



مركز البيان للدراسات والتخطيط
Al-Bayan Center for Planning and Studies

The Neural Impact of Binaural Beats

A Study on “Digital Drugs”

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Al-Bayan Center Studies Series

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The Neural Impact of Binaural Beats A Study on “Digital Drugs”

Saif Diaa Dair*

Introduction

Human civilization continues its journey towards progress at an accelerated pace, intertwining in its folds technology that touches all aspects of life. In the shadow of this tangible increase in reliance on technology, social media has witnessed notable developmental leaps in the last decade. It has surpassed its role as mediums dedicated to social communication and entertainment, to become an essential part of the daily life fabric for countless individuals around the world. With the expansion of its user base, these communication means have cemented their place as a prominent pillar in the digital age we live in today, an era characterized by growing development in the fields of artificial intelligence, electronic communications, and modern technical innovations.

The impact of this technological development comes in disguising the boundaries between the physical reality and the virtual dimensions of our lives, paving the way for new phenomena that may carry their implications on our psychological and scientific health alike. Among these is what has come to be known as “Electronic Digital Drugs”, or “iDoser”, which are phenomena that have gained increasing spread and interest. They are audio files designed to induce a specific effect on the brain by using certain sound frequencies believed to be capable of simulating the physical and psychological effects of traditional chemical drugs like cocaine or marijuana and other widespread traditional types, by stimulating them to higher levels of ecstasy and relaxation.

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The principle underlying these files is based on a technique known as “Binaural Beats”, which was previously used to treat some psychological conditions. It is an auditory phenomenon that arises when a sound of a specific frequency is presented in one ear and a sound of a different frequency in the other ear, leading to a neural response that works to generate a third frequency that is supposed to affect the state of consciousness and stimulate experiences similar to the effect of traditional drugs on the brain.

From this standpoint, this research paper aims to shed light on what contemporary societies are facing, represented in the phenomenon of digital addiction, which may reach implications that exceed those associated with traditional drugs. This type of addiction grows in the shadows, without clear awareness from families and society of its numerous dangers and destructive effects, making confronting it a complex challenge. The danger of digital addiction stems from its ability to cause neurological changes in the brain, leading to behavioral and psychological disorders that may hinder the individual’s daily functions, which negatively reflects on the development of societies and their sustainable security.

1. Music Therapy: History and Developments

Music has captivated humans since ancient times, being utilized in various civilizations as a means of healing, spiritual expression, and both psychological and physical therapy. The history of music therapy dates back to ancient times when philosophers like Plato and Aristotle discussed the effects of music on the human psyche. The indigenous music of American peoples played a central role in their therapeutic rituals, incorporating singing and dancing into their medical practices¹. In the Islamic era, scientific attention was

1. Sakae Yamamoto: Human Interface and the Management of Information Applications and Services: 18th International Conference, HCI International 2016 Toronto, P137

drawn to the contributions of luminaries like Al-Farabi and Al-Razi, who are considered pioneers of psychotherapy. They recognized the effects of music on the psychological and physical state of humans, acknowledging its ability to alleviate physical pain and improve mood. This marked one of the earliest systematic studies in the field of music therapy, with music being integrated into therapeutic approaches of that time². Contemporary studies have confirmed the effectiveness of music as a therapeutic agent in alleviating symptoms of illness. Among the contributions in this field:

- Heinrich Wilhelm Dove's theory of "Binaural Beats," established in 1839, which involves exposing the brain to different sound frequencies in each ear to induce a specific response leading to relaxation and enhanced mental awareness.³
- Richard Lawrence's contribution as a Scottish director and composer who extensively researched the effects of music on human psychological and physical health. He developed musical compositions that invoke the power of music to renew energy and promote relaxation, blending Western classical music with diverse nature melodies. Lawrence's project was an innovative response to the dilemma of noise pollution in the modern era, where machine sounds hinder individuals' mental and physical functions. This supports scientific evidence confirming the positive impact of music and sound blending on mental, emotional, and physical health.⁴

2. For more, see Ashraf Saleh Mohammed Sayed, *Funny Therapeutic Means in Arab Scientific Heritage Using Musical Tones as a Model* (Arab Heritage Journal, Issue Four, 2017).

3. *Digital Drugs and Their Effects / Survey Study of School and University Students / Presented by Dr. Sarhan Hassan Al-Ma'ini / United Arab Emirates - Police Sciences Academy - Published in 2017 p. 16.*

4. Khalid Kadhim Abu Duh, *Digital Drugs: An Approach to Understanding* (Saudi Arabia: Research Paper presented at the Symposium «Digital Drugs and Their Impact on Arab Youth,» Naif Arab University for Security Sciences, 2016), pp. 10, 11.

2. Nature of Digital Drugs:

Digital drugs, also known as “Binaural Beats,” are sets of tones or sounds believed to induce changes in brain consciousness akin to actual drugs like heroin, cocaine, marijuana, and others.⁵

This technology is one of the latest means that can lead to addiction, exposing individuals to loud musical doses simulating the drug euphoria experience. These vibrations evoke a transient and fluctuating state of happiness, ecstasy, hallucinations, and loss of mental and physical balance, possibly leading to unconsciousness and even death. Digital drugs consist of specially formatted MP3 files utilizing open-source techniques developed under GPL-Open-Source license. These files can be downloaded and played via dedicated applications available for iOS, Android, smartphones, tablets, and computers, with durations ranging from approximately 30 to 40 minutes.

These tones are based on the concept that presenting two different sound frequencies to each ear - for example, 530 Hz to the right ear and 520 Hz to the left ear - results in the brain perceiving a third frequency, known as “Binaural Beats.” This may produce effects similar to those induced by consuming substances causing intoxication and euphoria.

- In the physical context, these drugs are defined as sound formations that emit uneven electromagnetic vibrations. Listening to them may cause listeners to lose their mental and physical balance, transitioning from consciousness to unconsciousness. Additionally, there may be mood deterioration after attempting to abstain from them, leading to addiction.⁶

5. Ahmed Jalloul, Fawzi Farhat (Algeria: Digital Drugs: Their Danger and Means of Prevention, Journal of Social Studies and Research, Hamma Lakhdar University, Issue One, 2020), p. 61

6. Khalid Kadhim, aforementioned source, p. 84.

- In the medical context, the subject of these tones is explained by the human brain's two hemispheres, each responsible for specific functions. When exposed to such tones, the brain seeks to harmonize the sound frequencies between the ears, creating a resonance in musical frequencies because there is a relationship between what humans hear and see and the conscious mind. This gives a sense of integrated hearing experience. This alignment or harmony between frequencies may lead to neurological responses resulting in changes in brain wave activity, which may affect the mental and emotional state of the individual, deluding them into a sense of pleasure and euphoria⁷. After attempting to quit, the victim loses their mental balance, making them prone to nervous breakdowns.

3. Technological Revolution and the Proliferation of Digital Drugs:

Emerging technologies can have unforeseen negative side effects, as tech companies, once established, may gain the trust of governments that rely on their technologies, placing information technology companies in positions of utmost power. This makes it prudent to adopt a cautious approach towards smart cities, as crime scientists feel concerned about the potential of new technologies to create vulnerabilities that criminal entities can exploit.⁸

Concurrently with the massive revolution in communications and information technology, the internet has brought about radical changes in the structure of daily life, turning the World Wide Web into an essential element in most households, offering numerous benefits and cognitive achievements. However, it has also opened

7. Mohamed Morsi (Egypt: Digital Drug Addiction and Its Impact on Arab Youth, Field Study Applied to Arab Youth at Al-Azhar University, 2016), p. 6.

8. Abdul Rahman, Abu Saree, (Egypt: The Use of the Internet in Digital Drug Use, General Administration of Information and Documentation, Ministry of Interior, Arab Republic of Egypt, Cairo, 2017), p. 7.

the door to new challenges and risks, including what is known as electronic Digital Drugs, as mentioned earlier. MP3 audio files are composed and distributed over the internet, simulating the effects of traditional drugs such as cocaine, morphine, marijuana, and crystal meth, capitalizing on the information age culture.⁹

- Virtual Reality and Digital Drug Trade:

Digital drug trading markets proliferate on the internet, utilizing the World Wide Web as their headquarters. They provide a wide market and specialized promotional platforms efficiently marketing these audio files, aligning with the technological level of the current generation, through multiple media such as computers, smartphones, and tablets.

These platforms offer users the ability to choose from a wide variety of available musical compositions with varying doses, along with variations in the duration of the tones to suit the desired mental state. These range from 15 minutes to 30 or 45 minutes. Additionally, these sites also provide educational instructional files in PDF format explaining in detail how to obtain these audio files and their resulting effects, along with guidelines on how to use them, in about 40 pages.¹⁰

In the same context, a study conducted by Valerie Salimboor and Robert Zatorre, neuroscientists at McGill University, examined the ways in which dopamine affects the brain while listening to music. They measured body temperature and heart rate while monitoring their brains using positron emission tomography (PET). Here, individuals listened to their favorite music, while scientists observed the release of dopamine after individuals were prompted to press a button during moments of music when they felt chills or excitement.

9. For more, see [9.https://tinyurl.com/2y66awqv](https://tinyurl.com/2y66awqv)

10. Talib Hassan Mubarak (Saudi Arabia: The Nature of Digital Drugs, 2016). pp. 20-19.

Researchers recorded an increase in dopamine when individuals anticipated specific parts of their favorite music. The brain's reward system, which governs its response to emotion, reacted with the peak moment when individuals pressed their buttons to signal that they felt euphoria from the music. Salimbor points out that the delightful euphoria resulting from music is chemically enhanced neurologically by the brain, so the individual continues to return to it. It works like drugs, and on the same Cocaine system.¹¹

It is worth noting that the danger of these digital drugs lies in the ease of access and availability at any time and at prices starting from one dollar, with prices increasing based on the level of addiction required. With the absence of official oversight and specific legislation, some websites offer free samples of these audio clips as marketing advertisements to attract and stimulate young people to experiment before selling them stronger doses according to the development of the addiction.

- Digital Drugs and Online Marketing Strategies¹²:

The online space witnesses a growing proliferation of websites promoting what is known as “Digital Drugs,” and these platforms offer a wide range of related products, ranging from CDs and specialized microphones to software and accompanying equipment, such as curtains, pillows, and chairs designed to enhance the experience of using these digital drugs and achieve their maximum effect. These websites adopt intensive promotional strategies aimed at attracting customers of various ages, offering professional and impactful advertisements claiming that digital drugs provide many benefits, such as:

11. Addiction to Music is as Real as Addiction to Drugs — Piano Around the World <https://www.pianoaround.com/blog/addiction-to-music-is-as-real-as-addiction-to-drugs>

12. Talib Hassan Mubarak (Saudi Arabia: The Nature of Digital Drugs, 2016). pp. 20-19.

- I. Improving mood and increasing feelings of happiness.
- II. Stimulating impaired memory.
- III. Enhancing visualization and creative inspiration.
- IV. Enhancing natural sensations without the need for alcohol or enduring the resulting headache.
- V. Strengthening self-confidence and overcoming social phobia.

When considering these temptations and incentives, they appear difficult to resist, especially by teenagers and young people who may be more susceptible to being influenced by such claims.

- “Cognitive Stimulation” through Digital Drugs:

Digital drugs take various forms with varying effects, aiming to stimulate cognitive activity resulting from brainwave patterns in a manner that simulates the responses caused by the consumption of traditional drugs. These methods are based on the principle of auditory stimulation of the brain, utilizing a set of specific sound techniques. The main methods used in this context, as illustrated in the table below, include:

Wave Name	Frequency (Hz)	Resulting Effect
Delta	1-3	Deep sleep, daydreaming, feeling of greatness or invulnerability.
Theta	4-7	Deep relaxation (full), meditation or entering a meditative state.
Alpha	8-12	Memory enhancement, concentration enhancement, light relaxation “feeling of fast learning and exhilaration”.
Beta	13-25	Normal state of alertness and caution, feeling of fatigue and violation.
Gamma	>25	Feeling of anxiety, panic fear.

The table was prepared by the researcher based on the information provided at <https://www.4electron.com/2015/04/4224>.

- **Harms and Dangers of Digital Drugs:**

Recent studies have shown that digital drugs have significant harms and dangers on all aspects of the user's life, whether at the psychological, social, economic, functional, or sensory level. Therefore, it is important to raise awareness of these harms and dangers, and to take the necessary measures to prevent them, as follows:

Psychological Aspect	Isolation and the Pursuit of False Happiness: The use of digital drugs leads to the user's isolation from the real world, where they find in the world of digital drugs what they are looking for in terms of false happiness, which leads to neglecting social and family relationships, and increasing the feeling of loneliness and isolation.
	Laziness and Lethargy: The use of digital drugs causes a feeling of laziness and lethargy, where the user loses the desire to make any effort, leading to a decrease in productivity and job performance.
	Repetition: The use of digital drugs leads to repetitive behaviors, where the user seeks to reach the same narcotic feeling they feel when listening to music, leading to addiction.
	Mental Distraction and Loss of Focus: The use of digital drugs causes mental distraction and loss of focus, where the user finds it difficult to focus on anything else other than music, leading to poor academic achievement or professional performance.

Social Aspect	Ease of Access: Digital drugs can be easily obtained via the internet, making them available to everyone, even children and teenagers.
	Low Cost: Digital drugs are characterized by their low cost compared to traditional drugs, making them more attractive to users.
	Lack of Clear Symptoms: Users of digital drugs do not show clear symptoms, such as symptoms of using traditional drugs, making it difficult to detect and treat them.
	Accessibility to All Categories: Digital drugs can be accessed by all age groups, making them more dangerous.
Economic Aspect	Deterioration of Production: The use of digital drugs leads to a deterioration of production, where the user loses the desire to work or study, leading to a loss of money.
	Addiction: The use of digital drugs leads to addiction, costing the user large amounts of money to obtain the drugs.
Functional Aspect	Short-Term Memory Weakness: The use of digital drugs leads to short-term memory weakness, where the user finds it difficult to remember information.
	Depression: The use of digital drugs leads to depression, where the user feels despair and frustration.
Sensory Aspect	Damage to the Auditory System: The use of digital drugs leads to damage to the auditory system, where the user is forced to significantly raise the volume to achieve the desired narcotic effect.

The table is prepared by the researcher based on this source: <https://tinyurl.com/2ch24lpv>

Conclusion

In conclusion, we must highlight the danger posed by suspicious music products manufactured by certain companies. The risk is particularly evident in the marketing strategies employed by these economic entities, especially when targeting younger age groups - children, teenagers, and youth - within their strategies. This targeting is not coincidental but rather accomplished through the adaptation of music within audio waves subtly promoted through specifically prepared pieces or subtly embedded within songs and animated films, which hold a significant place in the hearts of children. The real danger lies in the insidious nature of this approach, paving the way for the normalization of digital addiction among new generations, which leads to a wide range of harmful behaviors. Given that these youth constitute the majority of our societies, the companies producing these music products find a clear path to dominate the social, economic, and cultural fabric, with individuals becoming dependent followers, addicted to their productions and aligned with their desires.

Here, scientific and ethical responsibility demands that we, as researchers, educators, and parents, raise awareness of these dangers and direct our efforts towards protecting communities and preserving their cultural heritage from the transformation of this generation into a mere consumer mass, deprived of its will and wasting its wealth on the threshold of addiction. Therefore, based on the foregoing, allowing the escalation of digital drug addiction casts its shadows over all aspects of social life and public health, necessitating the development of a comprehensive strategy to address this phenomenon.

This study necessitates the formulation of several inclusive and integrated proposals, representing a comprehensive roadmap and guiding tower to mitigate the widespread dissemination of this type of addiction. This can be manifested in the following key points:

- **Enhancing awareness and educational programs:** As scientific and educational communities, we must focus on deepening awareness of the dangers of digital drugs, similar to traditional drugs. Moreover, we should progress in developing educational programs and integrating them into curricula, digital media networks, and social media to achieve comprehensive and effective coverage.
- **Imposing and tightening regulatory measures:** The need arises to take necessary measures on a legal level to prosecute and punish marketers of these harmful products, as well as regulate sales and promotion outlets, including online markets and digital platforms.
- **Coordinated international cooperation:** Combating digital drug trafficking requires coordinated international efforts. It is essential to bridge cooperation between countries and unify laws to close all loopholes that smuggling networks and digital promotion may exploit.
- **Supporting specialized scientific research:** Surely, reaching unique and effective solutions requires supporting scientific research that investigates the nature of digital drugs and their real effects on the nervous system, as well as on various dimensions of mental and physical health.
- **Partnership:** Engaging in efforts to combat digital drug addiction is not limited to a specific entity but is an invitation to all those who contribute to weaving the threads of society - from families, educational institutions, civil organizations, to governments - to be part of the solution.

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1. Sakae Yamamoto: Human Interface and the Management of Information Applications and Services: 18th International Conference,

HCI International 2016 Toronto, P137

2. For more, see Ashraf Saleh Mohammed Sayed, *Funny Therapeutic Means in Arab Scientific Heritage Using Musical Tones as a Model* (Arab Heritage Journal, Issue Four, 2017).

3. *Digital Drugs and Their Effects / Survey Study of School and University Students / Presented by Dr. Sarhan Hassan Al-Ma'ini / United Arab Emirates - Police Sciences Academy - Published in 2017* p. 16.

4. Khalid Kadhim Abu Duh, *Digital Drugs: An Approach to Understanding* (Saudi Arabia: Research Paper presented at the Symposium "Digital Drugs and Their Impact on Arab Youth," Naif Arab University for Security Sciences, 2016), pp. 10, 11.

5. Ahmed Jalloul, Fawzi Farhat (Algeria: *Digital Drugs: Their Danger and Means of Prevention*, Journal of Social Studies and Research, Hamma Lakhdar University, Issue One, 2020), p. 61

6. Khalid Kadhim, aforementioned source, p. 84.

7. Mohamed Morsi (Egypt: *Digital Drug Addiction and Its Impact on Arab Youth*, Field Study Applied to Arab Youth at Al-Azhar University, 2016), p. 6.

8. Abdul Rahman, Abu Saree, (Egypt: *The Use of the Internet in Digital Drug Use*, General Administration of Information and Documentation, Ministry of Interior, Arab Republic of Egypt, Cairo, 2017), p. 7.

9. For more, see <https://www.google.com/gasearch?q=%D8%A7%D9%84%D9%85%D8%AE%D8%AF%D8%B1%D8%A7%D8%AA%20%D8%A7%D9%84%D8%B1%D9%82%D9%85%D9%8A%D8%A9&tbm=&source=sh/x/gm2/5#fpstate=ive&vld=cid:4222>

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11. Addiction to Music is as Real as Addiction to Drugs — Piano Around the World <https://www.pianoaround.com/blog/addiction-to-music-is-as-real-as-addiction-to-drugs>