EXPOSURE EFFECTS AND AFFECTIVE RESPONSES TO MUSIC

JAMES E. BRENTAR, KIMBERLY A. NEUENDORF AND G. BLAKE ARMSTRONG

Radio programming appears to follow a theory of mere exposure, where repeated exposure to a stimulus results in enhanced positive affect toward that stimulus. Although mere exposure has received substantial empirical support, other studies of exposure to music suggest that an inverted-\(U\) better describes the exposure-affect relationship. This study manipulated exposure to rock and popular songs in a counterbalanced design. Subjects heard manipulated songs at frequencies of 1, 8, 16, and 24. An inverted-\(U\) relationship was found, with a small but significant effect size that held when controlling for a number of stimulus and subject variables. The collative variables of subjective complexity and subjective novelty were hypothesized to interact with exposure in determining affective evaluations; this was not supported.

Radio stations claim to play the songs that people want to hear, using popularity as a criterion for airplay. However, it is clear that radio airplay acts to popularize the songs it plays (Rothenbuhler, 1985, 1987). Early studies of radio plugging of songs have shown that airplay can affect students' opinions of songs (Wiebe, 1940) and sales of sheet music (Erdelyi, 1940).

Rock, Top-40, and other popular radio formats generally operate with a “tight playlist” rotation, for “the common belief is that people only want to hear their very favorite songs . . . over and over again until they 'burn out' on them” (Lull, 1987b, p. 15). Thus, only a small portion of the music recorded is selected for massive levels of broadcast exposure (Rothenbuhler, 1987).

The Mere Exposure Hypothesis

Such a programming philosophy seems to follow a theory of mere exposure, which argues that repeated exposure is a sufficient condition for enhancement of positive affect toward a stimulus (Zajonc, 1968). Zajonc (1968) defines mere exposure as “a condition which just makes the given stimulus accessible to the individual's perception” (p. 1). Although affect can refer to a wide range of emotions, feelings, moods, and physiological reactions (Sypher, Donohew, & Higgins, 1988), Zajonc (1968, 1980) confines his discussion to those aspects of affect involved in positive evaluation or preference and ignores emotional responses such as surprise, anger, and guilt.

Zajonc (1968) suggests that the relationship between exposure frequency and liking is monotonic and “takes the form of a positive decelerating curve, with attitude enhancement a function of the logarithm of the exposure frequency” (Harrison, 1977, p. 40). The hypothesis refers only to initially unfamiliar stimuli, and it does not preclude other bases for liking—liking can occur without repetition, and liking from repetition can be offset by other factors (Harrison, 1977).

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Mere Exposure Research

Mere exposure has received much empirical support (Bornstein, 1989; Fink, Monahan, & Kaplowitz, 1989; Gordon & Holyoak, 1983; Harrison, 1977; see Harrison, 1977, for an excellent review\(^1\)). While most mere exposure research has used nonsense words or Chinese characters as stimuli, support has also been found using photographs of faces (Bornstein, Leone, & Galley, 1987; Zajonc, 1968), abstract paintings (Brickman, Redfield, Harrison, & R. Crandall, 1972), and music (Bartlett, 1973; Brickman & D'Amato, 1975; Heingartner & Hall, 1974; Obermiller, 1985). The hypothesis has found support when tested in a field setting as well as in a laboratory setting (R. Crandall, 1972; Rajecki & Wolfson, 1973; Zajonc & Rajecki, 1969).

Harrison (1977) considers five theoretical explanations for mere exposure. Only one of these—response competition—accounts for the hypothesis as specified by Zajonc (1968, 1980). The response competition theory states that a novel stimulus will elicit several responses, some of which will be incompatible or antagonistic, thus producing an aversive state with negative affect. Repeated exposure to the stimulus will strengthen some of these responses while weakening others, resulting in increased affect toward the stimulus. This theory was first introduced by Berlyne (1954) and has some evidence to support it (Harrison, 1968, 1977; Matlin, 1970; Saegert & Jellison, 1970).

The remaining four theoretical perspectives discussed by Harrison (1977) are: expectancy arousal, two-factor theories, semantic satiation/semantic generation, and arousal interpretations. The four are best viewed as competitive to mere exposure in that they go beyond Zajonc's monotonic function to predict an inverted-U relationship between exposure and affect.

Alternative Models to Mere Exposure

In contrast to Zajonc (1968), Berlyne (1970, 1971) argues that stimulus novelty can be positively related to liking. He maintains that the manner in which novelty relates to hedonic value is a function of the stimulus complexity. He explicates this view in terms of the Wundt curve, an inverted-U shape that describes the relationship between the arousal potential of a stimulus and its hedonic value (Berlyne, 1970, p. 284; Wundt, 1874/1904). Berlyne argues that a complex novel stimulus will have a high degree of arousal potential that will result initially in low hedonic value. With repetition, the stimulus loses novelty, arousal potential decreases to a moderate level, and the hedonic value will increase up to a point. When arousal potential becomes low enough, a boredom or tedium factor sets in, and hedonic value decreases with further repetition.

Berlyne and Parham's (1968) definition of novelty includes number of exposures in addition to other factors (see below). His definition of hedonic value includes reward value as well as an affective component, but his measure of hedonic value, a 7-point semantic differential scale, has been virtually identical to that used for affect in studies of mere exposure. In a series of experiments, he generally found support for his hypotheses.

Jakobovits (1966) similarly proposed an inverted-U relationship between exposure and popularity or liking of a song from a theory of semantic generation and semantic satiation (see Jakobovits & Lambert, 1963). His hypothesis is that "repeated exposure to an unfamiliar stimulus will result in its increase in
meaningfulness up to a point where further exposure no longer adds meaning-
fulness. At this ‘critical point’ the curve changes inflection with further expo-
sure, and meaningfulness decreases” (Jakobovits, 1966, p. 443).

Zajonc, R. Crandall, Kail, and Swap (1974) argue that the inverted–U func-
tion has been a more robust finding when applied to stimulus complexity or to
stimulus uncertainty than when applied to exposure. However, J. E. Crandall,
Montgomery, and Rees (1973) found support for an inverted–U relationship
between exposure and liking. Zajonc, Shaver, Tavris, and Van Kreveld (1972)
got an inverted–U finding when they used abstract paintings as stimuli.

The findings of Jakobovits (1966) and others, and observations of radio
programming strategies, have led Rothenbuhler (1987) to sum up: “Increasing
exposure, up to a point, leads to increasing popularity or affect, at which point
further increasing exposure leads to decreasing popularity or affect” (p. 79).

Exposure and Other Variables

Studies manipulating exposure within identical ranges have sometimes pro-
duced inconsistent results. Harrison (1977) lists several types of mediating
variables that can account for these inconsistencies: stimulus variables (e.g.,
initial familiarity, initial meaning/pre-exposure valence, complexity), presenta-
tion variables (e.g., context, presentation sequence), and measurement variables
(e.g., time and repetition of measures). However, experimental evidence sug-
gests that initial familiarity, initial stimulus valence, and positive/negative con-
text do not limit the mere exposure effect (Hamm, Baum, & Nikels, 1975;
Saegert, Swap, & Zajonc, 1973; Zajonc, Markus, & Wilson, 1974).

According to Berlyne (1970, 1971; see also Harrison, 1977, p. 71), there are
several collative properties of stimuli, such as novelty, surprisingness, incongru-
ity, ambiguity, and complexity, that affect arousal potential of a stimulus and
thus the affective responses to it. Of these properties, complexity and novelty are
the two variables upon which Berlyne’s own work most often focuses (1970,

Complexity has been found to have a great impact upon exposure effects.
Reducing stimulus complexity “lowers the likelihood of an exposure effect or
causes the inflection point in an inverted–U curve to occur after relatively few
exposures” (Harrison, 1977, p. 54). Highly complex stimuli have produced
increased liking with exposure, very simple stimuli have produced decreased
liking with exposure, and moderate complexity has produced an inverted–U
shaped relationship (Heyduk, 1975; Saegert & Jellison, 1970; Smith & Dorf-
man, 1975).

The second important collative variable, novelty, is defined by Bohme (1980)
as something new or unusual, something to which a person has not previously
been exposed. However, as Zajonc (1968) notes, “the novel stimulus cannot fail
being similar to an entire host of other stimuli that the individual had encoun-
tered in the past, and to which he [or she] had attached specific responses” (p.
22). Generally, stimuli can have only relative novelty. Berlyne and Parham
(1968) conducted a pair of experiments to explore what determines subjective
ratings of novelty. Eight components were found, including the number of
attributes distinguishing a stimulus from other stimuli that have preceded it in
the recent past. Berlyne (1971) used this component (number of distinguishing
attributes) and others to experimentally manipulate novelty.
Studies of Music

There remains little doubt that music is a form of communication (Berlyne, 1971; Frith, 1981; Lull, 1987c), although music, especially popular music, is routinely ignored by mass communication researchers. The limited mass communication research on popular music has focused on the content of song lyrics (Bridges & Denisoff, 1986; Carey, 1969; Desmond, 1987; Fedler, Hall, & Tanzi, 1982; Prinsky & Rosenbaum, 1987) and uses and gratifications associated with music (Christenson, DeBenedittis, & Lindlof, 1985; Larson & Kubey, 1983; Lull, 1985, 1987a). Of particular utility to this investigation is the finding that music involvement influences responses to music (Lull, 1987a; Mizerski, Pucely, Perrewe, & Baldwin, 1988; Voelker, 1989).

Various indices have been constructed to measure involvement in music. Dixon (1980) has developed an index with two factors: an active involvement factor, which includes attending concerts, listening to records, and buying records, and a passive factor, which includes listening to the radio. These measures correlate with differences in preferences for different musical genres. Voelker (1989) developed an index for music sophistication with two factors: a participation factor, which includes playing a musical instrument and attending concerts, and an involvement factor, which includes listening to music, discussing music with others, and watching music videos. Respondents scoring higher on the involvement factor reported more thoughts in response to unfamiliar music than did low involvement subjects.

Mizerski et al. (1988) used Dixon's (1980) active and passive measures of involvement and added an experiential involvement index based upon earlier work by Swanson (1978) and Hirschman (1983); the index included responses to statements like "I felt carried off by the song" and "I felt as if I were a part of the song" (Mizerski et al., 1988, p. 83). Of the three kinds of involvement, only experiential involvement was related to intent to purchase records.

Exposure Effects and Music

Early studies on the impact of exposure on affect toward music (Downey & Knapp, 1927; Gilliland & Moore, 1924, 1927; Krugman, 1943; Mull, 1957; Verveer, Barry, & Bousfield, 1933; Wiebe, 1940) have been criticized as the product of antiquated or poor methods (Heingartner & Hall, 1974; Zajonc, 1968) such as lack of control groups, using music that was already familiar to participants, having participants respond orally in a group setting, not controlling for the effect of song order, informing participants of the purpose and hypotheses of the experiment prior to participation, and admitting a bias of trying to prove aesthetic superiority of one type of music.

Lundin (1967) examined these early studies and came to five conclusions:

1. Classical and modern serious music tends to gain more in pleasant affective value than do popular works.
2. Popular music tends to reach the maximum of pleasantness at an early repetition, whereas classical selections reach their affective height with later performances.
3. With repetition, compositions considered by experts to be of greatest musical aesthetic value show the greatest gain in affective reaction with repetition.
4. Popular music reaches a rapid peak in affective value followed by a rapid decline in pleasantness with continued repetition.
5. Modern serious music seems to gain less in affective value with repetition than does the more traditional classical work. (p. 176)

Several more recent studies have examined the relationship between exposure to music and affective response. Although some of these studies have found a monotonic increase in affect with exposure (Bartlett, 1973; Bradley, 1971; Brickman & D'Amato, 1975; Heingartner & Hall, 1974), others have found support for an inverted-U shaped relationship (Brickman et al., 1972; Getz, 1966; Hargreaves, 1984; Heyduk, 1975). Hargreaves' (1986) review of these and other studies of exposure and liking finds some support for mere exposure but more support for an inverted-U relationship.

One reason that some of these studies fail to find an inverted-U shaped relationship may be because they generally use a small maximum number of repetitions of each song. Only one study (Bradley, 1971) used a maximum exposure frequency greater than 20, and most used fewer than 12 repetitions. The small number of exposures does not accurately reflect the number of times a person may hear a song on the radio. A greater number of exposures may reveal a downturn in affect.

Also, in most of these studies, the stimuli used bore little resemblance to music we regularly encounter in real life. This presents a potential threat to external validity. Music used in these studies includes simple tonal patterns (Obermiller, 1985), Pakistani folk music (Heingartner & Hall, 1974), Japanese court music (Brickman & D'Amato, 1975), and the non-hit sides (the "B-sides") of 10-year-old rock singles (Brickman et al., 1972). The extreme novelty, simplicity, or outdated nature of these types of music may produce responses that do not generalize to modern popular music.

Lastly, not one of these studies has used songs in their entirety. Given Lull's (1987b) assertion of the importance to popular music of repetition of themes, riffs, and hooks within the music itself, constructed melodies and tones, or edited segments of songs, may not reflect the actual amount of repetition that occurs with exposure to popular music. Also, Voelker (1989) found that for unfamiliar music the whole song as stimulus generated significantly more thoughts about the song than did a 60-second or 30-second segment.

Hypotheses

Our first hypothesis is very similar to Rothenbuhler's (1987, p. 79) observation:

H₁: Increasing exposure to a song, up to a point, will lead to increasing positive affect toward that song, at which point further increasing exposure will lead to decreasing positive affect toward that song.

At what point will this downturn in the inverted U occur? Most of the studies of mere exposure have used 0, 1, 2, 5, 10, and 25 exposures (see Zajonc, 1968). Bush and Pease (1968) found that playing a song 30 times in succession led to increased polarization of ratings, with more ratings toward the negative pole. Homogeneity of presentation may be partially responsible for this result, but it does suggest that the downturn point will be at fewer than 30 exposures but at more than the number of exposures in a typical music exposure study. Thus,
our second hypothesis will be:

H₂: Although the point at which further exposure will lead to decreased affect will vary for different songs, that point will be between 16 and 24 exposures.

As noted in Harrison (1977) and Berlyne (1970), the point at which further exposure will lead to decreased liking will vary according to other variables such as complexity and novelty. This suggests an interaction between these variables and frequency of exposure. So, our third hypothesis will be:

H₃a: Complexity will interact with exposure in producing affective responses, with high complexity and high exposure producing more positive ratings of the songs than low complexity and high exposure.

H₃b: Subjective novelty will interact with exposure in producing affective responses, with high novelty and high exposure producing more positive ratings of the songs than low novelty and high exposure.

Figure 1 presents all four hypotheses graphically.

METHOD

Overview of Design

The experimental design used was based upon the design used by Zajonc (1968) and used in other exposure studies. Exposure level (1, 8, 16, and 24 exposures) and song (four different songs were used) were manipulated in a repeated measures design. Both exposure and song were within subjects factors, but levels of each factor were not completely crossed. Instead, song and exposure level were counterbalanced so that each participant heard only one song at each exposure level and that each song appeared an equal number of times at each exposure level. Table 1 illustrates this counterbalanced design.

Pilot Test

To select stimulus music a pilot study presented 99 participants 57 songs. Each participant heard a tape of nine songs and completed a self-administered questionnaire⁶. For each song, participants were asked how many times they had heard the song before, whether they owned a copy of the song, how similar the song was to songs currently being played on the radio, how likely they thought it would be that the song would be played on a typical rock or top-40 radio station, and in what year they thought the song was recorded. In addition to these measures, all measures used in the main study were collected, and the procedures used in the main study were pilot tested. Songs were eliminated from consideration for use if they were familiar to any participants, if they were not perceived as being pop or rock music, if they were not perceived as being produced in recent years, and if they were not perceived as music that one might realistically hear on the radio today.

Stimuli

Four songs were chosen such that two were high in subjective complexity and two were low in subjective complexity, $F(3, 55) = 3.37, p < .05$. The four also differed in judgments of subjective novelty based on measures from Berlyne and Parham (1968): new-old semantic differential $F(3, 55) = 2.42, p < .10$ and judgments of similarity to other songs, $F(3, 55) = 3.20, p < .05$. The four songs were also chosen to be distinct in sound from each other. (One song had a
female lead vocalist, one song had a reggae style rhythm, and one had distinct electronic/new wave influences.)

To help maintain a heterogeneous presentation, each tape contained additional songs not being manipulated—filler songs. The filler songs were songs that were rated as pleasant on the pilot study, and that provided a wide range of prior familiarities and musical styles. These songs were the same for each group.

Four stimulus tapes were heard by each participant over a two-week period. Each tape contained 16 songs (some repeated) and was approximately one hour in length. Position of each song on the tape was determined randomly. To control for any possible song-order effects, three different tapes, each with different song orders, were used for each experimental group.

 Procedures

The 54 participants (58.8% female) were undergraduates enrolled in communication courses at a large midwestern university. The average age of the participants was 23.5 years (range = 18 to 43). None had participated in the pilot study. All participants received course credit for participation, and in addition, some participants were offered the opportunity to win a gift certificate to a local music store. Participants were randomly assigned to experimental groups.

Participants visited the Instructional Media Services (IMS) media lab twice a week for two weeks and were required to not make visits on consecutive days. On each visit, a participant would listen privately to a tape of music and fill out a self-administered questionnaire. Participants were required to sign in prior to receiving a tape and to sign out upon completion of the session. Sign-in and sign-out times were checked for each participant. Also, an experimenter monitored participation for at least two hours each day. A total of 44 students completed all four visits to the lab.

After listening to the 16 complete songs on each tape, participants heard a 10-20 second segment from each and were instructed by the tape to stop and fill out the portion of the questionnaire for that song. This procedure was repeated for each song. A few weeks after the completion of the experiment, all participants were debriefed in writing.

 Measuring Instruments

Affect was measured by 11-point good-bad (0 = good, 10 = bad) and pleasing-displeasing (0 = pleasing, 10 = displeasing) semantic differentials and a rating for each song on a scale from 0 to 100, where 0 is the worst and 100 is the best song they ever heard. Subjective complexity was measured by a simple-complex (0 = simple, 10 = complex) semantic differential, while subjective novelty was measured by old-new (0 = old, 10 = new) and imitative-innovative (0 = imitative, 10 = innovative) semantic differentials.

The music involvement measures used were based on previous research (Dixon, 1980; Voelker, 1989). Participants were asked how often they listened to the radio; how often they listened to records, tapes, or CDs; how often they attended concerts; how often they read about music in magazines and local newspapers; how often they talked with others about music; how often they attended bars or night clubs where music was featured; how many records,
Hypotheses 1 & 2

Positive Affect

Number of Exposures

Hypothesis 3A

Positive Affect

Number of Exposures

Hypothesis 3B

Positive Affect

Number of Exposures

FIGURE 1
### Table 1
**Study Design**

<table>
<thead>
<tr>
<th>Group</th>
<th>Song A</th>
<th>Song B</th>
<th>Song C</th>
<th>Song D</th>
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<td>I</td>
<td>24</td>
<td>16</td>
<td>8</td>
<td>1</td>
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<tr>
<td>II</td>
<td>1</td>
<td>24</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>III</td>
<td>8</td>
<td>1</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>IV</td>
<td>16</td>
<td>8</td>
<td>1</td>
<td>24</td>
</tr>
</tbody>
</table>

...tapes, or CDs they owned and how many had been purchased in the past month; how often they watched music videos; whether or not they played a musical instrument; whether or not they played or sang in a musical group; and how long they had played or sung in a musical group. Also, the five experiential music involvement measures from Mizerski et al. (1988) were included.

Each participant's first questionnaire included the music involvement measures and all of the measures used in the pilot study. For the remaining three visits, the questionnaire included only the semantic differential questions and the 0-100 song ratings.

**Analysis**

To test for differences in affective ratings due to level of exposure, a 4 (exposure) x 4 (song) repeated measures analysis of variance was conducted on the fourth-visit (final) song ratings for each participant. Both exposure and song are within subject factors with the levels of each factor not completely crossed, but instead counterbalanced. The analysis was conducted using procedures recommended by Kirk (1982) for a repeated measures Latin Square design. To test whether differences in means were in the pattern predicted by Hypothesis 1, a quadratic trend analysis was performed.

To establish our findings in the context of previous research the ANOVA used only final ratings. As an expansion, this research has additionally used regression analysis to include multiple time points per person and a number of important control variables. Because all variables were measured at the interval ratio level, regression analysis was chosen as an appropriate statistic to provide this richer and more rigorous test of the hypotheses, using ratings from all four visits to the lab to provide maximal power. The hypothesized relationship between exposure level and affect is non-linear; hence it was necessary to transform the independent variable. The inverted-U relationship is based upon an inverted parabola, a variation of \( y = -x^2 \) (see Berlyne, 1971). Therefore, the independent variable, number of exposures, was centered (zeroed) around the exposure level with the highest ratings (eight exposures) and squared. Since exposure level was the only independent variable hypothesized to have a non-linear effect, it was the only variable transformed.  

The control variables used were the demographic variables race, age, gender, and college class; song order (the position in which a song made its first appearance on a given tape); the compensation received by the participant (course credit only, or course credit plus a chance to win a gift certificate); the visit at which the ratings were collected; and the song that was being rated.
Also controlled were the other variables that were expected to influence affective ratings: subjective complexity (simple-complex semantic differential), subjective novelty (new-old and imitative-innovative), and the music involvement indices. For complexity and subjective novelty, concurrent ratings were used rather than pilot test ratings. Also, since this is a repeated measures analysis, subject needed to be controlled for (Cohen & Cohen, 1983). This was done by creating \( n-1 \) dummy variables, which were then included as a block.

Hierarchical forced-entry regression analyses were conducted using ratings from all four visits (13 data points for each participant); the demographic variables, dummyed IDs, and other independent variables were entered prior to exposure.

Hypothesis 3A predicts an interaction between complexity and exposure. To test this interaction, a regression analysis using identical controls to the previous analysis was conducted. In regression, the interaction term is carried by the product of two variables (Cohen & Cohen, 1983); therefore, an interaction measure (Complexity \( \times \) Exposure level) was used to test the interaction effect, entered after first partialing out the main effects of exposure and complexity (Jaccard, Turrisi, & Wan, 1990). Hypothesis 3B also predicts an interaction effect. Again, a regression analysis using the same control variables was conducted. Interaction measures (New-Old \( \times \) Exposure level, and Innovative-Imitative \( \times \) Exposure Level) were used to test the interaction effect.

**RESULTS**

The ratings from the fourth (final) visit to the media lab are shown in Figure 2 (with polarities reversed so that the vertical axis represents positive affect) and Table 2. As shown in Figure 2, the relationship between exposure and each of the dependent measures is in the shape of an inverted U. Table 2 ANOVA results show a significant main effect of exposure for all three dependent variables. To test specifically for an inverted–U shaped relationship, a quadratic trend analysis was performed for each dependent variable. The quadratic trend was significant for each measure. This supports Hypothesis 1.

The point at which further exposure begins to lead to decreased affect occurs between 8 and 16 exposures. Hypothesis 2 predicted the downturn at between 16 and 24 exposures. Therefore, Hypothesis 2 is not supported.

**Music Involvement Factor Analysis**

A principal components factor analysis using varimax rotation was conducted on the music involvement measures. After examination of a scree plot, a three-factor solution was chosen. The results are shown in Table 3. Factor 1 includes the items measuring listening to records (LISTEN), attending concerts (CONCERTS), ownership of records/tapes/CDs (RECORDS), buying records (PURCHASE), reading about music (MAGAZINE), and talking about music with others (TALK). This factor will be called an Active Involvement factor. Factor 2 includes playing or singing in a musical group and years spent playing or singing in a musical group (GROUP, YEARSGROUP). Therefore, this factor will be called a Participative Involvement factor. Factor 3 has listening to the radio (RADIO) and reading about music in local newspapers (LOCALNEWS) loading positively, and playing a musical instrument (PLAY) loading negatively on this factor. This factor will be called a Passive Involvement factor.
### Table 2

**Mean Song Ratings for Final Visit, With Mixed-Factor Repeated Measures Two-Factor ANOVAs**

<table>
<thead>
<tr>
<th>Variable</th>
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<th>8</th>
<th>16</th>
<th>24</th>
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<tr>
<td>Rating</td>
<td></td>
<td>40.25</td>
<td>48.70</td>
<td>45.42</td>
<td>37.05</td>
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<td></td>
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<tr>
<td>Exposure</td>
<td>df/SS/MS</td>
<td>3/3619.83/1296.61</td>
<td>3/5690.45/1866.82</td>
<td>6/1541.62/256.94</td>
<td>41/65842.70</td>
</tr>
<tr>
<td>Song</td>
<td>F/sign</td>
<td>3.19/(p &lt; .05)</td>
<td>4.93/(p &lt; .01)</td>
<td>0.68/(ns)</td>
<td></td>
</tr>
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<td>ExpoXSong</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td></td>
<td>114/43122.35</td>
<td>378.27</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>167/119726.95</td>
<td></td>
<td></td>
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<tr>
<td>Quadratic</td>
<td></td>
<td>1/2970.58</td>
<td>2970.58</td>
<td>7.85/(p &lt; .01)</td>
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<td>4.67</td>
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<td>Exposure</td>
<td>df/SS/MS</td>
<td>3/50.86/16.95</td>
<td>3/88.01/29.34</td>
<td>6/34.53/5.76</td>
<td>41/433.51/10.57</td>
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<td>Song</td>
<td>F/sign</td>
<td>2.75/(p &lt; .05)</td>
<td>4.76/(p &lt; .01)</td>
<td>0.93/(ns)</td>
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<th>Exposure Level</th>
<th>1</th>
<th>8</th>
<th>16</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasing-Displeasing</td>
<td></td>
<td>5.49</td>
<td>4.91</td>
<td>5.19</td>
<td>6.32</td>
</tr>
<tr>
<td><strong>Source</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposure</td>
<td>df/SS/MS</td>
<td>3/52.16/17.39</td>
<td>3/81.78/27.26</td>
<td>6/26.57/4.43</td>
<td>41/379.96</td>
</tr>
<tr>
<td>Song</td>
<td>F/sign</td>
<td>3.23/(p &lt; .05)</td>
<td>5.07/(p &lt; .01)</td>
<td>0.82/(ns)</td>
<td></td>
</tr>
<tr>
<td>ExpoXSong</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td></td>
<td>114/613.24</td>
<td>5.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>167/1153.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quadratic</td>
<td></td>
<td>1/30.70</td>
<td>30.70</td>
<td>5.66/(p &lt; .01)</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Procedures followed were those recommended by Kirk (1982, pp. 648–654).*

*11-point semantic differential, 0 = good, 10 = bad.

*11-point semantic differential, 0 = pleasing, 10 = displeasing.*

Indices were constructed for each of these factors using standardized values for all 13 items, each item weighted with factor score coefficients. A simple additive index was constructed for the experiential involvement items.9

**Regression Analysis**

Heirarchical forced-entry regressions were performed for each of the dependent variables, with the demographic variables, dummied IDs, and other independent variables entered prior to exposure. The results are shown in Table 4.
For each of the three dependent measures, number of exposures contributes significantly toward affective response. The effect size for our transformed exposure measure is small, but it is consistent across three dependent measures and remains a significant predictor, even when controlling for a large number of variables. This analysis provides support for Hypothesis 1.

A number of control variables are also significant predictors of affect. As the initial block, demographics contribute a significant amount of explained variance in all three equations. Although the unique contribution of type of compensation is significant for two of the three equations, the total block of the contextual/presentation variables (order, compensation, and number of visit) is non-significant in all cases. Importantly, both subjective complexity and
subjective novelty prove to be significant positive predictors of positive affect for all three dependent measures; the incremental $R^2$ for their block is substantial for all equations (ranging from .20 to .25). The dummied song variable contributes significantly for each of the dependent measures. For each dependent variable, the block of music involvement measures explains a significant portion of the variance. Three of the music involvement indices are significant individual predictors in at least one case. The experiential involvement index is a positive predictor of both the good-bad and pleasing-displeasing measures. Active music involvement (INVolvEMENT1) is negatively related to both the 0–100 rating and the good-bad indicator. Passive music involvement (INVolvEMENT3) is a unique positive predictor of the 0–100 rating. The overall equation is highly significant for each measure, with between 50% and 69% of the variance explained.

**Interaction Effects**

To test hypothesis 3A, a regression analysis using identical controls to the previous analysis was conducted, with an interaction measure (Complexity $\times$ Exposure level) entered last after first partialling out the main effects of exposure and complexity.

For each of the three dependent measures, the interaction measure fails to contribute significantly. Complexity by itself is a significant positive predictor for each of the three measures (contributing an incremental $R^2$ of between .01 and .03), but the interaction term does not contribute any additional variance (incremental $R^2 < .005$ in all three cases). This analysis does not provide support for Hypothesis 3A.

Hypothesis 3B was also tested using a regression analysis with the same control variables and two interaction measures (New-Old $\times$ Exposure Level and Innovative-Imitative $\times$ Exposure Level). For each of the three dependent measures, the interaction terms do not contribute significantly. As with complexity, subjective novelty by itself is a significant predictor of affect (the block of the two measures contributes between .05 and .07 to $R^2$), but it does not interact

---

**TABLE 3**

**Music Involvement Factor Analysis**

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1 Active</th>
<th>Factor 2 Participative</th>
<th>Factor 3 Passive</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>LISTEN</td>
<td>.75</td>
<td>.19</td>
<td>-.09</td>
<td>.61</td>
</tr>
<tr>
<td>CONCERTS</td>
<td>.84</td>
<td>.02</td>
<td>.09</td>
<td>.71</td>
</tr>
<tr>
<td>RECORDS</td>
<td>.94</td>
<td>-.03</td>
<td>.04</td>
<td>.90</td>
</tr>
<tr>
<td>PURCHASE</td>
<td>.77</td>
<td>-.05</td>
<td>-.33</td>
<td>.70</td>
</tr>
<tr>
<td>MAGAZINE</td>
<td>.56</td>
<td>-.08</td>
<td>.29</td>
<td>.40</td>
</tr>
<tr>
<td>TALK</td>
<td>.90</td>
<td>.13</td>
<td>.17</td>
<td>.88</td>
</tr>
<tr>
<td>GROUP</td>
<td>.05</td>
<td>.90</td>
<td>-.17</td>
<td>.85</td>
</tr>
<tr>
<td>YEARSGROUP</td>
<td>.06</td>
<td>.93</td>
<td>.05</td>
<td>.88</td>
</tr>
<tr>
<td>RADIO</td>
<td>-.27</td>
<td>.09</td>
<td>.68</td>
<td>.55</td>
</tr>
<tr>
<td>LOCALNEWS</td>
<td>.36</td>
<td>.01</td>
<td>.71</td>
<td>.64</td>
</tr>
<tr>
<td>PLAY</td>
<td>-.04</td>
<td>.17</td>
<td>-.48</td>
<td>.27</td>
</tr>
<tr>
<td>Eigenvalues</td>
<td>4.15</td>
<td>1.81</td>
<td>1.42</td>
<td></td>
</tr>
<tr>
<td>% Variance Explained</td>
<td>37.7</td>
<td>16.5</td>
<td>12.9</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 4
Multiple Regression for Number of Exposures

<table>
<thead>
<tr>
<th>Predictor</th>
<th>DV = 0–100 Rating</th>
<th></th>
<th></th>
<th>DV = Good-Bad Rating</th>
<th></th>
<th></th>
<th>DV = Pleasing-Displeasing Rating</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHNIC</td>
<td>.24**</td>
<td>.25**</td>
<td>.16**</td>
<td>-.04</td>
<td>.15**</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGE</td>
<td>.15**</td>
<td>.23**</td>
<td>.13**</td>
<td>.25**</td>
<td>.11**</td>
<td>.28**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>.14**</td>
<td>-.57**</td>
<td>.10**</td>
<td>-.13</td>
<td>.04</td>
<td>-.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COLLEGE</td>
<td>-.02</td>
<td>.29**</td>
<td>.07**</td>
<td>-.03</td>
<td>.17</td>
<td>.04**</td>
<td>-.01</td>
<td>.04</td>
</tr>
<tr>
<td>ORDER</td>
<td>.01</td>
<td>-.02</td>
<td>.00</td>
<td>-.04</td>
<td>.01</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPENSAT.</td>
<td>.05</td>
<td>.00</td>
<td>-.01</td>
<td>.29**</td>
<td>-.03</td>
<td>.26*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VISIT</td>
<td>-.01</td>
<td>.06</td>
<td>.00</td>
<td>-.09**</td>
<td>.00</td>
<td>.01</td>
<td>-.03</td>
<td>.03</td>
</tr>
<tr>
<td>COMPLEX</td>
<td>.32**</td>
<td>.16**</td>
<td>.31**</td>
<td>.20**</td>
<td>.36**</td>
<td>.25**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEW</td>
<td>.06</td>
<td>.07</td>
<td>.09**</td>
<td>.16**</td>
<td>.07</td>
<td>.09*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INNOVATIVE</td>
<td>.42**</td>
<td>.26**</td>
<td>.43**</td>
<td>.26**</td>
<td>.45**</td>
<td>.29**</td>
<td>.25**</td>
<td></td>
</tr>
<tr>
<td>SONG</td>
<td>-.03**</td>
<td>.04**</td>
<td>.20**</td>
<td>.36**</td>
<td>.19**</td>
<td>.45**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXPERIENT.</td>
<td>.36**</td>
<td>.28</td>
<td>.20**</td>
<td>.36**</td>
<td>.19**</td>
<td>.45**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVOLVE1</td>
<td>-.07</td>
<td>-.15**</td>
<td>-.07</td>
<td>-.12*</td>
<td>-.04</td>
<td>-.08</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>INVOLVE2</td>
<td>.26**</td>
<td>-.04</td>
<td>.16**</td>
<td>-.03</td>
<td>.15**</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVOLVE3</td>
<td>.00</td>
<td>.22**</td>
<td>.13**</td>
<td>-.04</td>
<td>.04</td>
<td>.03**</td>
<td>-.08*</td>
<td>-.02</td>
</tr>
<tr>
<td>ID</td>
<td>-.01</td>
<td>-.10**</td>
<td>.01**</td>
<td>-.16**</td>
<td>-.13**</td>
<td>-.11**</td>
<td>.01**</td>
<td>.01**</td>
</tr>
<tr>
<td>TOTAL R²</td>
<td>-.69**</td>
<td>.51**</td>
<td>.50**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td>48,462</td>
<td>48,460</td>
<td>48,462</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.

**KEY FOR TABLE 4**

- ETHNIC: white = 0, non-white = 1
- AGE: in years
- GENDER: male = 0, female = 1
- COLLEGE: freshman = 1, soph. = 2, junior = 3, senior = 4
- ORDER: position in which song first appeared on tape
- COMPENSAT.: S received extra course credit = 0, S received extra course credit plus possibility of gift certificate = 1
- VISIT: on which of 4 visits evaluation was made (1–4)
- COMPLEX: 11-pt. Simple-Complex semantic differential
- NEW: 11-pt. Old-New semantic differential
- INNOVATIVE: 11-pt. Imitative-Innovative semantic differential
- SONG: on which song evaluation was made (4 songs, 3 dummies)
- EXPERIENT.: music involvement index of five experimental items
- INVOLVE: music involvement index from 3-factor factor analysis of 13 general involvement items
- ID: subject ID, used as control for repeated measures (n = 1 dummies)
- EXPOSURE: number of exposures

with exposure (incremental $R^2 < .005$ in each case). This analysis does not provide support for Hypothesis 3B.

### DISCUSSION

This study's main hypothesis, that there exists an inverted-U shaped relationship between exposure frequency and affect toward music, was supported. A small but consistent effect size was found for our transformed exposure level, and it remained a significant predictor of affect when controlling for a large number of relevant variables. The second hypothesis, that the point at which further exposure will lead to decreased affect occurs between 16 and 24 exposures, was not supported. This point occurred earlier than expected, with
the highest ratings after 8 exposures and the downturn point between 8 and 16 exposures.

The two-part third hypothesis, that subjective novelty and complexity interact with exposure in producing affect, was not supported. Although measures of subjective novelty and complexity were significant predictors of affect, they did not interact significantly with exposure.

As noted earlier, research on exposure and affect seems to support one of two theoretical viewpoints: the mere exposure hypothesis, based largely on the work of Zajonc (1968), predicting a monotonic relationship between exposure and affect; and the arousal interpretations, based mainly on the work of Berlyne (1971), predicting an inverted-U relationship between exposure and affect. This study provides support for an inverted-U relationship between exposure frequency and affective response, where popular music is concerned.

Response competition seems to be the most cited explanation of the processes of the mere exposure hypothesis. Because we did not include any measures of response competition (such as response latencies or confusion between stimuli) or any measures of physiological arousal, we can not provide empirical support for such processes.

However, the processes from Berlyne's (1971) theory can account for results here. Participants could have found initial high arousal with initial exposure to the songs; repetition may have resulted in more moderate arousal (and thus higher affect) and then in lower arousal (and thus tedium and low affect). The mere exposure hypothesis as stated by Zajonc (1968) cannot account for a downturn in affect with further exposure.11

While this study does not disprove the mere exposure hypothesis, it does suggest that Zajonc's (1968) model has limited applicability to complex meaningful stimuli such as music. Studies where mere exposure has the most support tend to use initially meaningless stimuli such as nonsense words or characters. Studies using potentially meaningful stimuli, such as paintings or music, have been less likely to find a monotonic relationship (Harrison, 1977). Because communication involves complex meaningful stimuli and the sharing of meaning, an inverted-U shaped relationship should be more appropriate for communication.

Regarding popular music, Lull (1987c) argues for the importance of considering two sets of issues: (a) those regarding the making and distributing of music and (b) the question of what people do with music. Our findings here have implications for both of these sets of issues.

We began by stating that radio programming in commercial radio seems to follow a theory of mere exposure, although there is contradicting evidence of a burnout factor (Jakobovits, 1966; Lull, 1987b; Rothenbuhler, 1987). Most commercial radio stations are aware of this burnout and conduct proprietary research to help determine when songs are burning out so that they can pull them from airplay (Freeman, 1986; Hiber, 1987; Sowd, 1989). The data here suggest that the burnout point may be earlier than many radio programmers realize—as early as between 8 and 16 exposures. Although this point will differ for various songs, it is clear that the amount of airplay any single song can receive is limited. One expert on radio programming writes that a typical Top 40 station, using a tight rotation system, will play its top songs once every 2 hours and 45 minutes every day (Routt, 1985). A person who listens to radio for several hours each day
could easily hear a song 8 to 16 times within the space of a week. One approach
radio stations could use to offset the burnout factor is to simply play a slightly
larger selection of songs with less repetition. That many radio stations are now
advertising that they have less repetition suggests that many stations are taking
this approach.

Our findings also suggest that novelty as well as repetition affects liking of a
song. The perceived innovativeness or newness of a song was positively associ-
ated with preference among our participants. Radio decision makers often
select songs that best reflect current audience familiarity, rather than anything
that sounds new or different (Lull, 1987b). This conservatism of rock and pop
music programming has been heavily criticized for not reflecting audiences'
interests (Glasser, 1984) and for strangling creativity in the music industry
(“Davis raps radio,” 1986).

In reviewing the effect of changes in the market structure of the music
industry on popular music, Peterson and Berger (1975) found evidence that
with homogeneity of product, there was unsated demand in the marketplace,
and many consumers withdrew from the pop music market. Assertions that
consumers get what they want (or want what they get) from radio were not
supported. Given that the FCC has historically defined the public interest as
being determined by marketplace demands, this programming philosophy may
not be serving said interest.

In summary, there are two main practical implications of a mere exposure
based programming strategy: Use of such a strategy may contribute toward
radio not serving the public interest adequately, and rock and top-40 radio
stations using such a programming philosophy may not be as successful as they
could be. Overexposure of songs and homogeneity of music played may be
causing potential listeners to tune out.

These findings also have implications for what people do with music both
individually and collectively. People make active choices regarding their music
preferences and the music to which they listen. The findings here suggest that
people will be more likely to attend to music with which they are already familiar
but are not burnt out on. However, as Zajonc (1968) has noted, exposure effects
do not preclude other bases for liking or disliking, and these other bases can
influence, among other things, people’s exposure and music use choices for
unfamiliar and familiar music. For example, we found a significant effect for
which song was being tested in both ANOVA and regression analyses. Although
exposure had an effect on ratings of each song, there was something else about
each song that influenced ratings.

Numerous stimulus variables have been argued to influence responses to
music (Albert, 1976; Berlyne, 1971; Hargreaves, 1986; Helmholtz, 1954; Lundin,
1967). Most are beyond the scope of this research, but two have been studied here: complexity and novelty. In our findings, subjective novelty and
complexity did not interact with exposure as hypothesized and predicted by
Berlyne (1971), but they were significant positive predictors of affective re-
response even after controlling for a large number of other variables.

If Berlyne’s (1971) theory is incorrect on these points, as our findings imply,
then a highly complex composition should tend to be more liked than a simple
catchy tune, even on an initial hearing. The common wisdom in music suggests
that this is unlikely. If Berlyne's theory is correct, then our failure to find a significant interaction must have another explanation. The stimuli used here may not have differed enough in terms of complexity to produce a significant interaction, or the shape of the relationship of the exposure-complexity interaction may not be as hypothesized. These explanations need to be explored in future research.

Another implication for people's use of music lies in Zajonc's (1968) definition of mere exposure. Zajonc argues that mere exposure is simply making the stimulus accessible to an individual's perception, as opposed to pairing a stimulus with another stimulus or with a specific situation or context. This is an adequate definition for an experimental setting, but in the real world exposure is never mere—it always occurs in a context. The context in which exposure occurs is very important for an individual's response to a piece of music (Konecni, 1982). Especially important is the social and cultural context in which listening occurs. Lewis (1987) has argued that we tend to listen to and like what others around us listen to and like. The social and cultural uses of music have great importance throughout the world (Lomax, 1968; Lull, 1987c). Thus, social influences should affect the music to which people expose themselves and should provide a context in which exposure occurs.

Within cultures, popular music has a special relationship to young people (Frith, 1981). While our focus was college students, the urban university in question provides a wider-than-usual age range (18-43). Theory suggests that the exposure-affect relationship we have found here should hold for ages above and below those in our study, but future research should explore possible age differences in this relationship.

The results of this study also have implications beyond music and beyond a single medium of mass communication. Persuasion researchers often examine the effect of message repetition on persuasion. In advertising, it is important to know how repeated viewing of ads influences audience members' feelings about the ad and about the product or service it promotes. Television researchers and professionals are interested in how audiences perceive repeated viewed content, whether it is reruns, movies, or commercials. And, in this age of cable reruns and video rentals, the issue of movie and TV program repetition becomes increasingly relevant. Given the clear salience of exposure effects for many areas of mass communication, future research needs to extend these findings, using a greater variety of stimuli and a greater number of participants, in order to provide additional, powerful tests of this hypothesis.

ENDNOTES

1The literature review here owes a debt to Harrison for raising many of the points discussed in this article.
2Berlyne (1971) defines complexity as the number of independently selected elements a stimulus contains. He adds that when two stimuli contain the same number of elements, the one that has a greater degree of similarity among its elements will be less complex.

Other definitions of complexity (Cerullo, 1988; Leeuwenberg, 1973; Watt & Welch, 1983) define complexity as amount of information or entropy. But Leeuwenberg (1973) also notes there are factors other than information content that may be even more important in determining complexity. Since an apparently highly complex pattern can be generated from very simple rules, how the regularities in the pattern are interconnected and the amount of energy required to discover the rules used are also important.

Berlyne (1971) has identified some of the dimensions of complexity for visual stimuli, but these
dimensions seem inappropriate for application to music. Objective measures of complexity that have been previously used on music seem either too difficult and time consuming for a study of this type (Cerullo, 1988; Watt & Welch, 1983) or inappropriate for rock and pop music (Lomax, 1968).

The factors found to influence subjective ratings of novelty are: whether or not a stimulus has appeared in the recent past, the number of attributes distinguishing it from other stimuli that have preceded it in the recent past, homogeneity of presentation, repeated presentation of the same stimulus, repeated presentation of another stimulus preceding the stimulus, and the number of times the individual has encountered the stimulus in the past.

Brockman et al. (1972) state that many of the participants reported that their dislike for "the antiquated rock and roll" (p. 35) used as stimuli influenced their ratings.

In order to test all 57 songs, not all participants heard the same songs. Each song was heard by approximately 18 participants, and any song not heard by at least 12 participants was not considered for use in the study.

This use of interspersed ratings was a deviation from Zajonc's (1968) technique. Without providing theoretic backing, Harrison and R. Crandall (1972) argue that using interspersed ratings attenuates the mere exposure effect. However, they do not empirically compare interspersed ratings with a heterogeneous exposure sequence. J.E. Crandall et al. (1973) suggest that when ratings are not interspersed, participants may not be paying attention to each exposure of each stimulus.

Of those who completed all four visits, 25 (53.5%) were female and 5 (11.4%) were non-white. The average age of these participants was 24.7 years. Of these 44, data from 2 participants could not be used in some analyses due to missing data. An ANOVA comparison of those who completed all visits with those who dropped out found no statistically significant differences on gender, race, age, class standing, participative music involvement, passive music involvement, experiential music involvement, initial ratings of the songs, perceived complexity, perceived newness, perceived innovativeness, nor whether or not the respondent was differentially compensated. On only one comparative criterion—active music involvement—did the two groups differ significantly. Dropouts had a significantly higher score on that index than did completers (t = 2.15, p = .04). Given that a total of 13 comparisons were conducted, this one case of significance could well be due to chance and would not meet the Bonferroni criterion for multiple tests.

Bauer and Fink (1985) posit two basic approaches to transforming data: data transformation based upon theoretical or a priori considerations or estimating an appropriate transformation from the data being analyzed. For this study, we have hypothesized a specific non-linear relationship, an inverted U, so we will take the first approach.

The five experimental involvement items ("I felt carried off by the song," "I felt as if I were a part of the song," etc.) are theoretically distinct from the other involvement items, and their validity as a measure has been established elsewhere (see Mizerski et al., 1988). In an initial factor analysis, they all loaded cleanly on a single factor, on which no other items loaded. Since these items are all 0–100 scales with comparable means and standard deviations and their factor loadings were all about equal, a simple additive index was constructed.

Participants receiving additional compensation (a chance to win a gift certificate) rated the songs more highly than those receiving extra credit only. Participants' attitudes toward participation in the study may have influenced their attitudes towards the songs in the study, but there is no evidence that it has influenced the effects of repeat exposure. Controlling for type of compensation received ensures that the variance accounted for by level of exposure is unique and not due to compensation received.

Also, the large number of independent variables also raises the spectre of collinearity among predictors. Using procedures recommended by Belsley, Kuh, and Welsch (1980), SPSS regression analyses identified all near dependencies. Of the 49 condition indexes derived, 5 exceed the criterion of .15 (2 exceed .30). Within these, only three independent variables are substantially involved (i.e., with variance-decomposition proportions of .50 or more): gender, age, and college class standing. This indicates degradation to the regression coefficients for these variables; given that we neither hypothesize nor attempt to interpret the effect of these demographics on affect toward the stimulus, collinearity proves not to be of concern here.

It is possible that one could develop a theory where response competition is related to arousal level and moderate arousal level provides the highest level of affect. Berlyne's (1954) early work on response competition suggests such a possibility. This would establish an inverted–U shaped relationship, and thus it would still contradict the mere exposure hypothesis as stated by Zajonc (1968).

REFERENCES


