

# Empirical evidence of original metaphors in dreams: Five examples, description of the method used and theoretical conclusions about the meaningful and complex nature of dreaming

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*Summary.* The present paper deals with several topics which entail one another. The first topic is the issue whether dreams are meaningless or meaningful. To answer the question, we decided to study the presence of metaphor in dreams. Three criteria for the presence of a metaphor were observed: first the meaning of the metaphor is discovered by the dreamer when (s)he answers the question of the interview part of our method, second the metaphor must not be a conventional one, third the analogy between the metaphor and its target has to be obvious for the dreamer and the experimenter. Five examples of metaphors are presented and the method used is explained in details, since our methodology has original features and is helpful for studying other topics. The two main consequences of the presence of metaphors in dreams are first, that dreams are meaningful - an idea that a number of dream researchers reject; second, dreaming is a complex cognitive ability which cannot be reduced to reflecting underlying neurophysiological events or waking thoughts.

*Keywords:* Meaningless/meaningful nature of dreams, Dream metaphors, Methodology for discovering them, Reductionist conception of dreaming

## 1. Introduction

### 1.1. Are dreams devoid of meaning or meaningful?

The question whether dreams have meaning or are meaningless has divided the community of people who work and write on the topic of dreams. On the one hand, most psychotherapists since Freud (1955/original text 1900) to our days, e.g., the authors of the different chapters of a recent edited volume on dream work (Lewis & Krippner, 2016) and some scholars who study dreaming with a linguistic (e.g., Lakoff, 1993) or sociological approach (e.g., Lahire, 2018) are usually convinced that dreams are meaningful and deserve to be interpreted. For most of these authors this idea is a basic premise. On the other hand, dream researchers who value a scientific approach and study for example cognitive aspects or neurophysiological features of dreams, avoid the study of the meaning of dreams. For instance, the authors presented in the next subsection (Hobson & McCarley, 1977; Crick & Mitchison, 1986; Foulkes 1989; Graveline & Wamsley, 2015). The reason is that the topic of the meaning of dreams implies sooner or later dealing with the issue of dream interpretation, which has a long past of unscientific treatment. In effect, dream interpretation (a heuristic) was practiced in antiquity, numerous centuries before the existence of any

scientific methodology. At the end of the 19th century, Freud (1900, chapter 7) provided a list of dream symbols and their meaning, without mentioning anything justifying his interpretation. Nowadays, a heuristic remains impossible to be validated like an observed fact obeying scientific laws. However, there is a high probability that a dream interpretation is justified when a/ it is provided by the dreamer, after awakening, b/ it is based on cognitive data: memories and personal definitions associated to elements of the dream reports, both being the main sources of dreaming images; c/ the analogy between the dream metaphor and its target is striking.

The dichotomy of dream interpretation and study of dreaming processes, present since the 1960s, helped to attribute to the study of dreaming a status of reliable scientific activity.

### 1.2. Four models of dreaming attempting to prove that dreams are meaningless

Some researchers in the second category here above developed in the 1970s and 1980s theories that were supposed to explain the meaningless nature of dreams. For example, Hobson & McCarley (1977) proposed an "activation-synthesis" theory. According to that theory, the best known neurobiological theory of dreaming until the end of the 20th century, strong impulses at the level of the pons activate randomly fragments of memories or other content at the level of the forebrain. This first step, the activation, is followed by the step of synthesis, during which the forebrain makes the best job possible in order to organize the result of the chaotic activation into a partially story-like and plausible content. The conclusion of this theory which postulates that dream content is primarily activated randomly, is that no meaning - except the content which is immediately intelligible - must be sought in dreams.

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The activation synthesis theory is nowadays totally obsolete because it explains dream production by features of the REM stage of sleep. Numerous experiments during the second part of the 20th century demonstrated that dreaming occurred also in stages of sleep other than REM sleep. For example, Casagrande et al. (1996), Cicogna et al. (1998), Foulkes (1962), Foulkes & Schmidt (1983) and Stickgold et al. (2001) obtained rates of recall over 60% for reports upon awakening in Stage 2 sleep, the stage in which we spend the longest duration in a night of sleep. Moreover, several papers (for a review, see Montangero, 2018) revealed that the difference of content between REM-sleep reports and Stage 2 sleep reports disappears according to the length of the reports (Antrobus, 1983) and according to the moment of the night (Goodenough et al., 1959; Cicogna et al., 1998). Moreover studies on the impairments produced by brain lesions (Solms, 2000) showed a dissociation between dream reporting and the presence of REM sleep. The majority of sleep neurobiologists have stopped to confound dreaming with REM sleep at the latest since the beginning of the 21st century.

A second model of dreaming that aimed at showing the meaningless nature of dreams was that of Crick and his colleague Mitchison. The two authors advanced the idea that memories are stored in neural nets, "in which many units act in parallel and which in some models connect back to all the other units in the net" (Crick & Mitchison, 1986, p. 103). When overloaded during dreaming, the nets "misbehave" by producing a pattern which is a mixture of its stored patterns. In other words a condensation. A process of "reverse learning" damps down the mixed outputs produced by overlapping memories. Thus the two authors insisted on the process of partially forgetting or deleting during REM sleep and dream (both being not clearly distinct in their reductionist theory), at a time when the function of memory consolidation of sleep started to be discovered. Crick and Michison's model has two main weaknesses. First it is incompatible with the existence of recurrent dreams and recurrent images in dreams. Second, the model does not explain why dreams have narrative features.

In the 1980s, a third theory attempting to prove that dreams are meaningless was proposed by Foulkes (1989), one of the most productive dream researchers about cognitive aspects of dreaming of the period. Contrarily to the two previous models, the one presented by Foulkes had not at all a reductionist stance. However, his theory had some similarities with the activation-synthesis model. Foulkes asserted that dreams are formed from a diffuse mnemonic activation and they organize that information in order to obtain narrative cohesion. For him, dreams do not have any meaning and their only aim is constructing coherent sequences of events. It seems to me that syntax is always at the service of semantic. Moreover the finding of specialists of quantitative analysis of dream content clearly showed that the content of dream reports is related to the topics of interest or concerns of the dreamers (Domhoff, 1996).

A more recent model (Graveline & Wamsley, 2015) will now be described and commented in more details. The two authors deal with the question: "Are dreams more symbolic than waking cognition?" and they conclude that "there is little evidence that dreaming, as opposed to waking thought or fantasy, is especially rich in symbolic meaning." (p.102). Although they mention the creativity of dreaming, which is reduced to making an "amalgam" of memory fragments into

novel scenarios, Graveline and Wamsley do not mention any specific process or feature to dreams compared to waking thought. Dreaming is mainly viewed as the mirror of other psychological phenomena (the novel scenarios "reflect" in a transparent way the waking thoughts, experiences and personality of the dreamer), and it is also the "reflection" of ongoing neurobiological processes.

More specifically, the two authors propose the existence of a tight link between dream imagery and neural activation related to memory consolidation. The paper gives examples of incorporation of recent experiences into dreams and lists several neurobiological events common to the waking and dreaming states. However, Graveline and Wamsley acknowledge, somewhat contradictorily, that if dreams do not have a meaning, they are nonetheless meaningful since they reflect the concerns, experiences and personality of the dreamer.

Several ideas and research results mentioned by Graveline and Wamsley are very interesting. However, in my opinion, the conclusions are not based on convincing arguments. A first problem is that dreaming is poorly described. The authors devote several pages to the importance of recent autobiographical memory and assert that "...memories of waking experience form the basis of mental imagery in dreams." They do not mention the use of old memories and of general knowledge (semantic memory in the words of Tulving, 1983). The dichotomy of autobiographical memory and general knowledge is a basic differentiation of the cognitive approach to dreaming (Foulkes, 1985).

Beside the over emphasis on memory consolidation, there is no mention of the capability of dreaming processes to modify known elements. Dream reports show that change is brought to memory elements (Montangero, 1999): modification of the size (e.g., a kitchen much larger than it is in reality); of color (the white scooter of the dreamer's brother is black in her dream), of lightness (outdoor elements admired by the dreamer when she was awake and by daylight appear in her dream viewed by night with drops of rain), etc. Last, as we will show below, dreaming can transform an event into a metaphor.

These points are neglected by Graveline and Wamsley perhaps because they do not know any neurobiological findings which would corroborate these features. In their reductionist stance, they grant a greater weight to the slightest correspondence between sleep neurophysiology and some psychological events (aspects of dream content) than to the specific features of dream reports. Because they believe that dreams are reflections of underlying neurobiological processes, they are convinced that dream content is the mirror of the process of memory consolidation. Actually, the latter aims at keeping in mind the completeness and the specificity of memories. The novelty of dream scenarios does not reflect this conservation process. However, the novelty could be explained by the process of confronting a very recent memory to memory nets in which it could be stored (for example, Palombo, 1978; Malinowski & Horton, 2015). To my knowledge, no evidence of the correspondence between a dream metaphor or a bizarreness with underlying neurophysiological attempts to integrate a recent memory into a memory net has ever been given.

The concept of waking thought also lacks specificity. There are many forms of waking thought: rational and highly controlled (e.g., in a complex problem solving which requires a full use of executive functions); remembrance and

realistic anticipation, which have three common features with dreaming: they are imaged, incomplete and sequential; daydreaming, a spontaneous and weakly controlled form of thought (which adds the possibility to create bizarreness and sometimes momentary loss of reality testing (Foulkes and Fleisher, 1975; Fox, et al., 2013; Klinger, 1971). Dreaming is at the end of this continuum and it has several specificities: loss of reality testing (products of imagination are taken as reality), predominance of visual elements, economy of “signifiers” (a situation is evoked with a small number of images, words and other impressions), constant variation of content, decrease of influence of executive functions, apparently meaningless nature of part of the content. It seems therefore inappropriate to deny any difference between dreams and the forms of waking thought. Similarly, reading dream reports reveals that, most of the time, they are not “transparent” reflections of topics of interest and concerns of the dreamer. Moreover, the mnemonic sources of the dream content are often several years old, therefore already consolidated.

### 1.3. Importance of the concept of metaphor in the work of authors interested in dream interpretation

For researchers interested in dream interpretation, metaphor is a fundamental concept. For example, in the edited book about ways of working with dreams already referred to (Lewis & Krippner, 2016), the word ‘metaphor’ appears in nine contributions out of fourteen. A metaphor can be defined as a way to represent something – an event, a person or an object, an idea or a feeling – by a more concrete and simpler substitute. Linguists name ‘metaphor’ the substitute and ‘target’ the thing it represents. The metaphor has analogy with the target. In the waking state, metaphors give some emphasis to the target and probably favor its storing into long term memory. According to Tulving (1983), one strategy in order to help storing a content into long term memory is to represent it in another modality, e.g., visual rather than verbal.

The linguist Lakoff is convinced that, during sleep, metaphors structure the content of dreams (Lakoff, 1993). He developed an interesting theory of metaphor. He underlined the fact that metaphors are not only linguistic in nature. They are conceptual: They result from the tendency of the human mind to represent something in a concrete and analogical way. This mode of representation is imaginative and creative. Lakoff also asserted that metaphors are very frequent in verbal and written communication. This conception of metaphors is shared by many contemporary specialists of this concept. In his introduction to *The Cambridge Handbook of Metaphor and Thought* which he edited, Gibbs wrote that “Metaphor ... is a fundamental scheme by which people conceptualize the world and their own activities.” (Gibbs, 2008, p. 3). More generally, he mentioned that the authors in the edited volume see metaphor as a natural production of the human mind (ibidem, p.4).

Malinowski & Horton (2015) noted that three agreed aspects characterize metaphors. First, they concretely picture something that is abstract. Second, in dreams they are about emotional aspects of the dreamer’s life. Third, in order to understand dream metaphors, it is necessary to have information about the current events of the dreamer’s life. Malinowski and Horton, referring in particular to Kuiken,

1999, also mention that some authors think that metaphors enrich the understanding of the target.

Actually, during dreaming, dream metaphors do not facilitate at all the understanding of the target if the latter is not simultaneously represented, because dream content is taken for real events. As a consequence, metaphors often constitute an unintelligible part of a dream report. Baylor & Deslaurier (1986) noted that metaphor seems to many authors the main process which renders dreams not immediately understandable. However, we know that, once awake, the dreamers can discover the meaning of the metaphorical content, if a suitable method is applied. As far as the reasons for the presence of metaphors in dreams are concerned, we will mention them below in Section 4.2 of this paper.

### 1.4. Aims of the paper

The present paper has two aims. The first aim is to demonstrate that dreaming processes produce original metaphors. In my opinion, the presence of such metaphors in dreams, whatever their frequency, proves that parts of dream reports that are not immediately understandable are symbolic and have a meaning. The second aim is to present a method of collecting dream reports and related material useful to discover metaphors and some laws of dreaming when it transforms memory sources. In the last paragraph of Section 5.1 and 5.2, we will also briefly address the question of the relationship between dream content (a psychological event) and underlying sleep neurophysiology events.

Several points must be specified, so that the purpose of the present study as well as the justification of the method will be clear for the reader. A first point is that we are interested in the production of metaphors, but not whether participants know the concept and the name of metaphor. In other words, this is a study of the meaningful aspect of dreaming and not about people’s linguistic knowledge. A second point is one of the original aspects of dreaming. While sleeping, the dreamer is conscious of the dream content but the topic at the origin of the dream and its specific form (for example realistic or metaphorical, pleasant or unpleasant) are chosen involuntarily by dream production processes. The result is that when a dream content is metaphorical, the dreamer, during the dream and upon awakening, has no idea that it means something else than its apparent meaning. A reliable method of interpretation will be necessary so that the dreamer discovers the target of the metaphor.

We use the concept of metaphor when several conditions are fulfilled. First the dreamer, in a state of full cognitive arousal and after a dream work we proposed, discovers a meaning to a part of the dream report. This meaning applies to a concern, an aspiration or an important experience, etc. Its discovery is the interpretation, the last part of the dream work. Second, the meaning is based on the two main parts of the dream work: the search for memories related to the dream content and also a reformulation of the dream in more general terms. Both the memories and the reformulation are at the basis of the interpretation. Third, if the dream content is not a literal representation of the meaning discovered but is a more concrete and simpler way of representing it, we consider we are in presence of a metaphor.

## 2. Method

### 2.1. Collecting night reports

In our study of metaphors, we had no preconceived idea about the specific content of a dream report (except for the general features of dream reports compared to waking narratives). We used three criteria to consider that part of a dream was a metaphor. First, as we have just mentioned, the target was discovered through information yielded by the dreamer after awakening and when (s)he was in a state of full cognitive arousal. Second, the metaphor was not a conventional one or a usual one for the dreamer in the waking state. Third, the analogy between the metaphor and its target was evident not only for the dreamer but also for the experimenter.

Since the beginning of our research on dreaming, each dream report collected was followed by an attempt to find the source of the dream, whatever was the aim of the research. In the present study, the method used to discover an interpretation was identical in the laboratory dreams and within a cognitive-behavioral therapy.

Our aim was not to compare the two conditions, but just to present obvious examples of dream metaphors.

The five examples presented in the present paper were collected in different experiments whose aim was not the study of metaphors. The examples have already been published to illustrate the method of interpreting dreams in cognitive-behavioral therapy, in an edited volume about different forms of dream work (Lewis and Krippner, 2016). Each example was produced by a different participant. The reports were collected in one of three conditions. Two examples were extracts of reports collected in our laboratory of dream study, within the framework of two studies, one on a cognitive issue, the transformation of memories in dreams (never published) and one on a methodological issue (Montangero, Tihon Ivanyi and de Saint-Hilaire, 2003). Two other examples of metaphor were from dream reports of patients in cognitive-behavioral psychotherapy without severe problems or important personality disorder. The author of the present paper also gave an example of one of his own dreams which he interpreted at home with the method used by the other participants but without another person to question him, since he was the author of the method.

The laboratory reports were obtained by awakening the participants after 10 minutes of REM sleep, at the end of the second cycle of sleep. The other reports came from a very recent report described in the participants' dream log and verbally reported to us.

### 2.2. Collecting additional information beside the dream report

Analyzing only dream reports does not allow researchers to discover the presence and the meaning of metaphors or to conduct other studies on dreaming processes, like the transformation of memories in dream. For this reason, we always added to the recording of a dream report an interview of the dreamer in order to collect additional information. This interview takes place when the participant is in a state of full cognitive arousal and not during the night, when participants are under the influence of sleep pressure and sleep inertia. The interview usually yields rich new information about the content of the dream, the memories linked to elements of that content - therefore autobiographi-

cal data - and the personal meaning the dream elements have for the dreamer. The interview permits participants and experimenters to discover the meaning of metaphors and other apparently not understandable parts of a dream. It is divided into four parts and a fifth one in case of the presence of a metaphor.

**Part I.** The dream content: additions to the night dream report.

Dream reports rarely contain everything the dreamer has experienced during the dream. Moreover the experimenters may misunderstand certain passages of the report. In this first part, the experimenter gives the following instructions.

*"I am going to read aloud the transcription of your dream report, narrative unit after narrative unit. A narrative unit is the action or event or the simultaneous actions or events that take place before or after another event."*

*"During my reading, please visualize your dream and try to remember everything that you visualized, heard, made and thought. Let me know if some of these things are missing in your report."*

The participant possibly mentions missing elements. If no mention has been made of an emotion, the question is:

*"Did you feel an emotion during the dream? If it is the case, please specify the emotion and its intensity."*

If no information has been given by the participant about other important categories of dream content, we ask questions such as:

*"You did not mention anything about the setting of the dream scene. In some dreams, elements of the content are felt present but not visualized. Was it the case for the setting or do you remember some of its features?"*

The result of this first part is the completed report, the one on which are based the following parts.

**Part II.** Searching memory sources of elements of the dream report

The researchers of the Sleep and dream laboratory of the University of Bologna, Italy (for example, Cicogna et al. 1998) used to ask one question about memories at the source of the dream content: "Which memories do you associate to the elements of the dream content?" We propose a different way of questioning which yields the retrieval of more memories. For each element of the dream content, we ask the following questions:

*"What memory (memories) comes to your mind about an elephant?"*

and not: about the green elephant of your dream. When a memory source is found, we ask:

*"What were your feelings and your ideas when you experienced that episode?"*

**Part III.** The reformulation of the dream report

Every person uses words most of the time in their conventional, that is, shared definition. But everyone, as a function of his/her personality and experiences, establishes a strong link between the elements of the remembered dream and personal ideas and feelings. For example, two participants, each in a different research, perceived a highway interchange in their dream. Asked how they defined the interchange, one answered: "The place where I might take the wrong direc-

tion.” The other participant defined the interchange as “the place where I have a possibility to explore a new itinerary”. Instructions

*Experimenter:* “Could you describe again your dream, following the report sentence after sentence, using for each important element more general words than the ones used in the report? One possibility is to give your definition of the named element. For example, “a very helpful person” instead of “my neighbor”. You can find an encompassing category, e. g. “changing level” rather than “going down the stairs”, or you can specify the function of the element, e. g., “What gives access to” instead of “the door”.

#### Part IV. The interpretation of the report.

Very often, it is not necessary to ask for an interpretation. The meaning of the dream part studied is mentioned by the participant or patient spontaneously, generally after the reformulation work. If this is not the case, we ask: “Do you think, after this work of searching memories and of reformulation, that the dream or some part of it applies to something important for you: a past or anticipated event, a concern, an interest?”

**Part V.** (In case the dream content interpreted is a metaphor). Originality of the metaphor.

*“Did you ever use in the waking state the [description of the metaphor] in order to represent [description of the target]?”*

If the answer is negative, we consider that we deal with an original dream metaphor

### 3. Five examples of dream metaphors

#### 3.1. Reasons for choosing the five examples

Since our early research on dreaming, we were struck when a dream work yielded the discovery of a metaphor. As we were primarily interested in the cognitive processes of dreaming, we did not write any publication on the meaning of dreams. The report containing a metaphor was used, like the other ones, to analyze a cognitive aspect or, for a few years, to help the patients in therapy. Sometimes, however, we devoted a lecture to the topic of metaphor.

Recently, we decided to address the issue of the meaning of dreams. To this purpose, we selected five examples of metaphor for the following reasons. First, the analogy between the metaphor and the target was particularly obvious; second, the memories and personal definitions which, according to the participants were sources of the metaphorical part, were convincing transitions between the metaphor and the target.

#### 3.2. Dream of Francesco. Very abstract ideas presented simultaneously to their metaphor

The participant was a doctoral student in his thirties, awakened in our dream lab. He had finished writing his doctoral thesis. The defense of the thesis would take place three months after the collected dream, in front of a jury of five researchers and professors specialists of the thesis topic.

##### I. Completed report.

For the five examples, we decided to put into brackets the additions to the night or early morning report, rather

than giving the details of this part of the interview during the dream work.

*“I was [in a very large moonlike plain,] talking to five stars in the dark sky. [I wanted to convince them that my ideas were good]. I presented successively three ideas related to the question of the relationships between a whole and its parts. “First, each part can be connected to the other parts, without having a common origin.” I picked up a piece of the ground and showed it to the stars. It was a small turning wheel without hub.*

*“Second, the parts can have a common origin but no connection one with the others.” The turning thing that I showed to the stars was a hub with many spokes without contact with a wheel or with one another. “Third, the parts can be both related between them and with a common origin.” I showed a small bicycle wheel.*

##### II. Search for memories

*(Experimenter).* What memory comes to your mind about wanting to convince that your ideas are good?

*(Francesco).* Well, it is my main concern: to convince the jury, at my future dissertation defense.

##### III. Reformulation

Exceptionally, the reformulation part was not necessary, since the target was presented verbally simultaneously to the metaphor. The situation (convincing five persons) and the meaning of the small wheels were present in the dream.

##### IV. Interpretation

*(Francesco)* “This dream scene represents the first part of my future PhD dissertation defense.”

V. Originality of the metaphor (in case the interpretation is a metaphor)

Francesco asserted that in the waking state he had never compared to wheels the relationship of a whole and its parts.

This beginning of dream report is unusual for two reasons. First, the ideas presented in a dialectical succession (thesis, antithesis and synthesis) are very abstract. Moreover the metaphors were presented simultaneously with their verbal targets. Consequently there was no need to search for the meaning of the small turning wheels and the fact that the dream content was an anticipation of his defense of doctoral thesis.

The conclusion about this case is that dream processes create original metaphors, and they create them without delay (since this was the beginning of the remembered dream upon forced awakening).

#### 3.3. Dream of Lionel. A very brief content which is bizarre but ends up to be a metaphor of the therapy

Lionel was a man in his late thirties in psychotherapy for a problem of gambling dependency. The fragment of dream, recalled upon spontaneous morning awakening, dated from the same day as the session of dream work.

##### I. Completed report

*“I see a chamois [wild mountain goat of the Alps] rubbing its horns against a tree trunk [in order to lose them,] but they are deer antlers, not chamois’ horns. That is all I remember.”*

## II. Search for memory sources

Experimenter (E). *What waking memory comes to your mind about chamois?*

Lionel (L). *Before I got married, I used to hike in the mountains and I sometimes could see chamois.*

(E). *What was striking or important in that experience? Was it a neutral, pleasant or an unpleasant experience? Which ideas were associated with it?*

(L). *I felt happy and free and the chamois seemed still freer than I was. They were the embodiment of freedom.*

(E). *What memory comes to your mind about deer antlers?*

(L). *A friend of mine, a hunter, often talks about his sport. He once told me that, at a certain period of the year, deer rub their antlers until they lose them (or parts of them), although it is painful.*

(E). *What ideas and feelings were elicited by that information?*

(L). *I was struck by the fact that these animals accepted to suffer in order to get rid of something.*

(E). *What other memories come to your mind about deer?*

(L). *Nothing in particular, just these hunting stories of my friend.*

## III. Reformulation

(E). *For the chamois, would it be appropriate to use the definition you gave during the search for memories, that is, the embodiment of freedom?*

(L). *Yes.*

(E). *So how can you reformulate your dream report?*

(L). *The symbol of freedom is rubbing...*

(E). *What was the aim of the rubbing?*

(L). *... is trying to get rid of...*

(E). *How do you define a deer?*

(L). *It's a victim, the victim of hunters.*

(E). *Now please reformulate the whole description.*

(L). *Freedom is trying to get rid of... a characteristic of a victim. Well, that applies very well to me, to my current effort to get rid of my gambling dependency.*

## IV. Interpretation

The last sentence above is the spontaneous interpretation of the dream content. We do not think that Lionel would have found the meaning of the chamois with deer antlers if he had not been asked to search for memories and to reformulate the dream content. This example and many others reveal that condensations in dreams are not errors of binding as Revonsuo and Tarkko (2002) asserted.

## V. Originality

As we can guess, Lionel had never compared himself to a chamois rubbing its deer antlers.

## 3.4. Dream of Giovanna. A scene representing the positive evolution of the therapy

Giovanna was a thirty-year-old lawyer in therapy for a problem of psychophysiological insomnia. Her dream was reported during the sixth session of cognitive-behavioral therapy. At the beginning of the session, she said that she had stopped taking sleeping pills and she had slept normally for five days during the week. She also announced she had had a dream.

### I. Completed report

*"I was walking in a street and a man who wanted to rape me was following me. I entered a house and he entered too, saying I could not escape being raped, [it was programmed]. I was first terrified. Suddenly I realized that I could change the situation, I undressed the man and made love with him, placed on top of him. I heard a voice [of a woman of my age] saying: "I admire you: you don't panic, you manage the situation.""*

Giovanna said that earlier in the day she has searched for the meaning of her dream and she was convinced that it was about insomnia.

### II Search for memory sources

(E) *What memory comes to your mind about a rape?*

(G) *I sometimes have to work on a case of rape.*

(E) *What feelings and ideas did it cause?*

(G) *It made me sad and I was thinking of the physical and psychological consequences.*

### III. Reformulation

The result of her effort to reformulate the report was the following.

*"At first I am the victim of something that causes lasting physical and psychological troubles. Then I decide to invert the roles: I am in control of the situation, it gives me pleasure and pride."*

### IV. Interpretation

(G) *This dream represents how insomnia frightens me and that I am partly in control of it.*

### V. Originality

(G) *Being the victim of a rape and of insomnia have common aspects. But I do not remember to have done the comparison in the waking state.*

During the first session of therapy, six weeks before interpreting this dream, Giovanna had used the terms "it causes lasting physical and psychological troubles" when she had defined insomnia.

The inversion of an attempt to rape her was a very striking metaphor. From the viewpoint of the therapy, becoming aware of her capacity to control what was frightening her, was an important step ahead.

## 3.5. Dream of Jacqueline. An inner conflict is represented by a discussion between the dreamer and her double

Jacqueline was a twenty-five-year-old teacher who volunteered to be participant and spent a night in the dream lab.

### I. Completed report

*"I was busy in a bright kitchen. My hair was loose and I was wearing [a very comfortable] white dress. After a short while, a second myself entered. She had the hair in a bun and she was wearing a suit [and looked like a career woman]. We had a heated discussion about romantic relationships between women and men, because we had opposite positions. I had a positive viewpoint, thinking it is not very difficult to find someone good, wishing to start a family. The other myself had had serious disappointments with men and she thought that men were always a cause of big sorrows and any deep engagement should be avoided. [She was convinced to have the right attitude]. Eventually the first myself said: "I understand your viewpoint, but I do not share it. Let me be free to make my choices and I let you free to make yours.""*

### II. Memory sources

The search for memory sources gave the following information. Jacqueline explained that she had lived for a few years with a man and they made plans for the future. But gradually growing disagreements occurred between them. They separated three months earlier, and Jacqueline was very disturbed by that event, not so much because of the loss of this man but because of the loss of hope for the future. In order to forget her distress, she decided to concentrate on positive events, day after day. She took a lover, without making any plans for the future with him. However she felt sometimes uneasy when she thought that her new friend might suffer when he discovers that she does not want a lasting relationship.

The last sentence of the report ("Let me be free to make my choices and I let you free to make yours.") evoked for Jacqueline a memory of the day before the dream.

*"Yesterday I told these words to my brother, whom I had invited for a meal. He was shocked when I described how I considered my relationship with my new friend."*

### IV. Interpretation

The general question of the dream, "Should we trust men and engage into a deep relationship?" is clearly expressed in the dream scene. The metaphor, that is the presence of two versions of the dreamer and their opposite opinions, describes strikingly the ambivalence of the dreamer. The last sentence of the report is a decision to accept the ambivalence for the moment, after a distressing sentimental breakup.

### V. Originality

Seeing two representations of oneself is a metaphor that can occur in a dream only.

### 3.6. Dream of Jacques. Metaphor of the anticipation of an event that will take place the same morning after the dream

Jacques was a seventy-five-year-old university professor and researcher on dreaming. The dream reported was a home report. The method was similar to that proposed to the four other participants, except that no experimenter was giving instructions, since Jacques was the author of the method.

### I. Completed report

*"During a month of May, I woke up before 7 o'clock with a good recall of the dream I just had. I was skiing in the*

*middle of a forest with a young woman who was far behind me. I never saw her during the dream. I knew she was not an expert skier. I arrived at a difficult passage of the slope and I thought: "She will have difficulties here". I went on and I momentarily lost my balance. I thought: "Well, I should not feel so superior to her.""*

### II. Memory sources

When waking up, I was puzzled by one element of this dream content (which was only the first part of the dream recalled): skiing with a young woman who was not an experienced skier. After my daughter – a very expert skier – stopped skiing with me, two decades ago, I used to go skiing with two friends who were good skiers.

The search for memories did not yield anything interesting. I was probably still under the influence of sleep inertia and I was focusing on the first concrete events of the dream. Skiing with a young woman without expertise did not evoke any precise memory and skiing in the middle of a forest corresponded to vague forty-year-old memories.

Several helpful memories came back to my mind after starting a reformulation.

### III. Reformulation

*I decided to try a reformulation. This led me to discover the meaning of the dream scene, that is, the target of the metaphorical skiing event. I asked myself what was the more general category of the concept "skiing". The answer came without hesitation: "It is one of my two main hobbies".*

### More memories

*I realized that my second hobby was playing the piano. More memories came to my mind. Suddenly I remembered that the same morning at ten o'clock, a young woman playing the flute would come in order to rehearse a piece of music. Her flute professor had asked me to accompany her during a private concert and I said yes, on the condition that she would come to my place so that we could rehearse the piece. The day before the dream I examined the score we would play, a piece of Vivaldi that was very simple for the flute part and I deduced that the young woman was not an expert flute player. I also played the piano part and discovered that there was for the piano a rather difficult passage that I would have to practice. I thought: "I should not feel so superior to her." The reader can observe that the words in roman in the present paragraph are identical to words of the dream report. Yet the latter was recorded before the dreamer discovered its meaning.*

### IV. Interpretation

*It became clear to me that the skiing events were the metaphorical representation of the music rehearsal.*

### V. Originality.

*In the waking state, I never found that there were similarities between skiing and playing the piano.*

This report has been chosen because of the clear correspondence of the metaphor with the target. It would be difficult to assert that the music rehearsal is not what was meant by the skiing event. We find also in this example that the meaning of the metaphor was totally ignored during the dream and for many minutes after awakening.

### 3.7. Approval of an ethics committee

Participants provided consent that the researchers could publish and comment their dream work in scientific articles or books. They had been informed that their name and other information likely to uncover their identity would be deleted or modified. The ethics committee of the Psychology Department approved the different publications including one of our five examples.

## 4. Comments on the meanings of the five metaphors and on the reasons why they replace the literal meaning

### 4.1. The meaning of the five metaphors

Let us look for the commonalities between the meanings of the presented metaphors. In Francesco's dream, the metaphor represented an important anticipated event: the doctoral defense. It was both impatiently expected and slightly anxiety-inducing, like most exams. In Lionel's dream, the chamois with deer antlers represented the fact of trying to get rid of his dependency and improving his freedom, although it was difficult. The metaphor of Giovanna's dream meant that she had turned her role of victim into the role of being in control of insomnia. In Jacqueline's dream, the two representations of herself meant the ambivalence that she had to accept currently. Skiing, in the dream of Jacques, meant practicing music (a pleasure) and an unexpected difficulty. On the whole, four metaphors represented a positive event which was not devoid of difficulty.

At first sight, except for Jacqueline's dream, each metaphor seemed meaningless. If the verbal meaning of the metaphors had not been simultaneously present, who could guess that small wheels represented the dialectic of abstract relationships between a system and its parts? Or who could guess that a chamois with deer antlers was a substitute for the dreamer's aim and feelings during psychotherapy? Or that inverting the roles in an attempt of rape meant acquiring the control on insomnia? Or that skiing in a forest represented playing music with a beginner?

In spite of the apparent absence of semantic link between the metaphor and its target, the meaning discovered through related memories and personal definitions unveiled the striking analogies between the substitute and its source.

### 4.2. Why do the processes of dream production transform an event into a metaphor?

Replacing an event at the origin of a dream content by a metaphor satisfies two requirements of dream production. First, dream content is mostly the representation of sequences of concrete events and the visual modality is dominant. The use of metaphors is a necessity in order to evoke concerns, ideas, wishes and feelings. Second, dream production processes are parsimonious (Montangero 2018): they aim at representing an event with the minimum of signifiers constituting a homogeneous sequence. Consider the scene of skiing with a beginner. In order to represent literally the sequence of events, one should show three different scenes: 1/ The phone call during which we decided the day of rehearsal; 2/ Examining the score of the piece to play and concluding that the flute part was very easy (which elicited the thought: "she must be a beginner"); 3/ Jacques playing the piano part and discovering that a few measures of the

part were rather difficult, which entailed the thought "I don't master that completely, I should not feel so superior". To sum up: each step of this sequence has a different location and a different activity. Moreover, there is very little probability that examining a music score would be ever represented in a dream, since reading (more than a very few words) is absent from most dream reports (Hartmann, 2000).

Now, compare the literal sequence with the metaphorical scene. The latter contains 1/ The knowledge that there is behind me a skier devoid of expertise; 2/ Viewing a difficult passage of the slope, entailing the idea "She will have difficulties here"; 3/ Losing momentarily my balance when skiing along the difficult passage, which entailed the thought "I should not feel so superior to her". This sequence of three steps is much simpler and homogeneous because it comprised one single activity in the same location.

### 4.3. How can the imagination of an original metaphor be so rapid when dreaming?

In the waking state, finding an original metaphor instantly seems a challenge. Yet this is apparently an easy achievement when we dream. Cienky and Muller (2008) wrote that verbal metaphor is a cognitive activity that occurs online when speaking. We think that dream metaphors occur online during dreaming. How can dreaming so easily and rapidly substitute a memory element by a metaphor?

We have no expertise in the theories of semantics. However, two sources of information permitted us to outline hypotheses explaining the rapidity and the adequacy of the choice of a metaphor. The first source is the observations we have made since the beginning of our dream research (Montangero, 1999). Sometimes, the memory source of a dream content element was modified in that content. In several cases, part of a memory source was substituted by another element pertaining to the same category. For example an event related to a train in a railway station was replaced by a similar event related to a bus in a city street. "Bus" is, like "train", an element of the category "public transportation". Similarly an unexpected behavior of the dreamer's brother's first wife that occurred thirty years ago was enacted in a dream by the current brother's wife. In the loose logic of meaning when dreaming, this substitution is allowed, since the two persons enter the category "my sister in law". The substitution is also allowed between meaningful elements of the same collective class, that is, the elements having a spatial-temporal contiguity. For example, "train ticket" or "railway" for "train" or "a black coat" for a person who often wears such a dress.

Our second source of information is derived from models inspired by artificial intelligence and frequently used in neurophysiological studies. In works on memory consolidation, a received idea is that a new memory tries to integrate different memory networks to check whether the new memory can be part of some of these networks. Moreover we have seen that Crick and Mitchison (1986) referred to the idea that memories are stored in neural nets, in which many units act in parallel and may connect back to all the other units in the net. A similar connectionist view is outlined by Lakoff (2008). We can hypothesize that on the psychological level, meaningful elements are integrated into networks, and can be simultaneously activated. Whence the rapidity and adequacy of the choice of a metaphor. Let us give two examples.

In the mind of Lionel, “chamois” belongs to the network of the superordinate category “game ungulate mammals”, which includes deer. Lionel’s dream could therefore condense chamois and deer. However both belong to a different category in the personal definitions of Lionel (“free” and “victim”). The chamois trying to get rid of deer antlers is the result of a motivated condensation. In one image and one action, the animal represents for Lionel “freedom getting rid of one of the features of a victim,” that is, the aim of his therapy and its difficulty. People who consider a bizarre dream element as an error of binding miss meaningful dream creations.

As far as the case of Giovanna is concerned, in her mind, “insomnia” could be integrated into the network of “events that cause lasting physical and psychological troubles”, as well as into the memory network of “getting control of a situation”. In order to replace the idea of insomnia, dreaming chose “a threat of being raped” because it was both in the network of “lasting troubles” and offered a striking way to illustrate “getting control of the situation”.

## 5. Conclusions

### 5.1. Evidence and importance of the presence of dream metaphors

The five examples of metaphor clearly demonstrate that dream production processes create original metaphors. Each of these examples meet the three requirements for a dream scene or dream element to be a metaphor, conditions that we specified in the Introduction of the present paper. First, the meaning of the metaphorical scene is discovered through information yielded by the dreamers on their memories linked to the dream content and on their personal and encompassing definitions of elements of the dream scene. The preconceived ideas or the insight of the experimenter or other persons must not be proposed nor accepted. They lead to multiple meanings for the same dream (Hunt, 1989). The method we used consists in examining the relationships between dream elements and their sources: memory elements and personal conceptions in the dreamer’s mind.

Second, the metaphor must be original and not conventional or used when awake by the dreamer. The five metaphors presented are undoubtedly original. In the fourth example only, there is a kinship between the heated discussion of two representations of the dreamer and “an inner ambivalence”. However, visualizing oneself and a double is possible only when we dream. It is typically a dream metaphor.

Third, the analogy between metaphor and target was evident for the dreamer after being interviewed and for the experimenter in all five cases, and, I suppose, also for the readers of the present paper. We could easily add some more examples, but that would not demonstrate any more the presence and originality of dream metaphors.

This demonstration allows us to conclude that dreams – at least parts of dream reports – are meaningful. Dreaming processes deal mainly with the dreamer’s aspirations or concerns. The latter are often represented in an unexpected way, because the semantic organization of dreaming is somewhat loose. It allows our mind to substitute any concept by meanings pertaining to the same category or the same collective class. But its aim is to represent something meaningful and emotion laden, in very diverse ways.

Reducing dreaming to a mirror of underlying neurophysiological activity is a very impoverished conception of this creative and meaningful function.

### 5.2. Further research and last conclusion

New research on dream metaphors should be conducted, using the method presented in this paper. Two issues, among others, would be to obtain quantitative data about the frequency and classification of metaphors or, more complex and interesting, to elaborate a model of networks of meanings.

There is a possible isomorphism between a psychological model of networks of meaningful concepts and a neurophysiological model of cells underlying thought. However, contrarily to Lakoff ‘s (2008, p. 118) assertion that “thought is physical”, we think that the study of metaphor – a psychological topic – can only be based on observations, methods and concepts that are different from those used in neurophysiological studies. The observation of neural circuitry does not yield information about the content of an ongoing dream, its organization and its memory sources.

## References

- Antrobus, J. S. (1983). REM and NREM sleep reports: Comparison of word frequencies by cognitive classes. *Psychophysiology*, 20(5), 562-567.
- Baylor, G. W., & Deslauriers, D. (1986). Understanding dreams: Methods, maps and metaphor. *Dreamwork*, 5 (1), 46-57.
- Casagrande, M., Violani, C., Lucidi, F., Buttinelli, E., & Bertini, M. (1996). Variations in sleep mentation as a function of time. *International Journal of Neuroscience*, 85, 19-30.
- Cicogna, P., Natale, V., Occhionero, M., & Bosinelli, M. (1998). A comparison of mental activity during sleep onset and morning awakening. *Sleep*, 21(5), 462-470.
- Cienki, A., & Muller, C. (2008). Metaphor, gesture and thought. In R. W. Gibbs (Ed.), *The Cambridge handbook of metaphor and thought* (pp. 483-501). New York, NY: Cambridge University Press.
- Crick, F., & Mitchison, G. (1986). REM sleep and neural nets. *The Journal of Mind and Behavior*, 7(2-3), 229-250.
- Fox, K.C.R., Nijeboer, S., Solomonova, E., Domhoff, G.W., & Christoff, K. (2013). Dreaming as mind wandering: Evidence for functional imaging content reports. *Frontiers in Human Neuroscience*, 7, 412. [Dx.doi.org/10.3389/fnhum.2013.00412](https://doi.org/10.3389/fnhum.2013.00412).
- Foulkes, D. (1985). *Dreaming: A cognitive-psychological analysis*. Hillsdale, NJ: Erlbaum.
- Foulkes, D., & Fleisher, S. (1975). Mental activity in relaxed wakefulness. *Journal of Abnormal Psychology*, 84 (1), 66-75.
- Foulkes, D., & Schmidt, M. (1983). Temporal sequence and unit composition in dream reports from different stages of sleep. *Sleep*, 6, 265-280.
- Freud, S. (1955/1900). *The interpretation of dreams* (original edition 1900). New York: Basic Books.
- Gibbs, R. W. (2008). Metaphor and thought. The state of the art. In R. W. Gibbs (Ed.), *The Cambridge handbook of metaphor and thought* (pp. 3-13). New York, NY: Cambridge University Press.
- Goodenough, D. R., Shapiro, A., Holden M., & Steinschreiber, L. (1959). A comparison of “dreamers” and “non-dreamers”: Eye movements, electroencephalograms, and the recall of dreams. *Journal of Abnormal Social Psychology*, 59, 295-302.

- Graveline, Y. M., & Wamsley, E. J. (2015). Dreaming and waking cognition. *Transitional Issues in Psychological Science*, 1, 97-105.
- Hartmann, E. (2000). We do not dream of the 3 R's: Implications for the nature of dreaming mentation. *Dreaming*, 10, 103-110.
- Hobson, J. A., & McCarley, R. (1977). The brain as a dream state generator: An activation-synthesis hypothesis of the dream process. *American Journal of Psychiatry*, 134, 1335-1348.
- Hunt, H. T. (1989). *The multiplicity of dreams. Memory, imagination and consciousness*. New Haven, CT: Yale University Press.
- Klinger, E. (1971). *Structure and functions of fantasy*. New York, NY: Wiley.
- Kuiken, D. (1999). An enriched conception of dream metaphor. *Sleep and Hypnosis*, 1, 112-121.
- Lahire, B. (2018). *L'interprétation sociologique des rêves*. [The sociological interpretation of dreams.] Lyon (France): La Découverte.
- Lakoff, G. (1993). How metaphors structure dreams: The theory of conceptual metaphor applied to dream analysis. *Dreaming*, 3(2), 77-98.
- Lakoff, G. (2008). The neural theory of metaphor. In R. W. Gibbs (Ed.), *The Cambridge handbook of metaphor and thought*, (17-38). New York, N Y: Cambridge University Press.
- Lewis, J. E., & Krippner, S. (2016). *Working with dreams and PTSD nightmares*. Santa Barbara, CA: Praeger.
- Malinowski, J. E., & Horton, C. L. (2015). Metaphor and hyper-sociality: the imagination mechanisms behind emotion assimilation in sleep and dreaming. *Frontiers in Psychology*, 6: 1132.
- Montangero, J. (1999). *Rêve et cognition* [Dreaming and cognition]. Liège, Belgium: Mardaga.
- Montangero, J. (2018). Dreaming and REM sleep: History of a scientific denial whose disappearance entailed a reconciliation of the neuroscience and the cognitive psychological approaches to dreaming. *International Journal of Dream Research*, 11(1), 30-45.
- Montangero, J., Tihon Ivanyi, C., & de Saint Hilaire, Z. (2003). Completeness and accuracy of morning reports after a recall cue: Comparison of dream and film reports. *Consciousness and Cognition*, 12, 49-62.
- Montangero, J., & Cavallero, C. (2015). What renders dream more or less narrative? A microstructural study of REM and Stage 2 dreams reported upon morning awakening. *International Journal of Dream Research*, 8(2), 105-119.
- Palombo, S. (1978). *Dreaming and memory*. New York: Basic Books.
- Revonsuo, A., & Tarkko, K. (2002). Binding and dreams: The bizarreness of dream images and the unity of consciousness. *Journal of Consciousness Studies*, 9(7), 3-24.
- Solms, M. (2000). Dreaming and REM sleep are controlled by different brain mechanisms. *Behavioral and Brain Sciences*, 23, 793-850.
- Stickgold, R., Malia, A., Fosse, R., Propper, R., & Hobson, J. A. (2001). Brain-mind states: I. Longitudinal field study of sleep/wake factors influencing mentation report length. *Sleep*, 24(2), 171-179.
- Tulving, E. (1983). *Elements of episodic memory*. Oxford, U.K.: Oxford University Press.