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Music as a mood modulator

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ABSTRACT

Mood induction in normal subjects has been reported in numerous journal articles. A question exists as to whether these induced moods are identical with or the same as naturally occurring moods. This study was in part an attempt to compare music induced depressed mood and naturally occurring subclinically depressed mood based on mood and arousal patterns as measured by the Depression Adjective Check List and the Activation-Deactivation Adjective Check List. Thus it was a study of the differential response of normal and depressed subjects to two levels of music stimuli. Further, the study was designed to investigate the efficacy of music for modifying subclinically depressed mood states in young adults within a self-management framework. The efficacy of music to induce depressive mood states has been demonstrated in studies where mood-contingent cognition and behavior are in question. The purpose of this study was to further this line of research by exploring the efficacy of music stimuli to modify (reduce rather than induce) naturally occurring negative mood states (operationally defined as reduced DACL scores and increased AD ACL energetic arousal states). The music stimuli for this research were designed by a registered music therapist and had been used to establish significant mood effects in other research. The results of the study showed that the two levels of selected music stimuli induced measurably significant differences in affect in depressed and nondepressed subjects. The predicted relationship of decreased subjective negative affect and increased subjective arousal held only for nondepressed subjects, suggesting differential response in terms of reactivity.

INTRODUCTION

Music is present in all cultures, providing a construct through which mood can be expressed. The efficacy of music for altering mood states has been noted from earliest times, from antiquity by Greek physicians and philosophers, (e. g., Aristotle, Politics VIII, 7), through old testament (biblical) scriptures (e. g., Samuel, 16: 14-23), renaissance humanists (e.g., Burton, 1621/1927), the early experimental psychologists and continuing to the present. A recently published memoir or autobiographical case study (Styron, 1990) described the part played by music in the author's recovery from a severe depressive disorder.

In 1944, the Music Research Foundation was organized to study the application of music to emotional and mental disorders. It was perhaps the first scientific study of the effect of music on emotion (Gutheil, 1952). Research projects were undertaken by psychologists and musicians with patients at Walter Reed General Hospital, Washington, DC, and authorized by the Surgeon General's Office (Gilman and Paperte, 1952). As Raymond B. Cattell (1954) studied musical preference and personality, Alexander Capurso (1952) studied moods associated with music through this research organization. After World War II music began to be applied specifically as therapy and evaluated systematically and scientifically. In 1950 the National Association for Music Therapy was organized for standardizing clinical practice and research. This line of research has focused on the institutional and therapeutic use of music in medicine, dentistry and learning disability in education.

More recently there have been mood manipulation studies successfully using music stimuli to induce depressed or elated mood states as a basis for studying the effect of mood on perception, cognition, memory, and helping behavior in normal subjects (Clark, 1983; Goodwin and Williams, 1982; May and Hamilton, 1980; Mathews and

Bradley, 1983; Pignatiello, Camp and Rasar, 1986, 1989; Stratton and Zalanowski, 1989).

The purpose of this study is to explore whether or not naturally occurring subclinically depressed mood states might be modified by selective music stimuli. That is, if acute mood states can be induced through music stimuli, might naturally occurring depressed mood states be reduced or modified through the same process? The modification of depressed mood through music stimuli is the focus of this study with the major application within a self-management framework. The ability of music to evoke mood makes it is a potentially powerful resource for mood modulation.

LITERATURE REVIEW

Music

Research in the psychology of music includes the psychoacoustic perspective and the psychomusic perspective. The psychoacoustic (synthetic, atomistic) perspective involves a laboratory approach in which particular variables (separate auditory stimuli) are isolated for the study of sensory responses to physical stimuli. Problems of perceptual organization of acoustical elements are studied from the psychoacoustic perspective. The psychomusic (holistic, meaningful or significant) perspective examines reactions to music and perceived aesthetic stimuli taken from real life. For the purpose of this study of music and mood, that is, research questions that deal with relationships between music and some type of human affective behavior, the focus on the psychomusic approach is appropriate (McMullen, 1980).

Another basic distinction in music stimuli is made along absolutist and referential dimensions (Meyer, 1956; Radocy and Boyle, 1979). Absolutist theories view music's value or meaning as the result of the musical sounds themselves; that is, there is no musical meaning beyond that in the structure of the stimuli. Essentially any meaning or value derived from the music must be in terms of the intrinsic characteristics of the musical sound and structure and nothing else. Some absolutist theorists (expressionists) consider these embodied structural musical elements and patterns capable of exciting feelings and emotions in the listener; others (formalists) do not.

The referentialist position holds that the meaning of music involves more than the sounds themselves, that it includes extra-musical associations such as the images, memories, designated moods and consensual connotations evoked by music stimuli. A third position is a relativist position which allows for some personally derived meaning.

For the relativist, musical association, imagery or analogy, is a psychological product of experience and cultural orientation.

Radocy and Boyle (1979) and Kivy (1990) view classifications of music in terms of sensory, cognitive, and affective properties of music. On one level music can be a purely sensory experience. Responding to sound stimuli in a physical, primitive way seems genetically pre-patterned into our nervous system. We are particularly sensitive to the rhythm of drums, especially rhythm with a primitive and pronounced beat. At another level music listening may become a cognitive experience, primarily analytical, where the structure of the stimuli becomes most salient. Listening at this level may require training for such critical and comparative analysis. On yet another level music may be an analogic experience. Here the patterns of the sound (aural) stimuli may evoke feelings and images through association or by cuing, essentially the type of learning process of the classical conditioning paradigm.

These three levels or classes of stimulus properties have been isolated in theory and research of the arousal potential of music. Psychophysical properties (McMullen, 1980), produce experience in activation behavior (energy, excitement, stimulation, intensity, motivation) with responses in terms of increased motor activity and positive mood change through arousal and neurophysiological and biochemical concomitants of arousal. This is thought to result from physical characteristics (frequency [pitch], amplitude [intensity] and its psychological correlate loudness, waveform [timbre]) and duration contained in the stimuli (soundwaves) generating activation which is integral to an affective response.

Collative properties, the "structure dimension" (Meyer, 1956; Berlyne, 1971; McMullen, 1980), provide experience in structure (novelty, surprise, order, clarity) and concern the intramusical or intrinsic organization such as repetition, redundancy, variation, and deletions which activate recognition, habituation, and dishabituation

experiences. Certain sound stimulus patterns whose collative qualities give music a positive intrinsic hedonic value are pleasurable or rewarding in themselves. These positive hedonic values are a function of arousal. The arousal potential of the stimulus pattern includes intensity, associations, and motivations.

Ecological properties contribute experience in associations (designated moods, connotations, private images, memories) and are based on extramusical arousal theory. Thus these three classes of variables contribute to arousal potential; the psychophysical (waveform and intensity), the collative (structure dimension) and the ecological (learned associations - memories, associations, imagery).

McMullen (1980) further proposed a two-dimensional framework of energy and structure for analyzing intrinsic music stimuli. These two dimensions are perceived when music stimuli are presented. The nature of these dimensions is formulated from the principles of simultaneous and sequential mental processing with each forming a continuum from high to low.

Music stimuli may refer to any of four designations: the music itself, listening to music, having music in the environment and the making of music (Sears, 1968). Involvement with sound stimuli may be along a passive and active continuum (Hamel, 1979). Listening is often a more passive response; making one's own music may require more active involvement. Behavioral involvement is movement entrained to the music, that is, dance, exercise, and march. This study concerns the music itself and listening to music.

The fundamental question for a psychological study of music stimuli is how they are able to affect people. Some primitive response to music is shared by the whole species (Sloboda, 1985). Seen from the perspective of physics, a musical event is just a collection of sounds with various pitches, durations, and other measurable qualities. Somehow, the human mind endows these constructed sounds with significance and

expressive value. All models of the therapeutic value of music stimuli center around the concept of physiological arousal and its relationship to affective responses (Thaut, 1990).

Mood

There has been a renewed interest in mood and affect. Mood and affect are often used synonymously, but a more precise usage is with the understanding that mood subsumes affect. Earlier neglect of mood as an important aspect of personality has given way to a new and widespread interest in the measurement and modulation of mood. Mood, defined by Zajonc (1984), is a phasic character of emotional reactions, but he does not distinguish between mood and emotion. Lazarus (1984) refers to moods as sustained general states that may or may not be considered emotions. Theorists who have a distinct meaning for the term mood as differentiated from affect or emotion suggest that effects of mood are general and pervasive, that is, less intense than the more specific and intense construct of emotion, and that these mood states provide information about the general state of being, facilitating self-regulation (Nowlis, 1965; Pribram, 1975; Jacobsen, 1975; Isen, 1984).

According to Thayer (1989), mood is related to emotion but implies a longer course of time than emotion, and unlike emotion, occurs without an identifiable cause or stimulus. He considers mood to be a subtle background state on the order of a moderator variable. Morris (1989) suggests mood may be dichotomized as conscious or unconscious, normal or pathological, automatic or controlled, figure or ground. Researchers using self-report measures are operationally defining mood as conscious.

Among Thayer's (1989) essential features of mood (in contrast to emotion) are: 1) mood involves conscious awareness, 2) mood is an enduring reaction not usually identified with a particular stimulus, 3) mood is often assigned a positive or negative

hedonic value, 4) mood is understood in relation to the depression-elation continuum, 5) mood includes a physiological base, 6) mood is related to central biological functions, 7) mood is closely related to cognitive processes, and 8) mood is associated with behavior.

From Thayer's (1989) perspective, mood states can represent a summation of what is happening in the body at any moment. Moods are thought to be biochemically mediated, with the brain the central mediator of the mood states. When psychologically depressed, one is biochemically depressed as well, for brain chemistry changes right along with mood. The dependent variable is how one feels, that is, one's mood.

From this perspective, arousal is the basic element of mood and behavior. Subtle negative moods can motivate avoidance behavior. Although moods can be overcome, the mood-behavior relationship exists. Self-efficacy estimations and self-esteem vary with tense or energetic arousal. Social interaction or withdrawal varies with mood.

According to Thayer (1986; 1989), moods are modulated by complex interactions of energy and tension. These states of arousal translate into low energy-high tension (the basic components of depression, especially agitated depression) or the high energy-low tension components of optimism, sense of well-being and high self-esteem. As the energy state changes, mood state changes, and perceptual reality changes.

Basic perceptual processes are probably affected by mood. As mood changes, perception of personal problems, self and others changes. An association or interaction exists between mood and cognition. If one accepts acutely induced moods as comparable to the more naturally occurring variety, there is evidence that depression may affect the cognitive processing involved in person perception (Forgas and Bower, 1987).

Research of mood dimensionality, mood measurement, mood management, physiological correlates or mood antecedents is often conducted through self-report. Self-report as an index of arousal (or mood) is largely a cerebrocortical function, and as

such it represents a high level of integration of physiological systems and may be a better index of arousal than any single physiological measure (Thayer, 1989). Arousal may be designated as energetic arousal (task-directed) or tense arousal (danger-directed). High tense arousal and high energetic arousal produce tense-energy which is associated with achievement. High tense arousal and low energetic arousal produce tense-tiredness which is associated with depression. These dimensions correspond to the orthogonal factors of high-low positive affect and high-low negative affect of Watson and Tellegen (1985).

Mood disorders, particularly depression, comprise one of the most, if not the most, active research areas concerning mood. At least some types of depression include strong components of tense-tiredness (Thayer, 1989). One of the major symptoms of depressed mood is subjective absence of energy. Although depressed people appear overtly to be in a state of very low arousal, it is likely energetic arousal that is low. Self-reported depression among nonclinical adult cases shows clear patterns of low energy and high tension associated with the condition.

The question arises about the commonly experienced "normal" subclinical depressed mood. What coping strategies are used in attempting to move beyond it? What self-initiated therapeutic strategies help maintain a more balanced mood, or prevent depression from becoming a clinical disorder. The study of natural coping strategies for dealing with the experience of depression (that is, studying the coping strategies of normal individuals) could enhance depression therapy research. The study of normal self-management strategies may benefit depression researchers and practitioners in their development treatments for depression or dysphoria (Hosford, Burnett and Mills, 1984).

Kirsch, Mearns and Catanzaro (1990) discuss mood-regulation expectancy as a belief that one has the ability to alleviate negative mood states. The placebo effect would

be the prototype of the tendency for expectancy to produce expected responses. Using music as a strategy for pain control, Melzack (1973) found that the subject's beliefs about music's effectiveness significantly affected tolerance for pain. Thus the traditional view of music as a healing power to some extent contributes to music's effectiveness as a therapeutic agent (Gfeller, 1990). Having alternative strategies at their disposal, persons are generally good judges of what will work best for them (Kanfer and Grim, 1978). Different strategies are found to be effective for different persons with depressive or dysphoric mood states.

Music and Mood

Moods can be overridden by a variety of situational (sensory) influences that can have powerful psychological effects. These influences may exert their control through emotional activation that is more subjectively salient than the existing mood, or the effects may occur through activation of strong cognitive predispositions. Thayer (1989) reported ten percent of adult respondents to a survey of self-regulation of moods stated music to be the best way of alleviating bad moods. They use music as a mood modulator. It may be that music conveys mood as no other medium can.

A theoretical relationship between music stimuli and affective response may be grounded in a concept of activation or arousal. Within the framework of physiological arousal and its relationship to mood proposed by Thayer (1989), music-induced changes in arousal level can be seen as a resource for augmenting arousal (excitement, energy, stimulation) or for moderating arousal states toward calm states.

There is an elusive x-factor, for music is only a set of vibrations in the air. Yet these vibrations constitute a particular set of vibrations corresponding to a particular psychic state in the composer. The sounds are effective only insofar as they convey a meaning or have significance. All that physically exists external to human consciousness

is the arrangement of acoustical properties. Only when the perceiver interprets these properties as meaningful is an affective response possible. Whether or not detached notes are heard as a melody depends on the form and meaning given it by the perceiver. It is this form, meaning or perceived quality which is effective. But that meaning or form is something emotional or spiritual, the essential nature as distinguished from the medium in which it is embodied (May, 1985). However, biochemical processes can be influenced by these perceived properties whether the process occurs spontaneously or through language or music.

Experimentally manipulating mood states through language has been investigated in a variety of contexts. Moods have been found to be quite manipulable experimentally with strong implications for individual self-regulation of mood (Velton, 1968). Manipulation of independent variables in the form of acoustical properties or music stimuli to determine whether it will have a causal influence on a dependent variable of an affective nature (mood) has been of interest to researchers in the fields of psychology and music. The systematic observations surveyed below suggest that selected music stimuli elicit measurable mood change.

A study by Shatin (1970) suggested that depressed mood may be selectively altered through use of music and vectoring, that is, gradual movement via the music stimuli from one existing mood state to a more desired mood state. This study was based on the "iso-moodic" principle (Altshuler,1948), which maintains that a listener's mood can be influenced most effectively by first matching the musical stimuli to the existing mood, and then changing the music in the direction in which the subject's mood is to be maintained. The principle seems worthy of further study, particularly the implication of ability to control and change one's own mood behaviors in a self-management framework (Haack, 1980).

More recently, Pignatiello, Camp, and Rasar (1986) manipulated subjects to elation and depression with twenty-minute tapes of music proceeding from neutral to elating or neutral to depressing. The mood change occurred through use of instrumental classical, popular and musical score soundtracks previously judged as depressing, neutral or elating. Results suggested that music induced measurably significant mood differences between groups.

In a study of the effects of music and painting on mood (Stratton and Zalanowski, 1989), music appeared to be the dominant factor in determining the direction of mood, with mood moving in the direction of the music when variously paired with elating or depressing auditory and visual stimuli. In this study cognitive assessment of the visual stimuli or other cognitive mediators seemed to be an essential element of the mood change in that paired conditions contributed the strongest effects. However, the study suggested primacy of auditory over visual stimuli.

May and Hamilton (1980) found that the induced mood effects from the type of music playing in the background influenced how much subjects liked a stranger whose photograph they examined. Compared to subjects who carried out the task with no music playing, those who heard music they enjoyed (rock) liked the stranger better while those who heard music they found unpleasant (avant-garde) liked the stranger less. The study suggests that the power of music to affect mood and mood dependent interpersonal behavior is considerable.

In a study of music and mood in a psychiatric prison setting, Thaut (1989) measured self-perceived and self-reported changes in mood (relaxation and cognitions were other dependent variables) following music stimuli treatment. The data were presented as evidence of significant positive mood change through selected music stimuli. This may be important in view of theories that postulate mood modification as an essential step in behavioral change (Sutherland, Newman, and Rachman,1982).

Hanser (1989) recently completed a study to see whether music therapy could benefit older adults (over 60 and not well) who suffer from anxiety and depression. Some received music cassettes and intensive training during home visits; others received music cassettes and written instructions. A control group received no music cassettes during home visits. All were given standardized psychological tests at the beginning and end of the eight-week study. Improved mood was found in the two music conditions, but not in the home visit no-music group. The results of the study suggest it was the music, not the personal attention during home visits that had the greatest impact.

Clark (1983) studied the induction of depressed mood in the laboratory in an evaluation and comparison of the Velten procedures (a cognitively-based procedure whereby subjects talk themselves into a mood) and musical procedures. They successfully used the mood stimulus function of music in connection with their studies of cognitive relationships to elation and depression. The selected music stimuli showed effects on both physiology and affect.

Pignatiello et al. (1989) compared the two different mood induction techniques (Velton's statements and music) at a psychophysiological level (heart rate, systolic and diastolic blood pressure, finger pulse amplitude, and respiration rate). Mood induction states included elated, neutral, and depressed groups. Results showed that regardless of the technique, elated subjects had significantly lower scores than the neutral and depressed subjects on the Depression Adjective Check List. The overall emotional impression reported by the subjects in the elated music group was that the music made them feel relaxed yet excited (calm energy), and that they sensed having increased energy and spirit (energetic arousal). The percent change in heart rate supports the notion that music may achieve some of its effects through rhythm and tempo. For the music conditions, the lower the Depression Adjective Check List score (i.e., the more elated) the higher the percentage change (increase) in heart rate.

Steinberg and Raith (1985) examined the assumption that depressive mood slows down the tempo of music performed by an individual. They explored musical expression as a nonverbal paradigm of affective responsiveness with the course of psychiatric patients' treatment. The hypothesis was confirmed, but only for endogenous-depressive patients.

Standley (1986) analyzed all empirical studies reported in English of the effects of music in clinical (not analogue) studies of medical/dental treatment which reported data in a format amenable to analysis. The average effect size of music across all fifty-five dependent variables (the function of music was as a mood stimulus in some studies) was .98 for music versus nonmusic conditions. In fifty-four of the fifty-five variables analyzed, music conditions enhanced medical objectives whether measured by physiological, psychological/self-report, or behavioral observation. In these studies the function of music was to serve as a focus of attention, to offer opportunity for pleasure and feelings of well-being, to reduce depression or anxiety, to increase awareness and pleasure, and to initiate and maintain counseling interaction.

Tanioka, Takazawa, Kamata, Kudo, Matsuki and Oyama (1985), using music as an anxiolytic with orthopedic, gynecologic and urologic cases, found an effect size on stress hormone level (cortisol) of 1.80. It would appear that selective sedative music may alter specific hormone levels as well as self reported reduction of tension. Fibiger, Singer, Miller, Armstrong, and Datar (1984) found a significant correlation between cortisol and alertness (arousal).

Since studies have suggested that emotional stress and depression tend to elevate corticosteroid levels, Rider, Floyd, and Kirkpatrick (1985) measured the effect of taped music with imagery and relaxation on adrenal corticosteroids and the indirect effect on the immune system. Results indicated that corticosteroid and temperature rhythms were

significantly more entrained during the tape conditions. The mean corticosteroid level also declined during the music condition, but nonsignificantly.

The review of these studies, suggesting the ability of music to move the subject into a designated affective domain, supports the thesis that music has a place among therapeutic modalities for altering mood or affect. This ability makes it a potentially potent resource in self-regulation strategy. The nondesignative nature and lack of denotative meaning provide freedom for individual projection and identification with music stimuli (Kreitler and Kreitler, 1972). Music may evoke specific mood responses through specific associations or music may evoke nonspecific positive mood change, which in turn facilitates changes in cognition and behavior (Thaut, 1990).

Whether dependent measures are self-reported, or measured physiologically or behaviorally, mood effects of music have been demonstrated. The research reviewed above suggests music in a listening-based context could be a resource for deliberately modulating mood in a normal subclinically depressed population. Since most research has focused on the use of music as an adjunct therapy with a psychiatric and medically disordered population, the use of music for individual control and self modulation of mood appears to be an untapped application and research area.

The systematic use of music stimuli is required for a therapeutic music experience, that is, for specific therapeutic direction. Different types of music contain a different arousal potential in terms of direction and intensity. Music variables can be grouped under order, complexity, or energy (McMullen, 1980). Listener variables include previous experience with music and the motivational state for music interaction. As a result of listener music preference, the presentation of stimuli in other than an idiosyncratic fashion may be difficult.

Music preference is important as it is related to the mood of the individual (Abeles, 1980). Theoretically, one responds more favorably to music that corresponds

to or matches one's mood state. Corresponding music validates individual feeling and experience. According to the iso-moodic principle (Altshuler,1948), when depressed, listening to music that is experienced as sad, that represents the depressed state musically through low rhythmicity and descending themes, is therapeutic. Although this may reinforce the negative mood state, acknowledging what one feels is the first step in moving beyond that feeling. However, in order to elevate mood, the music must gradually progress from melancholy to the more positive mood state.

In the context of music as a mood modulator, preferred or particular music is important. Particular music, rather than general, has been considered essential for therapeutic use of music. For example, Styron (1990) responded only to the auditory stimuli of Brahms's Alto Rhapsody, particular music, in that it was uniquely meaningful to him through its associations. There is a need for systematic examination of the effect of general and particular music on mood response.

Theories of Mood Modulation through Music Stimuli

Music as a Distractor from Excessive Self Focus

Depression is a disorder that has been linked with excessive self-focus. Pyszezynski and Greenberg (1987) describe a self-awareness theory of (reactive) depression in which negative cerebration is caused by cyclical dysregulation in response to loss, which, in turn, produces self-focusing and debilitating pessimism. Theoretically, from this perspective, perseveration and pessimism could be reduced to the level of nondepressed subjects by inducements to focus externally, whereas focus on subjective feeling in psychotherapy would be counterproductive. A prescription to focus on compelling external stimuli would be a more appropriate and productive therapeutic strategy.

Wickland's (1975) earlier self-awareness theory states that at any given instance, attention is directed either toward the self or the environment. According to this theory, it is the prolonged and excessive self-focus that leads to an accumulation and accentuation of negative thoughts, self-criticism and pessimism, that is, depressogenic cognition. The inability to reorient attention away from the self to the environment is dysfunctional. Intervention should assist in the refocusing. In his theoretical exposition of self-awareness theory, Wickland suggested the intense stimulation of loud rhythmic rock music as a mechanism for steering focus from self to environment. The sensory surge of such highly rhythmic music may override negative ruminations. From the perspective of a neurophysiologist and music researcher (Clynes, 1982), music lets you become free; free of your own personal life.

Pyszczynski, Hamilton, Herring and Greenberg (1989) found that distracting depressed individuals from focusing on themselves reduced negative memory bias which seems to be mediated by excess levels of self-focused attention. These researchers found there was no difference in negative ideation between depressed and nondepressed subjects under conditions of external focus. The negative ideation occurred only when depressed individuals were self-focused. Techniques that decrease elevated levels of self-focus, over longer periods than provided by experimental conditions, might alleviate some of the self-perpetuating depressive processes. Temporary disruptions in depressive processing that result from extended periods of external focus could facilitate a return to constructive, goal-directed activity.

Smith and Morris (1977) looked at the differential effects of stimulative and sedative music on anxiety, concentration, and performance. Compared with sedative music, stimulative music increased worry scores, interfered with concentration, and resulted in predicted lowered expectancies. The study suggests stimulative (highly rhythmic) music overrides efforts to focus on anything but the music stimuli.

In an exploratory study, Cripe (1986) successfully used rock music as therapy for children with attention deficit disorder. The prominent beat and rhythm of rock music did override other environmental distractions and produced orienting responses and less random activity as predicted.

According to Csikszentimihalyi (1990), keeping order in the mind from within is very difficult. External stimulation is necessary to keep attention directed. When external input is lacking, attention begins to wander and thoughts become chaotic, resulting in the random rumination. According to this theory, unless one learns to control consciousness, to prevent negativity of depressive disorders, cognitive disorganization (the undisciplined state of mind) occurs. The ability to focus or re-focus is a form of discipline, and to practice the skill of refocusing is to begin to gain control over one's inner life, that is, by achieving control over cognition.

From this perspective (Csikszentimihalyi, 1990) stimuli that draw attention away from the self have an important role in distraction from self-focus. Most obvious are sights and sounds that impinge upon and bombard the senses and demand immediate attention. It is the unique structure of music, existing only through time and requiring commitment to the experience moment by moment (present-moment awareness) and structured time (temporal structuring), which makes music such a forceful distractor and antidote to debilitating self-focusing. Using music in a more deliberate way with a nonclinical population needs to be studied, as attention to selective music stimuli may reduce random rumination and alter focus.

One of the functions of music is to focus attention to patterns of sound stimuli appropriate to a desired mood. Such organized auditory stimuli help organize the mind that seriously attends to them, and through this mechanism music may reduce the depressive features that individuals experience when randomness reigns. Fully attending to relevant music stimuli can induce "flow" experiences and loss of self-consciousness.

Where focus is external, stimuli absorbing, the self is transcended. Self-scrutiny and concern for the self disappear, yet the sense of self emerges stronger after the flow experience (Csikszentimihalyi, 1990). Music is simply one strategy, among others, for deliberately disrupting self-focus and intentionally refocusing attention to the external environment whereby depressive features may be reduced to more normal levels by distraction from the self.

Music as Aesthetic Experience

There are several related theories which suggest the mood modulating effects of music are provided by the intrinsic characteristics of the music itself. That is, nonreferential information, information embodied within music, structured to produce arousal and resolution, mediates mood modulation. This kind of embodied meaning refers to those events in which the stimulus and consequent are of the same kind, that is, both musical, not extramusical.

For Meyer (1956) one musical event has meaning because it points to and makes the listener expect a subsequent musical event. Music that does not arouse expectation is simply without meaning for the listener. This theory suggests that affect is aroused when a tendency to respond is delayed or inhibited. From this perspective, the embodied meaning of music stimuli and resulting arousal (i.e., emotion or mood) are a function of expectancy and somewhat suspended resolution. Musical manipulations are designed or composed to disrupt expected patterns within the structure of the musical stimuli and are followed by suspension and resolution at some point within the composition.

Intrinsic structural (collative) music factors are the focus of an aesthetic theory formulated by Berlyne (1971) as the source of the psychobiological mood response to music. This theory suggests that music stimuli contain patterns that have specific arousal potential and that the collative characteristics may induce arousal, providing

hedonic value. This relationship between arousal potential and hedonic value is theorized to be in the form of a U-shaped curve. Basic to the theory is the hypothesis that positive hedonic values are a function of arousal and that optimum arousal is a source of pleasure. Thus inducing movement from a low to a more moderate state of arousal or reducing arousal from an uncomfortably high state is pleasurable. The point is that music stimuli that have positive intrinsic hedonic value are pleasureable or reinforcing in themselves.

Kreitler and Kreitler (1972) propose a homeostatic model of motivation which subsumes the arousal theory of Berlyne above. Some balanced or optimal level of stimulation can be disrupted by either too much or too little stimulation, requiring the restoration of equilibrium. The restoring of equilibrum (through esthetic stimuli) is pleasurable. Tension and relief may be manipulated through the organization of music stimuli. Musical factors such as rhythm, consonance and dissonance and compositional form can evoke tension and resolution of tension as the listener follows the flux of the thematic material.

More broadly, Kreitler and Kreitler (1972) theorize that participation in aesthetic experiences is motivated by potential tension reduction in the participant through the process of displacement. Diffuse tensions of the participant can be displaced onto the domain of music, mediated by the more specific or focused tension which is then discharged through the resolution of aesthetic stimuli. Resolution (relief) of diffuse tension occurs by generating new tensions which are specific to the aesthetic domain and worked through in that domain. Diffuse tensions can be absorbed into the more focused and directed tension of a composition of music stimuli and resolved through aesthetic means.

According to Thaut (1990), since there is no evidence to support a contrary view, the primary affective response to music may be from perceiving intrinsic musical patterns (the expressionist view), and music-induced mood states based on intrinsic

stimulus patterns must be considered. Determining music's arousal potential and influence on mood responses with regard to depressed populations is dependent on identifying and analyzing the stimulus patterns or properties and their corresponding responses in therapy settings. Control of arousal and resolution is the the basis reinforcement from this perspective.

These collative properties of music provide therapeutic experience in structure (form and focus). The experience of order and tension relief through musical structure stimulates mental organization. The collative experience provides meaningful sensory stimulation for a mood response that develops during the processing of musical events. Thaut (1990) syggested events for evoking mood response include the dimensions of simplicity/complexity, novelty/familiarity, clarity/ambiguity and tension/resolution, with hedonic value for the listener in terms of reinforcing modulation of arousal as well as the pleasurable aspects of the stimuli themselves. This aspect of the structural experience can be used to provide a deliberate experience for modulating mood according to current level of functioning and arousal needs.

The collative properties provide the form for the musical events (patterns) that build and resolve musical tension by evoking the appropriate level of arousal. Music stimuli may be used to facilitate the control and modulation of one's own emotional state through the collative properties of form and focus. According to May (1985), art (i.e., form) is our universal therapist. Art is the way we manage inner turmoil and transcend terror. When form and order are perceived in the environment, there is a corresponding sense of order and control within the mind and body of the perceiver. Therefore, aesthetic equilibrium can directly affect the functioning of the individual (McNiff, 1981). Theoretically, the feeling of competence in controlling mood in turn should build self-confidence and self-esteem.

Aesthetic stimuli have the power to give form to feelings and bring them into focus. However, Gfeller (1990) notes that the referentialist view is more prevalent in terms of therapeutic use of music stimuli. The referentialist view suggests musical meaning and arousal properties are mediated by extramusical associations.

Music as a Conditioned Stimulus

Through convention and association (extramusical associations evoked by music) we learn to connect certain sounds with certain emotions. Therefore, hearing the sounds associated with the emotion will call up these emotions even if not present initially. Music so associated with an emotionally charged event or person in the past suggests music may become a conditioned stimulus for the emotional response. Patterns of sound stimuli may evoke mood and images through association or by cue . The associative experience is not embodied in the content of the music, but consists of the connotations (cues), memories, and private images that have become associated with the music stimulus. Musical meaning, according to Meyer (1956), may indeed be designative (referential, extramusical) as well as embodied (absolute, intrinsic to music stimuli). The designative meaning of a musical stimulus may indicate events or consequents which differ from itself in kind, that is, nonmusical events.

Music is communication at a non-verbal level through the medium of sound. Gfeller (1990) discusses the symbolic function of music in communication. Through contiguity (repeated association with a referential image), cultural convention (standardized musical communication of mood), and iconicity, auditory patterns come to possess extramusical meaning. Similar to onomatopeia in the language of poetry, iconicity is the similarity (mimicry) between auditory characteristics and some referential feeling or process.

Research has shown that more intense and longer lasting imagery is generated with music than without. Halpern (1985) described research in which imagery production was found to be significantly higher under a music condition than under a merely relaxed condition. McKinney (1990) found a short recorded excerpt of classical music increased the intensity of feelings during imagery. Music might be used more deliberately in this manner to manage and alter nonpathologically depressed or anxious mood states in every day life. Certainly the composer of music intends to change the state of the listener through the transmission of auditory stimuli and the evocation of corresponding responses.

The use of music to effect changes in mood is most obvious in film and television. Musical scores associated with movies intentionally cue mood and emotion to a obvious and singular extent. Thayer (1983) studied the modulating effects of music on responses to a stressful film stimulus. An industrial safety film often used in psychophysiological research was shown to subjects with a soundtrack score to decrease stress, a soundtrack score to increase stress, and a control condition. Results indicated that musical scores can significantly alter electrodermal responses to a stressful film, possibly through the process of auditory cues for tense arousal.

Thaut (1990) suggests that music may evoke specific affective responses through particular associations or that music may evoke nonspecific mood change through perception of psychological and collative (music patterns) properties, which in turn facilitates changes in various thinking and feeling states and overt behavior. Awareness of feelings and designated mood experiences are among the therapeutic goals based on associative experiences in music.

Behavioral change specific to therapeutic experiences in extrinsic associations evoked through patterns of music stimuli may occur through significant memory recall, emotional processing through reminiscing, and emotional learning through associative

experiences. However, all models of music-induced mood changes center around the concept of physiological arousal and its relationship to affective response. Music may be used as a cue for matching the mood, tempo or rhythm of auditory stimuli. Rhythm, tempo and intensity might be thought of as arousal cues for altering or augmenting activation, elevating energy levels (motionally and emotionally), and motivation of subclinically depressed or dysphoric subjects. Motivational aspects of music affect mental attitude and motor activity level.

Music as Stimulation

Feder and Feder (1981) claim those who use music therapeutically have tended to view the field largely in terms of physiology, that is, in light of music's influence on the body. Music and sound stimuli do have a biologically meaningful effect on brain and nervous system functions. According to research summarized by Critchley and Henderson (1977) and Thaut (1990), several neurophysiological processes are theorized to be activated in response to music stimuli. Because music is nonverbal, it is thought to move through the auditory cortex directly to the limbic system, the emotional part of the brain, evoking immediate emotional response. Research also suggests music may help produce the peptides (endogenous opiates) that relieve pain by acting on specific receptors in the brain. It is also theorized that music may serve to activate the flow of stored memory material across the corpus callosum, so that right and left hemispheres of the brain work in harmony. The close connection and coordination of the auditory sysem with the motor region of the brain have led to research on the use of rhythm to facilitate aspects of motor or muscular activity and performance.

Rhythm and loudness are primary in producing physiological response. While rhythm, and particularly tempo, appear to be the predominant energizing factors, dynamic (loudness) level also appears to serve as a stimulator. Louder music seems to

stimulate greater response activity than less loud music. If a tone's frequency is held constant and its amplitude increased, the tone's loudness is increased. The perception of loudness is a result of the total effect of the combination of the firing rate of individual neurons and the number of neurons.

> When the intensity of a tone is increased, the nerves fire at a faster rate - up to a point. If the tone continues to increase in intensity the hair cells quickly reach their ultimate firing rate with the result that the resonance region spreads wider along the basiliar membrane, including more and more hair cells that join in the firing. (Hodges, 1980, p. 54)

Data from multiple measurements of rock groups indicate a mean of well over 100 dB, with some groups approaching a mean of 120 dB, that is, approaching the threshold of feeling (Haack, 1980). Although there is known risk, the trend of young adults is to demand and to be more responsive to music stimuli that are deafening. Yet at a fairly loud level, 80 dB SPL (sound pressure level), all the frequencies in the music are audible. SPL is a physical quantity that depends on the sound pressure, whereas loudness is a psychological response to the sound - not the same thing (Goldstein, 1989).

Apart from loudness, rhythm is primary in producing physiological response. Music of all cultures involves the organization of sounds within a rhythmic framework. It is the rhythmicity of music that energizes (Gaston, 1968). Rhythm, the energizing factor, characterized by detached, percussive sounds, stimulates muscular action or motor response. The more percussive, staccato and accented the music, the greater the apparent physical response to it. If the underlying beat is clearly defined, the listener is often moved to respond with some overt motor behavior.

It is rhythm that provides the energy of music. It is the intensity of rhythm and the manner in which the rhythm is indicated that determine, in large part, the amount of energy invested in the physical response to music. According to Gaston (1968),

> When the musics from all cultures of the world are considered, it is rhythm that stands out as most fundamental. Rhythm is the organizer and the energizer. Without rhythm there would be no music whereas there is much music that has neither melody nor harmony. (p. 17)

Gabrielsson (1986) discussed the multidimensional aspects of rhythm response as an experience of perceived grouping (accents, pulse and tempo), overt behavior (that is, tapping of feet, shaking of head, clapping of hands, and dancing), and psychophysiological response (changes in breathing, heart rate, muscle activity, activity in the brain). Dimensions of the experience of rhythm may also be categorized as experienced structure (structural), experienced motion character (motional), and emotional character (emotional). The experienced motion character and the emotional aspects of different rhythms have received relatively little empirical attention. Gabrielsson's distinction between structural (organizer) and motional-emotional (energizer) aspects of rhythm corresponds with Gaston (1968).

Theoretically, highly rhythmic music could induce movement toward the energetic arousal state ascribed by Thayer (1989) as the positive mood state. The emotional aspects of different rhythms have received relatively little attention from an empirical point of view (Gabrielsson, 1986), although in music therapy rhythm is usually considered as the fundamental component in music and as the most effective means for change in many treatments. Eagle's (1971) analysis of the literature on mood response found rhythm to be the primary element in evaluating mood responses to music. As stated above (Gaston, 1968), the beneficial effects of rhythm are considered to be the motional-emotional (energizer) and structural (organizer) aspects of rhythm. The rhythmic quality of stimuli, allowing those stimuli to be perceived not as separate and singular, but as clusters, is the organizer component. Rhythm, whenever it is perceived, serves the function of reducing, condensing, and mitigating the complexity of stimuli in constant flux, by ordering them into graspable and organized patterns which

satisfy through the illusion given of controlling the uncontrollable (Kreitler and Kreitler, 1972).

Rhythm is a very fundamental and pervasive concept in our physiology and functioning. Rhythm-related phenomena may be thought of as regularly recurring events in a pattern, however simple. Three rhythm related processes are relevant to the therapeutic use of the rhythmicity of music stimuli (Evans, 1986); entrainment, resonance and synchronicity are theorized as bases for change.

The process of entrainment may be thought of as the modification (carrying along) of one rhythmic phenomenon by the flow of another - the former conforming more or less to the rhythm of the latter. Thus the rhythmicity of music that differs from one's present energy or activation level would tend to modify it. The modification of one rhythmic phenomenon by the flow of another may result in a certain phase relatedness or synchrony. This synchronicity refers to the co-occurrence of events in time, as on the same wave length.

A related term and process, resonance, occurs when the frequency of an external stimulus is the same or nearly the same as the natural vibration of a system, and there is a tendency toward abnormally large vibrations in response to the external stimulus. Thus rhythmicity that does not differ from one's present mood, theoretically, intensifies and validates that mood. Music that differs from one's present mood in terms of rhythmicity causes a form of cognitive dissonance that may result in mood change.

Neher (1962) studied responses to rhythmic stimuli involving drums and the effects of drumming on the central nervous system. Drum rhythms of 8-13 cycles per second seem to be associated with, if not the cause of motoric and perceptual changes. Based on observation of the use of drums in ceremonies in different parts of the world, Neher laboratory-tested the effect of rhythmic drumming on physiological and psychological states. These states may be due to unique properties of auditory stimuli

produced by drumming: 1) a single beat of a drum contains many frequencies - different sound frequencies are transmitted along different nerve pathways in the brain - therefore the sound of a drum stimulates a larger area in the brain than a sound of a single frequency, 2) a drum beat contains mainly low frequencies - the low frequency receptors of the ear are more resistant to damage than the delicate high frequency receptors, and can withstand higher amplitudes of sound before pain is felt (therefore, it should be possible to transmit more energy to the brain with a drum than with a stimulus of higher frequency), and 3) neurons have a spontaneous firing rate that is reinforced by a rhythmic stimulus of similar frequency. The reasons for the unique effects of detached (rhythmic) compared with sustained stimulation may be that depletion of responding due to adaption of the nerves is not as great. There is time between pulses for nerve fatigue to dissipate.

Rhythmic stimuli are theorized to produce mood-enhancing brain chemicals that could alter depressive states. The physical act of drumming a rhythm pattern continuously stimulates the brain's production of endogenous opiates, which are thought to have a role in moods. It has been suggested that a deficiency coincides with emotional pain and depression. It has long been known that perception of pain (physical or psychic) can be modified by environmental stimuli (Melzac, 1973; Standley, 1986). From work in the 1970s, the existence of neural circuits that can produce analgesia has been known. A variety of environmental stimuli can activate these neuromodulators (endogenous opiates or endorphins).

Goldstein (1980) suggested that endorphins may intensify our emotional response to music. When subjects were asked to listen to their favorite music while under the influence of either a placebo or an endorphin blocker, some subjects on the anti-endorphin drug (naloxone), found the usual thrill response (slight shudder or physical sensation) to the music stimuli strangely missing. Music possibly produces

affective response through stimulation of certain neurochemical circuits, circuits that mediate opiate induced perception of pleasure. Theoretically these thrilling music experiences are mediated by music-induced endorphin release.

Clinical data suggest that in the depressed individual, increased motor activity and positive mood change may be induced through music stimuli of appropriate psychophysical attributes. The influence of a regular rhythmic stimulus on the level of arousal and its effect on the automatic, central nervous, motor, and sensory systems may account for that change. The response and experience of excitement, energy, and stimulation through music is reinforcing. According to Thaut's (1990) model of the process of music therapy with depressed adults, these responses lead to specific experiences in activation and result in a change in apathy or inertia, a change in energy level, a change in motor output, as well as the provision of immediate feeling experiences.

Lutz (1983) discussed depression as an inability to experience pleasure. To regain the ability, an individual must be directed toward sensory stimulation. Such purposeful pursuit of positive mood has rarely been highlighted in therapy. According to Kanfer and Schefft (1988) and Rachman (1981) assessment of the therapeutic contribution of intentional focus on positive sensory stimuli has not been done. An emphasis on an enriched capacity for enjoyment with music as the stimulus, with the client controlling quantity and content, would be a theoretically useful strategy for clients whose main complaint is a loss of interest in enjoyment. A common goal in therapy is to structure experiences so that the individual receives the satisfactions necessary to continue to seek them and to understand that these experiences lend themselves to the maintenance of better mood states. The moods generated in such activities and settings where there is intentional focus on aesthetic sensory stimuli frequently further change in cognitions as well.

Sutherland, Newman and Rachman (1982) suggest that in a dysphoric mood state it is more difficult to replace a negative thought with a more pleasant thought, and more difficult to remove intrusive, obsessional thoughts. In a music-induced positive mood condition in this study, unwanted cognitions were removed more efficiently. These researchers suggest focusing initially on the existing mood state. Teasdale and Taylor (1981) suggest from their research results that in a depressed mood the accessibility of negative information is increased. Thus music-evoked mood modulation becomes relevant as a primary focus and an integral part of the therapeutic process as a base for changing distressing thoughts and behaviors.

In conclusion, music and sound may be used as sources of energy and as a way to correct energy imbalances in depression (Lingerman, 1983). Equally reinforcing would be decreased arousal in states of hyperactivity, anxiety, and tension. Using the rhythmic structure of music for modulating level of arousal and optimizing mood states may be an effective strategy. However, music's function within psychological and physiological theories should be clearly described in terms of its special properties. Study of the components of music and their effects would be useful. Changes in behavior or state attributed to the effects of music are often made without identifying the characteristics that caused the observed changes.

Components of music include melodic line, rhythm, harmony, degree of consonance and dissonance, texture and form. The problem is whether it is more productive to examine the physical composition of music or the composition's psychological effect on the listener. How this effect comes about is intriguing and will be explicated at some future point. Until it can be, it seems appropriate to begin study, as psychomusic perspective suggests, where music affects the listener.

From the psychomusic perspective and with the intent to examine the psychological effects of rhythmicity, this study proposes to systematically assess the

effectiveness of rhythmicity to modify existing mood and to compare the mood effects of music of different levels of rhythmicity. Data will be obtained to test the following hypotheses.

1. The hypothesis that music of high rhythmicity decreases subjective negative affect.
2. The hypothesis that optimal mood states (energetic arousal or calm energy) are increased through selected music stimuli.
3. The hypothesis that a subjective sense of energetic arousal accompanies a decrease in depression scores, that is, are inversely correlated.
4. The hypothesis that depressed and nondepressed subjects respond differentially to highly rhythmic or minimally rhythmic auditory stimuli.

Finally, data will be obtained to consider the optimal length of music stimuli required to establish a mood and to provide evidence for presenting music in a self-management framework as a mood modifier.

METHOD

This experiment was designed to study the efficacy of the rhythmicity component of music for modifying affect and arousal states in young adults. The study was developed to assess the differential response to music stimuli of high and low rhythmicity in depressed and nondepressed young adults and was submitted for review and approved by the human subjects review committee.

Design

The effect of two levels of rhythmicity on two subject categories (depressed and nondepressed) was studied using the Depression Adjective Check List (DACL) (Lubin, 1981) and subscales General Activation and General Deactivation of the Activation-Deactivation Adjective Check List (AD ACL) (Thayer, 1986) as measures of subjective affect and arousal. The DACL was used to test mood effects of two levels of rhythmicity of music stimuli. The AD ACL was used to test the subjective sense of energetic and tense arousal. Both instruments, the DACL and AD ACL, were used to study patterns of affect and arousal or the differential response of depressed and nondepressed subjects. Two rating scales indicated the degree of familiarity and a hedonic value (pleasure).

The data from the experiment were analyzed using a Completely Randomized Factorial 2 (Depression) X 2 (Rhythmicity) General Linear Model (GLM) procedure with the DACL, GA and DA of the AD ACL and two rating scales as measures of the dependent variables.

Subjects

Subjects were seventy-three Psychology 101 preselected students who volunteered for extra credit and fell within the Beck Depression Inventory (BDI) (Beck,

1961; 1967) range of 10-15 (mild depression) and 1-4 (no depression). Subjects were pretested and screened for level of depression using the BDI prior to random assignment to one of two music conditions. Nondepressed subjects, subjects with BDI scores of 4 and below, were randomly assigned to one of the two music conditions. Subjects with a BDI score greater than 9 were classified as depressed, and randomly assigned to one of the two music conditions. The mean BDI scores were 2.92 and 15.00 for the nondepressed and depressed subjects, respectively. (Beck's suggested cutoff criteria are scores 0-9 as nondepressed and 10-15 as mildly depressed for 21-item BDI inventory). Although the mean BDI scores of the two groups were highly differentiated at the time the subjects responded to the instrument, Sacco (1981) suggests BDI scores tend to be unstable over time and should be repeated prior to an experimental session. The differences on the Beck mood scale may have been due to a transient depressive mood, and it is possible that some of these subjects had drifted out of the depressed category by the time of their participation ten to twelve days after the initial mood survey and categorization. However, uniformity and reliability, in terms of time from mass testing to experimental sessions, were maintained, with all subjects tested within a ten to thirteen day period following assessment with the BDI.

Procedure

Subjects participated in the study in small groups with assignment as their schedules permitted. They were assigned to one of four treatment conditions. In Condition I depressed subjects experienced music stimuli which moved at a certain point in the experimental session toward high rhythmicity (elating music stimuli), and in Condition II depressed subjects experienced music stimuli which moved toward low rhythmicity (depressive music stimuli). In Conditions III and IV, nondepressed subjects

were exposed to the same music stimuli of high or low rhythmicity. (See Appendix D for a listing of music segments.) Subjects were told that the study was concerned with assessing music response and preference in young adults, and that there were no right or wrong answers.

Experimental Sessions

Subjects were tested in groups of five to twelve in a small classroom. Through widely spaced seating and facing forward, nonverbal communication and group interaction was avoided. This arrangement obviated the need for another group to control for group process effects. Each subject was given a booklet of materials that included, in order, the DACL (Appendix A), the AD ACL (Appendix B), the hedonic rating scale, music preference survey, and the response questionnaire (Appendix C). Subjects were handed the booklet at the conclusion of the taped segments (Appendix D).

To preserve their anonymity, subjects were instructed not to identify themselves anywhere on their booklets. Before the tape began, subjects were informed that they would be asked questions about the music once the tape ended and were simply instructed to focus on the music and listen carefully. They were not told that the music stimuli were designed to alter affect. The experimenter explained rights of subjects and immediately following, the appropriate stimuli for each condition were presented. All music groups started with neutral music stimuli. Following exposure to the appropriate level of rhythmicity, subjects completed the DACL and AD ACL with instructions to focus on how they were feeling at that moment. A hedonic value (how pleasurable the subject found the music) was indicated on a scale from 1-10. Familiarity was also indicated on a scale from 1-10.

At the conclusion of each experimental session, the subjects were debriefed. They were given the following statement:

The hypothesis being tested is that the "kind" of music listened to affects the base-line level of mood (as reflected by questionnaires given). Implications of this possibility are those of better understanding and using music therapy.

Uniformity over the sessions was controlled in terms of lighting, extraneous noise, instructions to subjects and seating. Prior to the experimental sessions, three practice sessions were conducted during which a standard volume and standard volume adjustment was set for a single music segment during the fade out and before the following segment. A preliminary session suggested no changes in procedure or equipment were necessary. All subjects heard the tape with the same volume adjustment taking place during the session at the beginning of the same segment. However, responses from subjects in one session (n = 6) were not included in the final analysis because two of the subjects had written that maybe the music was too loud as they responded to a final question asking for further comments about experience.

Stimuli

The twenty minute mood induction tapes were developed from nineteen purely instrumental segments of music. These segments, ranging from one to five minutes in length, included classical music and musical soundtracks. According to the supplemental report of the licensed music therapist (Lee Anna Rasar, personal communication, 1991) who designed the tapes, these stimuli were originally chosen on the basis of the musical characteristics of rhythm, loudness, and tempo. Ordering of the segments on the tapes was such that the tapes began with the same neutral (neither depressing nor elating) stimuli and then became either more highly rhythmic (elating) or less rhythmic (depressive). For this study the same music segments were taped only from compact discs in order to control for the the sound quality. The dubbing was done at the recording studio at Iowa State University. One substitution of a segment was made in the depressive

tape. A three minute fifteen second segment from the second movement of Saint Saëns' Symphony Number 3 was substituted for Wagner's Song to the Evening Star, based on comparable rhythmic level and style. A compact disc was not available for the Wagner segment.

The nineteen segments were chosen for the most consistent ratings across gender and level of music training by four music therapy interns and four students who did not have music degrees. Interrater reliability (using a 7-point Likert scale) coefficients ranged from .84 to .96. Progressive ordering (based on mean ratings obtained by all eight raters) was toward greater rhythmicity on one cassette. Stimuli on the second cassette moved toward less. Music categories were matched along the dimensions of age preference, familiarity and complexity.

The stimuli were recorded on Denon HD7 60-minute cassettes and were presented by a sound system operated by the experimenter's assistant. The music stimuli were maintained at a level compatible with the room and the recordings. A uniform adjustment to be made during the experimental sessions was decided upon and held constant over all sessions. The sessions were held in a comfortable room using the following equipment: a TEAC A-550 RX stereo cassette deck, a Sansui TA-500 DC Integrated Tuner Amplifier, and a set of Model 14 Altec Lansing speakers.

Dependent Measures

The Depression Adjective List (Form E) (Lubin, 1981) is a measure for determining lowered or depressive mood states. The DACL-Form E (Appendix A) has an acceptably benign content (thirty-four adjectives), brief administration (two to three minutes), and responsiveness or sensitivity to slight mood fluctuation. The crucial test for a state measure of depressive mood is its ability to measure change, and the set

containing Form E has been tested for sensitivity to mood changes that might occur and accrue over sessions in an emotionally stimulating situation. An additional indication that the "now-today" version of the DACL measures short duration depressive mood can be seen in the comparative size of the correlations of the DACL with "today" and "in general" time sets and the MMPI-D trait scale. Generally, analyses suggest that the DACL has a high degree of reliability and validity. Scoring is one point for each positive (+) adjective that is checked and one point for each minus (0) adjective that is not checked. The score for the list consists of the total number of positive or plus (+) adjectives checked and minus (0) adjectives not checked. The mean scores (E List) for college and graduate school students is 8.08 (male) and 8.00 (female) according to the 1981 edition of the DACL manual. The mean scores for psychiatric patient (depressed) samples is 15.58 (male) and 20.39 (female). Depressed mood induction studies (Pignatiello et al., 1986, 1989) using music stimuli have found DACL short form (Appendix A) scores for groups with no prior differences for levels of depression to be at M = 12.6 in a depressive music condition and at M = 6.7 in an elated music condition, that is, differing significantly ($p < .01$). This short form is a composite taken from the Lubin self-report checklists. The brief list is considered appropriate in studies in which the stimuli under investigation are thought to influence mood rather quickly. During pilot testing with the self-report short form, satisfactory psychometric qualities were demonstrated (Pignatiello, personal communication, 1991). This form of the DACL consisted of fourteen adjectives (8 negative and 6 positive) in which the subject indicated the degree of emotion from not at all, a little bit, to a lot. Scoring of the positive adjectives was 2, 1, 0, respectively, and scoring of the negative adjectives was 0, 2, and 4, respectively. Possible scores range from 0 to 44 points.

The Activation-Deactivation Adjective Check List (AD ACL) (Thayer, 1967, 1986) (Appendix B) is a multidimensional self-rating test of various transitory arousal

states. According to Thayer, self-ratings provide a high level of integration of information of physiological states. There are four response alternatives, "definitely feel, feel slightly, cannot decide, and definitely do not feel." The check list is to be completed according to immediate reactions. Within the wider dimensions of energetic and tense arousal are four subscales - Energy, Tiredness, Tension, and Calmness. It is based on a four-point self-rating system. Subscales are arrived at by summing the five scores for each subscale. Generally, calm-energy represents an optimal mood state from this perspective (Thayer, 1989). Scoring of the subscales Energy (GA) and Calmness (GD) were indicated for this study.

RESULTS

Primary analyses of the data from the Depression Adjective Check List (DACL) (Lubin) and from two subscales, General Activation (GA) and General Deactivation (GD) (Calmness) of the Activation-Deactivation Adjective Check List (AD ACL) (Thayer), based on responses of seventy-three subjects, are presented in Tables 1, 2, and 3. Depressed and nondepressed subjects were randomly assigned to music stimuli in one of two levels of rhythmicity. The data from the four experimental conditions were analyzed using a Completely Randomized Factorial 2 (Depression) X 2 (Rhythmicity) General Linear Model (GLM) procedure.

Table 1. Depression Adjective Check List (DACL) mean scores as a function of depression and music levels

	Music	
Subject Classification	High Rhythmicity	Low Rhythmicity
Depressed		
M	14.46	19.00
SD	5.67	9.04
n	26	14
Nondepressed		
M	7.75	9.09
SD	3.25	3.59
n	16	17

Results of the CRF 2 (Depression) x 2 (Rhythmicity) GLM procedure with the DACL as the dependent variable showed there was a significant effect of depression, $F(1, 69) = 29.00$, $p < .0001$. There was a significant effect of rhythmicity, $F(1, 69) = 6.18$, $p < .05$ ($p < .015$). The DACL mean ($n = 73$) was 12.79 (the nondepressed mean was 8.85; the depressed mean was 16.05; the high rhythm music condition mean was 11.90; the low rhythm music condition was 14.00. The interaction was not significant.

Table 2. AD ACL subscale General Activation (GA) mean scores as a function of depression and rhythmicity levels

	Music	
Subject Classification	High Rhythmicity	Low Rhythmicity
Depressed		
M	11.69	11.36
SD	4.63	5.10
n	26	14
Nondepressed		
M	12.38	6.88
SD	3.70	3.33
n	16	17

Results of the CRF 2 (Depression) x 2 (Rhythmicity) GLM procedure with the AD ACL scale GA as the dependent variable showed that there was a significant effect of Depression, $F(1, 69) = 4.08$, $p < .05$. There was a significant effect of Rhythmicity, $F(1,69) = 7.38$, $p < .01$. There was a significant interaction (Depression X Rhythmicity), $F(1, 69) = 6.31$, $p < .01$. The mean of depressed subjects was 11.58; nondepressed was 9.55; the mean of the high rhythm music condition was 11.95; the low rhythm music condition was 8.90. The overall GA mean was 10.66.

Table 3. AD ACL subscale General Deactivation (GD) mean scores as a function of depression and rhythmicity levels

	Music	
Subject Classification	High Rhythmicity	Low Rhythmicity
Depressed		
M	14.19	16.36
SD	3.75	3.80
n	26	14
Nondepressed		
M	13.38	16.59
SD	3.61	3.66
n	16	17

Results of the CRF 2 (Depression) X 2 (Rhythmicity) GLM procedure with the GD scale of the AD ACL as the dependent variable showed that there was a significant effect of Rhythmicity, $F(1, 69) = 8.78$, $p < .01$. There was no interaction. Both depressed and nondepressed subjects experienced general deactivation (Calmness) in the low rhythm music condition. Adjectives such as calm, placid, still, quiet and at-rest characterized the positive affect of this scale. The GA scale was correlated with the DA scale ($r = -.63$, $p < .0001$).

Rating Scales

Analysis of the data from responses to a scale indicating subjects' familiarity with the stimuli selected for the experimental conditions follows below in Table 4. The subjects were asked to indicate on a numbered scale of one (unfamiliar) through ten (familiar) the degree of familiarity with the music stimuli presented in the session. A similar scale was provided for a hedonic rating (Table 5). Subjects were asked to indicate the degree of pleasantness on a scale of one (unpleasant) to ten (pleasant).

Table 4. Mean response to a 10 point rating scale of Familiarity with the music stimuli

	Music	
Subject Classification	High Rhythmicity	Low Rhythmicity
Depressed		
M	6.96	5.57
SD	1.71	1.95
n	26	14
Nondepressed		
M	7.56	5.59
SD	1.46	2.60
n	16	17

Table 5. Mean response to a 10 point rating scale of Pleasantness of the music stimuli

	Music	
Subject Classification	High Rhythmicity	Low Rhythmicity
Depressed		
M	7.77	8.57
SD	1.50	1.74
n	26	14
Nondepressed		
M	8.25	7.88
SD	1.57	2.09
n	16	17

The results of the 2 (Depression) X 2 (Rhythmicity) GLM procedure with the scales of Familiarity and Pleasantness as the dependent variables showed there was a significant music effect only for Familiarity $F(1, 70) = 12.68$, $p < .001$. Both depressed and nondepressed subjects were more familiar with the music segments in the high rhythm music condition. There were no significant interactions.

DISCUSSION

The study was designed to assess the effectiveness of music to modify existing affect and arousal patterns based on music stimuli in conditions of high and low rhythmicity in depressed and nondepressed subjects. Arousal level is considered basic to affect. Central to all theories of the therapeutic efficacy of music is the concept of the arousal inducing or reducing potential of auditory stimuli. It is rhythmicity that is considered a primary component in patterns of physiological and self-reported arousal, activation, and designated affect.

Based on systematic assessment provided by this study, it would appear that rhythmicity levels had a significant effect on self-reported affect as measured by the Depression Adjective Check List (DACL). The data supported the hypothesized efficacy of a brief period of concentrated music stimuli for altering affect. Self-reported DACL scores were significantly different from the music condition with a high level of rhythmicity to the music condition of low level rhythmicity. Both depressed and nondepressed subjects in the two levels of rhythmicity experienced significantly different subjective affect, with subjects in the high rhythmicity (elating music) condition showing lower mean levels of subjective negative affect (decreased scores on the DACL) than subjects in low rhythmicity (depressive music) condition who showed increased subjective negative affect (increased scores on the DACL). As reflected on the state-oriented DACL, it appears that selected music stimuli can alter the affect of both depressed and nondepressed individuals, at least on a transitory basis. This assessment might be considered an initial step in support of mood self-management using music stimuli.

Rhythmicity had a significant effect on both depressed and nondepressed subjects' responses of self-rated depression or affect, but the affective measure was not

specifically linked to activation and arousal as predicted. Existing mood does affect arousal patterns. The theorized and predicted relationship, that decreased DACL scores would be associated with increased AD ACL (General Activation subscale), held only for nondepressed subjects. Depressed subjects in the two levels of rhythm did not differ significantly. This significant interaction of depression and arousal or activation would suggest that naturally occurring depression might not be identical to the acutely induced depression. The lack of reactivity of depressed subjects to the different levels of rhythmicity appeared very different from the pronounced reactivity of nondepressed subjects, in terms of arousal and activitation patterns, based on responses to the GA subscale of the AD ACL. These findings suggest that for depressed individuals, music stimuli must be progressively ordered on the basis of matching inital mood and arousal level through music of low rhythmicity (depressive) in order to avoid excessive and uncomfortable dissonance.

The AD ACL subscale General Deactivation (Calmmness) supports the hypothesis that optimal mood states are increased through experience with selected music stimuli. Both depressed and nondepressed subjects reported significant differences in levels of GD or Calmness in the two levels of rhythmicity of music stimuli. The condition of low rhythmicity was associated with higher levels of subjective calmness in both depressed and nondepressed subjects. Depressed and nondepressed subjects experienced reduction of anxiety and tension as reflected in the increased mean scores of the AD ACL subscale GD or Calmness, suggesting the potential of music stimuli to alter affect in a positive or desired direction. It is calm energy that is associated with optimal mood and carries a highly positive hedonic valence, according to Thayer (1989).

The experimental variables were created by manipulating the type of music in terms of rhythmicity. The music segments were non-current, classic and solely instrumental. That these segments engaged the subjects sufficiently for emotional

processing of feeling states, tension or energy levels is suggested by findings of the significant effects of the two levels of rhythmicity on mood and arousal. `Although the analysis of the two rating scales (Pleasantness and Familiarity) suggests that subjects were more familiar with the music segments in the high rhythmicity condition, they did not prefer the music segments in that condition over music segments in the other. Subjects indicated a high hedonic value in both conditions of mostly classical music segments. However, it must be noted that the preferred style of the subjects (young adults) in this study, based on responses in this study to the Music Preference Questionnaire, is rock music. According to Bloom (1987), no classical music has been produced that can speak to this generation.

The taped music was approximately twenty minutes in length, well within the attention span of most individuals. The twenty minutes of concentrated music at a high and low level of rhythmicity resulted in significant differences, suggesting this was an optimal length. The short segments augmented maintenance of attention, for should a given segment be unappealing or uninteresting, subsequent segments could recapture the attention. Musical approaches which use one composition or longer segments would not have this advantage. Yet, however potent the music or the response, twenty minutes of any treatment approach is inadequate to effect more than transitory change. Crucial to therapeutic self-regulation is the issue of repeated hearings. Ideally, from a mood self-management approach, subjects would hear these concentrated taped segments on a frequent (daily) basis for an extended period (three to six weeks) in their own setting. A series or set (for variety) of twenty minutes of music segments on cassettes could provide selected levels of rhythmicity.

As the broader purpose was to present music as a mood modifier in a self-management framework, providing some assurance that this is a measurably effective strategy was an important preliminary step. More confidence that a given activity

reflects self-regulation would be possible if it could be shown that mood (affect) subsequently improved. Individuals do report using music to mitigate negative affect (Thayer,1989), and some subjects in this study indicated (see Music Preference Questionnaire, Appendix C) that mood modulation was a function of music for them. Of the various mood-elevating strategies - appetitive behaviors, drug ingestion - music may be one of the better methods for increasing arousal and positive affect. Belief in the method used for alleviating negative mood or affective states is essential for its success. Those who don't naturally use music as a mood modulator might be persuaded that it could be a compatible strategy. Of the hypotheses meant to account for the modulation of moods, instrumental self-regulatory responding has excited the most interest and attention (Morris, 1989).

In summary, this study has reviewed the mechanisms through which music has been theorized to alter affect and arousal. Whether primarily through association, aesthetic means, distraction, or sensory stimulation, or some combination, findings from experimental manipulation of rhythmicity support the thesis that music is a potentially effective resource for individuals seeking self-regulation of affect and arousal, that is, mood modulation. For now, both experimental and clinical approaches to affect and mood can provide awareness of an array (including music) of self-regulatory mechanisms and the ways they may be used.

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APPENDIX A

DEPRESSION ADJECTIVE CHECK LIST FORM E (LUBIN)

Below you will find words which describe different kinds of moods and feelings. Check the words which describe how you feel at the present moment. Some of the words may sound alike, but we want you to check all those words that describe your feelings. Work rapidly and check all of the words which describe how you feel at this moment.

1. Unhappy
2. Active
3. Blue
4. Downcast
5. Dispirited
6. Composed
7. Distressed
8. Cheerless
9. Lonely
10. Free
11. Lost
12. Broken
13. Good
14. Burdened
15. Forlorn
16. Vigorous
17. Peaceful
18. Well
19. Apathetic
20. Chained
21. Strong
22. Dejected
23. Awful
24. Glum
25. Great
26. Finished
27. Hopeless
28. Lucky
29. Tortured
30. Listless
31. Safe
32. Wilted
33. Criticized
34. Fit

DEPRESSION ADJECTIVE CHECK LIST (Short Form)

Each of the following words describes a way that people sometimes feel. Please indicate how much you have felt each of these ways today, including the present moment. Please select one of the three choices for each word.

ITEM	NOT AT ALL	A LITTLE BIT	A LOT
Full of pep			
Worthless			
Carefree			
Helpless			
Unhappy			
Lively			
Discouraged			
Lonely			
Cheerful			
Miserable			
Hopeless			
Alert			
Afraid			
Vigorous			

APPENDIX B

ACTIVATION-DEACTIVATION ADNECTIVE CHECK LIST:
STANDARD AND SHORT-FORM (Thayer)

Each of the words below describes feelings or mood. Please use the rating scale next to each word to describe your feelings at this moment.

EXAMPLES:

relaxed	vv*	v	?	no	If you circle the double check (vv) it means that you definitely feel relaxed at the moment.
relaxed	vv	v *	?	no	If you circle the single check (v) it means that you feel slightly relaxed at the moment.
relaxed	vv	v	?*	no	If you circle the question mark it means that the word does not apply or you cannot decide if you feel relaxed at the moment.
relaxed	vv	v	?	no*	If you circle the no it means that you are definitely not relaxed at the moment.

Work rapidly, but please mark all the words. Your first reaction is best. This should take only a minute or two.

---

vv*	v	?	no	:	definitely feel
vv	v *	?	no	:	feel slightly
vv	v	? *	no	:	cannot decide
vv	v	?	no*	:	definitely do not feel

carefree	vv	v	?	no	aroused	vv	v	?	no
serious	vv	v	?	no	fearful	vv	v	?	no
peppy	vv	v	?	no	lively	vv	v	?	no
pleased	vv	v	?	no	still	vv	v	?	no
placid	vv	v	?	no	self-centered	vv	v	?	no
leisurely	vv	v	?	no	wide-awake	vv	v	?	no
sleepy	vv	v	?	no	skeptical	vv	v	?	no
jittery	vv	v	?	no	activated	vv	v	?	no
intense	vv	v	?	no	sad	vv	v	?	no
grouchy	vv	v	?	no	full-of-pep	vv	v	?	no
energetic	vv	v	?	no	affectionate	vv	v	?	no
egotistical	vv	v	?	no	quite	vv	v	?	no
calm	vv	v	?	no	concentrating	vv	v	?	no
suspicious	vv	v	?	no	sluggish	vv	v	?	no
tired	vv	v	?	no	overjoyed	vv	v	?	no
regretful	vv	v	?	no	quick	vv	v	?	no
stirred-up	vv	v	?	no	nonchalant	vv	v	?	no
warm-hearted	vv	v	?	no	quiescent	vv	v	?	no
vigorous	vv	v	?	no	clutched-up	vv	v	?	no
engaged-in-thought	vv	v	?	no	wakeful	vv	v	?	no
at-rest	vv	v	?	no	rebellious	vv	v	?	no
elated	vv	v	?	no	active	vv	v	?	no
drowsy	vv	v	?	no	blue	vv	v	?	no
witty	vv	v	?	no	defiant	vv	v	?	no
anxious	vv	v	?	no	tense	vv	v	?	no

vv*	v	?	no	:	definitely feel
vv	v*	?	no	:	feel slightly
vv	v	?*	no	:	cannot decide
vv	v	?	no*	:	definitely do not feel

---

active	vv	v	?	no	drowy	vv	v	?	no
placid	vv	v	?	no	fearful	vv	v	?	no
sleepy	vv	v	?	no	lively	vv	v	?	no
jittery	vv	v	?	no	still	vv	v	?	no
energetic	vv	v	?	no	wide-awake	vv	v	?	no
intense	vv	v	?	no	clutched-up	vv	v	?	no
calm	vv	v	?	no	quiet	vv	v	?	no
tired	vv	v	?	no	full-of-pep	vv	v	?	no
vigorous	vv	v	?	no	tense	vv	v	?	no
at-rest	vv	v	?	no	wakeful	vv	v	?	no

AD ACL

Date_____ Time_____

Each of the following words describes a way that people sometimes feel. Describe your feelings at the present moment. Please select one of the three choices for each word.

ITEM	DEFINITELY FEEL	FEEL SLIGHTLY	NOT AT ALL
Active			
Placid			
Sleepy			
Jittery			
Energetic			
Intense			
Calm			
Tired			
Vigorous			
At-rest			
Drowsy			
Fearful			
Lively			
Still			
Wide-awake			
Clutched-up			
Quiet			
Full-of-pep			
Tense			
Wakeful			

APPENDIX C

PREFERENCE IN MUSIC

Circle three preferred styles and beside circled style indicate music factors and functions associated with each preference.

STYLE	FACTORS	FUNCTION
Rock		
Pop		
Folk		
Gospel		
Blues		
Religious		
Show tunes		
50s/60s		
Classical		
Easy Listening		
Punk		
New Wave		
Soul		
Country western		
Jazz		
Ethnic		

FACTORS
Style
Rhythm, beat
Melody, tune
Harmony
Timbre
Tempo
Mood of music
Lyrics
Volume/intensity
Extramusical associations

FUNCTION
dance music
background music
ceremonial music
ambiance/environment enriching,
learning/studying
exercise
entertainmnent
sensory stimulation
diversion
mood modulation

QUESTIONNAIRE

1. Gender:

2. Music Training: Yes ( ) No ( )

   a. Have you ever had group or private lessons? Yes ( ) No ( )
   b. If yes, what instrument
   c. If yes, how long?
   d. If yes, when?

   e. Have you ever taken music theory classes or lessons? Yes ( ) No ( )
   f. If yes, where?
   g. If yes, when?
   h. If yes, how many units or hours?

3. On a scale of 1 (unfamiliar) to 10 (familiar) indicate (circle number) how familiar the taped segments of music were.

   1 2 3 4 5 6 7 8 9 10

4. On a scale of 1 (unpleasant) to 10 (pleasant) indicate (circle number) how pleasant the taped segments of music were.

   1 2 3 4 5 6 7 8 9 10

5. Further comments on this experience:

APPENDIX D

MUSIC SEGMENTS

Elating tape: (20 minutes and 11 seconds)

1) Bizet: *Intermezzo* from *Carmen Suite No.1*. Montreal Symphony: C. Dutoit, conductor. London 417 839 (time: 2:58)

2) Gerschwin, *An American in Paris*. Cleveland Symphony Orchestra; R. Chailly, conductor. London 417 326-2 (time: first 3:14)

3) Beethoven, *Symphony No. 9 in D Minor*, IV. Berlin Philharmonic Orchestra; C. M. Giulini, conductor. Deutsche Grammophon 427-655-2 (time: begins with "Ode to Joy," recorded for 2:23)

4) Rogers, *Guadalcanal March*, from *Victory at Sea*. R. R. Bennett, conductor. RCA ANKI-0970 (time: 2:58)

5) Marais, *Le Basque*. J. Galway, flute; National Philharmonic Orchestra; C. Gerhardt, conductor. RCA RCD13061 (time: 1:55)

6) Conti, *Overture* from *Rocky II*. EMI Manhattan CDP 7 46082 2 (time: omit first 0:18, record 1:36, then omit until break at 4:41. resume recording for 1:42)

Depressive tape: (19 minutes and 39 seconds)

1) Bizet: *Intermezzo* from *Carmen Suite No.1*. Montreal Symphony; C. Dutoit, conductor. London 417 839 (time: 2:58)

2) Beethoven, *Egmont Overture*. Philharmonia Orchestra; V. Ashkenazy, conductor. London 411 941-2 (time: first 1:16)

3) Saint Saëns, *Symphony Number 3*, II. Berlin Philharmonic Orchestra; J. Levine, conductor. London 419 617-2 (time:3:15)

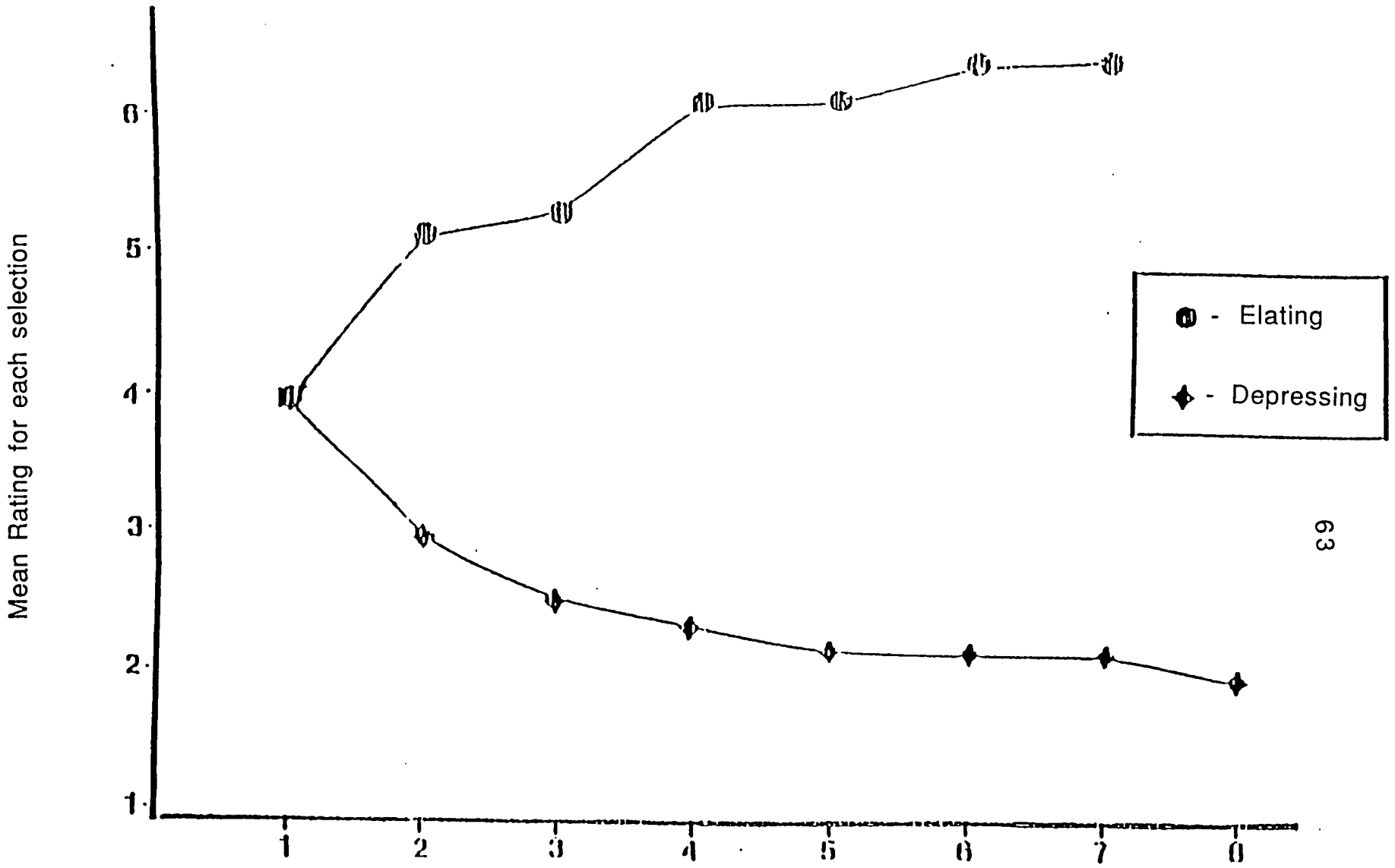
4) Tchaikovsky, *Overture-Fantasy* from *Romeo and Juliet*. London Symphony Orchestra; G. Simon, conductor. Chandos Chan 8310/11 (time: first 2:26)

5) Bruch, *Introduction* from *Scottish Fantasy*, Op. 46. J. Heiffetz, violinist; New Symphony Orchestra of London; M. Sargent, conductor. RCA 6214-2-RC (time: first 2:28)

6) Beethoven, *Sonata No. 7 in D major*, Op. 10, No. 3, II. M. Perahia, pianist. Columbia MK 39344 (time: first 2:43)

7) Chopin, *Marche Funebre* from *Sonata No. 2 in Bb minor*, Op 35. M. Pollini, pianist. Deutsche Grammophon 415-346-2 (time: first 2:18)

8) Tchaikovsky, *Symphony No. 6 in B minor*, Op. 74, IV. Leningrad Philharmonic Orchestra; E. Mravinsky, conductor. Deutsche Grammophon 419-745-2 (time: last 2:20)



Vectoring the mood based on combined ratings
obtained from music therapy interns and students
(1 - very depressing, 4 - neutral, 7 - very elating)

APPENDIX E

Phone Solicitation Statement

The purpose of the research project in which you are being asked to participate is to learn more about the ways in which young adults respond to various types of music. For the purposes of this study you will be asked to listen to twenty minutes (total) of taped segments of music. You will be listening in a group of about ten student participants.

After hearing the music you will be asked to complete response instruments (two brief checklists and a brief survey of styles in terms of your preferences). There will be no right or wrong responses or answers and the entire session should be a reasonably pleasurable experience. At the end of the session you will learn more about the nature of the study.

The experimental session will last about thirty minutes. It will take place in Room 24 of Music Hall which is a comfortable room for listening with high quality sound equipment and acoustics. It is requested that you not have listened to music for several hours before the research session. You will receive one full hour of credit for your participation. Your participation is entirely voluntary and you may withdraw at any time without losing any credit.

Modified Consent Form

(To be read to the subjects)

This research is intended to determine in part the effect of music on young adults. There are no known hazards involved, but you are free to discontinue participation at any point without losing research credit.

Debriefing Statement

The hypothesis being tested is that the "kind" (rhythmicity level) of music listened to affects the base-line mood (as reflected by questionnaires given). Implications of this possibility are those of better understanding and using music theory.