**Music and Consciousness**

Earl Vickers

> "On a river of sound
> Thru the mirror go round, round
> I thought I could feel
> Music touching my soul
> Something warm, sudden cold
> The spirit dance was unfolding."
> — John Lennon, "#9 Dream"

Music has a way of interacting with consciousness. For listeners, one's state of mind may alter what one hears, and vice versa. For performers, the two-way interaction between mind and music becomes a real-time feedback loop, especially when multiple performers engage in extreme improvisation.

Just as people sometimes self-medicate for conditions such as depression, they also use music to self-regulate their emotional states. Conversely, the music that pops unbidden into your head can be an indicator of your emotional state, a window into the soul revealing content of which you may not have been consciously aware. In Lisa Tucker's debut novel, *The Song Reader*, one of the main characters earns money by analyzing and decoding the songs that are stuck in her client's heads. Along similar lines, Tracy Ullman's psychotherapist character on *Ally McBeal* recommends that Ally discover her theme song as a step toward locating her errant mental health.

While music is commonly intended to affect the listener's mood, compositions have also been designed specifically for the purpose of altering the listener's consciousness. Indeed, entire musical genres (acid rock, trance, rave, etc.) have explored the interplay between mind and music.

Consciousness consists of a wide continuum of mental states, constantly changing in direction and focus. Music, like mind, is ephemeral, mercurial, always in motion, often flitting from one insubstantial thought to the next. Sometimes a single phrase can be evocative of a certain mental state. For example, in the Beatles song "A Day in the Life," the wordless vocals following the phrase "somebody spoke, and I went into a dream" evoke an image of someone falling into a dream or trance state.

This article will explore the interactions between mind and music, including a number of techniques for using sound to interact with the listener's consciousness.

**Dreams and Dreaming**

Music inspired by dreams (e.g., http://sfxmachine.com/sounds/dream_melody.mp3 by Earl Vickers) often has a strangely dreamlike quality and is sometimes felt to have special personal value.

> "Dream songs, as we shall see in the next chapter, were particularly important in American Indian life. The dream songs received during the all-important adolescent vision quest became the dreamer's personal refrain. They were used throughout his life at stressful times (for example, war parties) and were also used to evoke the power of his own personal spirit. This is readily understandable as a function of the dream songs' strong emotional power for the dreamer." (Garfield, p. 53.)

While dreams are an unreliable source of musical material and are quite likely to be forgotten upon awakening (as was part of Coleridge's "Kubla Khan"), with practice, musical dreams can occur more frequently and perhaps be remembered better.

> "Many of my songs I dream fully realized. I dream that I am in the control room, listening to something on the speakers, and it is this piece of music that I have not written yet.... This has happened so frequently that I can wake myself up and remember substantial parts. I don't know whether my subconscious has been working overtime writing these songs without my help and then revealing them to me, or whether they're transmitted to me by some kind of muse or angel, or whether there is a difference between the two.... They're lucid to the extent that I realize I'm dreaming and wake myself up to write the song down." (Rundgren, p. 104.)

Paul McCartney dreamed the melody of his most successful song, “Yesterday." Steve Allen's biggest hit, "This Could Be the Start of Something Big," originated in a dream. Portions of Handel's *Messiah* and Wagner's *Tristan and Isolde* are said to have come from dreams. Stravinsky claimed that his *Octet for Winds* was inspired by a dream in which the composer was surrounded by musicians playing an unknown piece on an unusual collection of instruments; while he was unable to recall the music, he did make note of the instrumentation and began composing the *Octet* the next morning. Mozart, Beethoven and Schubert also referred to music derived from their dreams.

At age 21, Giuseppe Tartini dreamed he sold his soul to the devil in exchange for a composition. The devil seized his violin and played "the most exquisite, enchanting, and breathtaking sonata." Tartini said the piece he composed upon awakening, *The Devil's Trill*, was far inferior to what he had heard in his dream, but was still by far the best he had ever written. This plot was later revisited in the Charlie Daniels song "The Devil Went Down to Georgia" (which was in turn transformed into David Allen Coe's "The Devil Went Down to Jamaica"); the final episode of *Futurama* had a similar story line. (The recurring theme of paying with one's soul for shortcuts to musical inspiration might suggest caution.)

External sounds are often incorporated into one's dreams. Researchers have experimented with using audio playback to induce lucid dreams (in which the dreamer is aware that he or she is dreaming):

> "We began our experimentation on cuing lucid dreams with perhaps the most obvious sort of reminder: a tape-recorded message stating 'This is a dream!'.... The subjects in this study were already proficient at lucid dreaming, and the success rate for inducing lucid dreams was accordingly high. The tape was played a total of fifteen times and produced five lucid dreams.... Eight times the tape simply awakened the subjects.
>
> "On two occasions the message entered the dreamer's world, but the dreamer lacked the presence of mind to realize what it meant. In one particularly amusing case, the subject complained that someone in the dream was insistently telling him, 'You're dreaming,' but he paid no attention to the advice! From this and our subsequent efforts to stimulate lucid dreams with cues, we concluded that we can help people to realize when they are dreaming by giving them reminders from the outside world. But would-be lucid dreamers must still contribute to the effort by preparing their minds to recognize the cues and remember what they mean." (LaBerge and Rheingold, pp. 83-4)

Just as Salvador Dali used sunlight to induce brighter, more vividly colored dreams, it seems likely that audio stimulation during sleep can encourage specific types of dreams, including dreams with musical content.

**Hypnotic States**

Like dream states, hypnotic states have also inspired music, and conversely, music can be used to help induce hypnotic states. To develop new musical ideas, Wagner would sometimes induce a semi-hypnotic state by forcing himself to stay awake late into the night.

Rachmaninoff dedicated his Second Concerto to the hypnotherapist who cured his apathetic condition:

> "Consequently I heard the same hypnotic formula repeated day after day while I lay half asleep in my armchair in Dr. Dahl's study, 'You will begin to write your concerto.... You will work with great facility.... The concerto will be of excellent quality....' It was always the same, without interruption.

> "Although it may sound incredible, this cure really helped me. Already at the start of the summer, I was composing once more. The material accumulated, and new musical ideas began to stir within me — many more than I needed for my concerto. By autumn I had completed two movements (the Andante and the Finale)...." (von Riesemann, 1934)

**Surrealism**

Surrealism, the art movement founded by Andre Breton around 1920, prided itself on being "the most powerful mental explosive ever invented." (Carrouges, p. 99.) It used Rimbaud's "reasoned disordering of the senses" to disintegrate and reintegrate the mind. Although the techniques of Surrealism have mostly been used in literature and visual art, they can also be applied to music. Such techniques might well be more effective in music than in art, because an auditory stimulus is more likely to slip past our conscious awareness than a visual one. Sight speaks more directly to the conscious; sound speaks more directly to the unconscious.

In addition to drawing inspiration from the dream state, the Surrealists also pursued the cultivation of voluntary hallucinations. These hallucinations were primarily visual, elicited through exercises such as staring at the textured patterns on a blank wall, but it was discovered that "by using a seashell, one can also have auditory hallucinations, related either to voices or to music, and which often have a premonitory or monitory character." (Carrouges, p.172.) The ocean-like sound of the seashell, which acts as a Helmholtz resonator, serves as an auditory substrate upon which auditory hallucinations can develop.

The Surrealists developed the technique of automatic writing, not only for creating literature but also for cultivating hallucinations. Automatic writing is the practice of writing quickly, without premeditation or conscious control. One simply listens to one's mind and writes what one hears. A similar technique was adopted for painting.

The manic stream-of-consciousness monologues of Neal Cassady,

> a unique being whose quest is Speed, faster, godamn [sic] it, spiraling, jerking, kicking, fibrillating tight up against the 1/30 of a second movie-screen barrier of our senses, trying to get into... Now
> (Wolfe, p.131.)

helped inspire the Beat Movement, Kerouac's *On the Road*, and the improvisational style of the Grateful Dead. Musical improvisation by its very nature is more automatic than art or literature. When painting or writing, one can always slow down to edit or intellectualize, but live musical performance inherently occurs in real time.

Surrealist poets practiced the intentional disarrangement of the senses in an attempt to destroy mental narration and filtering. The Beatles' "Revolution No 9" introduced many

new listeners to musique concrète, "a musical form defined by fragmentation and discontinuity" (Pouncey), based on found sound recorded and played back in a musical context. The Surrealist techniques of multiple images, superposition, and juxtaposition are taken to new levels in the works of Negativland and in John Oswald's "plunderphonics."

A related technique involves the intentional confusion of illusion and reality by superimposing sounds that appear to come from the listener's immediate environment rather than from the recording — a knock on the door, or someone whispering in your ear. This can be particularly effective when using binaural or multichannel spatialization.

**Shamanism and Psychedelia**

Music is commonly used by shamanic healers as an integral part of their healing rituals, often accompanied by the use of plant hallucinogens. De Rios and Katz suggested that the music did much more than merely set a mood; it served as a vital link in bridging separate realities and was instrumental in providing the structure for the experience. They hypothesized that for the traditional societies they studied, the music "functions almost as a computer's magnetic tape, instructing the calculating machine in a particular course to follow." (De Rios and Katz, p. 68.) Peruvian ayahuasca healers learn a vast repertoire of "magic melodies" known as icaros, which are used to elicit specific visions to achieve predetermined goals: contacting a supernatural deity, revealing the cause of illnesses, etc.

By way of contrast, a passage from Daniel Pinchbeck's *Breaking Open the Head,* a fascinating first-person exploration of contemporary shamanism, looks back on the psychedelic rock of the 1960s:

> "Leary's slick, superficial constructs lacked the deep framework of separation, transcendence, and reintegration that shamanic cultures had developed over 75,000 (give or take) years....
>
> "... [Psychedelics] break the trance of the consensus culture. But neither LSD nor Leary could provide answers to the most profound issue exposed by the LSD trip: Once the individual ego was liberated from its social role, from the well-worn grooves of Western society's game machinery, what was it supposed to do?
>
> "This agonizing question is refracted, reverbed, and wa-wa pedaled through the psychedelic rock of that era. Psychedelic rock oscillates between contrasting impulses. There is the Dionysian desire to pulverize all the boundaries of space and time — Jimi Hendrix's yearning to kiss the sky, or chop down a mountain with the side of his hand. But the feeling of magic super-potency is countered by its opposite, a childlike helplessness, found in the nursery rhyme pastoralism of Pink Floyd's 'See Emily Play' or the Beatles' 'Mother Nature's Son.'
>
> "Psychedelic rock reached its unfortunate endpoint in distorted soundscapes of

> psychic disintegration... The music traces the sorrowful process of psychic decay, swirling down toward what Freud called 'the oceanic,' a zone of preinfantile undifferentiation. The records describe failed attempts at initiation — short-circuited blow outs, made without road map or guide, except for Leary's dangerous manual....
>
> "The 1960s pursuit of shamanic knowledge was too shallow, too uninformed, to succeed. Products of a consumer culture, the hippies and flower children tended to treat psychedelics and spirituality as new commodities. Fooled by the immediate psychic transformations of LSD, they thought enlightenment could be quickly achieved.... The psychedelic culture flourished for a few short years, leaving behind a chaotic legacy of short-circuited brilliance and schizoid tragedy...." (Pinchback, pp. 184-5.)

## Psychoacoustic Effects

### Polyphony

Changes in consciousness can be triggered when the brain is overloaded by an excess of sensory input. A simple method of overloading the brain's ability to follow melodic patterns is through polyphony, the use of multiple independent melodies. The average person can consciously attend to one or two melodies at a time, but not to, say, four simultaneous melodies, as in the counterpoint of J. S. Bach.

Anton Ehrenzweig, in *The Psycho-Analysis of Artistic Vision and Hearing: An Introduction to a Theory of Unconscious Perception*, claims that “the birth of polyphony was due to a sudden rise of irrational urges in the late Middle Ages,” that it died out “in the century of enlightenment and modern rationality,” and that it began emerging again in the 20th century. (Ehrenzweig, p. 41, 85.) Polyphony, because it can not be followed by the conscious, rational part of the mind, has a confusing, “ear-wandering” effect. (Ehrenzweig, p. 42.)

> In order to enjoy polyphonic music a change of attitude is necessary. One has to experience the fugue-theme from the very beginning not as a melody but as a germ cell from which the intricate polyphonic structure of a fugue will grow; to follow the unfolding of this structure with a diffuse attention not concentrated on a single voice but on the structure as a whole; to feel how it gains in transparency and expands into infinite space (perhaps an example of an ‘oceanic’ feeling in art); only then will the listener feel the deep elation connected with polyphonic music which has to speak in several tongues instead of in one. (Ehrenzweig, p. 42.)

The confusing effect of polyphony is extended further if more than one set of words are used, or if the words occur at different times in different voices, as in Bach’s cantatas or in the madrigals of the mad prince Gesualdo. The very rational classical Greeks did not

like vocal polyphony precisely because of the confusing effect it causes. Aristotle compared vocal polyphony to several speakers saying the same thing, when one person alone could be heard much better. (Ehrenzweig, p.90.)

Often, multiple melodies are perceived as a type of background texture, though it can be an interesting form of meditation to try to follow all the melodies at the same time. Spatial processing that places different melodies at different positions around the listener can enhance this effect.

### Spatial Effects

If multiple spoken voices are played back on separate channels, the effect may be reminiscent of that described in *Tales of Power,* in which separate voices whisper in each ear, causing a feeling of being split in half. (Castaneda, p. 183.) Al Stewart's *Past, Present and Future* uses spatial effects in which sounds are rapidly panned back and forth from one channel to the other. The Rolling Stones' song, "In Another Land," from *Their Satanic Majesties Request*, also uses interesting spatial effects. "Note, when listening to the number with stereo headphones, the effectiveness of the device of putting the voice in the left ear and throwing the echo into the right channel." (Davis, p. 173.)

The right ear is somewhat more directly linked to the left side of the brain and vice versa. The left hemisphere is responsible for much of our music perception and for processing words and sound sequences, while the right hemisphere processes the quality of complex non-verbal sounds. (Deutsch, p. 92.) The left ear is reportedly better at perceiving vocal nonverbal sounds, such as hummed melodies, laughing, and crying; the right ear is better at perceiving verbal sounds. (King and Kimura, p. 111~116.)

Various auditory illusions can be used to trick the brain's perceptual system. For example, the brain apparently uses separate mechanisms for determining what sound is being heard and which direction that sound is coming from. In right-handed subjects, the right ear determines what pitch is being heard, while the direction of that pitch is determined by which ear is hearing the highest pitch. (Deutsch, p. 92.) Thus, a pattern could be perceived which is not the pattern being played. In theory, a recording could have entirely different melodies depending on whether it were played in mono or stereo.

### Repetitive Sounds

Throughout history, traditional and modern cultures have sought to generate trance-like states using music with short, repeated phrases and a hypnotic beat, so that time seems to slow down or stop.

> "The incremental repetition of brief, non-developing phrases, with or without intelligible words, generates and at the same time is generated by an unremittent beat. The continuity of the beat destroys the sense of temporal progression, so that

> one lives once more in mythological, rather than in chronological, Time." (Mellers, p. 29.)

Repetitive, hypnotic sounds can induce trance-like states by focusing the brain's attention on a minimal set of sensory inputs:

> Music has become such a commonplace that its effects may pass unnoticed, but when recordings of African or other unfamiliar music is listened to, it is realized that the rhythms are "fascinating." The repetition of phrase and motif, the complicated rhythm within a rhythm that is characteristic of much of this music, may explain why man throughout recorded history and in the multiplicity of modern cultures has used music, both instrumental and vocal, for inducing the trance. When these phenomena are subjected to experimental study, some forms of music will be found to be much more hypnogenetic than others, and some persons will be more susceptible than others. For example, Ravel's 'Bolero' can hardly fail to induce definite trances in some listeners. Ancient man knew of the trance-inducing qualities of music and used it for this purpose. The Druids, at the beginning of the Christian Era, were versatile in their use of hypnosis, and music was one of their chief ways of inducing "magical sleep." (Williams, p. 6.)

Tape loops and sampled audio loops generate repetitive or hypnotic sounds by repeating the same verbal or musical phrase over and over. After a while the phrase (particularly if it is verbal) may seem to change to something different, typically followed by additional transformations. The underloaded brain tends to invent perceptual changes.

### Rhythm and Auditory Entrainment

The sonic driving effect, also called auditory entrainment or the Frequency Following Effect, is based on the idea that physiological functions, such as the heartbeat or brainwaves, tend to synchronize to rhythmic patterns in the audio. Whether or not one's heartbeat actually locks up to auditory rhythms, it is clear that tempo has a strong effect on whether a piece of music is perceived as calming or exciting.

Movies make use of this phenomenon to heighten the tension at key moments; a heartbeat pulse may speed up to produce extra suspense. The video game "Space Invaders" used a low-frequency pulse that accelerated as the player approached the end of each level. Fast food stores use music with upbeat tempos to speed up the movement of customers as well as employees. The drumbeats of military music are designed to keep the feet moving even when the head may have second thoughts.

The use of rhythm to induce changes in consciousness is common among traditional cultures:

> "In Australia, aborigines sat by the flickering fire. They played the digerido — a long hollow wooden tube which produces a peculiar drone note, and used wooden

click sticks for rhythmic accompaniment. Playing the digerido, at least by my personal experience, requires a unique circular breathing method and causes a slight oxygen deprivation which causes lightheadedness and an altered sense of surroundings....

"Most Native American tribes I studied seemed to use rhythmic drumming to alter states, along with long periods of dancing. Many ceremonies took place in a dark lodge or at night, with flickering smoky fires. Different method, similar results.

"Siberian Shamans and some Northern Tribes seemed to use drumming, rhythmic movement and sleep deprivations to help induce altered states. Some American Indian Tribes used vision quests methods where food, sleep and water deprivation helped induce altered states.

"The more I studied different religions and tribal customs, I realized that they all used locally available materials to change the sense of light and the sense of smell, as well as using rhythmic chanting, drumming or noisemakers to assist." (Genuit)

Traditional cultures use different types of rhythmic patterns — polyrhythms (African music), interlocking patterns (Balinese and Javanese gamelan), rapid accelerating tempos (Haitian voodoo possession music) — for a variety of purposes. Siberian shamanic music breaks up the rhythm by constantly varying the tempo:

"Unique among all kinds of music we'd previously met with, shamanic music apparently varied constantly in tempo. This distinguished it from trance or possession music, which typically works up to climactic extremes of speed and volume, as well as from non-shamanic musics of peoples with shamanic cultures, which typically conform to the steady tempo pattern of almost all folk musics.

"But why, then, did the music of the shamanic performances constantly vary in tempo? We set off into the field with an idea, but were forced to abandon it. We thought that the function of music during shamanising was largely to disorientate listeners and participants through constant fluctuations of tempo. This idea owed much to Robert Ornstein's work in the 1960s on the experience of time.... It seemed to us that where the grouping unit was constantly unstable—as with music of constantly varying tempo—the normal habitual modes of information-processing would become generally disturbed, and the subject would then become increasingly psychologically suggestible....

"After discussion with practitioners, however, it became clear to us that the primary reason for tempo fluctuation in shamanic séances was not to produce a deliberate effect on the audience. It transpired that shamanising involves the interaction between the drumming activity, producing a sensory input, and a sequence of psychological states in the mind of the shaman. These states are at least stimulated, if not regulated, by shifts in tempo and intensity of drumming. But the shaman is not using the drumming in order to reproduce the same

> psychological evolution in an audience. Consequently the description of shamanising as a performance – as in Western theater or music – is misleading. This non-performance aspect becomes even more marked when several people shamanise together, as sometimes happens. In these workouts, each person follows his or her own psychological evolution, and coordination of psychological states and, consequently, of drumming tempo is exceptional." (Hodgkinson)

The auditory flicker phenomenon is a similar psychoacoustic effect involving the use of repetitive sounds. This is closely related to the visual flicker phenomenon, a colorful effect created by looking at a strobe light with the eyes closed. Epileptic fits, which may be triggered by flickering lights or by a fine mesh pattern in the visual field, can also be caused by certain types of music, which suggests that the visual flicker phenomenon has an auditory analogue. (Ferguson, p. 180.) Notes played at a rate of eight to ten per second (the brain's alpha frequency, at which speed strobe lights are most effective) may produce the strongest effect, due to the brain's tendency to link up with rhythmic stimuli. (Ferguson, p. 70.) An auditory strobe, which would blink music on and off at such a rate, can make the music seem to be a sequence of instants, freezing it as the strobe light freezes motion, with a similar hypnotic effect.

> "The emphasis in house music and dance culture on physiologically compatible rhythms and this sort of thing is really the rediscovery of the art of natural magic with sound; that sound, properly understood, especially percussive sound, can actually change neurological states..." (McKenna)

Sounds rich in harmonics may be more effective at producing auditory entrainment. Shamanic healing music often uses rattles, which create a fine mesh pattern in the auditory field:

> "The lowest common denominator of the musics appears to be the frequency of rattling effects, or rapid vibratory sounds, almost always in consort with whistling or singing." (de Rios)

Rattles have rich harmonic content and almost no fundamental, and drums generally have no definite fundamental but have "a powerful and dense overtone chord." (Ehrenzweig, p. 160)

### Timbre and Overtones

Timbre, or tone quality, is largely a function of the harmonics of the tone. Ehrenzweig claims that the brain represses the harmonics for biological survival reasons. "In the repression of the overtone chord usually the lowest of the sounds emitted by a particular thing remain consciously audible while the higher ones undergo repression." (Ehrenzweig, p. 161.) In other words, the fundamental is consciously perceived, while the harmonics are perceived by the unconscious mind. The harmonics are heard not as separate tones, but as tone color, or perhaps directly as emotion.

The human voice is capable of perhaps the most interesting harmonic variations of any instrument. Because people are so familiar with normal vocal sounds, any alteration of the voice immediately captures the attention of the listener. Political and religious leaders throughout history have used highly reverberant environments, such as cathedrals, to make their voices sound more powerful and godlike. Many other methods have been used to modify the voice, including vocal techniques such as vibrato, tremolo, operatic techniques and Tibetan overtone singing, as well as devices such as bullhorns, multi-effects boxes, and audio effects software. “It has been suggested that that strange baby-voice in which John sings 'Lucy in the Sky' could have been maintained only by way of a preliminary inhaling of helium.” (Mellers, p. 192.)

### Caveat Emptor

The "new age" marketplace includes a number of CDs and sound machines that claim to produce a variety of mental and psychological effects by means of binaural beats, brainwave altering frequencies, harmonic blends, brain synchronization, subliminal messages, morphic resonance, etc. Studies have shown that some of these techniques can indeed alter brainwave frequencies, but there is a need for additional research and unbiased comparative reviews. Some of the more promising products include binaural audio recordings for hypnosis, featuring two or three therapists speaking simultaneously from distinct spatial locations.

## Conclusion

Music may be used for relaxation or to increase excitement. It may be intended primarily to affect the mind, the body, the heart or the soul. In traditional cultures, consciousness-altering music was generally designed to facilitate the healing process by inducing various hypnotic or trance-like states; more recently, Todd Rundgren's *Healing* was intended as an experiment in therapeutic environmental music. While some of the techniques from this article can produce interesting effects, techniques are only means to an end. Ultimately, music's effect on consciousness depends largely on the intention and skill with which these techniques are applied.

Note: This paper was originally written for a Physics of Music class in 1977 and has been updated extensively while preserving, to the extent possible, the sloppiness of the original writing.

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