Music's Influence on Dream Content

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Abstract

Studies have shown that external stimuli could have the ability to affect people's dreams. Music is a stimulus that affects everyone in his or her daily life. Music seems to have a psychological affect on humans that is extremely different than other sensory stimuli, and has no real biological dependency. Constantly being played, and it has played an important role in our evolutionary history. Prior research has shown that music composed in a minor key with a slower tempo causes feelings of sorrow while the opposite creates feelings of happiness. This study sought out to examine how listening to one genre of music (classical, hip-hop, rock, and jazz) for two consecutive days, prior to sleep, for one week could influence dreams. Throughout this study, it was seen that music has an extremely detrimental effect on sleep quality, emotion, and dream vividness. Differences in musical genres, gender of the listener, and key signature of the songs all seemed to have affected the results.

Introduction:

Imagine Billy Corgan chasing after you one stormy night; his apathetic and melancholy lyrics booming in your ears, progressively slowing you down as his steps become louder and closer to your shaking body. You awake just as he reaches you, telling you that music has a psychological effect on most people who listen to it. Music provokes intense emotions like other sensory stimuli (taste, touch, smell, and sight) but unlike other stimuli, it has no real survival or biological value. (Blood, et al., 1999) Scientists believe that music has had an extremely influential role in our evolution. Blood and colleagues found that when exposed to dissonance, which is known as an unpleasant or unstable sound, under a PET scan, areas of the limbic system that deal with unpleasant emotions lit up while the opposite effect occurred with consonance (Blood, et al., 1999).

Although it is not known why we need to sleep or dream, it is vital for our daily lives and regulates our daily functions. Sleep deprivation can result in many negative aspects such as disrupting long-term and short-term memory, and impeding that that memories are stored during sleep (Lee, Douglass, 2010). All animals sleep and go through two distinct stages during this time called Rapid Eye Movement sleep (REM) and Non-rapid Eye Movement sleep (NREM). NREM stages are about ninety minutes long; REM occurs after the NREM cycle, and is typically longer than NREM stages. Research has consistently demonstrated that humans dream primarily during REM since when awakened in a sleep laboratory they recalled vivid, dream like experiences. (Hoss, 2005)

Ernest Hartmann performed studies on dream content and emotion (1996). He stated that dreams, especially the Contextualized Image (CI), receives the emotion of the

dreamer, and the intensity of this CI is based on the emotion. This correlates with nightmares, considering that fear is the predominate emotion. The emotion of fear may be portrayed via frightening images. In Post Traumatic Stress Disorder (PTSD) nightmares, the Contextualized Image will replay the traumatic event that led to this disorder. In order for patients to overcome these nightmares, they can take part in Image Rehearsal Therapy, which allows for them to create a new dream, and rehearse it enough until the dream is completely modified (Krakow, et. al, 2001).

Nightmares are vivid and highly emotionally arousing dreams that can cause the dreamer to awaken; they are currently viewed as the most traumatizing sleep disorders (Levin & Nielsen, 2007). Currently, five percent of the population has an issue with frequent nightmares (Schredl, 2009). They are seen to be accompanied by a "phobia of going to sleep" because of their frightening physiology, and are the causes of nocturnal wakening (Levin & Nielsen, 2007) thus leading to insomnia. Nightmares produce one predominant emotion, which is fear or terror. This is seen to be a result of high amygdala activity.

Much research has been done with various external stimuli and dream content. For example, Schredl et al., conducted a study to determine if the type of books that children prefer, such as fantasy, would be linked with lucid dreaming, and found that fantasy did hold the highest amount of lucid dreams (Schredl et al, 2012).

Few studies have been conducted addressing the influence of music on dream content. Music is composed of timbre, pitch, reverberation, and many other elements. Research has shown that pieces composed in major keys with an upbeat, rapid tempo tend to create happiness and those in a minor key with a slower tempo cause sorrow and

despair (2000, The Biology of Music, *The Economist*). Sand and Levin examined whether listening to exciting music prior to sleep would result in high amounts of anxiety in dreams as well as more bizarre dream imagery (1997). They predicted that calming music would produce more levels of boundary fluidity. It was found that there were no significant differences for hostility, anxiety, or boundary disturbance but there was a difference between three musical conditions on the Primary Process Scale. This research has led us to believe that music does have a role in influencing dreams. One consideration is that the participants in Sand and Levin's study were students who were classically trained in music. Therefore, their participants interacted with music in an extremely different manner than those who were not classically trained.

The purpose of this current experiment was similar to Sand and Levin's study but the participants were not composed of solely classically trained musicians. In addition, this study looked at the effect of four different genres of music (classical, hip-hop, rock, and jazz) on dream content and emotion. It was hypothesized that listening to music before sleep would result in dream content and emotion similar to that of the music, and that music holds the ability to affect dreams. More specifically, music composed in a major key with an upbeat tempo (rock and hip-hop) would result in happier dream content while pieces composed in a minor key with a slower tempo (jazz and classical) would create more upsetting dream content.

Methods and Materials:

Fifty adolescents and adults originally participated in this experiment; but only fourteen participants completed the entire study. Participants consisted of students from a suburban high school and the surrounding community. The ratio of female to male

participants was 10:4; the range in age was 15-45 years with the average age being 17. The subjects were asked to rate, on a scale from one to five, how calming or exciting each genre; jazz, hip-hop, rock, and classical, was, which genre they preferred, and how often they listened to each. Next, the participants filled out an Initial Survey, which foreshadowed the Dream Report. The Initial Survey focused on assessing their musical background, and whether or not they have frequent bad dreams or nightmares. These questionnaires were based on the Likert scales, ranging from least (1) to most (9). Along with the questionnaires, the participants were asked to record their dreams in a dream log, for the duration of one week.

A CD was created for each participant with selections from each genre of music (Figure 1.1). Each participant was then given a CD and selected which genre he or she wished to listen to for the first week. The participants were explicitly told to listen to one genre per week and two of the four pieces per night right before they went to bed. The Dream Reports consisted of fourteen items regarding what music they listened to, their recollection of dreams, if they had any nightmares or bad dreams, and the predominant emotions of these dreams. Participants were also asked to write down a short summary of one of their dreams and if they have had a similar dream before. Within each dream report, the subjects were asked to record their top five emotions seen in their dream, the first being the least intense and the fifth being the most intense (examples include confusion, happiness, mysterious.)

Rock	Classical	Rap	Jazz
•**Mr. Brightside-** The Killers. •**Sweet Jane-** The Velvet Underground. •**Fly By Night-** Rush. •**Hello Kitty Kat-** The Smashing Pumpkins.	•**Violin Concerto in A Minor, RV 356 Largo-** Vivaldi.. •**The Swan-** Saint Saens. •**Concerto No. 2 in G Minor, RV 315 Summer Movement 2-** Vivaldi. •**Brass Sextet in E Flat Minor-** Oskar Bohme.	•**Red Alert-** Childish Gambino. •**Gravel Pit-** Wu Tang. •**The Message-** Grandmaster Flash. •**Wu-Revolution-** Wu Tang.	•**Round Midnight-** Miles Davis •**Time after Time-** Chet Baker. •**My Funny Valentine-** Chet Baker. •**Lush Life-** John Coltrane.

Figure 1.0

Results:

All data was analyzed via averages, modes, and one-way ANOVAS. P values indicating statistical significance were then calculated using Excel and Graphpad software.

Figure 2.0 represents the average sleep quality after listening to each genre, as compared to the sleep quality without listening to music prior to sleep. As shown, the sleep quality of all participants declined after listening to music in general. The sleep quality within each genre drastically decreased after the participants listened to music. Their initial sleep quality was 7.2 on a Likert scale from 1-9, nine being fantastic, and one being

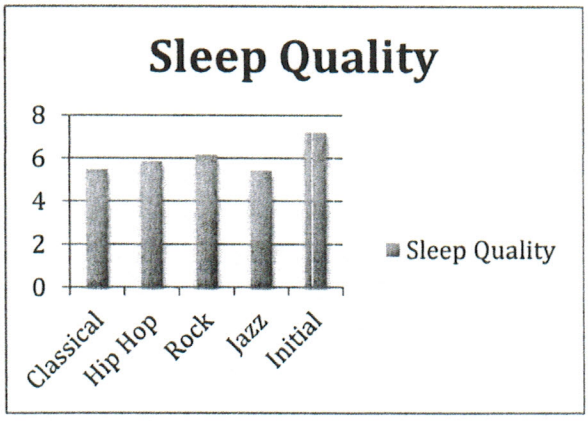

Figure 2.0
This demonstrates music's ability to significantly decrease sleep quality. Initially, it was closer to "amazing" while with music; most of the participants had "adequate" sleep quality.

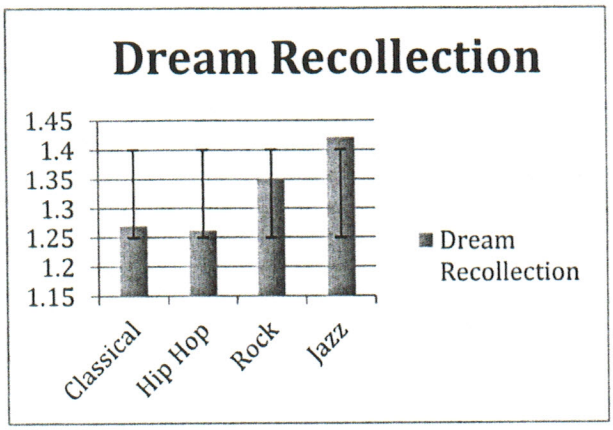

Figure 3.0
It was seen that every genre resulted in about one dream per night with hip-hop being the lowest and jazz being the highest.

terrible. According to the data, the participants' favorite genre was rock, then classical. On average, rock was the highest at 6.18, classical was 5.45, while hip-hop was the second highest at 5.85. This leads us to believe that rock and hip-hop might have lead to an increase of sleep quality. (See Figure 2.0) ANOVAs resulted in a P value of 0.7679.

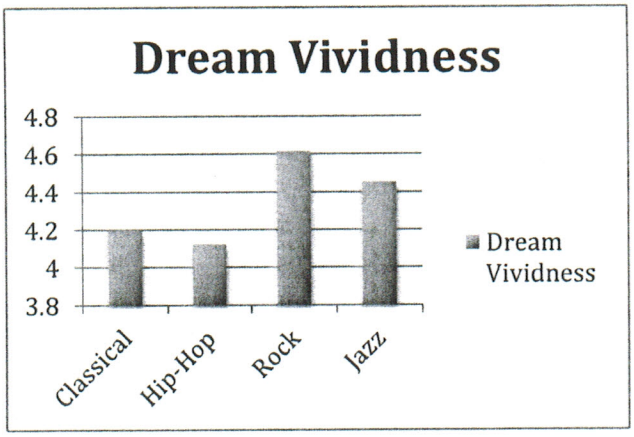

Figure 4.0
Rock was seen to produce more vivid dreams than any other genre, especially hip-hop. Jazz was seen to produce higher dream vividness as well.

Dream recollection throughout the genres was also examined, as seen in Figure 3.0. The data shows that every genre produced about one dream per night. It was seen that jazz resulted in the highest account of dream recollection, with rock as the second highest. It was also seen that these two genres held the highest level of dream vividness at 4.45 and 4.62, respectively with a standard deviation of 0.47. As shown in Figure 4.0, rock produced the most dream vividness while hip-hop produced the least vivid dreams, closely followed by classical. The p value calculated for this was 0.99876, which is not statistically significant. This could be due to limited recollection.

There were a total of ten bad dreams reported throughout the study, and only three nightmares. As seen in Figure 5.0, listening to classical music prior to sleep resulted in zero nightmares, and listening to the other three genres resulted in one nightmare per genre. Those who did have bad dreams said that they were less upset by them before listening to classical while they were more upset after listening to rock and jazz. Those who reported having bad dreams were only extremely upset by them while they listened to rock and hip-hop prior to sleep.

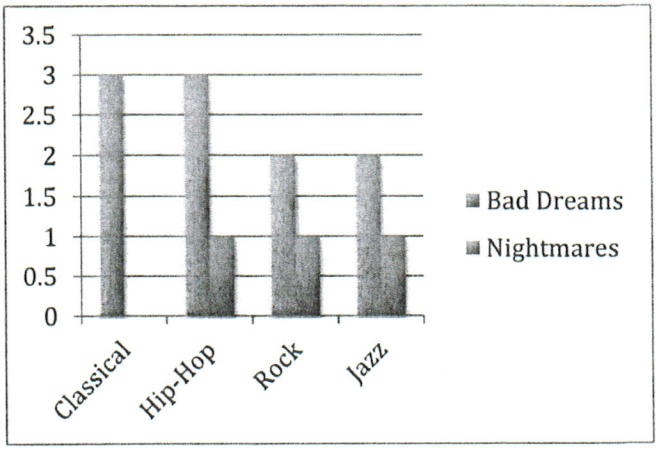

Figure 5.0
This demonstrates that classical and hip-hop produced the same amount of bad dreams while classical did not produce any nightmares, and the other three genres produced one nightmare each.

Within the Dream Reports, the participants were asked to record the dreams that they remembered along with the intensity of five emotions, ranging from 1-5, with 5 being the most intense. The top three emotions of each genre was rated and it was seen that with classical and hip-hop, confusion was the most frequent emotion while with rock and jazz, happiness was the most frequent. Within each gender, it was seen that females thought that their dreams were more exciting, especially within classical and hip-hop while in males, the most frequent emotion for classical and hip-hop was haunting, and jazz was seen to be more calming.

As seen in the dream reports, some participants had more extreme dreams, such as; one participant listened to rock before sleep, and had a dream about zombies chasing after her. While another participant listened to jazz, and dreamed about being with her grandmother. Most of the participant's dreams did not seem to be altered by the music,

and matched up with their dream reports. Since most of them were teenagers, their dreams demonstrated their day-to-day life, anxieties, and goals.

Conclusion:

This study investigated the influence of music on dreaming in terms of major and minor keys, and fast and slow tempos. A number of statistics were calculated, and the final sample size was too low to be statistically significant in most cases. The direct incorporation of external stimuli on dreams is very rare. However, seeing that music does hold the ability to influence dreams in some way was remarkable. It was shown that the anticipated emotions such as those on the sorrow and despair spectrum for classical and jazz, and those in the happiness spectrum for rock and hip-hop, were not seen within the dreams recorded. Oddly enough, happiness was recorded for rock and jazz, which demonstrates that tempo and key signature may not play a specific role in creating certain emotions.

It was also shown that music did not improve the sleep quality of the participants. The initial sleep quality was much higher before the study had begun, and, within each genre, sleep quality decreased significantly except in rock. The participants' favored genre of music was rock, and one can infer that this could be why the sleep quality for it was higher than the others. The findings for both rock and hip-hop went against the hypothesis, both producing calm dreams, and had a smaller decrease in sleep quality than the other two genres.

It was interesting to examine the difference in emotions within the two genders. Most males believed that their dreams were more haunting with the incorporation of music while most females thought that it was more calming; this was especially seen in

classical and hip-hop. The fact that classical music created more calming dreams for many participants could have resulted from many of them being classically trained music students who played in the advanced orchestra.

Discussion:

Some of music's influence may have been seen in later dreams in the course of the next few days, which is called the dream lag affect. Further research should be sure to analyze the dreams of the next day or two in hopes of obtaining full incorporation. In order to accurately examine this relationship between music and dreams, further research should also be completed with a larger n value, and a closer monitoring of participants. More males would also be desirable for further research on account that there were only four who participated. In an ideal experiment, equal numbers of males and females would participate in a controlled environment with an extended length of time for dream recordings.

Also, many of these participants were music students, it would be of high interest to incorporate more non-musical or classically trained participants for they look at music in a completely different way, and are affected by it much more than others.

Since the participants were not studied in a dream laboratory, it was difficult to confirm levels of control. Participants were on the honor system in regards to if they actually listened to the music or not, and if the days were consecutive.

This is one of only a few experiments conducted in order to analyze how music could affect dream content. Finding that it does affect dream content, even slightly, is remarkable and will influence further research.

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