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Degrees of Familiar & Affective Music & Their Effects on State Anxiety

Stephen Rohner
Western Kentucky University

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Rohner,

Stephen J.

1978
DEGREES OF FAMILIAR AND AFFECTIVE MUSIC
AND THEIR EFFECTS ON STATE ANXIETY

A Thesis
Presented to
the Faculty of the Department of Psychology
Western Kentucky University
Bowling Green, Kentucky

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

by
Stephen J. Rohner
April 1978
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DEGREES OF FAMILIAR AND AFFECTIVE MUSIC
AND THEIR EFFECTS ON STATE ANXIETY

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Dean of the Graduate College
Edward Gray
ACKNOWLEDGMENTS

Although my name is the only one gracing the title page, there are many others who had invaluable impact upon this manuscript. First and foremost, my thanks to Dr. Rich Miller, the chairperson of this thesis. It was he who helped my seedling thesis topic blossom into a full-blown research proposal, and who supported the entire project from start to finish. He played a major part in the design and statistics of this study. I am also indebted to my other committee members, Dr. Dave Shiek and Dr. Clint Layne. Dave helped out with the statistics and Clint played devil's advocate, challenging my rationale and keeping me on my toes. He also contributed valuable insights to the Discussion section.

I give special thanks to Carolyn Marks for going above and beyond the call of duty to help simplify my data collection. In addition, I appreciate the courtesy of the Department of Music Therapy and Music Education at the University of Kansas for the use of their departmental library-a comprehensive source of manuscripts and references.

Finally, my thanks go to countless friends, family and faculty members for their moral support.
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Table 2. Summary Table Describing the Statistical Significance of Affect, Familiarity, and Their Interaction Versus the Control Group. .................................................... 19
The success of the therapeutic use of music in various institutions and other research settings has pointed to the possibilities of using music to reduce anxiety in high anxiety subjects representing the non-institutionalized segment of the population. Ten sections of introductory psychology students (N=321) were randomly assigned to one of four treatment conditions or the control group. Forms A and B of the Eight State Questionnaire (8SQ) were administered in a counterbalanced fashion prior to and following the music (or no music) treatment. Results proved to be statistically non-significant. However, there appeared to be a trend for sedative music to have some anxiety reducing effect upon high state anxiety subjects. Implications of the study and a need for research investigating the effects of music on simultaneous psychological and physiological measures of anxiety were discussed.
INTRODUCTION AND REVIEW OF THE LITERATURE

Music has long been thought of as a universal language, possessing not only the capacity to communicate emotions, but to have some healing capacity as well. An example of this healing capacity is the common assumption that music can relax us when we are tense and jittery and revitalize us when we are lethargic and depressed.

Successful therapeutic uses of music, however, have been employed primarily with the disturbed, handicapped and hospitalized (Alvin, 1975; Gaston, 1968), but rarely with the general population.

Music research with subjects from the general population can generally be categorized as either investigating the behavioral effects of music or determining what variables affect a person's reaction to music. Under the category of behavioral effects, there seem to be three general areas of investigation: physiological response, psychological response, and performance on some task.

**Physiological Response**

Relaxation, as measured by physiological response, can be characterized by such areas as increases in skin resistance, as measured by the Galvanic Skin Response (GSR), by decreases in heart rate, pulse, and blood pressure, and by increased stomach contractions.
Peretti and Swenson (1974) introduced music into an anxiety situation and found that GSR decreased, a trend toward relaxation. The introduction of two types of music, "exciting" and "calming," however, led to a differential response that was similar in both children and college students. In response to the exciting music, GSR values indicated a decrease in electrical skin resistance and an increase in emotional excitement. In response to the calming music, GSR values indicated an increase in electrical skin resistance and a decrease in emotional excitement (Zimny & Weidinfeller, 1962). Shrift (Note 1) found similar GSR results for these same two types of music.

Hyde (1924) found that the cardio-vascular response to music depended upon both the type of music played and the subject's preference for the music. Tachycardia, or increase in heart rate, seems to result from music with driving, insistent rhythms, and progressive dynamic intensity, while bradycardia (decrease in heart rate) is related to music possessing changes in rhythm, texture and dynamics (Landreth & Landreth, 1974). Pulse rate and blood pressure (Webster, 1973) also decrease when background music is played, as opposed to no music. Ellis and Brighouse (1952), on the other hand, could find no heart rate differences when either sedative or "vivid and dynamic" music was played, but did find that respiration rate increased in response to the more stimulating type of music. Foster and Gamble (1906) and Webster (1973) showed respiration to increase as a result of listening to music. However, they made no distinction as to whether the
music was sedative and/or stimulating.

Sedative music tends to increase stomach contractions (Wilson, Note 2) and change muscle tonus (Sears, Note 3), as well as constrict the pupil (Slaughter, Note 4). Music, however, does not seem to affect pain threshold (Lancaster, Note 5).

**Psychological Response**

Various therapists (Lowe, 1973; Payn, 1974) have found the psychological effects of music helpful in treatment of clients. Others have claimed that sedative music facilitates client-therapist relationships (Mezzano & Prueter, 1974; Prueter & Mezzano, 1973; Wooden, 1972). Bonny (1972) elaborated the uses of music in therapy:

Music complements the therapeutic objective in five interrelated ways: 1) by helping the patient relinquish usual controls and enter more fully into his inner world of experience; 2) by facilitating the release of intense emotionality; 3) by contributing toward a peak experience; 4) by providing continuity in an experience of timelessness; 5) by directing and structuring the experience. (p. 65-66)

Other research on the psychological and emotional effects of music are varied and somewhat contradictory. Middleton, Fay, Kerr, and Amft (1944) found that men and women felt more rested and pleasant when listening to music than no music, especially if popular-vocal (as opposed to waltz-instrumental) music was played. They added that people's belief in the effects of music may have affected
the results. Similarly, Fisher and Greenberg (1972) found that calm
music produced less anxiety than no music, which, in turn, produced
less anxiety than exciting music.

Smith and Morris (1976) showed stimulating music to increase
worry and emotionality. Sedative music, however, had no effect on
anxiety when compared to the control group. Taylor (1973) found that
GSR and subjective judgments of the emotional effects of different mu-
sical pieces agreed on only a chance (50%) basis. Taylor found that
listeners do not always emit the same response to stimulating or seda-
tive music. He concluded that people may not always be aware of their
physical responses to stimulating or sedative music.

Bilder, Olson and Breen (1974) looked at the effect of "happy"
and "sad" music on both trait and state anxiety. Music, they discov-
ered, had no effect on trait anxiety. However, "sad" music tended to
lessen the more transitory state anxiety than did "happy" music.

Healey's (1973) review of the literature was, perhaps, the most
optimistic about the potential uses for music. He concluded that music
has been shown to stimulate or depress, aid in therapy, change be-
havior and mood, and facilitate learning. Furthermore, music used
over an extended period could be employed to regulate a patient's be-
havior.

Task Performance

The effects of music on task performance also seems varied.

Stanton (1975) stated that high test anxiety students seemed to perform
better under music conditions than in silence. Colbert (1961), in con-
trast, said that music is not a major factor in reducing anxiety, and
only improves some students' performances on tasks of recalling let-
ter configuration and nonsense syllables.

Other researchers have thought of music as being a possible
distractor on performance. Fogelson (1973) found popular music to be
distracting on reading-test performance, especially for students with
less ability. Barnes (1976) showed relaxation training to have a stabil-
izing effect on the recall of didactic material, but that music seemed to
produce the opposite effect. Mowsesian and Heyer (1973) found that
rock, folk, symphonic or operatic music had no distracting effects on
test-taking performance of tenth graders, when compared to a control
group hearing no music. In two other studies (Cass, 1974; Smith &
Morris, 1976), performance factors were not affected by music.

On the other hand, rock music seems to facilitate visual vigil-
ance performance better than easy-listening music (Corhan & Gounard,
1976). Furthermore, random intervals of music are more facilitative
than either fixed or continuous intervals. Simpson (1976) argues that
background music contributes to hyperactivity in brain-injured chil-
dren, but facilitates learning by possibly creating arousal while
blocking out other background distractions. Similarly, Smith and
Morris (1976) feel stimulating music may be helpful in increasing or
maintaining alertness, participation, attentiveness and activation in
college students.
In addition, music positively affects creative performance (Kaltsounis, 1973) and relevant learning (Stainbach, Stainbach & Hallahan, 1973). Exciting music seems to affect scores more on projective tests, such as the Draw-a-Person and the Thematic Apperception Test, than on structured tests, like the Bass Famous Sayings (Greenberg & Fisher, 1971). The authors conclude that these results may be due to music affecting immediate mood rather than enduring personality characteristics. A follow-up study (Fisher & Greenberg, 1972) tended to contradict the previous study, as, this time, structured tests were more affected by music than previously thought.

Subject Characteristics

The variables affecting a person's reaction to music can be broadly classified into either individual characteristics or specific musical elements. The Iso principle takes both of these types of variables into account:

...when the structural dynamics of the music is similar to the structural dynamics of the emotions, sympathetic unison of the two results and any changes in the former will produce corresponding changes in the latter. (Taylor & Paperti, 1958, p. 253)

In other words, if the mood of the person does not match the mood of the music, the music will be rejected, and the person's mood will not change (Shatin, 1970).
Sex (Billings, 1974; Hart & Cogan, 1973; Middleton, et al, 1944; Peretti & Swenson, 1974; Wilson, Note 2; Sears, Note 3), familiarity or listening experience (Billings, 1974; Hart & Cogan, 1973; Henkin, 1957; Middleton, et al, 1944; Sopchak, 1955; Taylor, 1973), intelligence (Fogelson, 1973; Rubin-Rabson, 1940; Zenatti, 1975) and musical training (Henkin, 1957; Peretti & Swenson, 1974; Rubin-Rabson, 1940; Sopchak, 1955; Wilson, Note 2; Sears, Note 3) are only a few of the subject variables affecting response to music. Furthermore, Billings (1974) and Hart and Cogan (1973) have demonstrated an interaction between sex and familiarity. Hart and Cogan found that men who were less familiar with a particular musical piece rated that piece as more positive than men who were highly familiar with the piece. Conversely, women who were less familiar with the piece gave fewer positive ratings than women who were highly familiar with the piece.

Sopchak (1955) stated that the subject's mood is also a factor and added, "Emotional responses to music are the combined result of learning and/or projection, in addition to the music itself" (p. 18). Hyde (1924) also saw the importance of the subject's mood in addition to a consideration of preference and fatigue.

A discussion of Harwood's (1974) research seemed to take a more theoretical approach to these variables:

...theories of the psychology of music and musical behavior will need to include explanations at the level of cognitive and perceptual processes, while remaining
sensitive to the cultural context which can determine listener response. (p. 5710)

Music Variables

The elements of music should also be taken into account as relevant variables. Henkin (1957) argued that GSR's are affected by rhythm and melody, but not musical style, dynamics, or orchestration. Richman (1976) demonstrated that music played at a regular tempo facilitated a manual task performance among severely retarded individuals better than either a slow or fast tempo, or no music. Geringer and Breen (1975) showed that judgment of a composer's musical expression is related to the degree of dynamic range in the music. These three studies do not necessarily conflict, since judgment of expression may not be related to GSR. In another study (Pendleton & Tasto, 1976), the rhythmic ticking of the metronome was used as a relaxation technique.

Recent studies have shown that auditory discrepancy (Kinney & Kagan, 1976) affects attention span in infants. That is, infants tend to listen more attentively to new and different sounds rather than similar or repetitive sounds. An interesting parallel exists with school age children and adult subjects, as intensity, novelty, complexity (Steck & Machotka, 1975), number of different pitches and melodic redundancy (McMullen, 1974), and repetition (Bartlett, 1973; Hyde, 1924; Verveer, Barry & Bousfield, 1933) tend to affect preference.

The complexity of musical elements (Gaston, 1951; Hevner,
1934) may be more practical to study than the individual parts, because, as Sopchak (1955) cautioned, isolating certain specific components destroys the effects to be studied, since auditors respond differently to the part than to the whole.

Finally, the generalized type of music, such as classical, rock, and so forth, has produced varying behavioral effects, depending on both the situation and what is measured (Corhan & Gounard, 1976; Geringer & Breen, 1975; Hyde, 1924; Middleton, et al, 1944; Mowsesian & Heyer, 1973; Rubin-Rabson, 1940; Taylor, 1973).

The Nature of Anxiety

From nearly all the research cited above, music seems to have immediate effects upon behavior. Logically, therefore, research concerning the construct of anxiety should primarily involve the nature of immediate or short-term anxiety fluctuation as opposed to gradual, long-term changes.

General anxiety can be thought of as a combination of state and trait anxiety (Spielberger, 1972, chap. 2), where state anxiety represents a particular emotional mood that can be aroused or depressed, depending upon the situation, while trait anxiety is defined as a relatively enduring personality trait that is minimally affected by a person's present mood. State anxiety, then, will likely be more sensitive to immediate and short-term measurement than trait anxiety (Bilder, et al, 1974; Stoudenmire, 1975).

Can music, therefore, promote a psychological sense of
well-being? If so, what are some of the variables involved in such a state? A testable research topic that might help answer this question could involve two different types of music, sedative and stimulating, and the effects they have on people with different degrees of anxiety. Before this question can be answered, the effects of sex, preference, and familiarity need to be investigated as they pertain to the listener.

It was hypothesized that music would have some soothing or reducing effects on high anxiety subjects, and that music established as familiar would reduce state anxiety more than unfamiliar music. Furthermore, music established as sedative would reduce state anxiety in high state anxiety subjects more than stimulating music. In addition, the type of music (stimulating or sedative) would account for more variance than either sex or degree of familiarity. In these subjects, it was expected that the general condition of music would have a greater effect of reducing anxiety than a no music condition.
METHOD

Validation of Appropriate Musical Selections

Since few studies had experimentally defined emotionality in music, it was decided to pre-test various types of classical music to determine how stimulating or sedative such music was perceived to be. Data were also gathered on the sex of each subject as well as subject preference and degree of familiarity for each musical selection.

The subjects were 57 undergraduate students taken from introductory psychology classes at a southeastern university. Twenty music pieces had been previously selected according to two dimensions: a) how familiar the piece was likely to be; b) whether the piece might be perceived as stimulating or sedative. Consequently, there were four musical conditions (1) familiar-stimulating; 2) familiar-sedative; 3) unfamiliar-stimulating; 4) unfamiliar-sedative) with five pieces per group. The classification of these 20 pieces had been established in previous research (Bonny & Savary, 1973; Hevner, 1937). The rationale behind the preliminary study was to obtain music for the actual study that was experimentally agreed upon across these two dimensions.

The subjects listened to twenty 1.0 to 1.5 minute musical segments (see Appendix A) with pauses between selections, during which they were to rate each piece according to three dimensions:
a) familiarity; b) affect (how stimulating or sedative they thought it was); and c) preference. The three dimensions were rated on a five-position Likert scale for each piece. In addition, for every piece, each subject was asked to choose at least three but not more than eight adjectives that could describe the music from a list of 66 adjectives compiled from Hevner's (1937) mood wheel. The adjectives were rearranged alphabetically both to determine whether Hevner's groupings were stable and to ease the subjects' search for descriptive adjectives. The use of the mood wheel also helped to determine whether 1.0 to 1.5 minute segments of music would be described in the same manner as entire pieces or movements (Bonny & Savary, 1973). It was found that Hevner's mood wheel was stable, and also that abbreviated segments were described in the same manner as the entire piece or movement.

Overall, the pieces that had been pre-categorized according to familiarity and affect were rated in the same manner by the subjects. However, there appeared to be wide variation in preference, both across pieces and across sex. Therefore, given these results, the method of selecting one piece to represent each of the four musical conditions was based on how well both sexes agreed on their preference for any one piece. Granted, some pieces were rated as more preferable by both sexes than others. At this point, however, it was desirable to control for the possible interaction of preference and sex in the main study and yet still have music representative of the four
pre-categorized conditions. Stated another way, any differences between the sexes in the main study could not be attributed to preference because of the method of musical selection in the preliminary study.

**Subjects**

Ten sections (N=321) of introductory psychology students at a southeastern university were randomly assigned to either one of the four musical treatment groups or the control (no music) group. Thus, two sections of between 30-45 students per section were randomly assigned to each of the five conditions, resulting in approximately 60 students per condition. Since the purpose of the study was to investigate the effects of music on high anxiety subjects, only those subjects who were pre-tested as highly anxious were retained for the analysis (N=156). High anxiety subjects were defined as those falling above the mean of the normative group on the first administration of the Eight State Questionnaire (8SQ).

**Apparatus**

**Music Treatments.** From the preliminary study, the following four pieces were chosen to represent four musical conditions:

1) familiar-stimulating: Beethoven's Symphony No. 9 in D Minor, Op. 125, "Fourth Movement" ("Ode to Joy");

2) familiar-sedative: "Largo" from Dvorak's New World Symphony (Symphony No. 9 in E Minor, Op. 95, "Second Movement");

3) unfamiliar-stimulating: Beethoven's Symphony No 7 in A Major, Op. 92, "First Movement";
4) unfamiliar-sedative: Sibelius' "The Swan of Tuonela."

This music was presented in 8.5 to 10.5 minute segments via a cassette tape recorder to subjects in the main study.

**Anxiety Measure.** Because the 8SQ appears to be the only measure of state anxiety that has a parallel form, this instrument was used to obtain pre and post-treatment measures of state anxiety. One important assumption is made, however, in the use of this instrument. It is assumed that equivalence reliability ("same" occasion administration) is higher than reliability between forms administered on different occasions. This assumption implies that the 8SQ would be sensitive to the effects of an intervening variable. The actual equivalence coefficient, as reported by Cattell (1976), is .83 for the Anxiety subtest. Immediate retest reliabilities using the same form range from .90 to .94.

**Procedure**

All subjects were told that they would be participating in a two-part survey on behaviors of college students that required a ten-minute break, followed by completion of the survey. At this point, the experimenter announced that, to pass the time, he would play some music. In the four musical conditions, the experimenter then switched on the tape recorder previously set up with the appropriate music, and proceeded to grade the initial 8SQ forms during the remaining portion of the musical segment. In the control condition, the experimenter announced the ten-minute break, and graded 8SQ forms for approximately
ten minutes. Subject behavior during the music (or no music) condition varied both between and within groups. That is, behavior ranged from quiet attentiveness to talking and laughing. For the second part, the subjects in all conditions were group administered the other parallel form of the 8SQ that they did not receive during the initial administration.

Those students' scores meeting the criterion of high anxiety on the pretest were then compared with their scores on the posttest, and analyzed by an F test of significance on difference scores in an incomplete factorial design. This design pits two variables with the two corresponding levels of each variable against a single control group. Theoretically and practically, the normally expected 3 x 3 factorial is inapplicable in this case, since certain cells in this analysis of variance are undefined (e.g. a sedative, no music condition or a familiar, no music condition is impossible). For a further, detailed rationale concerning this design, the reader is referred to Winer (1971).
RESULTS

To facilitate data analysis and ease interpretation, the mean and standard deviation of Forms A and B of the 8SQ's Anxiety subtest were used to transform all raw scores into standard (z) scores. By transforming the data to standard score format, results on both forms could then be compared and analyzed on the same scale.

Because the four representative pieces were chosen on the basis of agreement across sex based on ratings of preference (like/dislike), affect (sedative/stimulating), and familiarity in the initial study, it was felt that the variable of sex was adequately controlled. Hence, this belief dictated the decision to collapse the data with respect to sex. Another advantage of collapsing sex was to insure N size for each of the conditions studied.

Only subjects whose z scores were greater than zero on the pretest were retained for comparative analysis with posttest scores (N=156), as this was the operational definition of highly anxious. The generated data are summarized in Table 1. Since difference scores

Insert Table 1 about here

16


**TABLE 1**

Mean Difference Scores, Cell Size, Sum of Difference Scores, and Standard Deviations for Music Treatment and Control Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Familiar</th>
<th>Unfamiliar</th>
<th>Control (No Music)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Affect</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\bar{X})</td>
<td>0.37</td>
<td>0.36</td>
<td>0</td>
<td>0.36</td>
</tr>
<tr>
<td>N</td>
<td>28</td>
<td>37</td>
<td>0</td>
<td>65</td>
</tr>
<tr>
<td>(\Sigma X)</td>
<td>10.35</td>
<td>13.17</td>
<td>0</td>
<td>23.52</td>
</tr>
<tr>
<td>S.D.</td>
<td>0.95</td>
<td>1.00</td>
<td>0</td>
<td>0.97</td>
</tr>
<tr>
<td>Stimulating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\bar{X})</td>
<td>0.18</td>
<td>-0.08</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>N</td>
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<td>31</td>
<td>0</td>
<td>62</td>
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<tr>
<td>(\Sigma X)</td>
<td>5.72</td>
<td>-2.34</td>
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<tr>
<td>S.D.</td>
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<td>0.71</td>
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<td>0.82</td>
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<tr>
<td>Control (No Music)</td>
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<tr>
<td>(\bar{X})</td>
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<td>-0.06</td>
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<tr>
<td>S.D.</td>
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<tr>
<td><strong>Total</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\bar{X})</td>
<td>0.27</td>
<td>0.16</td>
<td>-0.06</td>
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<tr>
<td>N</td>
<td>59</td>
<td>68</td>
<td>29</td>
<td>156</td>
</tr>
<tr>
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<td>10.83</td>
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<td>25.16</td>
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were used, the higher the mean score per cell the greater the drop in state anxiety. As can be seen, the difference between the means of the stimulating and sedative groupings (.36 - .05 = .31) is of greater magnitude than the mean difference between the familiar and unfamiliar groupings (.27 - .16 = .09), when compared to the control group (\( \bar{X} = .16 \)).

To facilitate further analysis, subjects were equalized in the five conditions by taking the best representative score in each cell (i.e., the mean) and continually subtracting that score from the sum of each cell until all five conditions contained 28 subjects. An analysis of variance was then performed on the resultant data.

The summary of the analysis appears in Table 2. The table

---

Insert Table 2 about here

---

confirms the mean differences comparison made of the data from Table 1. Although not significant, affect (\( F = 3.41, .05 < p < .10 \)) accounted for more variance than either familiarity (N.S., \( F = .43, p < .05 \)) or the interaction between affect and familiarity (N.S., \( F = .58, p < .05 \)). The control condition, compared to the other conditions, proved to be nonsignificant as well (N.S., \( F = 2.05, p < .05 \)).

Because there had been no research precedent to use any one scale independently of the entire 8SQ scale, it was felt that a reliability check was needed on the pre and post-anxiety scale measures. As stated earlier, the equivalency coefficient between Form A and B on
### TABLE 2
Summary Table Describing the Statistical Significance of Affect, Familiarity, and Their Interaction Versus the Control Group

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
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<th>p</th>
</tr>
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<tbody>
<tr>
<td>Between cell</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control vs. all others</td>
<td>1</td>
<td>1.62</td>
<td>1.62</td>
<td>2.05</td>
<td>N.S.</td>
</tr>
<tr>
<td>A (Affect)</td>
<td>1</td>
<td>2.69</td>
<td>2.69</td>
<td>3.41</td>
<td></td>
</tr>
<tr>
<td>B (Familiar)</td>
<td>1</td>
<td>.34</td>
<td>.34</td>
<td>.43</td>
<td>N.S.</td>
</tr>
<tr>
<td>AB</td>
<td>1</td>
<td>.46</td>
<td>.46</td>
<td>.58</td>
<td>N.S.</td>
</tr>
<tr>
<td>Within cell</td>
<td>135</td>
<td>106.26</td>
<td>.79</td>
<td></td>
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the Anxiety scale is .83. Retest reliability coefficients range from .90 to .94 (Cattell, 1976). These last two coefficients were obtained for the Anxiety scale used concurrently with the other seven scales rather than separately, as in this study. Counterbalanced administration further dictated the need for a check on retest reliability.

The 65 subjects used composed the entire control group (i.e., not just those with positive \( z \) scores). It was found that the reliability between pre and post-measures of anxiety was .77. With a more restricted population of just those 29 control subjects who were classified as anxious (i.e., those with \( z \) scores greater than zero), the reliability coefficient was .63.
DISCUSSION

The main hypothesis that music would reduce anxiety, as opposed to no music, was not supported. However, the investigation of some of the variable components of music gave a more accurate description of what occurred in this study. Familiarity with the music had negligible effect upon high state anxiety subjects, while the affective component showed a trend for sedative music to decrease state anxiety in high state anxiety subjects better than stimulating music. Although the level of significance for affect was less than the commonly accepted level of significance (.05<.10), the magnitude of the difference between this F ratio (3.41) and the other ratios merit discussion and further investigation. The implication here was that music does not increase anxiety, and, under certain conditions, (i.e., sedative) may even help to reduce it. Furthermore, as predicted, the affective dimension did account for more variance than either familiarity or the interaction between familiarity and affectiveness.

Up to this point, sedative and stimulating music have been defined according to student's subjective ratings. A more precise operational definition of music in terms of tempo, rhythm, melody, orchestration and dynamics could have been desirable, but extremely difficult to pinpoint. Instead, the Hevner (1937) mood wheel was
simultaneously administered with the Likert scale check list as a rough measure of concurrent validity. In general, the adjectives comprising scales 2, 3, and 4 of the mood wheel corresponded to the author's preconceived notion of sedative, while scales 6, 7, and 8 corresponded to stimulating music.

The "Largo" from Dvorak's New World Symphony was rated as very sedative by the judges and also described as fitting the Hevner categories of 4 and 3. "The Swan of Tuonela" was rated as sedative and corresponding to categories 2 and 3 of the mood wheel. These ratings corresponded exactly with Bonny's (1973) research on this Sibelius composition. Beethoven's "Ode to Joy" was judged to be stimulating, as well as fitting categories 6, 7, and 8. The First Movement from Beethoven's Symphony No. 7 was also rated stimulating, having mood wheel ratings of 7 and 8, which corresponded to Bonny's ratings of 6, 7, and 8. (Previous mood wheel research had not rated the Dvorak piece and the "Ode to Joy,") Thus, the concepts of sedative and stimulating do have a researched foundation.

Familiarity and the interaction between affect and familiarity were not a factor in this study, according to the results. Nevertheless, some conclusions can be drawn from these figures. Since familiarity is a relative term, it may be too specific a variable to consider for a study of the effects of classical music—that is, classical music as a whole is, most likely, unfamiliar to both college
students and the general population. It would be interesting to see if familiarity had more of an effect within the confines of popular music.

Theoretical implications of this study seem to cast doubt on the Iso principle and to support the research of Bilder, et al (1974), Mezzano and Prueter (1974), Prueter and Mezzano (1973), and Wooden (1972). As stated before, according to the Iso principle, the mood of the music must match that of the subject. Then, any change in the music will bring a corresponding change in the subject. If mood and music do not correspond, the music will be rejected by the person and his/her mood will not change. Assuming that high anxiety and sedative music form an incompatible pair, then, according to the Iso principle, no change in anxiety level should occur. The opposite, in fact, occurred. Sedative music tended to reduce state anxiety to some degree.

The assumption that does evolve out of this study and the studies cited in the preceding paragraph is that sedative music does have some facilitating psychological and behavioral effects. These effects may be manifested as more subtle and temporary than long-term, but such a qualitative difference does not reduce the potential usefulness of music for therapeutic purposes.

Further research in this area could compare the effects of music on physiological measures of state anxiety with proven measures of the psychological aspects of state anxiety (such as the 8SQ or Spielberger's State-Trait Anxiety Inventory). The literature in this
area is relatively nonexistent, as research has looked primarily at physiological or psychological effects. At best, one study (Taylor, 1973) investigated both modes of response through GSR and subjective self-reports of emotion and found only 50% or chance agreement between the two. One wonders, however, if the results would be different if a well-researched psychometric instrument were used.

Should consistent agreement result from further research between the physiological and psychological aspects of state anxiety, a definite case could be made for pairing music with relaxation training or even with biofeedback. Webster (1973) demonstrated the former, and concluded "...relaxation (training) is more effective with music than without it" (p. 18). Stoudenmire (1975), using Spielberger's State-Trait Anxiety Inventory, found state anxiety to be significantly reduced by muscle relaxation or music. Stoudenmire, however, informed his subjects that they were taking part in a relaxation experiment. Consequently, his results may be biased.

More research is needed on both the perceived and actual effects of music on people. It might have been interesting to inform the subjects that this study was investigating whether music helped people to relax, and to see if the results would have been significant. In addition, perhaps a screening instrument could be developed which would identify those clients most positively susceptible to the effects of music. In this manner, music could increasingly become an effective adjunct therapy tool.
The robustness of the Anxiety subtest of the 8SQ (r = .77) suggests the utility of this scale, either by itself or in conjunction with the other seven subjects. In this study, with time lapses of only ten minutes and the administration of an alternate form for the posttest measurement, this instrument proved to be a remarkably reliable measure of state anxiety.

A posteriori improvements of this study could increase the predictive accuracy of what effects sedative music does have on state anxiety. Only subjects whose standard score was above the mean on the pretest (z > 0) were used in the analysis between pre and posttest measures. One can only speculate as to the effects of music on those reported as having average or below average state anxiety (z ≤ 0), or how pooling both groups might have affected the results.
Twenty Musical Pieces Used in Validation Study,
Representing Four Conditions

Familiar-Stimulating

Bach: Toccata and Fugue in D
Ravel: Bolero
Beethoven: Symphony No. 9, Fourth Movement-"Ode to Joy"
Strauss, J.: The Blue Danube
Chopin: Polonaise in A-Flat

Familiar-Sedative

Vaughn Williams: Greensleeves
Tchaikovsky: Symphony No. 6, First Movement
Beethoven: Moonlight Sonata, First Movement
Dvorak: New World Symphony, Largo (2nd Movement)
Debussy: Prelude to the Afternoon of a Faun

Unfamiliar-Stimulating

Brahms: Symphony No. 1, First Movement
Rachmaninoff: Piano Concerto No. 2, First Movement
Stravinsky: Le Sacre Du Printemps (The Rites of Spring)
Beethoven: Symphony No. 7, First Movement
Holst: "Mars" from the Planets

Unfamiliar-Sedative

Ravel: Daphnis and Chloe, Suite No. 2
Debussy: "Sirenes" from Nocturnes
Sibelius: Swan of Tuonela
Brahms: Symphony No. 4, Second Movement
Beethoven: Symphony No. 6, Second Movement


REFERENCES


(Psychological Abstracts, 1977, 58, 423.)


Mezzano, J., & Prueter, B. Background music and counseling interaction. *Journal of Counseling Psychology, 1974, 21, 84-86.*

Middleton, W. W., Fay, P. J., Kerr, W. A., & Amft, F. The effect of music on feelings of restfulness-tiredness and


Pendleton, L. R., & Tasto, D. L. Effects of metronome-conditioned relaxation, metronome-induced relaxation, and progressive muscle relaxation on insomnia. *Behavior Research and Therapy*, 1976, 14, 165-166.


Richman, J. S. Background music for repetitive task performance of severely retarded individuals. *American Journal of Mental Deficiency*, 1976, 81, 251-255.


Verveer, E. M., Barry, H., Jr., & Bousfield, W. A. Change in affectivity with repetition. *American Journal of Psychology, 1933, 45, 130-134.*


