

Music in dreams and music in waking:

An online study

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Abstract

A connection between music and dreams has been reported in many cultures. Although inspirations by dreams were reported for famous musicians there are few studies investigating the occurrence of music dreams in the general population. In the present online study, 1966 participants filled out an online questionnaire concerning their involvement in music in waking and the occurrence of music in dreams. The basic framework for the study was the continuity hypothesis of dreaming, that is, more musical activity during waking should be related to a higher amount of music dreams. About 6% of all remembered dreams contained music and the frequency was significantly higher when the participants spent time with music activities in waking like singing, playing an instrument or listening actively to music – supporting the continuity hypothesis. In addition, music dreams were associated with more positive emotions. Future research should study the effects of music in waking on music in dreams over a longer period of time (dream diaries) as well as the dreams of professional musicians.

Keywords

Music dreams, continuity hypothesis, playing an instrument, singing, emotions

All musical cultures depend on giving information from generation to generation as this is how traditions are created (Griffiths, 2006), that is, before notation and recording, memory was the only measure for music of the most ancient traditions. According to the continuity hypothesis of dreaming (Schredl, 2003), this intense engagement in musical activities in waking should be reflected in dreams. Moreover, in many cultures there are age-old rituals of bringing healing songs from dreams to waking, for example healing ceremonials of primitive people like the Temiar in Malaysia (Roseman, 1991). Especially in cultures with shamanism this connection with the spirit world was the confirmation of one's calling as shaman (Grace, 2012). Griffiths (2006) stated that there was no culture without any form of music art and for many people music was of high importance as it was seen as coming from the soul to express deep-rooted emotions (Luban-Plozza, 1990). Famous musicians such as Beethoven, Stravinsky, Tartini and Wagner reported music in dreams, even composing new pieces (Grace, 2012). However, there are only a few empirical studies addressing the question how often music occurs in dreams in general; one would expect – as music is an important part of our culture (Griffiths, 2006) – that this topic can be found quite frequently in dreams of the general population. Studies investigating the frequency of music dreams will be reviewed below.

In a dream diary study, the occurrence of music dreams for musicians was 40% and for psychology students 20% (Uga, Lemut, Zampi, Zilli, & Salzarulo, 2006). Retrospective studies in two mixed student samples showed a prevalence of 12% music dreams (Kern et al., 2014; Vogelsang, Anold, Schormann, Wübbelmann, & Schredl, 2016). The first population-based sample (Schredl, Berres, Klingauf, Schellhaas, & Göritz, 2015) reported a prevalence of 6% music dreams of all remembered dreams. In this sample, including 2929 participants with a wide range in age and education, age was negatively related to the music dream frequency (Schredl et al., 2015) which might be explained by the fact that older people spend less time with music in waking (Chamorro-Premuzic, Swami, & Cermakova, 2010). Moreover, music

dreams were rated to be more positive than dreams in general (Kern et al., 2014; Schredl et al., 2015). As music during the day had positive effects on the listener (Liljeström, Juslin, & Västfjäll, 2013) it seems plausible that music in dreams is also perceived as positive.

The present study was design to expand the findings of Schredl et al. (2015) by eliciting musical activities in waking – additionally to the percentage of music dreams. It is also an extension of the Vogelsang et al. (2016) as this study was based on a relatively small student sample. Based on the continuity hypothesis of dreaming (Schredl, 2003), it was expected that more musical activities in waking will result in more music dreams. Second, we hypothesized that music dreams to be more positive than dreams in general – as listening to music is often associated with positive emotions (Liljeström et al., 2013).

Methods

Participants

Overall, 1966 participants (1141 women and 825 men) completed the online survey between April 8, 2016 and April 18, 2016. The sample had a mean age of 47.68 ± 14.46 years (range: 15 to 91 years). The distribution concerning education was the following: not finished school (N = 15), 9 years of school (“Hauptschule”; N = 212), O-level (“Mittlere Reife”; N = 586), A-levels (“Fach-/Hochschulreife”; N = 475), university (N = 617), doctorate (N = 61). A subsample of participants reported at least one music dream. These 876 persons (512 women and 364 men) had a mean age of 45.49 ± 14.41 years (range: 15 to 91 years).

Measurement Instruments

The following two questions of the Mannheim Dream questionnaire (MADRE) that is in full length available in German and English (Schredl, Berres, Klingauf, Schellhaas, & Göritz, 2014) were used in the present study: The dream recall frequency was measured by a 7-point-scale (0 = never, 1 = less than once a month, 2 = about once a month, 3 = 2 to 3 times a

month, 4 = once a week, 5 = several times a week, 6 = almost every morning). The retest reliability of the dream recall frequency scale is high with $r = .756$ (Schredl et al., 2014). The emotional tone of the dreams in general was rated by a 5-point-scale (-2 = very negative, -1 = rather negative, 0 = neutral, +1 = rather positive, +2 = very positive) with a retest reliability of $r = .617$ (Schredl et al., 2014).

In addition, the participants were specifically asked about music in dreams. The percentage of music dreams of all remembered dreams, the emotional tone of music dreams measured by a 5-point-scale (-2 = very negative, -1 = rather negative, 0 = neutral, +1 = rather positive, +2 = very positive), the most frequent activities in music dreams (listening to music, concert, dancing, party, performance, rehearsal, discussion about music), whether the dreamer created new music in dreams (Yes/No), the most frequent music style in dreams (Classic, HipHop, Rock, Pop, Heavy Metal, German folk music, Reggae, Electronical music, Jazz/Swing/Blues) and the subjectively rated continuity between musical activities of the previous day and music in dreams (0 = not at all, 1 = scarce, 2 = sometimes, 3 = often, 4 = very often).

Lastly, the participants were asked about music in their waking-life. How much time they spend with musical activities (playing an instrument, singing), at what age they had their first musical instructions, how much time they spend with listening actively and passively to music per day, which their preferred music style is (Classic, HipHop, Rock, Pop, Heavy Metal, German folk music, Reggae, Electronical music, Jazz/Swing/Blues) and the attitude towards music in waking life (music doesn't play a role in my life, facilitating relaxation, facilitating concentration, listening to music while exercising, playing an instrument/singing as hobby, music is an important part of my life, music as a profession).

Procedure

The study link was posted on the online panel www.wisopanel.net, where persons with an interest in online studies are registered, having heterogenic demographic backgrounds. For some surveys, prizes or money are given for participation, but this study was voluntary and unpaid.

Statistical procedures were carried out using SAS for Windows 9.4. As data were not normally distributed and in order to compute non-parametrical statistics, music percentages were grouped into several categories (see Table 1). We carried out ordinal regression analyses to test the magnitude between playing an instrument/singing in waking, listening actively/passively to music in waking, and the percentage of music dreams, controlled for potentially confounding variables like age, gender, education, and dream recall frequency. A second ordinal regression analysis was done for those participants who carried out musical activities in waking life to investigate the relationship of music dream frequency with the age of first musical instruction. Based on our hypothesis, we applied one-tailed tests for investigating the relationship between the amount of musical activities in waking-life and music dream frequency. A signed-rank-test was used to compare the emotion tone of dreams in general and the emotional tone of music dreams and phi correlations to calculate the relation of preferred music style in waking and its occurrence in dreams. A Spearman's rank correlation was done for subjectively perceived continuity between waking and dreaming regarding music and the percentage of music dreams. Sample sizes are sometimes slightly reduced due to missing values.

Results

Overall, the mean percentage of music dreams was $6.30\% \pm 12.72\%$ of all remembered dreams. About half of the sample reported no music dreams at all, while a small subgroup reported that more than 40% of their dreams included music (see Table 1). The dream recall frequency of the sample was 3.35 ± 1.79 dreams and the emotional tone of the dreams in

general was balanced (0.02 ± 0.77 ; range: -2 to +2). During waking, the mean time spent with musical activities (playing an instrument/singing) are 1.28 ± 3.56 hours per week ($N = 1962$), listening passively to music 3.09 ± 3.03 hours per day ($N = 1956$) and listening actively to music 0.99 ± 1.60 hours per day ($N = 1957$). The mean age of the first musical instruction was 9.25 ± 6.91 years (range: 3 – 85 years).

The ordinal regression analysis for the music dream percentage categories is depicted in Table 2. Both playing an instrument/singing in waking and listening actively to music in waking were significantly correlated with more music dreams. Age was negatively associated with the percentage of music dreams, while there was a positive association for education and dream recall frequency on music dream percentage. A second ordinal regression analysis for the subgroup of participants playing an instrument/singing in waking yielded no significant relation between age of first musical instruction and music dreams (see Table 3).

The subsample of participants who reported at least one music dream had a balanced emotional tone of the dreams in general (0.07 ± 0.79 ; $N = 862$) and a more positive tone for the music dreams (0.75 ± 0.74 ; $N = 862$). The signed-rank-test comparing the two emotion variables was significant ($S = 59208$, $p < .0001$). The different activities found in music dreams are shown in Table 4. Listening to music and party were the most frequent topics, while dancing, concerts, performances, rehearsals and discussions about music occurred less often. In the music dreams ($N = 859$) 43% of the music was known, 40.16% known but with some alterations to the known music while unknown music occurred in 16.76%. 28.79% of the participants with music dreams ($N = 837$) stated that they create new melodies/pieces of music within their dreams. The preferred music styles in waking and dreamed music styles are depicted in Table 5. Pop, Classic and Rock were most favorite and there were similar results for music style in waking and in dreams. The correlations showed significant results for all music styles.

The results of the subjectively rated continuity between musical activities of the previous day and music in dreams are depicted in Table 6. While most of the sample stated there was no continuity, about 8% answered with “often” or “very often”. A Spearman’s rank correlation was done for the continuity scale and the occurrence of music dreams, yielding a significant result ($N = 1474$, $r = .506$, $p < .0001$).

Lastly, the attitude towards music in waking life is depicted in Table 7, presenting facilitating relaxation as the most important attitude towards music in life and only 19 participants stating music as their profession. The music percentage of this group was $15.32\% \pm 19.64\%$.

Discussion

The main finding of the study indicates that even though more than 50% of the sample reported no music dreams, about 6% of all dreams contain music – comparable to the previous finding of Schredl et al. (2015). As the participants were recruited from the same panel two years apart there is an overlap of participants who responded to both surveys (but participating in a dream study two years ago should not affect the present findings regarding the continuity between waking and dreaming). The frequency of music dreams is significantly higher when the persons spend more time with musical activities like singing/playing an instrument or listening actively to music in waking. Moreover, music dreams included more positive emotions than dreams in general. These findings regarding music provides additional evidence for the validity of continuity hypothesis of dreaming (Schredl, 2003) which has been demonstrated for other waking-life topics like sports, politics, and reading (Erlacher & Schredl, 2004; Kern et al., 2014; Noveski, Schredl, & Göritz, 2016; Schredl & Erlacher, 2008).

This music dream frequency is considerably smaller compared to the Uga et al. (2006) study, who reported 20% of diary dreams containing music in the subsample of non-musicians (in the present sample the majority of participants were no professional musicians).

This might be explained by the fact that the Uga et al study was advertised as a study concerning music so it seems that the sample was self-selective, that is, participants with music dreams were more likely to participate. The present study was entitled “Media and dreaming” and, thus, a selection bias in respect of music dreams should be small. However, a study carried out in the same panel (Schredl et al., 2014) showed that high dream recallers were more likely to participate and, thus, as dream recall frequency is related to music dream frequency, one might expect a slightly lower music dream percentage in representative samples including also persons with very low dream recall. This was also the reason to include dream recall frequency as a possible confounder in the analyses. In the diary study (Uga et al., 2006), the participants were specifically asked about the occurrence of music in their dreams every morning so this might have increased the frequency of music dreams as this effect was shown in another study for other dream topics (Stern, Saayman, & Touyz, 1978). The retrospective estimates of percentages of music dreams might be biased by beliefs and expectations (Beaulieu-Prevost & Zadra, 2007), however, for sports topics the accordance between retrospectively measured sport dream frequency and frequency of sport dreams measured with dream diaries was very high (Erlacher & Schredl, 2004; Schredl & Erlacher, 2008), indicating that the retrospective measures have sufficient validity.

The result that playing an instrument/singing and listening actively to music in waking were significantly correlated with more music dreams is supporting the continuity hypothesis of dreaming (Schredl, 2003). This corroborates the findings of Vogelsang et al. (2016) that music-associated activities during the day affects the occurrence of music in dreams. In accordance with Uga et al. (2006), we also found that professional musicians reported more music dreams compared to the other participants. The fact that two previous studies (Kern et al., 2014; Uga et al., 2006) found no significant relation between musical activities during the day and music dream frequency might be explained by role that emotional involvement might play in this relationship. The present study only found significant effects for singing/playing

an instrument and listening actively to music but not for listening to music passively, that is music with less involvement (music in the background of the person's attention) does not affect the dream content. This effect of emotional involvement of the daytime experience and the incorporation of this experience into dreams has also been reported for events not related to music (Malinowski & Horton, 2014; Schredl, 2006).

The continuity between dreaming and waking was also supported by the high correlations between music styles preferred in waking and music styles present in music dreams. Moreover, about 40% of the sample reported that at least sometimes music occurs in dreams if they were engaged in more music activities the previous day than usual; again supporting the continuity hypothesis of dreaming.

In contrast to the finding of Uga et al. (2006), we did not find an effect of the age of the first musical instruction on music dream frequency. This might be explained by the fact that the correlation in the Uga et al. (2006) study was obtained from a sample of 35 musicians whereas most of the participants of the present study were no professional musicians but played an instrument or sang as a hobby and, thus, did not practice as much as the professionals, that is, the variance in the total amount of practice is smaller if the training intensity is relatively low.

Moreover, the music dream percentage of the present study is smaller compared to the two retrospective studies (Kern et al., 2014; Vogelsang et al., 2016) most likely due to the higher mean age of the participants in this study. The finding of the present study that music dreams are negatively associated with age are in accordance with the study of Schredl et al. (2015). This age effect could not be explained by spending less time with music in waking as this was statistically controlled, that is, other variables might be of importance. One might hypothesize that musical interest might decrease with age (cohort effects) so that older people have less music dreams; but this hypothesis have to be tested empirically.

Furthermore, the dream recall frequency was positively associated with more music dreams which might be caused by the following reason: Persons with a low dream recall frequency might think they never have music dreams as they are scarce and, thus, underestimate their “real” music dream frequency. Underestimations of low dream recallers regarding their dream content have been reported previously (Schredl, 2002). In addition to this recall effect, one might speculate that openness to experience (Big Five personality factor) modulate the relationship between dream recall frequency and percentage of music dreams as persons who are open to experience report high dream recall (Schredl, Wittmann, Ciric, & Götz, 2003) and more open to reflective and complex as well as intense and rebellious music styles (Dunn, de Ruyter, & Bouwhuis, 2012) and, thus, might have more intense interest in music which might mediate the continuity between waking and dreaming. Future research should use diary studies over a longer time to collect enough dreams of low dream recallers so that music dream frequency might be analyzed over a longer period and elicit the personality dimensions of the participants.

Another finding of the present study was that music dreams were more positive than dreams in general and is in compliance with the Kern et al. (2014) and the Schredl et al. (2015) study. Positive effects of music during the day on the listener were found (Liljeström et al., 2013), so this might be the same for music at night. As facilitating relaxation was the most frequent attitude towards music in the present study, future investigations should analyze the effect of music dreams on the mood of the following day as these positive dreams might be stimulating. Previous studies have shown that dreams frequently affect daytime mood (Schredl, 2009).

In addition to famous musicians creating new melodies in their dreams (Barrett, 2001) hobby musicians in the present sample also reported hearing unknown music and composing music in their dream – comparable to the findings of Vogelsang et al. (2016) study. That is, dreams provide valuable inspirations for musicians.

To summarize, the present study indicated that music dreams occur in a sample with a large age range and that these are more frequent when there are musical activities (playing an instrument, singing, listening actively to music) in waking. Music dreams also tend to be more positive compared to dreams in general. Future research should include a larger diary series to study the effects of music in waking on music in dreams over a longer period of time as well as the dreams of professional musicians. In addition, experimental studies which present music prior or even during sleep in a controlled sleep laboratory setting with subsequent awakenings from REM sleep would be of interest.

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Table 1. Participants' reported percentage of music dreams grouped into six categories (N = 1952)

Percentage of Music dreams	Number of participants	Percentage of participants
0%	1076	55.12%
0.01% to 5.00%	379	19.42%
5.01% to 10.00%	218	11.17%
10.01% to 20.00%	132	6.76%
20.01% to 40.00%	89	4.56%
40.01% to 100%	58	2.97%

Table 2. Ordinal regression analysis for the categorized music dream percentage (N = 1938)

Variables	Standardized Estimates	χ^2	<i>p</i>
Age	-.1118	19.5	<.0001
Gender	-.0411	2.6	.0718
Education	.0718	8.0	.0047
Dream recall frequency	.2872	114.5	<.0001
Playing an instrument/Singing in waking (h/week)	.2131	70.3	<.0001
Listening to music passively in waking (h/day)	.0314	1.6	.2089
Listening to music actively in waking (h/day)	.1819	53.4	<.0001

All variables were entered simultaneously.

Table 3. Ordinal regression analysis for the music dream variable for the participants with playing an instrument/singing in waking (N = 1085)

Variable	Standardized Estimates	χ^2	<i>p</i>
Age	-.1174	13.0	.0003
Gender	-.0823	6.4	.0116
Education	.0203	0.4	.5229
Dream recall frequency	.2393	51.4	<.0001
Playing an instrument/Singing in waking (h/week)	.2716	64.5	<.0001
Age of first musical instruction	.0191	0.4	.5457

Table 4. Percentage of activities in music dreams (N = 876)

Activity	Percentage
Listening to music	44.52%
Party	36.64%
Dancing	30.82%
Concert	25.68%
Performance	20.43%
Rehearsal	8.56%
Discussion about music	8.22%

Table 5. Correlations of preferred music style in waking and its occurrence in dreams (N = 876)

Preferred music style	Percentage in dreams	Percentage in waking	Phi-correlation	<i>p</i>
Classic	37.79%	36.22%	.603	<.0001
HipHop	8.68%	13.73%	.490	<.0001
Rock	36.64%	53.92%	.502	<.0001
Pop	48.40%	61.50%	.512	<.0001
Heavy-Metal	8.68%	12.72%	.564	<.0001
German folk music	18.95%	20.50%	.569	<.0001
Reggae	6.28%	12.41%	.380	<.0001
Electronical music	13.70%	18.26%	.550	<.0001
Jazz/Blues/Swing	14.95%	21.97%	.512	<.0001
Other music styles	11.99%	14.09%	---	

Table 6. Subjectively rated continuity between musical activities of the previous day and music in dreams (N = 1488)

Category	Percentage
Not at all	42.61%
Scarce	18.35%
Sometimes	30.31%
Often	7.26%
Very often	1.48%

Table 7. Attitude towards music in waking life (N = 1966)

Attitude	Percentage
Facilitating relaxation	67.14%
Music is an important part of my life	34.28%
Facilitating concentration	20.75%
Listening to music while exercising	18.92%
Music doesn't play a role in my life	14.04%
Playing an instrument/Singing as hobby	10.38%
Music as a profession	0.97%