

Music in dreams

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Received 18 May 2005

Available online 21 October 2005

Abstract

Music in dreams is rarely reported in scientific literature, while the presence of musical themes in dreams of famous musicians is anecdotally reported. We did a systematic investigation to evaluate whether the occurrence of musical dreams could be related to musical competence and practice, and to explore specific features of dreamt pieces. Thirty-five professional musicians and thirty non-musicians filled out a questionnaire about the characteristics of their musical activity and a structured dream log on the awakening for 30 consecutive days. Musicians dream of music more than twice with respect to non-musicians; musical dreams frequency is related to the age of commencement of musical instruction, but not to the daily load of musical activity. Nearly half of the recalled music was non-standard, suggesting that original music can be created in dreams.

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Keywords: Dreaming; Dream content; Sleep; Music; Musicians; Creativity

1. Introduction

Dream reports include frequently visual images (Snyder, 1970), and among acoustic mainly verbal ones, with several degrees of complexity (Salzarulo & Cipolli, 1974). Sensations of smell or taste are rarely reported (Zadra, Nielsen, & Donderi, 1998).

Daytime activities show a relationship with dream contents: in particular, interindividual differences in waking-life could be reflected in differences in dream content (Schredl & Hofmann, 2003). Nevertheless, the occurrence in dreams of a given activity is not fully accounted for by the amount of waking time spent in it. The various activities of waking could differ as to their probability to occur in dreams. Hartmann (2000) and Schredl and Hofmann (2003) showed that daily activities such as reading, writing or calculating rarely occur in dreams, whereas talking or walking are more frequent. Several interpretations has been proposed: (a) dreams being “archaic”, dream production processes cannot make use of relatively recent cultural acquisitions (Schredl, 2000); (b) dreaming deals very little with highly focused cognitive activities related to a feed-forward functioning mode of the neuronal nets, since during dream production nets operate in an

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autoassociative mode (Hartmann, 2000); (c) activities like reading, writing, or typing are hard to perform in dreams due to their nature of effortfully learned skills, rather than evolutionary adaptations responding to the requests of the ancestral environment (Revonsuo, 2003).

Among the human activities, music might be a privileged domain of investigation for it allows to be conceived both as a waking time-consuming activity and as an expression of knowledge and competence. To this latter respect, music is quite similar to a natural language: since the earliest age children show a general musical capacity (Papousek, 1996; Trehub, 2003), and the ability to extract and store structural representations from a complex musical stream seems to develop spontaneously in human subjects (Bigand, 2003; Koelsch, Gunter, Friederici, & Schroger, 2000). Nevertheless, to become a performer or a composer implies the achievement of more sophisticated musical abilities: professional musicians undertake an intensive, lifelong training to learn and manipulate the “musical language,” and practice music as a main activity in their daily life (Gabrielsson, 1999; Sloboda, 2000).

The relation between music and dreams has so far received little attention in the scientific literature. Research done by surveys on dream content found the recall of musical themes quite rare in the general population (Schneider & Domhoff, 2004). As to musicians' dreams, Seidner (1968) observed the spontaneous occurrence of musical episodes, and Sand and Levin (1997) explored the effect of listening to music before sleep in a musicians' sample on several dream features, such as presence of referential activity, hostility and anxiety, primary process thinking and boundary disturbance. Anecdotal reports about the presence of musical themes in dreams of famous musicians as Berlioz, Tartini, Stravinsky (respectively, Cairns, 1969; Farga, 1950; Stravinsky & Craft, 1959) suggest that musical material could be included in dream experience and, in addition, that the creation of original musical pieces could occur during sleep.

The aim of this study is to detect the presence of music in dreams by means of specific questions, which should elicit the retrieval of dreamt musical material and its characteristics. We will evaluate whether the occurrence of music in dreams could be related to musical competence and to the involvement in musical practice. To have learnt the language of music could indeed provide the professional musician with a unique set of cognitive processes that may function during sleep, leading to various forms of music representation and even to the creation of new pieces.

2. Method

2.1. Subjects

Thirty-five professional musicians, age range 20–47 years (mean \pm SE: 30.09 \pm 1.13), and thirty non-musicians, age range 18–38 years (20.83 \pm 0.81), took part in the study. Musicians were instrumental or vocal performers of Western tonal music; non-musicians were undergraduate students. All the subjects were unpaid volunteers and were recruited through advertisement: for musicians, advertisement was put up in the Conservatory “Luigi Cherubini,” Florence, and in the office of Orchestra “Camerata Strumentale della Città di Prato,” Prato; for non-musicians, in the Faculty of Psychology, University of Florence. To be included in the non-musicians group, subjects should have neither received any formal musical training and played any musical instrument, nor sung as a soloist or in a choral ensemble.

2.2. Material and procedure

Each subject filled out a questionnaire about the characteristic of her/his musical activity at the beginning of the survey, and kept a structured dream recall questionnaire composed of 30 sheets to be filled out each morning for 30 consecutive days. The questionnaire about musical activity assessed: for musicians, the age of commencement of musical instruction, the years of musical practice and the hours of daily musical exercise; for non-musicians, the hours/day committed to listen to music. Subjects were asked to estimate the parameters “hours of daily musical exercise” (for musicians) and “hours/day committed to listen to music” (for non-musicians) over the past month. Each sheet of the dream recall questionnaire consisted in 14 multiple-choice questions, concerning dream recall, dream content and, in particular, the occurrence of musical and verbal activity. The question concerning the presence of music in dreams was: “*Did some musical activity occur in*

dream?,” with the following alternatives: (a) *no recall*, (b) *yes, just the presence of music*, (c) *yes, some fragments* and (d) *yes, a melody*. The next question aimed to ascertain if music in dreams was a “replay,” or it sounded somehow altered with respect to music usually experienced in daily life. The question asked: “*How much did you feel familiar with the music you dreamt?*”, with the following alternatives: (a) *it was a factual reproduction of a known musical piece*, (b) *it was an unusual version of a known musical piece* and (c) *it was an unknown musical piece*.

2.3. Data analysis

For each subject, we computed: the percentage of dream recall (i.e., the recall to have dreamt at least once in the preceding night) upon 30 days, the percentage of dream with content upon dream recalled, and the percentage of recall of verbal and musical activity in dreams with content; data were compared between musicians and non-musicians. In the musicians group, the recall of musical activity was evaluated as a function of the characteristics of the individual musical activity, i.e., (a) age of commencement of musical instruction, (b) years of musical practice, and (c) hours of daily musical exercise. In the non-musicians group, recall of musical activity was evaluated as a function of the hours/day committed to listen to music. Familiarity of dreamt music was evaluated only in the musicians group, due to the potential unreliability of non-musicians’ judgement. Statistical analyses were performed by means of Student’s “*t*” test for independent samples, Pearson’s “*r*” correlation coefficient and partial correlation coefficient. Significant *p* level was set to .05.

3. Results

Each subject completed the dream questionnaire for 30 consecutive days. Thus, a total of 1050 dream questionnaire sheets for musicians and of 900 for non-musicians were collected. Musicians reported from 5 to 30 dream occurrences upon 30 nights (mean \pm SE: 19.2 ± 1.1); non-musicians from 8 to 30 (17.9 ± 1.2). The percentage of dream recall was similar in the two groups (mean \pm standard error, $64.10 \pm 3.65\%$ for musicians, compared with $59.78 \pm 4.09\%$ in controls: $t = 0.79$, *df*: 63, n.s.). The percentage of recall of dreams with content was also similar ($89.28 \pm 1.74\%$, compared with $90.52 \pm 2.67\%$ in controls: $t = 0.39$, *df*: 63, n.s.), as was the percentage of recall of verbal activity ($76.65 \pm 4.69\%$, compared with $72.78 \pm 6.03\%$ in controls: $t = 0.51$, *df*: 63, n.s.). However, musicians’ dreams contained more than twice the recall of musical contents with respect to non-musicians’ dreams (cumulated “yes” answers, $40.10 \pm 3.73\%$, compared with $18.20 \pm 3.32\%$: $t = 4.38$, *df*: 63, $p < .001$) (Fig. 1).

There is a clear negative correlation between frequency of music recall and the age of commencement of musical instruction: the earlier the age, the higher the frequency of music recall, even after controlling for years

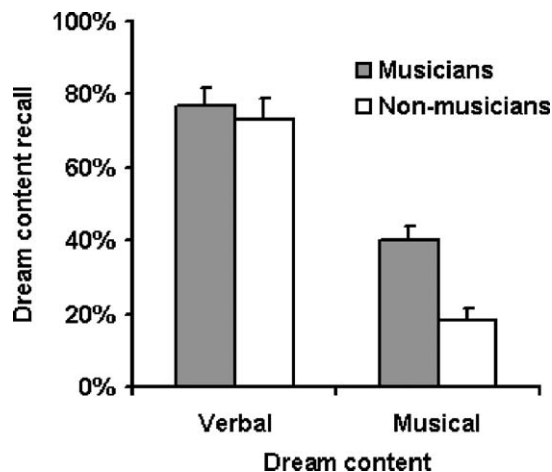


Fig. 1. Frequency of verbal and musical activity in dreams.

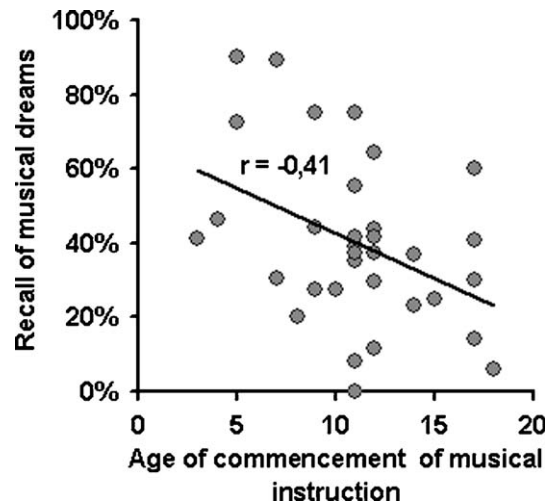


Fig. 2. Relationship between frequency of music recall and age of commencement of musical instruction.

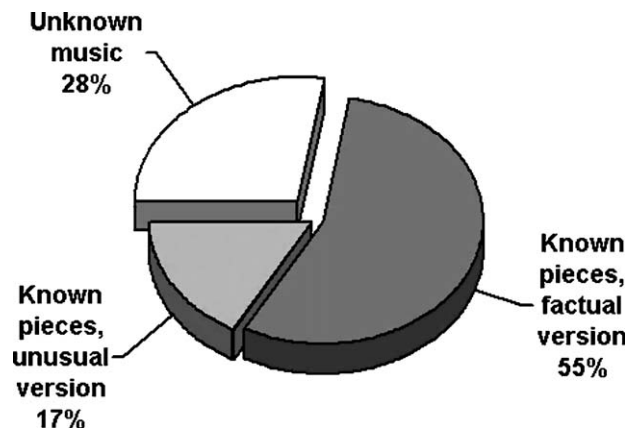


Fig. 3. Musicians' judgement of familiarity of musical pieces in dreams. Nearly half of dreamt music was non-standard (unusual versions of known pieces and unknown music).

of musical practice and the hours of daily exercise ($r = -.41$, $p = .015$; partial correlation coefficient = -0.41 , $p = .017$) (Fig. 2). No significant relationship was found either between musical dream recall and the years of musical practice ($r = .11$, n.s.; partial correlation coefficient = -0.11 , n.s.), or with the hours of daily exercise ($r = -0.02$, n.s.; partial correlation coefficient = -0.06 , n.s.). As to non-musicians, no significant relationship was found between frequency of music recall and the hours/day committed to listen to music ($r = -0.02$, n.s.).

In the musicians group, 135 out of the total 244 musical dreams (55%) were factual reproductions of known musical pieces, 41 (17%) were unusual versions of known pieces and 68 (28%) were reported to contain unknown musical pieces (Fig. 3).

4. Discussion

In earlier studies, the instructions to the subjects have been shown to play a major role in dream research (Foulkes, 1962). A relevant methodological issue is the uncertainty about whether the reports following an unspecific question that requires to refer dream content reflect the totality of the precedent mental sleep experience. A specific questioning should allow to retrieve as much information from memory is possible. This method has been used among others by Snyder (1970) and Cipolli and Salzarulo (1975) and it was found

to be effective in improving recall of verbal activity; in fact, our actual verbal activity recall percentages obtained using a specific question (about 42% of dream logs) are very close to those reported by Cipolli and Salzarulo (1975) (39% of reports). The present study, which made use of specific questions about the presence of music in dreams, prodded the subjects to retrieve an appreciable amount of musical material, at odd with results obtained by means of general surveys, or unspecific questioning (Schneider & Domhoff, 2004).

The occurrence of music even in non-musicians' dreams suggests that a general capacity to deal with complex acoustic representations like music, besides linguistic ones, could be at work in dream production processes. This is in agreement with recent studies showing that musical aptitude, which seems to be a natural endowment of the human brain, could develop as a consequence of mere exposure to the musical idiom of a given cultural environment (Bigand, 2003; Koelsch et al., 2000; Trehub, 2003), in a similar way that linguistic competence does.

Musicians' dreams show more than twice musical contents with respect to non-musicians' ones, thus indicating that the formal knowledge of a musical idiom increases the probability to produce musical material in dreams. Musicians' peculiar competence could involve focused cognitive processes (Bever & Chiarello, 1974; Messerli, Pegna, & Sordet, 1995) and the technical and expressive skills required by the professional performance need an effortfully learned mastering of musical matter (Gabrielsson, 1999; Sloboda, 2000). Since the rarity of activities like reading, writing, calculating found in dreams was attributed to their nature of either highly focused cognitive processes (Hartmann, 2000), or effortfully learned skills (Revonsuo, 2003), we should have expected a lack of differences between musicians and non-musicians. The increased frequency of music in dreams of musicians, who have learnt a musical idiom through an intensive training, suggests that music might not fully share the properties of the above mentioned focused cognitive activities which rarely occur in dreams. The frequency of music even in non-musicians' dreams (18%) seems much higher than the frequency of reading or writing typically is in dreams: this could be an additional argument for the difference between music and the other cognitive skills. Musical training could enable musicians fully to develop the human musical aptitude: thus, the propensity to dream of music could increase.

In the musician group, the frequency of music recall shows a relationship with the age of commencement of musical instruction: the earlier the age, the higher the frequency of music recall. This finding is in agreement with the notion that the early years of childhood are crucial for establishing the lifelong development of musical skills (Gordon, 1997). The association with an early commencement of musical formation has also been observed in some music-related abilities, such as the identification of absolute pitch and the enhanced bimanual coordination due to a reduced hand skill asymmetry (up to 9 and up to 7 years, respectively) (Pantev et al., 1998; Schlaug, Jancke, Huang, Steiger, & Steinmetz, 1995).

On the other hand, a significant relationship has not been found between musical dream recall and either the years of musical practice, or the quantity of daily exercise. This is in agreement with non-musicians' results, where there is no relationship between the amount of time committed to listening to music and the frequency of musical dreams. Thus, the occurrence of music in dreams would not seem to result from daytime load of musical activity. Together with the higher frequency of recall in musicians with respect to non-musicians, this result is in favour of the role of musical competence and knowledge of musical rules on the presence of music in dreams.

The association between the frequency of musical dreams and the status of professional musician, but not with the exercise load, is not fully supporting Schredl and Hofmann's (2003) remark as to the increase of dreaming about occupational themes as a function of the daily amount of time spent working. We suggest that the achievement of some peculiar competences, like music, could engender status-related differences between expert and non-expert subjects which may possibly be reflected in differences of dream contents; the age of commencement of the training could modulate the propensity to dream items related to the specific competence domain. Moreover, since music is widely intended as emotional communication (Meyer, 1956; Sloboda, 2000), the role of the emotional involvement attached to the waking life experience on dream contents (Schredl & Hofmann, 2003) should be taken into account to justify the higher frequency of music in musicians' dreams.

As pointed out in the Method section, the characteristics of dreamt music taken into account were evaluated only in the group of musicians, due to the lack of specific competence in non-musicians. We designed three answer options to evaluate whether mnemonic traces of known pieces of music could be replayed in dreams,

or somehow transformed; otherwise if dream processes could produce original combinations of musical elements. Known music is likely to be replayed in dreams: musicians recognise factual reproductions of existent musical pieces in 55% of their musical dreams. This result shows that a musical trace could be exactly reactivated, suggesting that dream production processes could recruit simultaneously all the structural dimensions of a known music.

On the other hand, the occurrence of dreams containing unusual versions of known pieces (17%) shows that a musical mnestic trace could be reprocessed during sleep. It could be speculated that single features of a known music should be separately modified to obtain such unusual versions of known musical pieces. Such hypothesis agrees with the notion of independent cognitive processes committed to analyse each dimension of music (Boltz, 1998; Krumhansl, 2000; Lechevalier, 2003). It could be suggested that this relative processing independence of musical dimensions could sometimes be brought to evidence spontaneously by sleep.

Twenty-eight per cent of musical dreams are claimed to contain unknown pieces, about which musicians feel confident to have never heard them before. How could these novel pieces of music be produced? It could be supposed that, being able to attach musical events on a normative structure in a meaningful and comprehensible way (Meyer, 1956; Sloboda, 1985), musicians might create original musical surfaces from new combinations of memory items. The occurrence in dreams of music that has been never heard suggests that this capacity, usually conceived as a conscious cognitive effort (Sloboda, 1985), could be at work even during sleep. Further experiments analysing dreams obtained after provoked awakening in the lab could allow us to collect more detailed descriptions of the several dimensions (melodic line, rhythmic pattern, tonal context, harmonic movements, and instrumentation) of dreamt music.

In conclusion, the use of specific questions makes possible to find an appreciable amount of musical dreams. The status of professional musician doubles up the propensity to dream music, in particular if the musical instruction commenced at an early age. Finally, the occurrence of unknown musical pieces shows that new musical productions could be created in dreams: this is in agreement with even recent suggestions about creativity during sleep (Maquet & Ruby, 2004; Wagner, Gais, Haider, Verleger, & Born, 2004). The present study brings to evidence that the celebrated dreams of Tartini, Berlioz or Stravinsky could be something more than suggestive tales.

Acknowledgments

We thank David Burr and Nicoletta Berardi for comments on an earlier version of the manuscript and Maestro Marco Rapetti and Anna Maria Freschi for their precious advice. We are grateful to Conservatory “Luigi Cherubini,” Florence, and Orchestra “Camerata Strumentale della Città di Prato,” Prato, and to their musicians.

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