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The Effects of Music on Mood and Perception of a Visual Stimulus

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We examined the influence of music on mood by instructing 81 undergraduate students to complete the Multiple Affect Adjective Check List–Revised (MAACL-R) both before and after watching a 15-min video that was or was not paired with a piece of music. The 2 music categories were pleasant or depressing. Participants from the depressing group experienced a drop in positive affect, whereas participants from the pleasant group showed an increase on this measure. Men from the pleasant group had the highest pretreatment and lowest posttreatment anxiety scores, whereas the women displayed no change in anxiety. The results indicate that music has only a slight impact on mood.

RESEARCHERS HAVE MEASURED MOOD BY USING physiological data. Throughout the 20th century researchers have found conflicting results with respect to self-report and physiological measures when studying the effects of music on emotion. Stratton and Zalanowski (1991) proposed that physiological arousal may or may not accompany emotional responses attributed to musical stimuli. Davis and Thaut (1989) suggest that idiosyncratic physiological response patterns are common and need to be controlled when researching behavior that is potentially influenced by music. Moreover, Hodges (1980) summarized 21 studies demonstrating contradictory results from experiments on music that used heart rate as a measure for arousal levels associated with affect.

Despite the conflicting reports between physiological and self-report measures, there is consistent evidence supporting music as an effective agent promoting relaxation and reducing psychological stress. Many researchers (Gatewood, 1921; Middleton, Fay, Kerr, & Amft, 1944; Shatin, 1970) have documented mood alteration by music. Barger (1979) reported that participants who listened to music perceived themselves to be more relaxed than did participants in a silent control condition. In this study, participants

completed mental multiplication problems as a means to induce anxiety, followed by a period of rest when background music was played.

Self-reports of anxiety reduction are a common finding in studies involving music. Greenberg and Fisher (1971) noted the efficacy of music to reduce anxiety and induce relaxation. Rohner and Miller (1980) discussed how music tended to reduce anxiety in participants who scored high for state (how a person feels in the present) anxiety. Jellison (1975) reported similar findings with participants having reduced anxiety scores when music was played after anxiety was experimentally induced. Furthermore, O'Connell (1984) found that students who listened to music prior to test taking experienced a reduction in scores on an anxiety scale.

Author note. This article is based on the undergraduate research work of Elizabeth J. Vella and Michael D. Irvin, Department of Psychology, Sonoma State University. A poster of this study was presented at the annual meeting of the Western Psychological Association on April 17, 1998, in Albuquerque, New Mexico.

We thank Barry Godolphin for providing us the opportunity to produce this study.

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Music has a calming effect for individuals experiencing physical stress. Hanser, Martin, and Bradstreet (1982) noted stress reduction as a function of background music while participants received dental work. Music therapy-assisted childbirth has been effective in reducing pain (Hanser, Larson, & O'Connell, 1983). McDowell (1966) found that self-reports of pain relief increased when music volume was turned up at the beginning of contractions. Burt and Korn (1964) and Clark, McCorkle, and Williams (1981) reported that music had a relaxing effect on women in labor.

Researchers have been somewhat effective at inducing specific emotional states by playing music previously rated as demonstrating qualities that match those particular moods. Pignatiello, Camp, and Rasar (1986) found that music ranging from neutral to depressive or uplifting could produce the corresponding mood. Stratton and Zalanowski (1991) studied the effects of music on mood in the presence of suggestion. Their results indicated that cognitive suggestion had more of an impact than music on mood when participants were instructed to tell a happy or sad story while viewing a painting. However, this is not to say that music had no effect on mood whatsoever; perhaps the task of telling a happy or sad story took enough attention away from listening to the music to attenuate its effect.

An essential limitation of the Stratton and Zalanowski (1991) study is the discrepancy in time length between their musical selections; they made comparisons of data obtained from a depressive music piece lasting approximately 15 min and a pleasant piece only 2.5 min long. This uncontrolled factor may be responsible for their finding that depressive music significantly increased depression in the neutral-story-instruction condition, whereas the pleasant-music and no-music conditions led to a slight decrease. Thus, it appears that the depressive piece may have had more emotional impact in the neutral condition based on time exposure alone.

Another problematic aspect of Stratton and Zalanowski's (1991) study is the apparent depressive quality of their supposed neutral visual stimulus. The painting *Snap the Whip*, by Winslow Homer, portrays a young boy laying face down on the ground and surrounded by other youths. In addition to the comparatively short pleasant music piece, this visual stimulus may have contributed to their finding that sad-story instruction increased depression in the pleasant-music condition.

Stratton and Zalanowski (1989) found that music and visual stimuli combine to influence mood more strongly than either stimulus alone. In that study,

happy or depressive music was paired with paintings intended to evoke positive or negative feelings. It was found that emotional changes always followed the music being played, but the visual stimulus was necessary to produce significant differences when being compared to a music-only control group.

Therefore, it appears that cognitive suggestion convolutes the effects of music on mood when presented with one visual stimulus. Furthermore, music has been shown to be the initial indicator of emotional direction when presented with various paintings. This research was conducted to demonstrate how music affects mood and the perception of one visual stimulus without cognitive suggestion through replication of Stratton and Zalanowski's (1991) study. We controlled for the potential confounds of music length and neutrality of visual stimulus. The hypotheses under investigation are: (a) a significant difference in mood change will occur as a result of music type and (b) music will have a significant impact on perceptions of the visual stimulus.

Method

Participants

We selected eighty-one participants (30 men and 51 women), a convenience sample from the residential community at Sonoma State University, to participate in this study. Each participant was randomly assigned to one of three conditions ($n = 27$). There were 12 men and 15 women in the pleasant-music condition, 9 men and 18 women in the depressive- and no-music conditions.

Materials

Two musical selections were used to represent dichotomous affect: Beethoven's Symphony no. 3 in E-flat, op. 55, second movement, first theme for negative affect; Copland's *Fanfare for the Common Man* and two selections from Copland's *Rodeo* for positive affect. These musical pieces are the same as those used by Stratton and Zalanowski (1991), except that *Rodeo* replaced *Appalachian Spring* theme and variations in order to provide a selection equal in length to the Beethoven piece for comparison. In a research design critique session, *Rodeo* was assessed as having pleasant qualities by a group of 3 professors and 19 undergraduate psychology students.

The visual stimulus used was a 15-min segment of a video by Godfrey Reggio (coproduced by Francis Ford Coppola and George Lucas) entitled *Powaqqatsi: Life in Transformation*. This visual stimulus was a variation from the painting used by Stratton and Zalanowski (1991). Due to the depressive nature of this painting, it was decided that a more neutral visual

stimulus would be used in the present study. *Powaqqatsi* is a multicultural documentary portraying daily life events in various countries. There are no words in the film, and its scenes come from all over the world. The selected section of *Powaqqatsi* provides a neutral visual stimulus to compare with the musical selections because it does not portray people under stress.

Mood was measured using the state form of the Multiple Affect Adjective Check List-Revised (MAACL-R; Zuckerman & Lubin, 1985). This measure is composed of 131 adjectives of emotional states. The MAACL-R scales of interest for this study include positive affect, anxiety, and depression; internal reliabilities for these scales are .82, .80, and .93 respectively (Zuckerman & Lubin, 1985). We also administered two 10-point Likert-type scales to determine pleasantness of the film and music when used.

Procedure

All participants in each condition viewed the video. Each participant was tested individually in a small room and seated on a couch. A television set with a 19-inch (48-cm) screen was placed 6 ft (1.8 m) away from each participant. The sound pressure level of the music was measured with a Radio Shack brand meter at the spot where participants were seated, which was also 6 ft (1.8 m) away from the music source. A comfortable intensity level average was measured at 55 dB.

We administered the MAACL-R just before and after each test administration. Participants rated the film immediately following the second MAACL-R testing.

Results

The design used for this experiment was a split-plot factorial with three conditions and six scores per participant (three affect scores per test). Mood change scores were calculated for each participant (*after scores minus before scores*).

Results of two-way ANOVAs comparing music and sex for positive affect, anxiety, depression, and film ratings revealed no significant main effects. However, a *t* test comparison between the no-music ($M = .185$, $SD = 12.03$) and pleasant condition ($M = 4.93$, $SD = 10.85$) approached significance, $t(52) = 1.52$, $p = .07$. Another *t* test evaluated significance in positive affect difference scores between the pleasant and depressive ($M = -2.44$, $SD = 11.9$) conditions, $t(52) = -2.38$, $p = .012$. Figure 1 illustrates the positive affect difference scores for all three conditions.

The ANOVA on anxiety scores revealed a significant group by sex interaction, $F(2, 75) = 3.64$,

$p = .031$. Matched sample *t* tests were performed as post hoc and displayed a significant difference between men ($M = -18.67$, $SD = 32.29$) and women ($M = -.6$, $SD = 11.67$) in the pleasant condition, $t(25) = 1.96$, $p = .024$. Figure 2 illustrates the changes in anxiety difference scores for the pleasant condition by sex. Participants from the male pleasant group had the highest pretreatment and the lowest posttreatment anxiety scores, whereas the female group showed relatively no change in anxiety. Another *t* test comparing anxiety scores between men in the pleasant and no-music ($M = 1.67$, $SD = 19$) conditions approached significance, $t(19) = 1.63$, $p = .06$.

A Mann-Whitney *U* test using a *z* statistic for larger samples approached significance on Likert scale differences between music groups, $z = -1.59$, $p = .056$. However, neither the pleasant or depressive conditions were significantly different from the no-music condition in Likert scale comparisons.

Discussion

The results of the present study do not confirm either of the hypotheses under investigation, indicating that classical music has only a slight impact on mood and perceptions of a visual stimulus. Although neither the pleasant or depressive conditions were significantly different from the no-music condition, both music groups displayed significant fluctuations in mood scores; participants from the depressive group experienced a drop in positive affect, whereas those from the pleasant group demonstrated an increase on this measure. However, the pleasant and depressive conditions did not differ significantly from the no-music condition. The increase in positive affect scores that approached significance in the pleasant condition comparison with the no-music condition may be accredited to the given piece of Copland's music. That is to say, a music appreciation class might have determined a different selection of classical music as more uplifting and thus a better stimulus to use in a study. In agreement with Pignatiello et al. (1986), music assessed as having a particular emotional component, as in depressing or pleasant, tended to produce the corresponding mood, however not to a significant extent.

The present study supports Stratton and Zalanowski's (1991) study indicating that classical music has a minimal effect on mood; however, there are significant differences between these studies. In the previous study, the only significant effect of music was in the depressive condition. The present study shows a trend toward significance in the pleasant condition. This finding may be attributable to the increase in time of music exposure for the pleasant

FIGURE 1. MAACL-R positive affect scores as a function of music type.

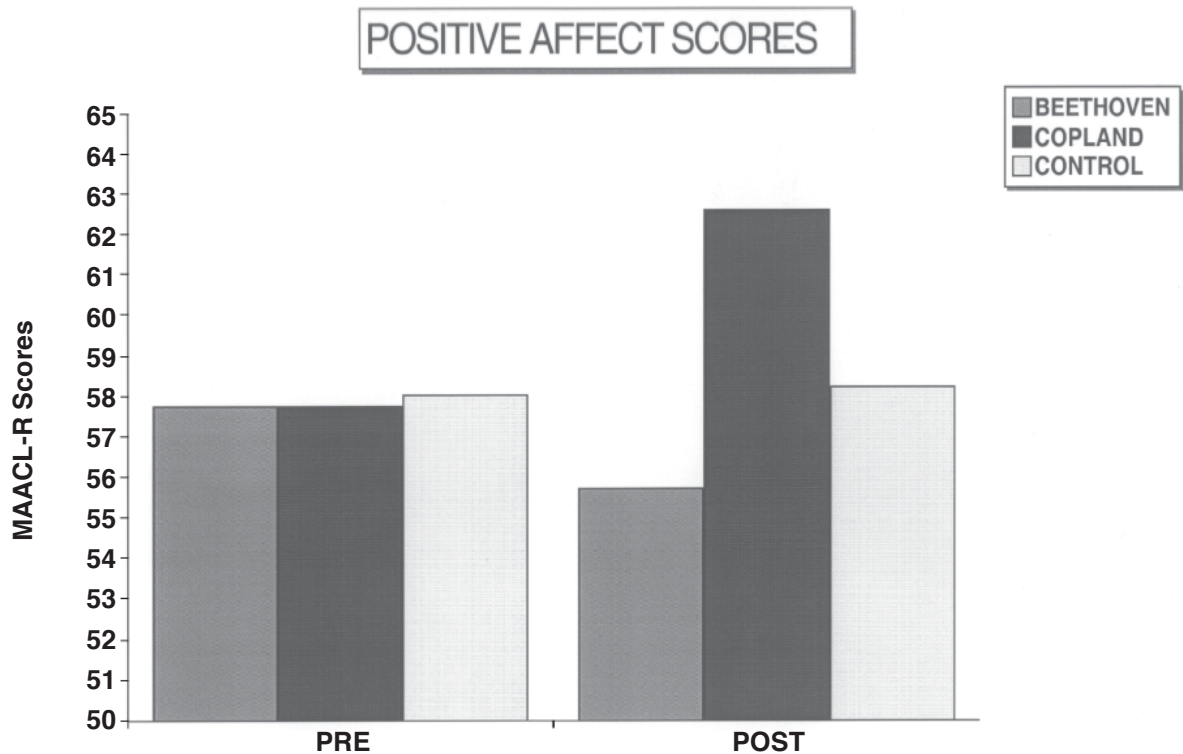
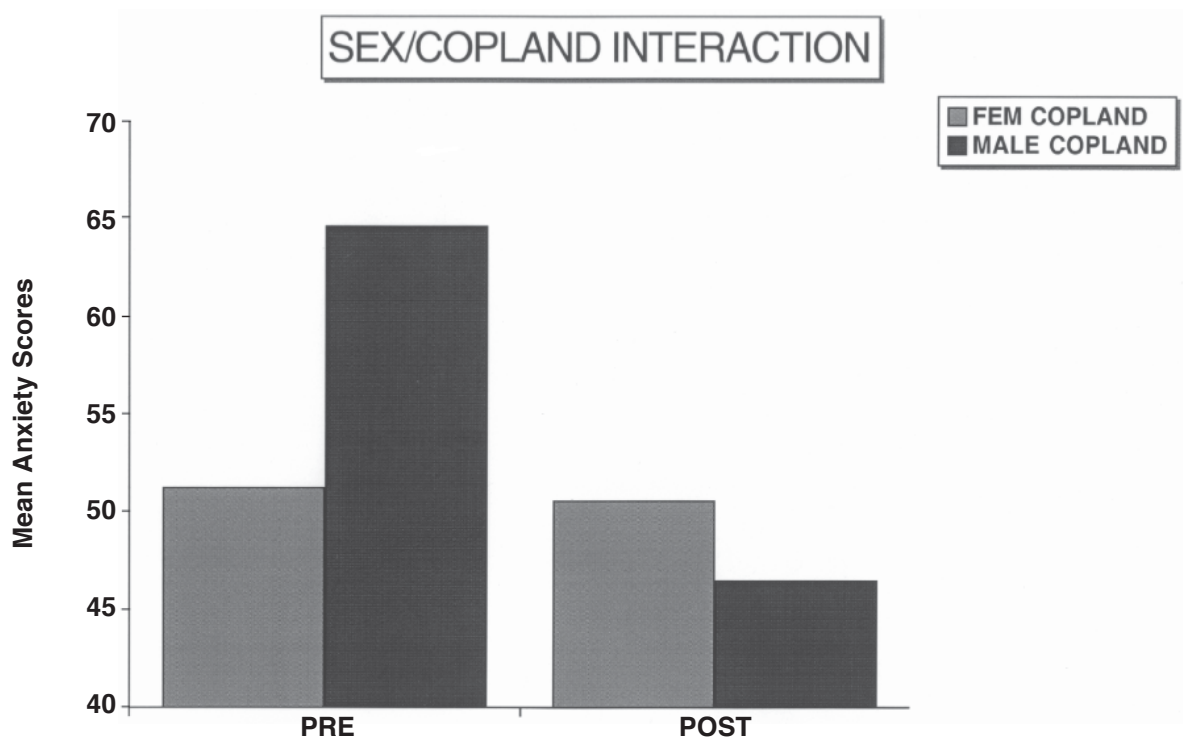


FIGURE 2. MAACL-R anxiety scores by sex for the pleasant condition.



condition. According to the present study and in contrast with the previous study, the experimental selection of Beethoven's music does not affect mood any more than sitting in a quiet room.

In accordance with Rohner and Miller's (1980) study, music was effective in reducing anxiety for participants who initially scored high during pretest administrations. However, an explanation for the sex by pleasant group interaction is elusive. The mean ages for men and women in the pleasant condition are 21.5 and 19.5, respectively. In a college context, a 2-year age difference can be critical. It is possible that the men had a tendency to be more anxious in this experimental situation because they are closer to graduation and entering the job market.

Music tended to predict whether the video was considered pleasant or unpleasant: participants who listened to Copland perceived the video as more pleasant than participants who listened to Beethoven. However, this finding only approached significance when we compared music groups; comparisons with the no-music condition were not significant. A standardized measure of film perceptions, as in a checklist designed to distinguish video preferences, may be necessary to determine whether music has a significant influence on how the documentary is viewed.

We conducted the present study to assess any significant changes in mood that are attributable to music and how perceptions of a visual stimulus fluctuate therein. The outcomes of this study add to the normative data, which may be applied to music therapies. Our results show that type of music increases positive affect, decreases anxiety, and affects perceptions. These findings agree with the Stratton and Zalanowski (1989) results that showed perceptions of various paintings followed the affect intended by music. Thus, music has the potential to facilitate a shift in how we experience what would typically be perceived as stressful life situations, such as driving in heavy traffic. However, significant sex differences are apparent in this study with respect to anxiety and uplifting music; men showed a great reduction and women displayed no fluctuations.

The present and previous studies utilized music that was unfamiliar to most of the participants. At this point the effects of familiar music on mood are not

known. Further studies can investigate whether the findings of the present study are reliable by incorporating familiar music and sampling from a diverse age group.

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