

How 808 bass affect people's mental performance

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Abstract. This article delves into the "rage music" trend led by Trippie Redd through his song "Miss the Rage" in 2021, particularly focusing on the psychological implications of the pivotal 808 bass drum within this genre. Originating from the Roland TR-808 drum machine, the 808 bass, with its deep and prolonged tone, has become an iconic element in hip-hop music, eliciting potent psychological and physiological responses from listeners. Research indicates that the 808 bass not only stimulates emotional arousal and excitement due to its unique sonic characteristics but may also trigger aggressive behavior as a result of its long-term association with provocative content. While this connection necessitates substantial repetition to establish, the widespread dissemination of hip-hop music has significantly manifested the provocative effect of the 808 bass within specific demographics. Furthermore, the high volume and multimodal perception of the 808 bass during mental performance contribute to the aggressive behavior of audiences. Nevertheless, the study acknowledges that the direct link between the 808 bass and mental performance requires further investigation, taking into account factors such as cultural backgrounds and listening environments.

Keywords: Roland TR-80, Hip-hop, Rage Beats, Music psychology, Mental performance.

1. Introduction

In January 2021, a short black and white clip appeared on Trippie Redd's Instagram. The rapper plays a new song with a joint in his mouth and dances euphorically around the room. Four months later, the single "Miss the rage" had been released with the blueprint of a new trap's subgenre: "rage music" [1, 2]. So-called "Rage Beats" are now increasingly found all over the Internet, which producers build based on the sound technology model of "Miss the Rage", following the basic rage formula: combining hard-hitting trap drums with sharp synths [1, 3].

Whenever the punchy, distinct bass drops aggressively, people start to shake their head, grooming and crashing to each other in the mosh pit. Obviously, the invasion of hip hop will be associated with a kind of synthetic bass: the 808 bass. The 808 bass was originally derived from Roland TR-808 Rhythm Composer: a drum machine imitating acoustic percussion. Among all of its imitated voices, perhaps the most influential has been the bass drum built from a sine oscillator, which is the 808 bass, a defining characteristic element in hip hop music [4, 5]. Counterintuitively, the TR-808's initial heyday was short-lived. The expensive price and scarce semiconductors in the machine made Roland cease production after its initial 12,000 sold. Nevertheless, the second-hand 808 somehow fueled its popularity by lower price and entrenching its legacy till now by its distinctive bass [6].

The 808 bass primarily occupies the sub-bass range, with fundamental frequencies typically ranging from around 20 to 60 Hz, which is categorized as a low frequency sound (LFS) wave residing below 300hz [7]. In regard to low frequency, people often conduct research on low frequency noise (LFN) due to its influence on mental performance [8]. However, LFN has a significant difference with sound that has a low pitch (LFS). LFN (Such as the sound of traffic rumble and industrial machinery) refers to unwanted sound with dominant content of low frequencies 10–250 Hz [7, 8]. In the exposure of LFN (infrasound), symptoms like nausea, disorientation and general unpleasantness can occur [9]. It is worth mentioning that LFS such as the 808 bass are usually produced by music instruments, either physical or digital. This essay will analyze the effect on human mental performance brought by 808 bass as a LFS instead of LFN.

In a REVOLT (2021) episode in 2022, a TV show that was designed to interview Hip hop artist, Kanye West (Ye) a outstanding rapper whose album 808 & heartbreak are fully established on the 808 drum machine expressed his opinion about the 808 bass: "The 808(bass) exists in the lowest

chakra of your body. The majority of content that is related to the 808 is killer or sexual content. The original 808 is even off-pitch, so that meant it's an actual sound in the track that you don't realize is there that is f**king up your entire frequency. "The effect of 808 bass on mental aspects is controversial. Research has shown that bass produces feelings of power and confidence in listeners, creating a sense of invincibility [10]. In contrast, some declared that LFS are often associated with feelings of sadness, melancholy [11]. Either positive or negative, the effect of 808 bass on a human's mental performance is inevitable. Research in neuroscience has shown that music the deep, resonant bass of 808 bass can stimulate reward centers in the brain, potentially leading to emotional arousal and excitement [12]. On the other hand, The field of psychoacoustics explores how we perceive sound. The low frequencies of 808 beats can be physically felt due to their longer wavelengths, potentially enhancing emotional reactions and contributing to a sense of excitement [13]. The impact of 808 bass also depends on cultural context and the listening environment. In settings like clubs or concerts where 808 bass are prevalent, they can contribute to a collective atmosphere of excitement, influenced by both the music and the social setting [14]. In conclusion, while there's no direct research on 808 bass specifically, applying general principles of music psychology suggests that their unique sound characteristics could influence emotional arousal through neurological, psychoacoustic, and socio-cultural mechanisms.

2. Main body

First and foremost, 808 bass affects people's mental performance due to the fact that the bass itself can be linked with negative or provocative contents. 808 bass, as I mentioned in the introduction, is a crucial instrument that is utilized in different music genres. Among the music genres that the 808 are applied to, Hip hop is a genre that almost considers the 808 as a "default setting". Musically, the 808 bass itself was favored for its deep persisting, concentrated sound by Hip Hop producers and musician [6, 15]. More than that, Its synthesizer, TR-808 drum machine, is considered to be the optimal choice for Hip Hop music for its low price and flexibility in audio processing in bass [15, 16]. Additionally, Hip Hop is a music genre that features the highest frequency of swear words, aggression-associated content as well as strong sexual connotation [17, 18]. In Kreyer (n.d.)'s report, in a corpus consisting of 52 albums including 18 hip hop albums and 198,387 words in total in 2003 and 2011, the frequency of taboo words in hip hop albums are significantly higher than taboo words in non hip hop albums. The frequencies of top three taboo words (nigga, shit, fuck) are 606, 626, 504, which are outstandingly higher than 12, 43, 45, the corresponding word frequency in non-hiphop album. On top of that, to be more specific, Nick Minaj is an influential female rapper who has 12 grammy nominations, and 58% of her lyrics are offensive slang [19, 20]. There is a 200 millisecond latency when a human is processing sound (100 ms) and other auditory information (300 ms) that requires cognition such as lyrics and melody [21]. In other words, people tend to dissect audio information such as 808 faster than lyrics. From my perspective, the 808 bass itself can be linked with the toxic content in Hip hop and further influence the listeners through a process called Ivan Pavlov's second-order conditioning. According to statistics by Spotify, 400 million users have streamed Hip Hop music in 2023. Huge number of Hip Hop fans are exposed to 808 bass and toxic content simultaneously. In Ivan Pavlov's experiment, a neutral stimulus (NS) can be paired with an unconditioned stimulus through repetition and become a conditioned stimulus (CS). Based on that, a conditioned stimulus can be paired with another neutral stimulus, which is the process of second-order conditioning. The 808 bass (NS) can be paired with provocative music contents (CS) and contribute to the connection between 808 bass and aggressive behavior that is originally caused by provocative contents. Thus, it is realistic that people present negative or aggressive behavior when they are exposed to the 808 bass. However, when considering 808 bass as merely a sound, the effects seem to be more influential and easy to trigger. In psychophysiological studies, the listeners actively hypothesize predictions after accepting audio signals [22]. Based on this information, hearing the sound of 808 bass agitates people with linked provocative content.

In regard to neurology, the 808 bass contributes to a provocative effect due to its low frequency. The human being's sensitivity to low frequency bass are inherent. The first acoustic stimuli that human fetuses receive after the maturation of their auditory system is the voice of their mother as well as the sound of heartbeat [23]. On top of that, there is research in neuroscience that has shown that music that includes rhythmic pattern and bass activates the reward centers in the brain [12]. In Van Erp and Miczek (2000)'s research, rats are collected and sampled for experiments. When the rats were being sampled, they illustrated aggressive behavior due to their biting and aggressive acts and postures while their dopamine level was rising. More specifically, in Schlüter et al. (2016)'s experiment, after viewing violent movies, both groups of male subjects displayed elevated aggression with higher dopamine release. The deep, booming 808 bass can be a factor that triggers the activation of the reward center and therefore facilitates the release of dopamine, and finally results in arousal of excitement which can be demonstrated by aggressive behavior. Additionally, sensation of self-motion might be the result from the exposure of the loud music [13]. With the increasing bass volume in music in the past decades, The 808 bass occupies most of the bass frequency of a soundtrack with relatively large volume that results in the sensation of self-motion and spontaneous body movements including aggressive behavior [24, 25]. To sum up, 808 bass has the ability to attribute aggressive behavior from excitement and sensation of self-motion by its loudness and its rhythmic pattern that triggers the release of dopamine.

The presence of 808 bass can be a catalyst to aggressive behavior in the context of live music [26]. In live performance, Hip Hop music has been interrogated, vitriolized or even isolated due to its "culture of violence" and its attractiveness to violent, or even armed crowds. [27, 28]. For instance, the genre Hip Hop is completely banned from a music venue after a weapons incident after a HipHop show, and local bars filter Hiphop out of their jukebox [29, 30]. The presence of 808 in hip hop could be a catalyst that potentially promotes people's aggressive, or violent behavior. In live performance, especially in those concerts that are held in huge stadiums, music will be remixed or remastered before being played. The mixing or mastering engineer might adjust several parameters to ensure the impact of the performance. The adjustments can be made to the volume, reverb or audio effects on different instruments that usually includes the bass. In live Hip Hop music, drums and 808s are artificially mixed to be more prominent and punchy in setting down the groove in a larger performance space. With an elevated presence in 808 bass, people in the live concert are more likely to be led to aggressive behavior through the process in paragraph one. In Fearing et al. (2018)'s analysis, they collected 10,214 calls to 63 Madison bars from 2008 to 2016 from the Madison Police Department. On top of that, they gave value 1 to violent service calls and gave value zero to other calls to calculate the violent offense ratio. In the analysis, the genre Hip Hop All with 42 violent offense accounts and 0.52 violent offense ratio ranks the second place in offense account and third place in offense ratio, a top three statistics only lower than Rock music and world music.

3. Conclusion

In conclusion, this research demonstrates that 808 bass in music is able to influence people with their provocativeness in various aspects: Firstly, 808 bass can be linked with hip hop music that has toxic content and instigate people with agitated implications [22]. Secondly, the typical frequency of 808 bass might trigger reactions in the human auditory or neuro system and subsequently lead to excitement or even aggressive behavior [12, 25]. Last but not least, in a context such as a bar or live house, 808 bass might act as a catalyst to thrill the audience [26].

4. Discussion

This research provides detailed dissection on 808 bass with perspective in psychological, physiological, contextual perspective. However, there appear to be some points to be discussed

Firstly, this research states that people will tend to be aggressive when they hear the 808 alone due to the second order conditioning by Ivan Pavlov. In fact, such bonding between two originally unrelated subjects, violent contents and 808 bass, takes much repetition to establish. In other words, such a provocative effect is only possible to build when a person is listening to Hip hop music constantly for the long term. But, due to the enormous Hip Hop fan base, 385 million followers across major platforms, the provocative effects of 808 are still effective in a considerable amount of the population [31].

Secondly, this research points out that the sensation of self-movement that might result in aggressive behavior could be evoked by the loudness and rhythmic pattern of 808 bass in the music by inducing the release of dopamine in the human brain. In fact, the research has linked the outstanding volume of 808 bass and the loud music that can lead to release of dopamine. Such associations between bass and a specific kind of music are not completely equivalent and accurate, which illustrates that volume of 808 might not precisely lead to the release of dopamine. However, loudness only plays a small role in the spontaneous body movement in bass [24, 25]. The factor that mainly promotes movements is a multimodal auditory-tactile percept produced by the bass frequency itself [25].

Thirdly the research also mentioned that 808 bass in live performance can serve as a catalyst to push the emergence of aggressive behavior with. But, the research only cites the case study in clubs in Madison America to prove the provocative effects of 808 bass, which are not representative to other live houses in the world. The aggressive behavior might be attributed to other factors such as censorship. As an illustration, such behavior might not happen in regions that have restrictive censorship and regulation such as China. However, live performances in the US usually have restrictive regulations. As an illustration, in the 30th WoodStock music festival, violence or even several sexual assault still happens with the presence of 700 armed state polices, 3000 securities as well as 500 medical cares. In terms of censorship, censorship usually emphasizes on musical content with less attention to violence and more on sexual topics. (Nie, 2021)

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