.02069
Mode3	0.37250	0.13876	0.00685	0.08278
Mode1	0.37632	0.14161	0.00286	0.02069
Tempo1	0.37650	0.14176	0.00014	0.06208

ENJOYMENT-JOY Responses to Selection #2

	Multiple r	Variance	r ² Change	Simple r
Tempo1	0.35099	0.12319	0.12319	0.35099
Mode1	0.38186	0.14582	0.02263	0.15042
Mode2	0.38623	0.14917	0.00335	-0.02507
Instrument1	0.38839	0.15085	0.00168	0.00000
Tempo2	0.39054	0.15252	0.00168	-0.17549
Instrument2	0.39719	0.15776	0.00524	-0.10028

Table 9 (continued)

ENJOYMENT-JOY Responses to Selection #5

	Multiple r	Variance	r ² Change	Simple r
Instrument2	0.37245	0.13872	0.13872	-0.37245
Tempo3	0.43634	0.19039	0.05167	-0.01064
Mode2	0.46462	0.21587	0.02548	-0.15962
Instrument1	0.47940	0.22983	0.01396	0.11705
Instrument3	0.49123	0.24131	0.01148	-0.11705
Tempo4	0.49433	0.24437	0.00306	0.35116
Mode3	0.49719	0.24720	0.00283	0.05321

FEAR-TERROR Responses to Selection #2

	Multiple r	Variance	r ² Change	Simple r
Tempo1	0.40709	0.16572	0.16572	-0.40709
Instrument1	0.43957	0.19323	0.02751	0.16585
Tempo2	0.47964	0.23005	0.03683	0.25631
Mode1	0.49846	0.24847	0.01841	-0.13570
Mode2	0.51653	0.26680	0.01834	0.13570

Table 10

CONTEXTUAL ANALYSES OF VARIANCE

INTEREST-EXCITEMENT Responses to Selection #2
 by Tempo Change from Selection #1 to Selection #2
 Instrument Change from Selection #1 to Selection #2
 Mode Change from Selection #1 to Selection #2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	9.542	2	4.771	3.036	0.054
Instrument	1.100	2	0.550	0.350	0.706
Mode	11.208	2	5.604	3.567	0.033
Residual	114.699	73	1.571		
Total	129.799	79	1.643		

DISTRESS-ANGUISH Responses to Selection #2
 by Tempo Change from Selection #1 to Selection #2
 Instrument Change from Selection #1 to Selection #2
 Mode Change from Selection #1 to Selection #2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	14.417	2	7.208	7.061	0.002
Instrument	1.425	2	0.712	0.698	0.501
Mode	3.467	2	1.734	1.698	0.190
Residual	74.524	73	1.021		
Total	108.387	79	1.372		

Table 10 (continued)

FEAR-TERROR Responses to Selection #2
 by Tempo Change from Selection #1 to Selection #2
 Instrument Change from Selection #1 to Selection #2
 Mode Change from Selection #1 to Selection #2

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	1.275	2	0.637	1.113	0.334
Instrument	3.750	2	1.875	3.275	0.043
Mode	0.542	2	0.271	0.474	0.625
Residual	41.800	73	0.573		
Total	54.987	79	0.696		

ENJOYMENT-JOY Responses to Selection #3
 by Tempo Change from Selection #2 to Selection #3
 Instrument Change from Selection #2 to Selection #3
 Mode Change from Selection #2 to Selection #3

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	7.650	2	3.825	5.283	0.007
Instrument	0.225	2	0.112	0.155	0.856
Mode	4.467	2	2.233	3.085	0.052
Residual	52.849	73	0.724		
Total	71.949	79	0.911		

Table 10 (continued)

DISTRESS-ANGUISH Responses to Selection #3
 by Tempo Change from Selection #2 to Selection #3
 Instrument Change from Selection #2 to Selection #3
 Mode Change from Selection #2 to Selection #3

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	12.900	2	6.450	7.744	0.001
Instrument	2.475	2	1.237	1.486	0.233
Mode	7.267	2	3.633	4.362	0.016
Residual	60.800	73	0.833		
Total	79.950	79	1.012		

INTEREST-EXCITEMENT Responses to Selection #4
 by Tempo Change from Selection #3 to Selection #4
 Instrument Change from Selection #3 to Selection #4
 Mode Change from Selection #3 to Selection #4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	0.123	2	0.062	0.052	0.949
Instrument	3.786	2	1.893	3.705	0.029
Mode	0.179	1	0.179	0.151	0.699
Residual	87.751	74	1.186		
Total	97.487	79	1.234		

ENJOYMENT-JOY Responses to Selection #4
 by Tempo Change from Selection #3 to Selection #4
 Instrument Change from Selection #3 to Selection #4
 Mode Change from Selection #3 to Selection #4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	2.048	2	1.024	0.845	0.433
Instrument	18.898	2	9.449	7.800	0.001
Mode	1.241	1	1.241	1.024	0.315
Residual	89.651	74	1.212		
Total	117.950	79	1.493		

Table 10 (continued)

DISTRESS-ANGUISH Responses to Selection #4
 by Tempo Change from Selection #3 to Selection #4
 Instrument Change from Selection #3 to Selection #4
 Mode Change from Selection #3 to Selection #4

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	1.502	2	0.751	0.832	0.439
Instrument	8.519	2	4.259	4.718	0.012
Mode	1.501	1	1.501	1.663	0.201
Residual	66.806	74	0.903		
Total	81.550	79	1.032		

SHAME-HUMILIATION Responses to Selection #3
 by Tempo Change from Selection #2 to Selection #3
 Instrument Change from Selection #2 to Selection #3
 Mode Change from Selection #2 to Selection #3

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	2.037	2	1.019	2.753	0.070
Instrument	3.512	2	1.756	4.746	0.012
Mode	1.017	2	0.508	1.374	0.260
Residual	27.012	73	0.370		
Total	32.487	79	0.411		

Table 10 (continued)

ENJOYMENT-JOY responses to Selection #2
 by Tempo1
 Mode1
 Mode2
 Instrument1
 Tempo2

Source of Variation	Sum of Squares	df	Mean square	F	Significance of F
Tempo1	4.813	1	4.813	5.283	0.024
Mode1	2.253	1	2.253	2.473	0.120
Mode2	0.533	1	0.533	0.585	0.447
Instrument1	0.267	1	0.267	0.293	0.590
Tempo2	0.133	1	0.133	0.146	0.703
Residual	67.416	74	0.911		
Total	79.549	79	1.007		

FEAR-TERROR Responses to Selection #2
 by Tempo1
 Instrument1
 Tempo2
 Mode1
 Mode2

Source of Variation	Sum of Squares	df	Mean square	F	Significance of F
Tempo1	1.541	1	1.541	2.828	0.097
Instrument1	4.004	1	4.004	7.350	0.008
Tempo2	3.008	1	3.008	5.522	0.021
Mode1	2.001	1	2.001	3.672	0.059
Mode2	1.008	1	1.008	1.851	0.178
Residual	40.316	74	0.545		
Total	54.987	79	0.696		

Table 10 (continued)

INTEREST-EXCITEMENT Responses to Selection #5
 by Instrument2
 Tempo3
 Mode5
 Mode3
 Mode1

Source of Variation	Sum of Squares	df	Mean square	F	Significance of F
Instrument2	7.605	1	7.605	5.538	0.021
Tempo3	2.205	1	2.205	1.606	0.209
Mode5	2.205	1	2.205	1.606	0.209
Mode3	0.225	1	0.225	0.164	0.687
Mode1	0.050	1	0.050	0.036	0.849
Residual	101.625	74	1.373		
Total	116.750	79	1.478		

ENJOYMENT-JOY Responses to Selection #5
 by Instrument2
 Tempo3
 Mode2
 Instrument1
 Instrument3

Source of Variation	Sum of Squares	df	Mean square	F	Significance of F
Instrument2	11.407	1	11.41	10.08	0.002
Tempo3	8.167	1	8.167	7.217	0.009
Mode2	3.307	1	3.307	2.922	0.092
Instrument1	2.604	1	2.604	2.301	0.134
Instrument3	1.267	1	1.267	1.120	0.293
Residual	83.749	74	1.132		
Total	110.387	79	1.397		

Table 10 (continued)

ENJOYMENT-JOY Responses to Selection #1
by ENJOYMENT-JOY after Relaxation

Tempo1

Instrument1

Model

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Relaxed	15.736	4	3.934	4.832	0.002
Tempo1	5.115	1	5.115	6.283	0.014
Instrument1	0.011	1	0.011	0.013	0.908
Model	0.304	1	0.304	0.373	0.543
Residual	58.614	72	0.814		
Total	81.387	79	1.030		

SURPRISE-STARTLE Responses to Selection #1
by SURPRISE-STARTLE after Relaxation

Tempo1

Instrument1

Model

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Relaxed	6.492	4	1.623	2.874	0.029
Tempo1	0.086	1	0.086	0.152	0.698
Instrument1	0.632	1	0.632	1.119	0.294
Model	0.137	1	0.137	0.242	0.624
Residual	40.658	72	0.565		
Total	47.550	79	0.602		

Table 10 (continued)

DISGUST-CONTEMPT Responses to Selection #1
 by DISGUST-CONTEMPT after Relaxation
 Tempo1
 Instrument1
 Model

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Relaxed	22.399	2	11.199	37.16	0.000
Tempo1	0.342	1	0.342	1.134	0.290
Instrument1	0.196	1	0.196	0.649	0.423
Model	0.022	1	0.022	0.073	0.788
Residual	22.301	74	0.301		
Total	45.549	79	0.577		

ANGER-RAGE Responses to Selection #1
 by ANGER-RAGE after Relaxation
 Tempo1
 Instrument1
 Model

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Relaxed	3.819	2	1.910	16.66	0.000
Tempo1	0.007	1	0.007	0.065	0.799
Instrument1	0.278	1	0.278	2.425	0.124
Model	0.301	1	0.301	2.624	0.109
Residual	8.481	74	0.115		
Total	13.200	79			

Table 10 (continued)

SHAME-HUMILIATION Responses to Selection #1
 by var049 SHAME-HUMILIATION after Relaxation
 Tempo1
 Instrument1
 Model1

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Relaxed	2.559	2	1.280	4.327	0.017
Tempo1	0.577	1	0.577	1.951	0.167
Instrument1	0.495	1	0.495	1.672	0.200
Model1	0.011	1	0.011	0.037	0.849
Residual	21.588	73	0.296		
Total	25.468	78	0.327		

FEAR-TERROR Responses to Selection #1
 by FEAR-TERROR after Relaxation
 Tempo1
 Instrument1
 Model1

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Relaxed	3.781	3	1.260	12.922	0.000
Tempo1	0.051	1	0.051	0.522	0.472
Instrument1	0.193	1	0.193	1.983	0.163
Model1	0.001	1	0.001	0.007	0.932
Residual	7.119	73	0.098		
Total	11.200	79	0.142		

All of the above analyses were conducted with a 10:1 ratio between subjects and groups of musical stimuli. The third level of analysis was designed to increase the power of the analysis by examining the fifty responses to each piece of music, resulting in a 50:1 ratio. As with the less powerful analyses, there were several steps in the examination of the emotional responses without regard to the orders in which they were heard. In order to make the more powerful analyses, the emotional responses were summed across the five ordered groups. The conclusions were reached through the analysis of variance.

The significant crosstabulations of summed responses and musical components are in table 17 in the Appendix. The significant summed analyses of variance are in table 11.

Table 11

SUMMED ANALYSES OF VARIANCE

INTEREST-EXCITEMENT Responses
by Tempo
Instrument
Mode

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	8.703	1	8.703	5.414	<.05
Instrument	2.723	1	2.723	1.694	
Mode	0.903	1	0.903	0.562	
Tempo Instrument	0.123	1	0.123	0.076	
Tempo Mode	1.823	1	1.823	1.134	
Instrument Mode	0.023	1	0.023	0.014	0.188
Tempo Instrument Mode	0.303	1	0.303	0.188	
Residual	630.1	392	1.607		
Total	644.6	399	1.616		

ENJOYMENT-JOY Responses
by Tempo
Instrument
Mode

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	51.840	1	51.84	21.07	<.01
Instrument	0.040	1	0.040	0.016	
Mode	0.250	1	0.250	0.102	
Tempo Instrument	2.890	1	2.890	1.175	
Tempo Mode	0.040	1	0.040	0.016	
Instrument Mode	0.160	1	0.160	0.065	0.004
Tempo Instrument Mode	0.010	1	0.010	0.004	
Residual	964.5	392	2.461		
Total	1019.7	399	2.556		

Table 11 (continued)

DISTRESS-ANGUISH Responses by Tempo
Instrument
Mode

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	60.840	1	60.84	50.28	<.01
Instrument	0.810	1	0.810	0.669	
Mode	1.960	1	1.960	1.620	
Tempo Instrument	0.010	1	0.010	0.008	<.01
Tempo Mode	0.160	1	0.160	0.132	
Instrument Mode	1.690	1	1.690	1.397	
Tempo Instrument Mode	10.190	1	10.19	8.421	
Residual	474.3	392	1.210		
Total	550.0	399	1.378		

FEAR-TERROR Responses
by Tempo
Instrument
Mode

Source of Variation	Sum of Squares	df	Mean Square	F	Significance of F
Tempo	3.610	1	3.610	6.726	<.01
Instrument	1.960	1	1.960	3.652	
Mode	2.560	1	2.560	4.770	<.05
Tempo Instrument	1.960	1	1.960	3.652	
Tempo Mode	1.960	1	1.960	3.652	
Instrument Mode	0.810	1	0.810	1.509	
Tempo Instrument Mode	0.490	1	0.490	0.913	
Residual	210.4	392	0.537		
Total	223.7	399	0.561		

Table 12

MOST SIGNIFICANT RELATIONSHIPS

Emotional Group	Components	Selection #
INTEREST-EXCITEMENT	tempo	3,4,summed
ENJOYMENT-JOY	tempo	1,3,4,5,summed
DISTRESS-ANGUISH	tempo	2,3,4,5,summed
DISTRESS-ANGUISH	tempo, instrument, mode	2,summed
FEAR-TERROR	tempo	2,5,summed

Table 13

LESS CONSISTENT SIGNIFICANT RELATIONSHIPS

Emotional Group	Components	Selection #
INTEREST-EXCITEMENT	instrument	4
INTEREST-EXCITEMENT	tempo, instrument	3
INTEREST-EXCITEMENT	tempo, instrument, mode	2, 5
INTEREST-EXCITEMENT	instrument change	2, 4
INTEREST-EXCITEMENT	mode change	2
ENJOYMENT-JOY	tempo, instrument	3, 5
ENJOYMENT-JOY	tempo, mode	2
ENJOYMENT-JOY	tempo, instrument, mode	2
ENJOYMENT-JOY	tempo change	3
ENJOYMENT-JOY	instrument change	4
SURPRISE-STARTLE	mode	4
SURPRISE-STARTLE	tempo, instrument	3
DISTRESS-ANGUISH	tempo change	3
DISTRESS-ANGUISH	instrument change	4
DISTRESS-ANGUISH	mode change	3
ANGER-RAGE	mode	1
SHAME-HUMILIATION	instrument	3
SHAME-HUMILIATION	tempo, mode	5
SHAME-HUMILIATION	instrument change	3
FEAR-TERROR	mode	summed
FEAR-TERROR	tempo, instrument	5
FEAR-TERROR	tempo, mode	2
FEAR-TERROR	tempo, instrument, mode	1, 2
FEAR-TERROR	instrument change	2

DISCUSSION

The conclusions of this search for nonlinguistic phonemes of emotion are that fast tempo elicits INTEREST-EXCITEMENT groups of emotions, slow tempo elicits DISTRESS-ANGUISH and FEAR-TERROR groups, and a combination of slow and minor music sung by an alto elicits DISTRESS-ANGUISH groups of emotions. Results of this study indicate that, while there are many statistically significant relationships between musical components and emotions, the most significant are those listed in table 12. The relationships in table 12 were selected because of statistically significant three-way analyses of variance of both the individual and summed emotional responses groups. Other relationships which resulted in statistically significant analyses of variance at either the individual level or the summed level are in table 13.

There are several possible explanations which can account for the results, including speculation that the music has little relationship with the emotional responses. The contextual analyses of variance indicated that emotional state before hearing the music was important for SURPRISE-STARTLE, DISGUST-CONTEMPT, ANGER-RAGE, SHAME-HUMILIATION, and FEAR-TERROR responses to the first selections, whereas, for the other emotional groups, the musical components account for significant amounts of the variance.

An examination of the stimuli used in this study is important at this point. While there were two categories of tempo, instrument, and mode used, there is a question about the opposition of fast-slow, voice-instrument (alto-English horn?) and major-minor.

When tempo was included in the study, there was no compensation made for duration; i.e., the music at the fast tempo was of shorter duration than that at the slow tempo. Therefore, it is impossible, under the circumstances, to ascertain whether the subjects responded to the tempi, the the relative tempi, the durations, the relative durations, or some combination(s) therein. A definite duration problem was mentioned by several subjects who commented that the fast selections ended too soon for any real reactions to be formed. The slow selections, on the other hand, were perceived as "dragging" to such an extent that initial reactions were changed or lost before the music ended.

In both the pilot run and the actual experiment, several subjects mentioned difficulty in recognizing the alto voice (heard in a rare instance without words) and the English horn (which is seldom heard alone); that could have interfered with the groups of emotions under study. In the responses to the fourth selections, the English horn elicited the INTEREST-EXCITEMENT group of emotions. That could be an indication of the attention and curiosity underlying attempts to recognize the instrumentation. The

use of the voice as opposed to the instrument did not turn out to be a dichotomy as expected; some subjects perceived the voice as an instrument, often that someone was learning how to play. That sort of ambiguity could result in responses which are unrelated to the stimuli as intended; if a pair of unknown instruments are perceived, neither of which has a historical connection with any specific emotions for the subjects, one might anticipate that there would be no significant difference between the responses to those unknowns. As there was no attempt to ascertain recognition of the instrumentation in this study, it is impossible to know how many subjects were responding to a voice-instrument dichotomy, how many were responding to two or more instruments, and how many perceived only one instrument or voice.

The third category of musical variables, mode, was divided into major and melodic minor. One relationship lacking in significance which is of particular importance to the music world is the relationship between mode and the response groups ENJOYMENT-JOY and DISTRESS-ANGUISH. A great deal of Western music is based on the premise that the major mode reflects ENJOYMENT-JOY emotions and that the minor mode is used to convey DISTRESS-ANGUISH emotions. The results of this study indicate that, controlling for the tempo and instrumentation, mode is completely unrelated to those emotional groups. Use of the melodic minor mode resulted in

differences in only sixteen (24.6%) of the sixty-five notes; the harmonic minor would have changed twenty (30.8%), and the natural minor would have changed twenty-three (35.4%) or twenty-four (36.9%) of the notes (One note, the f in measure nineteen, could have been altered to f# in the descent from g or remained unaltered before the g in measure twenty). The melodic minor might not, with the basic melody in this study, have been perceived as different from the major. That explanation can be refuted on the basis that mode, in combination with tempo, is significantly related to the ENJOYMENT-JOY responses and, alone, is significantly related with SURPRISE-STARTLE and FEAR-TERROR responses (see tables 8 and 11). Western music theory and composition courses include limitations on the use of the major and minor modes with major connected with fast tempo to lead to positive emotions, and minor with slow tempo to lead to negative emotions; musical background might, therefore, have accounted for differences in responses to mode; however, the wide range of musical backgrounds and the small subject sample preclude taking them into account in this study. Most (63.7%) of the subjects reported that they had never taken any music courses and 81.1% reported never having taken any theory or composition courses; as a result, it is possible to conclude that significant relationships between mode and emotions are responses to the music rather than taught responses.

Along with the elements of music being examined in this study, other factors which were mentioned by the subjects included attention to the ending and the number of pieces of music perceived. In the pilot study, many subjects objected to the ending because the music was perceived as "unfinished" or "the person made a mistake and stopped". Subjects in both the pilot study and the actual experiment suggested that the ending be "fixed". Attention to the ending (recency effect) could account for inattention to the components of music under study. Several subjects reported boredom at hearing the same piece of music over and over again while others said they enjoyed hearing several new pieces of music, but as this was not formally or consistently reported, it was impossible to know to what number of stimuli subjects were responding. If only one stimulus piece was perceived repeatedly, inattention to the stimuli would result in boredom which might or might not be classifiable in the emotion groups under study; in the pilot run, many subjects wrote "boredom" on their response sheets as a ninth emotional category.

Music is a contextual concept. One note does not make music, but two or more notes in temporal proximity are perceived as music. Melodic lines and harmonic organization are perceived as the concepts of tempo, mode, and meter come into play in an organized whole or groups of wholes. Groups of wholes are in turn perceived only through comparison and

contrast with other wholes.

It has been assumed, rightly or wrongly, that each of the musical variations is perceived by each subject as a whole, yet there is no reason to assume that this is the case. Each selection could easily have been perceived as several different pieces of music presented without temporal breaks. If that were the case, it is not known which of those pieces or combinations of pieces resulted in the documented emotional responses.

The threshold of temporal proximity varies from one person to another. While some subjects might have remembered the music from one selection to another, others might forgotten each selection before hearing the next. That memory difference among subjects could account for perceptions of only one or several different pieces of music.

A research problem which was not taken into account was the amount of time between selections; in each experimental session, the subjects were given as much time as they needed to fill out each page of the questionnaire. That meant that, for each group of subjects, the one who took the longest controlled the interselection time which might have been a factor which should have been analyzed. During the pilot run, some subjects noted that they were annoyed with other subjects who took a long time to respond and others complained that they were distracted by those who

finished quickly and started to talk or laugh while waiting for everyone to finish. By limiting the number of people in each session to four, and requesting that there be no discussion at all until the experiment was completed (with the exception of questions about the baseline page of the questionnaire), part of the problem of group interaction was overcome. The time between selections had an additional problem, as one subject apparently rushed so as not to be the last to complete the questionnaires and left some of the open-ended responses unfinished. The experimenter watched the subjects fill out the questionnaires, and when all had stopped writing, asked "Is everyone ready for the next selection?". Most of the subjects would either nod, say "Yes", or say "Not quite", and then signify completion by raising a hand or saying "Okay". It is expected that nonassertive people might have been reluctant to admit that they had not finished.

When time and memory were such that comparisons between consecutive pieces of music were made, similarity or difference was perceived according to the individual attention to specific aspects of the music. Forty of the individual relationships between emotions and contextual musical components were statistically significant as enumerated in tables 12 and 13. The multiple regression results indicated that five contextually important relationships existed between music and emotions. When

those relationships were entered into analyses of variances, the results were that tempo of the first selection influenced ENJOYMENT-JOY responses to the second selection; instrument of the first selection and tempo of the second selection influenced FEAR-TERROR responses to the second selection; instrument of the second selection influenced INTEREST-EXCITEMENT responses to the fifth selection; and instrument of the second selection and tempo of the third selection influenced ENJOYMENT-JOY responses to the fifth selection.

Only in the INTEREST-EXCITEMENT responses to the fourth selection does the analysis of variance indicate that the use of a voice as opposed to an instrument is important; in that case the English horn is more strongly related to INTEREST-EXCITEMENT than the alto voice. When context is taken into account, all of the musical components under study appear to be important. Changes in tempo affect ENJOYMENT-JOY and DISTRESS-ANGUISH emotional groups; changes in instrumentation affect INTEREST-EXCITEMENT, ENJOYMENT-JOY, DISTRESS-ANGUISH, SHAME-HUMILIATION, and FEAR-TERROR; and changes in mode affect INTEREST-EXCITEMENT and DISTRESS-ANGUISH groups of emotions. Perhaps, then, the responses should only be examined in context.

An additional parameter which was mentioned by several subjects, was the like-dislike dichotomy as a response to the stimuli. This was not collected consistently, but

should probably be included in future studies of this sort.

One limitation in this study is order effect in the data collection; all of the emotional response questionnaires were laid out in the same order with the positive emotions listed first and the negative emotions last. That fact might account for the tendency of the response distributions toward zero (not at all) of the negative emotion groups.

The avoidance of negative reactions might account not only for the negative responses, but also for the normal distributions of INTEREST-EXCITEMENT responses as people were reluctant to acknowledge a lack of interest in the experiment. Most of the subjects were either students receiving academic credit for their participation in the experiment or were musical colleagues of the experimenter.

Temporal context is important in examining the responses as the time needed to fill out the questionnaire might result in loss of memory as the subjects progressed down the page. Some subjects did not respond to the emotions in the order listed, but after each selection responded immediately to the most applicable emotional groups and then put zeroes in the others. The hazard of that approach is that sometimes subjects left out responses, resulting in missing data. In responding to the questionnaires used in the pilot run which contained eight multiple choices of emotions to eight musical selections,

some subjects attempted to match an emotion with each musical selection. By the same token, in the actual experiment, subjects probably realized that there were a lot of zeroes on the page, and at the expense of appearing perseverative, responded at the level of one or higher to the SHAME-HUMILIATION and FEAR-TERROR groups.

The emotional response group of DISGUST-CONTEMPT was not significantly related to any of the musical components or combinations thereof. In an examination of the distributions of emotional responses in table 14, it is noted that most of the DISGUST-CONTEMPT responses are "0, not at all". That is the first indication that the musical stimuli selected for the study, and the presentations used, had little effect on that group of emotions; because only one basic melody was under study, it is possible to speculate that another melody containing the same variations might produce different results with the DISGUST-CONTEMPT group of emotions.

Context of the emotional responses appears to be important as shown in table 20 in the Appendix, where the highest correlations are between consecutive negative responses. The same table reveals that only in selections #1 and #4 is SURPRISE-STARTLE negatively correlated with DISTRESS-ANGUISH; in comparing the correlations of the SURPRISE-STARTLE responses with the musical components and the other emotional groups, it is noted that

SURPRISE-STARTLE, defined by Plutchik and Izard as a positive emotional group is borderline between positive and negative.

While examining the correlations between responses in the discriminant analysis, another interesting result was noted. For each of the five selections heard, the correlations between ENJOYMENT-JOY and DISTRESS-ANGUISH were -0.29585, -0.36589, -0.38170, -0.44201, and -0.39326. Those correlations are all significant at a level of $p < .01$, indicating that there is definitely a negative relationship between those groups of emotions.

Conversation with subjects at the conclusion of the experimental sessions resulted in statements that, in some cases, there was confusion about the groupings of emotions. For example, "distress" was described as an extreme case of "sad"; "unhappy" was called a much different emotion than "sad"; "happy" would have been an apt response to some of the music but did not seem to be adequately covered in the ENJOYMENT-JOY category. Four of the subjects, including one who had participated in the pilot run, circled or underlined specific words or pairs of words as their responses, indicating that the emotional groupings, as wholes, were not applicable.

When the significant relationships are examined, it is noted that the patterns of the relationships take one of two forms:

1. the majority of zero-level (not at all) responses are in one row of the table, while the majority of the one- through four-level (very much) responses are in the other row (or in other rows).

2. the majority of zero-level (not at all) and one-level responses are in one row of the table and the majority of two-level through four-level (very much) responses are in the other row (or in other rows).

Given a larger sample, it is expected that, to reach significance in the analysis of variance, other response patterns will emerge. That is already the case with some of the results in this study in which the chi-square analyses were significant, but in which the analysis of variance was not.

It is possible that, for some of the emotional groups under study, the highest meaningful level of response might not be four (very much), but could be as low as one. If that were the case, the results of the highly skewed and restricted range response distributions are particularly meaningful.

In taking the appropriateness of the various emotional responses groups into account, it is possible that not only does the music in the study not have any strong relationships with certain emotions (e.g., the DISGUST-CONTEMPT emotional group), but might have limited effects on the SURPRISE-STARTLE, ANGER-RAGE,

SHAME-HUMILIATION, and FEAR-TERROR emotional groups.

As a result, in this search for a nonlinguistic emotional phoneme, the best conclusions are that the most readily examined response groups are the INTEREST-EXCITEMENT, ENJOYMENT-JOY, and DISTRESS-ANGUISH emotions. The fast tempo, or selections of short duration, elicit INTEREST-EXCITEMENT and ENJOYMENT-JOY; the slow tempo, or selections of long duration, elicit DISTRESS-ANGUISH; and the combination of slow and minor presented with an alto voice elicits DISTRESS-ANGUISH.

Summary

The questions posed in the present study have been answered with the indications that nonlinguistic sound does elicit emotion and specific components of sound do elicit specific emotions.

Half of communication is perception; replication of this study with similar results can lead to an instrument to measure accuracy of perception of emotion in the absence of language. Attention to specific components of sound can be determined as a baseline against which improvement of communication can be measured. Another possible use would be in preselection of participants for group therapy.

In addition, with larger samples, it is possible that a link between personality factors and emotional perceptions might be found which would provide a psychological diagnostic tool. One of the possible future uses of a study of this sort is as an aural projective test. Like the Rorschach inkblot test, the music provides ambiguous stimuli onto which one can project and also contains elements of attention which can be examined as they can in the Rorschach.

An indication of the use of music as a projective test is the fact that all of the subjects in this study described thoughts related to the music and many mentioned the specific aspects of the music to which they were attending. Analysis of those data should provide an interesting

adjunctive study.

The contextual results indicate that further study is warranted in the area of explaining the ability of music to change emotions. That assumption already underlies the present use of background music. Manipulation of emotion in the therapy session can be used both to offer and impose control.

Those are only a few of the many implications of the outcome of this study. More of such organized research is certain to facilitate the progress of the developing field of music therapy.

APPENDIX

Table 14

Distributions of Emotional Responses

INTEREST-EXCITEMENT Responses

	not at all 0.	1.	2.	3.	very much 4.
Selection #1	11	22	22	18	7
Selection #2	14	14	25	16	11
Selection #3	8	21	26	21	4
Selection #4	8	11	32	20	9
Selection #5	14	16	22	22	6

ENJOYMENT-JOY Responses

	not at all 0.	1.	2.	3.	very much 4.
Selection #1	14	34	19	11	2
Selection #2	24	28	18	10	0
Selection #3	19	33	20	7	1
Selection #4	23	14	25	14	4
Selection #5	25	16	10	16	2

Table 14 (continued)

SURPRISE-STARTLE Responses

	not at all 0.	1.	2.	3.	very much 4.
Selection #1	58	12	8	2	0
Selection #2	45	21	9	4	1
Selection #3	47	24	7	2	0
Selection #4	42	21	5	5	1
Selection #5	50	18	5	5	2

DISTRESS-ANGUISH Responses

	not at all 0.	1.	2.	3.	very much 4.
Selection #1	58	12	5	4	1
Selection #2	53	11	4	10	2
Selection #3	42	21	12	3	2
Selection #4	49	16	8	6	1
Selection #5	41	23	7	4	5

Table 14 (continued)

DISGUST-CONTEMPT Responses

	not at all				very much
	0.	1.	2.	3.	4.
Selection #1	64	9	5	1	1
Selection #2	60	11	5	0	0
Selection #3	64	9	4	1	1
Selection #4	66	16	8	1	1
Selection #5	59	11	5	2	2

ANGER-RAGE Responses

	not at all				very much
	0.	1.	2.	3.	4.
Selection #1	75	2	3	0	0
Selection #2	71	5	3	1	0
Selection #3	70	6	3	1	0
Selection #4	73	6	0	0	0
Selection #5	70	7	2	1	0

Table 14 (continued)

SHAME-HUMILIATION Responses

	not at all				very much
	0.	1.	2.	3.	4.
Selection #1	74	3	2	0	1
Selection #2	69	5	4	2	0
Selection #3	68	7	3	2	0
Selection #4	71	6	3	0	0
Selection #5	67	7	3	2	1

FEAR-TERROR Responses

	not at all				very much
	0.	1.	2.	3.	4.
Selection #1	74	4	2	0	0
Selection #2	63	6	9	1	1
Selection #3	65	6	6	2	1
Selection #4	72	6	1	0	1
Selection #5	65	7	3	2	1

Table 15

SIGNIFICANT INDIVIDUAL CROSSTABULATION

Tempo3 by INTEREST-EXCITEMENT Responses to Selection #3

	not at all	0.	1.	2.	3.	very much	4.
fast		3	6	17	10		4
slow		5	15	9	11		0

chi square = 10.86630 with 4 degrees of freedom
significance = 0.0281

Tempo4 by INTEREST-EXCITEMENT Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
fast		3	2	16	14		5
slow		5	9	16	6		4

chi square = 8.26565 with 4 degrees of freedom
significance = 0.0823

Table 15 (continued)

Instrument4 by INTEREST-EXCITEMENT Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
alto		5	8	17	7		3
English horn		3	3	15	13		6

chi square = 5.69773 with 4 degrees of freedom
significance = 0.2229

Tempo3 and Instrument3 by INTEREST-EXCITEMENT Responses to Selection #3

	not at all	0.	1.	2.	3.	very much	4.
fast alto		0	4	7	7		2
fast E h		3	2	10	3		2
slow alto		4	9	3	4		0
slow E h		1	6	6	7		0

chi square = 20.36992 with 12 degrees of freedom
significance = 0.0604

Table 15 (continued)

Tempo2, Instrument2, Mode2 by INTEREST-EXCITEMENT Responses to Selection #2

	not at all				very much
	0.	1.	2.	3.	4.
	1	3	2	2	2
fast alto major	0	3	3	2	2
fast alto minor	3	0	2	1	4
fast E h major	2	1	6	1	0
fast E h minor	2	2	2	3	1
slow alto major	2	1	4	2	1
slow alto minor	4	3	2	1	0
slow E h major	0	1	4	4	1
slow E h minor					

chi square = 30.53912 with 28 degrees of freedom
significance = 0.3379

Table 15 (continued)

Tempo3, Instrument3, Mode3 by INTEREST-EXCITEMENT Responses to Selection #3

	not at all				very much
	0.	1.	2.	3.	4.
fast alto major	0	1	4	3	2
fast alto minor	0	3	3	4	0
fast E h major	0	2	7	1	0
fast E h minor	3	0	3	2	2
slow alto major	2	6	0	2	0
slow alto minor	2	3	3	2	0
slow E h major	1	4	2	3	0
slow E h minor	0	2	4	4	0

chi square = 42.55666 with 28 degrees of freedom
significance = 0.0384

Table 15 (continued)

Tempo5, Instrument5, Mode5 by INTEREST-EXCITEMENT Responses to Selection #5

	not at all	0.	1.	2.	3.	very much	4.
fast alto major	1		2	4	3		0
fast alto minor	2		1	4	2		1
fast E h major	2		2	3	2		1
fast E h minor	0		1	2	6		1
slow alto major	3		3	2	2		0
slow alto minor	0		3	3	2		2
slow E h major	2		2	2	3		1
slow E h minor	4		2	2	2		0

chi square = 21.28999 with 28 degrees of freedom
significance = 0.8131

Table 15 (continued)

Tempo1 by ENJOYMENT-JOY Responses to Selection #1

	not at all	0.	1.	2.	3.	very much 4.
fast	4	14	13	8	1	
slow	10	20	6	3	1	

chi square = 8.48192 with 4 degrees of freedom
significance = 0.0754

Tempo3 by ENJOYMENT-JOY Responses to Selection #3

	not at all	0.	1.	2.	3.	very much 4.
fast	4	14	16	5	1	
slow	15	19	4	2	0	

chi square = 16.61169 with 4 degrees of freedom
significance = 0.0023

Table 15 (continued)

Tempo4 by ENJOYMENT-JOY Responses to Selection #4

	not at all	0.	1.	2.	3.	very much 4.
fast	7	2	16	12	3	
slow	16	12	9	2	1	

chi square = 20.76744 with 4 degrees of freedom
significance = 0.0004

Tempo5 by ENJOYMENT-JOY Responses to Selection #5

	not at all	0.	1.	2.	3.	very much 4.
fast	6	15	6	11	2	
slow	19	12	4	5	0	

chi square = 11.74333 with 4 degrees of freedom
significance = 0.0194

Table 15 (continued)

Instrument4 by ENJOYMENT-JOY Responses to Selection #4

	not at all	0.	1.	2.	3.	very much 4.
alto	15	7	11	3	4	
English horn	8	7	14	11	0	

chi square = 11.06186 with 4 degrees of freedom
significance = 0.0259

Tempo3 and Instrument3 by ENJOYMENT-JOY Responses to Selection #3

	not at all				very much
	0.	1.	2.	3.	4.
	1	5	10	3	1
fast alto					
	3	9	6	2	0
fast E h					
	9	9	2	0	0
slow alto					
	6	10	2	2	0
slow E h					

chi square = 24.03893 with 12 degrees of freedom
significance = 0.0201

Table 15 (continued)

Tempo4 and Instrument4 by ENJOYMENT-JOY Responses to Selection #4

	not at all				very much
	0.	1.	2.	3.	4.
fast alto	6	0	9	2	3
fast E h	1	2	7	10	0
slow alto	9	7	2	1	1
slow E h	7	5	7	1	0

chi square = 40.89485 with 12 degrees of freedom
significance = 0.0001

Tempo5 and Instrument5 by ENJOYMENT-JOY Responses to Selection #5

	not at all				very much
	0.	1.	2.	3.	4.
fast alto	6	7	4	3	0
fast E h	0	8	2	8	2
slow alto	8	7	3	2	0
slow E h	11	5	1	3	0

chi square = 24.56363 with 12 degrees of freedom
significance = 0.0170

Table 15 (continued)

Tempo2 and Mode2 by ENJOYMENT-JOY Responses to Selection #2

	not at all	0.	1.	2.	3.
fast major	4	9	7	0	
fast minor	5	5	4	6	
slow major	7	5	4	4	
slow minor	8	9	3	0	

chi square = 16.75237 with 9 degrees of freedom
significance = 0.0527

Tempo4 and Mode4 by ENJOYMENT-JOY Responses to Selection #4

	not at all	0.	1.	2.	3.	very much 4.
fast major	3	1	9	5	2	
fast minor	4	1	7	7	1	
slow major	11	5	3	1	0	
slow minor	5	7	6	1	1	

chi square = 27.16765 with 12 degrees of freedom
significance = 0.0073

Table 15 (continued)

Tempo2, Instrument2, Mode2 by ENJOYMENT-JOY Responses to Selection #2

	not at all	0.	1.	2.	3.
fast alto major	2	5	3	0	
fast alto minor	2	3	1	4	
fast E h major	2	4	4	0	
fast E h minor	3	2	3	2	
slow alto major	2	1	4	3	
slow alto minor	6	3	1	0	
slow E h major	5	4	0	1	
slow E h minor	2	6	2	0	

chi square = 32.03168 with 21 degrees of freedom
 significance = 0.0581

Table 15 (continued)

Tempo4, Instrument4, Mode4 by ENJOYMENT-JOY Responses to Selection #4

	not at all				very much
	0.	1.	2.	3.	4.
fast alto major	3	0	5	0	2
fast alto minor	3	0	4	2	1
fast E h major	0	1	4	5	0
fast E h minor	1	1	3	5	0
slow alto major	5	2	2	1	0
slow alto minor	4	5	0	0	1
slow E h major	6	3	1	0	0
slow E h minor	1	2	6	1	0

chi square = 57.12189 with 28 degrees of freedom
 significance = 0.0009

Table 15 (continued)

Mode4 by SURPRISE-STARTLE Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
major	27	7	5	0	1		
minor	15	14	6	5	0		

chi square = 11.85281 with 4 degrees of freedom
significance = 0.0185

Tempo3 and Instrument3 by var069 SURPRISE-STARTLE Responses to Selection #3

	not at all	0.	1.	2.	3.
fast alto	7	10	3	0	
fast E h	15	3	1	1	
slow alto	14	5	1	0	
slow E h	11	6	2	1	

chi square = 11.20263 with 9 degrees of freedom
significance = 0.2621

Table 15 (continued)

Instrument4 and Mode4 by SURPRISE-STARTLE Responses to Selection #4

		not at all	0.	1.	2.	3.	very much	4.
alto	major		14	3	2	0		1
alto	minor		9	6	1	4		0
E h	major		13	4	3	0		0
E h	minor		6	8	5	1		0

chi square = 21.49606 with 12 degrees of freedom
significance = 0.0436

Tempo2 by DISTRESS-ANGUISH Responses to Selection #2

		not at all	0.	1.	2.	3.	very much	4.
fast			34	4	2	0		0
slow			19	7	2	10		2

chi square = 17.06346 with 4 degrees of freedom
significance = 0.0019

Table 15 (continued)

Tempo3 by DISTRESS-ANGUISH Responses to Selection #3

	not at all	0.	1.	2.	3.	very much	4.
fast		29	8	3	0		0
slow		13	13	9	3		2

chi square = 15.28571 with 4 degrees of freedom
significance = 0.0041

Tempo4 by DISTRESS-ANGUISH Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
fast		31	8	1	0		0
slow		18	8	7	6		1

chi square = 14.94898 with 4 degrees of freedom
significance = 0.0048

Table 15 (continued)

Tempo5 by DISTRESS-ANGUISH Responses to Selection #5

	not at all	0.	1.	2.	3.	very much	4.
fast		25	12	3	0		0
slow		16	11	4	4		5

chi square = 11.16194 with 4 degrees of freedom
significance = 0.0248

Tempo2 and Instrument2 by DISTRESS-ANGUISH Responses to Selection #2

	not at all	0.	1.	2.	3.	very much	4.
fast alto		17	1	2	0		0
fast E h		17	3	0	0		0
slow alto		11	3	2	4		0
slow E h		8	4	0	6		2

chi square = 27.11215 with 12 degrees of freedom
significance = 0.0074

Table 15 (continued)

Tempo3 and Instrument3 by DISTRESS-ANGUISH Responses to Selection #3

	not at all				very much
	0.	1.	2.	3.	4.
fast alto	16	2	2	0	0
fast E h	13	6	1	0	0
slow alto	4	8	4	2	2
slow E h	9	5	5	1	0

chi square = 24.28569 with 12 degrees of freedom
significance = 0.0186

Tempo4 and Instrument4 by DISTRESS-ANGUISH Responses to Selection #4

	not at all				very much
	0.	1.	2.	3.	4.
fast alto	15	4	1	0	0
fast E h	16	4	0	0	0
slow alto	6	5	6	2	1
slow E h	12	3	1	4	0

chi square = 26.79248 with 12 degrees of freedom
significance = 0.0083

Table 15 (continued)

Tempo2 and Mode2 by DISTRESS-ANGUISH Responses to Selection #2

	not at all				very much
	0.	1.	2.	3.	4.
fast major	19	0	1	0	0
fast minor	15	4	1	0	0
slow major	10	4	1	3	2
slow minor	9	3	1	7	0

chi square = 27.99585 with 12 degrees of freedom
significance = 0.0055

Tempo4 and Mode4 by DISTRESS-ANGUISH Responses to Selection #4

	not at all				very much
	0.	1.	2.	3.	4.
fast major	16	4	0	0	0
fast minor	15	4	1	0	0
slow major	7	6	2	5	0
slow minor	11	2	5	1	1

chi square = 27.47617 with 12 degrees of freedom
significance = 0.0066

Table 15 (continued)

Tempo2, Instrument2, Mode2 by DISTRESS-ANGUISH Responses to Selection #2

	not at all	0.	1.	2.	3.	very much 4.
fast alto major	9	0	1	0	0	
fast alto minor	8	1	1	0	0	
fast E h major	10	0	0	0	0	
fast E h minor	7	3	0	0	0	
slow alto major	7	2	1	0	0	
slow alto minor	4	1	1	4	0	
slow E h major	3	2	0	3	2	
slow E h minor	5	2	0	3	0	

chi square = 47.24797 with 28 degrees of freedom
significance = 0.0129

Table 15 (continued)

Tempo₄, Instrument₄, Mode₄ by DISTRESS-ANGUISH Responses to Selection
#4

	not at all				very much	
	0.	1.	2.	3.	4.	
fast alto major	8	2	0	0	0	
fast alto minor	7	2	1	0	0	
fast E h major	8	2	0	0	0	
fast E h minor	8	2	0	0	0	
slow alto major	3	3	2	2	0	
slow alto minor	3	2	4	0	1	
slow E h major	4	3	0	3	0	
slow E h minor	8	0	1	1	0	

chi square = 43.01358 with 28 degrees of freedom
significance = 0.0347

Table 15 (continued)

Model by ANGER-RAGE Responses to Selection #1
not at
all

	0.	1.	2.
major	40	0	0
minor	35	2	3

chi square = 5.33333 with 2 degrees of freedom
significance = 0.0695

Instrument3 by SHAME-HUMILIATION Responses to Selection #3

	not at all	0.	1.	2.	3.
alto		30	5	3	2
English horn		38	2	0	0

chi square = 7.22689 with 3 degrees of freedom
significance = 0.0650

Table 15 (continued)

Tempo5 and Mode5 by SHAME-HUMILIATION Responses to Selection #5

	not at all				very much
	0.	1.	2.	3.	4.
fast major	17	2	1	0	0
fast minor	19	1	0	0	0
slow major	18	1	1	0	0
slow minor	13	3	1	2	1

chi square = 12.81023 with 12 degrees of freedom
significance = 0.3830

Instrument3 and Mode3 by SHAME-HUMILIATION Responses to Selection #3

	not at all			
	0.	1.	2.	3.
alto major	16	1	3	0
alto minor	14	4	0	2
E h major	19	1	0	0
E h minor	19	1	0	0

chi square = 19.91594 with 9 degrees of freedom
significance = 0.0184

Table 15 (continued)

Tempo2, Instrument2, Mode2 by SHAME-HUMILIATION Responses to Selection #2

	not at all	0.	1.	2.	3.
		9	1	0	0
fast alto major		10	0	0	0
fast alto minor		10	0	0	0
fast E h major		9	1	0	0
fast E h minor		8	2	0	0
slow alto major		9	0	1	0
slow alto minor		6	1	3	0
slow E h major		8	0	0	2
slow E h minor					

chi square = 37.57680 with 21 degrees of freedom
significance = 0.0144

Table 15 (continued)

Tempo3, Instrument3, Mode3 by SHAME-HUMILIATION Responses to Selection #3

	not at all	0.	1.	2.	3.
fast alto major	10	0	0	0	0
fast alto minor	8	1	0	1	1
fast E h major	9	1	0	0	0
fast E h minor	10	0	0	0	0
slow alto major	6	1	3	0	0
slow alto minor	6	3	0	1	1
slow E h major	10	0	0	0	0
slow E h minor	9	1	0	0	0

chi square = 37.21004 with 21 degrees of freedom
significance = 0.0159

Table 15 (continued)

Tempo2 by FEAR-TERROR Responses to Selection #2

	not at all	0.	1.	2.	3.	very much	4.
fast		35	3	2	0		0
slow		28	3	7	1		1

chi square = 5.55555 with 4 degrees of freedom
significance = 0.2349

Tempo5 by FEAR-TERROR Responses to Selection #5

	not at all	0.	1.	2.	3.	very much	4.
fast		36	4	0	0		0
slow		29	3	3	2		3

chi square = 8.89670 with 4 degrees of freedom
significance = 0.0637

Table 15 (continued)

Instrument3 by FEAR-TERROR Responses to Selection #3

	not at all				very much	
	0.	1.	2.	3.		4.
alto	29	6	3	2		0
English horn	36	0	3	0		1

chi square = 9.75385 with 4 degrees of freedom
significance = 0.0448

Tempo2 and Instrument2 by FEAR-TERROR Responses to Selection #2

	not at all				very much	
	0.	1.	2.	3.		4.
fast alto	16	3	1	0		0
fast E h	19	0	1	0		0
slow alto	14	1	3	1		1
slow E h	14	2	4	0		0

chi square = 13.39682 with 12 degrees of freedom
significance = 0.3409

Table 15 (continued)

Tempo5 and Instrument5 by FEAR-TERROR Responses to Selection #5

	not at all				very much	
	0.	1.	2.	3.	4.	
	20	0	0	0	0	
fast alto	16	4	0	0	0	
fast E h	13	1	1	2	3	
slow alto	16	2	2	0	0	
slow E h						

chi square = 25.18971 with 12 degrees of freedom
significance = 0.0139

Tempo2 and Mode2 by FEAR-TERROR Responses to Selection #2

	not at all				very much	
	0.	1.	2.	3.	4.	
	16	3	1	0	0	
fast major	19	0	1	0	0	
fast minor	17	0	3	0	0	
slow major	11	3	4	1	1	
slow minor						

chi square = 17.20634 with 12 degrees of freedom
significance = 0.14

Table 15 (continued)

Tempo2, Instrument2, Mode2 by FEAR-TERROR Responses to Selection #2

	not at all				very much
	0.	1.	2.	3.	4.
fast alto major	6	3	1	0	0
fast alto minor	10	0	0	0	0
fast E h major	10	0	0	0	0
fast E h minor	9	0	1	0	0
slow alto major	10	0	0	0	0
slow alto minor	4	1	3	1	1
slow E h major	7	0	3	0	0
slow E h minor	7	2	1	0	0

chi square = 40.76186 with 28 degrees of freedom
 significance = 0.0565

Table 15 (continued)

Tempo5, Instrument5, Mode5 by FEAR-TERROR Responses to Selection #5

	not at all				very much	
	0.	1.	2.	3.	4.	
fast alto major	10	0	0	0	0	
fast alto minor	10	0	0	0	0	
fast E h major	8	2	0	0	0	
fast E h minor	8	2	0	0	0	
slow alto major	8	0	0	0	2	
slow alto minor	5	1	1	2	1	
slow E h major	9	1	0	0	0	
slow E h minor	7	1	2	0	0	

chi square = 42.561 with 28 degrees of freedom
 significance = 0.0384

Table 16

SIGNIFICANT CONTEXTUAL CROSSTABULATIONS

Instrument Change from Selection #3 to Selection #4 by
INTEREST-EXCITEMENT Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
alto to E h	5	4	11	7	3		
no change	3	5	8	2	2		
E h to alto	0	2	13	11	4		

chi square 11.59124 with 8 degrees of freedom
significance = 0.1704

Tempo Change from Selection #2 to Selection #3 by ENJOYMENT-JOY
Responses to Selection #3

	not at all	0.	1.	2.	3.	very much	4.
slow to fast	1	5	10	3	1		
no change	10	19	8	3	0		
fast to slow	8	9	2	1	0		

chi square 18.42349 with 8 degrees of freedom
significance = 0.0183

Table 16 (continued)

Tempo Change from Selection #4 to Selection #5 by ENJOYMENT-JOY Responses to Selection #5

	not at all				very much	
	0.	1.	2.	3.	4.	
	6	15	6	11	2	
slow to fast						
	19	12	4	5	0	
fast to slow						

chi square 11.74333 with 4 degrees of freedom
significance = 0.0194

Instrument Change from Selection #3 to Selection #4 by ENJOYMENT-JOY Responses to Selection #4

	not at all				very much	
	0.	1.	2.	3.	4.	
	10	5	9	2	4	
alto to E h						
	11	5	3	1	0	
no change						
	2	4	13	11	0	
E h to alto						

chi square 30.92235 with 8 degrees of freedom
significance = 0.0001

Table 16 (continued)

Instrument Change from Selection #3 to Selection #4 by
SURPRISE-STARTLE Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
alto to E h	15	9	2	4	0		
no change	17	0	2	0	1		
E h to alto	10	12	7	1	0		

chi square 24.09982 with 8 degrees of freedom
significance = 0.0022

Mode Change from Selection #3 to Selection #4 by SURPRISE-STARTLE
Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
minor to major	27	7	5	0	1		
major to minor	15	14	6	5	0		

chi square 11.85281 with 4 degrees of freedom
significance = 0.0185

Table 16 (continued)

Tempo Change from Selection #1 to Selection #2 by DISTRESS-ANGUISH Responses to Selection #2

	not at all	0.	1.	2.	3.	very much 4.
slow to fast	25	4	1	0	0	
no change	16	2	2	0	0	
fast to slow	12	5	1	10	2	

chi square 26.73984 with 8 degrees of freedom
significance = 0.0008

Tempo Change from Selection #2 to Selection #3 by DISTRESS-ANGUISH Responses to Selection #3

	not at all	0.	1.	2.	3.	very much 4.
slow to fast	16	2	2	0	0	
no change	19	11	7	2	1	
fast to slow	7	8	3	1	1	

chi square 10.21428 with 8 degrees of freedom
significance = 0.2503

Table 16 (continued)

Tempo Change from Selection #4 to Selection #5 by DISTRESS-ANGUISH Responses to Selection #5

	not at all	0.	1.	2.	3.	very much	4.
slow to fast	25	12	3	0	0		
fast to slow	16	11	4	4	5		

chi square 11.16194 with 4 degrees of freedom
significance = 0.0248

Instrument Change from Selection #3 to Selection #4 by DISTRESS-ANGUISH Responses to Selection #4

	not at all	0.	1.	2.	3.	very much	4.
alto to E h	18	6	5	0	1		
no change	7	6	2	5	0		
E h to alto	24	4	1	1	0		

chi square 21.09067 with 8 degrees of freedom
significance = 0.0069

Table 16 (continued)

Tempo Change from Selection #1 to Selection #2 by SHAME-HUMILIATION Responses to Selection #2

	not at all	0.	1.	2.	3.
		29	1	0	0
slow to fast		17	3	0	0
no change		23	1	4	2
fast to slow					

chi square 13.96715 with 6 degrees of freedom
significance = 0.0300

Instrument Change from Selection #2 to Selection #3 by SHAME-HUMILIATION Responses to Selection #3

	not at all	0.	1.	2.	3.
		14	2	3	1
alto to E h		35	4	0	1
no change		19	1	0	0
E h to alto					

chi square 11.22269 with 6 degrees of freedom
significance = 0.0817

Table 16 (continued)

Tempo Change from Selection #1 to Selection #2 by FEAR-TERROR
Responses to Selection #2

	not at all				very much
	0.	1.	2.	3.	4.
	29	0	1	0	0
slow to fast	16	3	1	0	0
no change	18	3	7	1	1
fast to slow					

chi square 16.15872 with 8 degrees of freedom
significance = 0.0402

Table 17

SIGNIFICANT SUMMED CROSSTABULATIONS

Tempo by ENJOYMENT-JOY Responses

	not at all 0.	1.	2.	3.	very much 4.
fast	30	59	62	42	7
slow	75	77	30	16	2

Tempo by DISTRESS-ANGUISH Responses

	not at all 0.	1.	2.	3.	very much 4.
fast	152	35	12	1	0
slow	91	48	24	26	11

Tempo, Instrument, Mode by DISTRESS-ANGUISH Responses

	not at all				very much
	0.	1.	2.	3.	4.
fast alto major	38	8	3	1	0
fast alto minor	36	10	4	0	0
fast e h major	42	7	1	0	0
fast e h minor	36	10	4	0	0
slow alto major	24	14	7	4	1
slow alto minor	18	12	7	8	5
slow e h major	24	11	4	7	4
slow e h minor	25	11	6	7	1

Tempo by FEAR-TERROR Responses

	not at all				very much
	0.	1.	2.	3.	4.
fast	176	16	6	0	2
slow	163	13	15	5	4

Mode by FEAR-TERROR Responses

	not at all				very much
	0.	1.	2.	3.	4.
major	176	12	9	0	3
minor	163	17	12	5	3

Table 18

PILOT STUDY DEMOGRAPHIC QUESTIONNAIRE

1. Name
2. Date of Birth
3. Sex
4. Race
5. Education Background: What is the highest grade of formal education you have completed?
6. Occupation: What is your present or most recent occupation?
If you are a student, what is your major?
7. Musical Background:
 - a. What kind(s) of music do you like?
 - b. What kind(s) of music do you dislike?
 - c. Where do you hear music? Check all that apply:
☐ concerts ☐ radio ☐ recordings
☐ television ☐ other, please specify
 - d. How often do you listen to music?
☐ daily ☐ 2 or 3 times a week
☐ once a week ☐ 2 or 3 times a month
☐ monthly ☐ never ☐ other, please specify
 - e. Do you play music? ☐ Yes ☐ No
 If yes, what instrument(s) do you play?

 Do (have) you play(ed) in any groups? ☐ Yes ☐ No
 If yes, how many years?

 Do (have) you take(n) private lessons? ☐ Yes ☐ No
 If yes, for what instrument(s)?

 If yes, how many years?
 - f. Have you taken any music courses? ☐ Yes ☐ No
 If yes, please describe:

 How many years for each?
 - g. Do you write music? ☐ Yes ☐ No
 If yes, what kind?
8. Please describe your present mood.
☐ interest ☐ fear ☐ sad ☐ joy
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
☐ other, please specify

Table 19

PILOT STUDY RESPONSE QUESTIONNAIRE

Name:

Please fill in the following information after you hear each piece of music.

1. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ interest ☐ fear ☐ sad ☐ joy
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
 Please describe any thoughts you had while listening to the music.
2. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
☐ interest ☐ fear ☐ sad ☐ joy
 Please describe any thoughts you had while listening to the music.
3. Did you have a reaction to the piece of music that you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ interest ☐ fear ☐ sad ☐ joy
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
 Please describe any thoughts you had while listening to the music.
4. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
☐ interest ☐ fear ☐ sad ☐ joy
 Please describe any thoughts you had while listening to the music.
5. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ interest ☐ fear ☐ sad ☐ joy
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
 Please describe any thoughts you had while listening to the music.
6. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
☐ interest ☐ fear ☐ sad ☐ joy
 Please describe any thoughts you had while listening to the music.
7. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ interest ☐ fear ☐ sad ☐ joy
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
 Please describe any thoughts you had while listening to the music.
8. Did you have a reaction to the piece of music you just heard?
☐ Yes ☐ No
 If yes, which of the following? Check all that apply.
☐ anger ☐ surprise ☐ disgust ☐ embarrassment
☐ interest ☐ fear ☐ sad ☐ joy
 Please describe any thoughts you had while listening to the music.

Table 20

CORRELATIONS AMONG RESPONSES

Emotions	Selections #'s				
	1	2	3	4	5
INTEREST-EXCITEMENT to ENJOYMENT-JOY	.4693	.4694	.3669	.4993	.5383
ENJOYMENT-JOY to SURPRISE-STARTLE	.1107	.0663	.0829	.2718	.3027
SURPRISE-STARTLE to DISTRESS-ANGUISH	-.0055	.0339	.1341	-.0385	.2049
DISTRESS-ANGUISH to DISGUST-CONTEMPT	.2258	.2527	.2204	.2943	.4953
DISGUST-CONTEMPT to ANGER-RAGE	.5553	.6031	.7772	.4808	.6318
ANGER-RAGE to SHAME-HUMILIATION	.5088	.4769	.5353	.5214	.3029
SHAME-HUMILIATION to FEAR-TERROR	.1595	.4961	.6015	.5460	.7333

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