What renders dreams more or less narrative? A microstructural study of REM and Stage 2 dreams reported upon morning awakening

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Summary. A microanalysis of fourteen dream reports was conducted with the aim of understanding which features of these reports rendered them more or less narrative. The result should help us to compare the relative narrative quality of samples of dream reports. The reports described the last dream of the night and they were collected immediately upon spontaneous morning awakening in a sleep laboratory. Half of the dreams reported in our sample were produced in Rapid eye movement (REM) sleep and the other half in Stage 2 sleep. The microanalysis dealt with the relationship between each pair of successive temporal units and with the presence of other elements of the dream content likely to influence the narrative character of a dream. The more important findings were the following. First, coherence is the rule in the relationship between pairs of successive units of the reported dream sequences. Second, two categories of relationship, Psychologically causal links and Plausible links appear to be the main building blocks of the sequences of dream events. Third, most dreams comprised one or several complications, that is, events creating change and often tension. Fourth, the combination of a continuity score and a complication score permitted us to rank the reports according to their narrative nature or quality, whereas emotions and story-like features were not good candidates to that purpose. Fifth, no differences were observed between REM-sleep and Stage 2 reports of similar length in their sequential regulation and other features. This result shows that the process regulating the sequences of dream events is not dependent on the sleep stage, a strong argument in favor of the idea of a single generator which produces dreams across the sleep stages. More generally, most sequences of dream events did not correspond to sequences of recent or older experiences stored in memory. The sequential organization of dream events is regulated during dreaming and reveals an important dreaming production process.

Keywords: Dreaming, Dreams narrative organization, REM- and Stage 2-sleep dreams, Late night dreams, Coherence of dreams

1. Introduction

An important specific property of dreams, contrarily to some hypnagogic images which are static, is that they result from a dynamic form of representation where change occurs constantly and events succeed one another. Most people interested in dreams agree that this succession has at least some narrative aspects. This is not surprising if we admit that in the waking state we organize our memory of human happenings mainly in the form of narratives (Bruner, 1991), that dreaming reflects this story-telling instinct (Pace-Schott, 2013) and that story-telling and dreaming are two of the greatest forms of narration (Foulkes, 1999). A few authors (e.g., Cipolli & Poli, 1992; Jung, von Franz, Henderson, Jacobi, & Jaffe, 1964; Kilroe, 2001) even asserted that dreams are structured like well organized stories produced in the waking state. In our opinion, it conforms more to the nature of dreams to consider them as narratives, in the wide sense, rather than as similar to canonical stories. We define narratives in the wide sense as reports of a sequence of events involving living beings who react to one another or to physical events and including some unexpected events which create a certain tension for the protagonists and interest in the listeners or readers (Montangero, 2012a). A canonical story is a narrative with rich content and a well organized structure which obeys an overall planning. All the parts of a story are connected and the end is related to what precedes and it terminates the tension (Jung et al., 1964; Prince, 1982)

The topic of the narrative aspect of dreams is particularly interesting for researchers who, like us, adopt a cognitive approach to dreaming (Foulkes, 1985; Montangero, 2012b). The latter is one of the many approaches in this domain (see Barrett & McNamara, 2012), the one followed by most scholars conducting empirical research on dreams. It consists in analyzing the content or the form of dream reports with methods and concepts used in cognitive psychology or in related domains. Studying the narrative quality of dreams permits researchers to deal both with dream content and structure, that is, with qualitative aspects of dream content and with the organization of the sequence of dream events. The latter is not imposed on the dream material during the reporting process, in which case the narrative features of dream reports would reflect waking narrative usage and would not have their peculiarities. Among the latter we find

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oddities known only by dream scholars, like characters or objects which the dreamer feels closely present but does not visualize during the dream experience. Other peculiarities are missing transitions and other discontinuities, lack of beginning or of ending in the narrative sense and frequent change of topic. Moreover the narrative organization of dream reports remains unchanged in spite of change in the state of vigilance and in the memory conditions (immediate recall versus delayed recall). This was demonstrated by Cipolli and Poli (1992). The participants were awakened four times during the night and reported a dream. After terminal morning awakening, they were asked to report again the night dreams. The narrative organization of morning reports was similar to that of night reports. This finding, as well as the specific features of dream reports compared to waking reports (Reis, Montangero, & Pons, 1999; Montangero, 2012a) tend to show that the organization of the sequence of dream events is produced during dreaming. As a consequence, in studying the narrative nature of a sample of dream reports, we learn something about a dream production process and we can see whether a similar production process is at work in the dreams reported and in other categories of dreams or in waking narratives.

In the present research, a first aim was related to the analysis of the narrative quality of dream reports. We wanted to test a way of assessing this aspect of reports by considering numerous features and to find out which of these features accounted best for the narrative nature of the reports. Incidentally, we also wanted to see whether the hypothesis that no report would be organized as a canonical story was confirmed. This hypothesis is based on the deficit of executive functions, and in particular of the capacity of overall planning during dreaming. The second main issue dealt with in our research was related to the similarity or difference between reports of REM and Stage 2 dreams. In spite of the difference of functional state of the brain between Stage 2 and REM sleep, we do not expect differences in the organization of dream sequences. Foulkes & Schmidt (1983) showed that the difference of temporal sequencing of the dream events were due to the difference of length, which is also observed within the same stage. More generally, several dream researchers who compared the content of dream produced in different stages concluded that cognitive processes underlying dreaming can be the same across stages (Foulkes, 1999; Cicogna, Natale, Occhionero, & Bosinelli, 1998). This view, coined the one generator model, is opposed to the strict mind-brain isomorphism postulated by specialists in sleep neurobiology (Hobson, Pace-Schott, & Stickgold, 2000). For the latter, specific production processes are at the origin of REM-sleep dreams. The one generator model, however, has also been validated by some researchers in this field (Oudiette et al., 2012; Solms, 2000).

Nielsen and his colleagues (Nielsen, Kuiken, Hoffmann, & Moffit, 2001) asserted that REM reports were stories more frequently than Stage 2 reports, because 66% of them versus 43% of Stage 2 dreams included an episode. This concept was used in the sense of Stein & Glenn, (1979) who defined it as a three step causal chain of events (see example in the next paragraph). In contrast, Cicogna and her colleagues (1998) concluded that there were no differences in terms of narrative continuity between the REM and Stage 2 reports of their sample. These reports described the last dream of the night, just before spontaneous definitive morning awakening. They were produced by volunteers who slept in a sleep laboratory. Sleep stage upon morning awakening were scored using polysomnography. The main goal of the research was to compare the content of these last dreams with dreams reported upon a forced awakening at sleep onset.

The morning dream reports collected by Cicogna and her colleagues were precisely the type of data we wanted to analyze for our research. A first reason was that the dreaming production was not interrupted by a forced awakening that might prevent the dream narrative to develop or to have an ending. Secondly, the dreams of the second part of the night are supposed to have a more complex narrative structure (Cipolli & Poli, 1992). Moreover, in order to compare the influence of the sleep stage, we needed dream reports collected in a sleep laboratory. Professor Cicogna kindly accepted our request and sent us copies of the morning reports collected at the Sleep laboratory of the Psychology Department of the University of Bologna (Italy).

Researchers studying the narrative aspect of dreams – in other words how events evolve and are connected - have used different methods which varied from the most global one to the most analytical one. A global approach was adopted by Cicogna and her colleagues (1998), who assessed whether dream reports had a consistent plot. Other researchers (Jung et al., 1964; Kilroe, 2000) used a more analytical method that we can call macro-structural. They considered the whole dream report and checked whether it could be divided into the three to five successive phases of the classical conception of story structure in literary studies (Aristotle in his Poetics; Freytag, 1863; Larivaille, 1974). Micro-structural analyses dealing with the organization of smaller parts of reports were conducted by other authors. They used models of story grammar analyzing the constituent parts of episodes. Cipolli and Poli (1992) applied to dream reports Mandler and Johnson's (1977) model which, in our opinion, is too elaborate to this purpose. For example, each episode is supposed to include a developed sequence of goal-directed behavior and to have an ending. Actually, some dream episodes are devoid of goal-directed behavior and abrupt passages between dream episodes can often be observed (Reis et al., 1999). Nielsen and colleagues (2001) made use of Stein and Glenn's (1979) concept of episode, defined as a three step causal chain of events. An event causes a character to react, and this reaction entails another event. The problem with these episodes is that they are not found in all dream reports. About half of the dreams in Nielsen and colleagues' sample did not include one single episode. That concept would not permit us to assess the relative narrative quality of a sample of dream reports.

The most micro-structural approach was used by Reis and colleagues (1999). It consisted in defining the relationship between each pair of successive temporal units and to categorize these relationships as close or loose. We have chosen that method in the present research, because the units of analysis are easier to define and to score than larger units. A second reason is that the model can be applied to all dream reports and to all parts of the reports. This method is very suitable to assess the continuity of the sequence of events in a reported dream. However, continuity or coherence is a necessary condition but not a sufficient one for a report to be a narrative. The sequence of daily activities in a firm can be perfectly continuous but devoid of any narrative character. The latter is due to the presence of unexpected events creating change and a certain tension (a breach in

the canonicity, to use the terms of Bruner, 1991). As a consequence, we found necessary to add to the assessment of continuity other analyses in order to evaluate the narrative interest and tension of the reports.

To sum up, the present study is a detailed analysis of fourteen dream reports collected upon morning terminal awakening. It aims at finding out which features of the dreams reported render them more or less narrative and could permit us to rank the reports according to their relative narrative quality. Our approach is microstructural and not a global assessment of 'narrativity'. It consists firstly in analyzing the role of the relationship between each pair of successive events of the reported dreams, and secondly in studying the impact of elements of the dream content likely to influence its narrative character. Beside our exploratory goal, we aim at testing the following hypotheses. First, dream reports are not incoherent sequences of events, secondly we do not expect them to be structured like canonical stories, thirdly no difference will be observed between the narrative quality of REM-sleep and Stage 2 reports having the same length.

2. Method

2.1. Sample of dream reports analyzed

The sample of dream reports analyzed was part of the Dream Data Bank of the University of Bologna (Zito et al., 1991). It comprised 52 REM sleep and Stage 2 reports of the last dream of the night, collected in the Bologna Sleep Laboratory after spontaneous morning awakening, at the mean time of 7:25 a.m. (see Table 1a). Fifteen dreams were reported upon awakening from REM sleep and thirty-seven upon awakening from Stage 2 sleep. This proportion (28% REM morning awakenings and 71% in Stage 2) is similar to the findings of sleep physiologists (Schulz, & Zulley, 1980; Webb, Campbell, & Hendlin, 1980).

Some reports could not be used for a narrative analysis for one or several of the following reasons. The report was too short (less than three successive events) or the order of succession of the events was not reported, or both the number of successive events and the mention of the order of events were relevant, but the participant mentioned that his/her recall of the dream was vague, which was confirmed by the report content. The proportion of reports not relevant for a narrative analysis (see Table 1a) was slightly higher for Stage 2 reports (64%) than for REM reports (53%). The sample of REM reports that could be analyzed amounted to seven. We discarded six Stage 2 reports theoretically usable for a narrative analysis in order to obtain two samples of similar size: a total of seven REM and seven Stage 2 reports and a mean number of successive events slightly higher for REM reports (8.8 against 8.0, see Table 1b). Moreover, the cycles of sleep of the Stage 2 dream reports selected were identical to those of the REM category, that is, third and fourth cycles except for one report from the fifth cycle.

In the complete sample, REM reports tended to include more TU than Stage 2 reports (mean number of TU: 5.2 for REM and 4.1 for Stage 2 reports, that is, 28% less TU for Stage 2 reports). Between the seven reports compared, the difference of the total and mean number of TU was less important than in the complete samples: 10% less TU in the group of Stage 2. In spite of this difference, the two compared samples fulfill our aim which is to show whether REM sleep and Stage 2 reports of similar length have similar narrative quality.

Table 1a: Total sample of REM and Stage 2 morning reports. Total number and percent of reports, number and average number of "Temporal units" (TU) and number and percent of reports improper to be analyzed in terms of narrative quality

	REM		Stage 2	
	N	%	N	%
Reports	15	28.85	37	71.15
N of TU	79		152	
Mean N of TU (SD)	5.27 (4.36)		4.11 (4.35)	
Improper reports	8	53.33	24	64.86
Superfluous reports	0		6	16.21

Table 1b: Sample of REM and Stage 2 morning reports analyzed. Total number of reports, number and average number of "Temporal units" (TU)

	REM	Stage 2
	N	N
Reports	7	7
N of TU	62	56
Mean N of TU (SD)	8.86 (4.14)	8.00 (5.13)

2.2. Participants

The participants were 12 students of the Psychology Department of the University of Bologna in their twenties (range of age: 20 to 28 year-old). They participated to two experimental nights after a night of habituation. Two students, a male and a female one, produced each two reports of our selection. Our sample of 14 reports included nine reports of female participants and five reports of male students. The participants, who were self-declared good dream recallers - that is, who recalled several dreams every week -, were paid for spending several nights at the Lab. There is no reason to think that the organization of their dreams would be specific. Our results confirmed this idea: the dream reports displayed an important variety, in terms of length, of content and of narrative organization. In the few studies comparing the dreams of young participants with those of older adults, the rare differences were in terms of category of content. In particular, there are less negative emotions in older adults' dreams (Côté et al., 1996).

2.3. Instructions given

"Upon your terminal awakening in the morning, please ring the bell and report via intercom what was going through your mind just before awakening." Immediately after the dream report, the participants were first asked about the presence of emotions and about their intensity on a scale from one (very low) to seven (extremely intense). Secondly, the report was replayed, segment after segment, and they were asked: "What memory sources can you identify for this part of your dream?"

2.4. Reports features analyzed

We started by editing the reports: translation from Italian into English, deletion of redundant or meaningless words and of waking comments. We have conducted a detailed analysis of the edited reports, bearing on nine features that will be presented in the next section: Segmentation into temporal units, then into episodes, assessment of the amount of information, continuity of each pairs of successive units within episodes, continuity of the successive episodes, number of "complications", impact of complications, number and intensity of emotions, and finally presence of three story-like features (semantic unity, growing tension, presence of an ending).

The two authors scored independently three features (the number of temporal units, the segmentation into episodes and the contiguity between episodes). Inter-rater agreement was defined as two times the number of "elements" scored in common over the total number of "elements" scored by both judges (Foulkes and Schmidt, 1983). The agreement was over 83% and 100% after discussion. For the other features, one of the authors made the first scoring which was then examined by the other author, who noted his points of disagreement. These disagreements were solved after a discussion. As far as the stage of sleep of the reports was concerned, it was not mentioned on the written texts analyzed. One of the authors totally ignored the stage of the reports until all the features were analyzed. The other author accomplished the selection of the reports among REM and Stage 2 reports one year before the analysis of their content took place.

3. Results

3.1. Preliminary analysis

Before scoring the narrative features of dream reports, it was necessary to analyze basic features that are not narrative per se. First, since a narrative is basically the organization of a chain of events, each report had to be segmented into temporal units. The further microstructural analysis of the dream reported would bear on the relationship between the successive units. At a more macrostructural level, the narrative analysis had to deal with the relationship between larger parts of reports, hence the necessity to segment the reports into episodes. Moreover, in order to compare the reports, we needed to know the relative richness of content of each of them. We decided to evaluate the latter in terms of amount of information (definition in section 3.1.2.)

3.1.1 Number of temporal units

The temporal units are the successive events that constitute the dream sequence. A temporal unit (TU) is a part of a report which comprises an event or several simultaneous events that occur prior to or after another event (Foulkes & Schmidt, 1983). We considered that an event could be an action, a mental content or psychological activity or a physical phenomenon. A state (e.g., standing; feeling an emotion) was not considered as an event as long as it occurred simultaneously with an event. However, when it was not the case and when a state occurred before or after another event, we considered it as an event constituting a TU. For example: 1. A cow was standing in the middle of the road, 2. I stopped the car abruptly. *For more details about scoring criteria, please contact Jacques Montangero.*

The total number of temporal units in a report indicates the length of the chain of events constituting the dream sequence. In our sample of dream reports, the number of temporal units per report varied from 3 to 17 units and the total number of temporal units of the sample was 118 (See Table 2). The mean number of TU and standard deviation were 8.86 (SD 4.14) for REM reports and 8.0 (SD 5.13) for Stage 2 reports. When the simultaneous events occurring in the temporal units were taken into consideration, the total number of events per report varied from 5 to 19 and the total for the 14 dreams was 142 events. The important dispersion of the total number of units per report had the advantage of allowing a further study of the correlation between the length of the chain of events and the narrative quality of the dream reported. *(Examples of segmenting into TU and into episodes and of evaluating the amount of information are given in the Appendix A)*

3.1.2 Amount of information

In order to assess the richness of content of the reports, we preferred an evaluation of the amount of information (Montangero et al., 2003) to the usual method consisting in counting the number of words. In effect, a single piece of information can be conveyed by one word ("red"; "scared") or by several words ("I had the feeling of floating on water"). Each first reference to an entity such as the setting of the dream, a character, an action or an emotion and each attribute of these entities was considered to be a piece of information.

For each report, the total number of pieces of information was the addition of:

- The number of events (TU + simultaneous activities)
- The number of non-self characters. Animals were considered as characters.
- Groups (more than three undifferentiated characters) were counted as one character.
- The number of objects, parts of buildings ("door"), natural elements and body parts.
- The number of settings
- The number of emotions
- Other pieces of information: Anything that was mentioned and didn't fit into one of the five preceding categories. For example: state, past events, thought or speech content and the attributes of actions, characters, objects, settings and emotions.

The amount of information per report varied less than the number of temporal units, but the variation was nevertheless important: from 24 to 62 pieces of information per report. Table 2 shows that the most frequent category of information (excluding "Other information" which is a miscellaneous category of information) was that of events. The total number of pieces of information in the 14 reports was 574. As far as the comparison of the two sets of reports – those produced upon awakening in REM-sleep and those produced upon awakening in Stage 2 – was concerned, the difference between them was small. As for the number of TU, Stage 2 reports contained 10 percent less pieces of information.

3.1.3 Episodes

The study of the narrative aspects of dreams necessitates to considering not only the relationship between temporal units (microstructural analysis) but also larger parts of dream reports, the episodes. We considered three categories of content in order to segment the reports into episodes: the setting, the activity and its goal or topic and the acting characters. We decided that when one only of these three categories changed, the temporal units remained within the same episode. A new episode started when at least two of the three categories changed. Table 3 shows the result of the segmentation into episodes.

3.1.4 Comment on the results of the preliminary analysis

The fact that the most frequent category of content was that of events shows that dream reports, and most likely the dream experiences themselves, are basically sequences of events. It seems therefore very relevant to study how these sequences are organized.

3.2. Scoring narrative features of dream reports

Six main aspects of the dream reports were scored in order to assess the narrative nature or quality of the reports: the continuity or coherence between temporal units within episodes, the continuity between episodes, the presence of "complications", their impact, the emotions and the story-like nature, scored in considering three aspects.

3.2.1 Continuity or coherence of the successive pairs of TU within episodes

A basic condition for a report to be a narrative is its continuity. The successive temporal units cannot be disconnected from one another or be connected into very short sequences that would be unrelated semantically. The continuity of the report was assessed in taking into consideration each pair of successive TU. The relationship between these pairs could be close or loose. They were considered as close in the following conditions.

- The second unit was a consequence of the preceding one. The relationship was Physical causality (physical event – consequence), Psychological causality (reaction of a protagonist to the preceding event) or Teleonomy or means-end relationship: The second unit was either the outcome of the preceding attempt or a further step toward reaching a goal.
- Script-like relationship. The two units usually followed each other in the waking experience of the dreamer.
- Sequel: continuation of an activity.
- Plausible relationship that does not disrupt the continuity. The second event was not expected but it could plausibly follow the preceding one. Moreover, the second event had a relationship with what preceded and what followed.

The relationship between two successive TU was loose in two cases. First, when the occurrence of an event was plausible but the event did not create a connection between what preceded and what followed. For instance, 1. The dreamer eats. 2. She sees a paper bag. 3. The names of

Table 2: Amount of temporal units and of information, by decreasing order of number of TU, for REM-sleep and Stage 2 (St. 2) dreams reported

Stage	Report*	TU	Ev	Ch	Obj	Set	Emo	Other	Total
	Visits	17	19	5	7	1	4	16	52
	Motorcycle	10	11	2	12	5	5	27	62
	Train	10	10	5	4	3	2	18	42
REM	Ghosts, lab.	8	9	4	3	2	2	29	49
	Plates	7	10	2	6	2	2	17	39
	Cat TV	5	7	2	3	1	3	13	29
	Shop	5	7	3	6	1	2	11	30
	Subtotal	62	73	23	41	15	20	131	303
	Dr.'s practice	14	17	5	5	5	4	18	54
	Snow	14	16	3	5	3	2	22	51
	Taxi, prison	12	12	3	4	4	3	12	38
ST. 2	Homer	6	10	7	4	2	3	15	41
	Dogs, etc.	4	4	3	6	3	3	12	31
	Kiss, slap	3	5	4	2	2	3	16	32
	Archery, etc.	3	5	2	5	2	2	8	24
	Subtotal	56	69	27	31	21	20	103	271
Total		118	142	50	72	36	40	234	574

TU = Temporal Units, Ch = Characters, Set = Settings, Ev = Events, Obj = Objects, Emo = Emotions

*Title of the report, preferred to a number, in order to underline that the basis of the analysis is the specific content of the report

The two groups of reports are separated in order to show the similarity of the total amount of TU and information.

Table 3: Number of episodes of the reports listed in decreasing order according to the number of TU per report

Report	N of TU	N of episodes
Visits	17	3 + embed.
Dr.'s practice	14	3
Snow	14	3
Taxi, prison	12	3
Motorcycle	10	3
Train	10	2
Ghosts, etc.	8	2
Plates	7	2
Homer	6	2
Cat TV	5	1
Shop	5	1
Dogs, etc.	4	2
Kiss, slap	3	2
Archery, etc.	3	2

Table 4: Total number of occurrences of the six categories of close links and of the two categories of loose links between units within the episodes

Category of relationship	N	%
Close Links		
Psychological causality	29	34.11
Close plausible relationship	21	24.71
Teleonomy (means-end relationship)	10	11.76
Script-like relationship	9	10.58
Sequel (continuation of an activity)	8	9.41
Physical causality	2	2.35
Loose links		
Non connective plausible	3	3.53
Transformations	3	3.53
Total	85	100.00

right wing political leaders come to her mind. The links between 1. and 2. and between 2. and 3. are loose. Secondly, when the second unit had no relationship whatsoever with the preceding one, for instance a character or a setting is suddenly transformed into another one without reason.

(Examples of scoring the relationship between pairs of units are given in Appendix B)

We first evaluated the continuity of the pairs of successive units within each episode of a report. Table 4 shows the frequency of the eight different categories of between unit links.

Two categories of close links were predominant, Psychological causality and Plausible sequence. They occurred two to three times more often than the most frequent of the other four categories. As far as Loose links were concerned, their frequency was very low, 7% of the total number of inter-unit relationships within episodes.

Not surprisingly, the longest sequences of close links were found among the reports including the highest number of TU. Sequences of four or five close links appeared in three quarters of the reports. In the three reports shorter than five TU, the longest close sequence amounted to two links at most. Clearly, no development can take place in these short reports. The total number of close connections and the number of Loose links per report are shown in Table 5. The total number of within episode close links varied from 0 to 11, and was strongly correlated to the total number of TU (Spearman rank R=0.96, p<.001).

3.2.2 *Continuity or coherence between episodes*

We granted one point to each inter-episode relationship when there was a *spatial-temporal contiguity* between the last TU of an episode and the first TU of the next one. In that case, the event of the first TU of the new episode took place immediately after the event of the last TU of the preceding episode and it was located in the vicinity or in the same setting. An incomplete contiguity was attributed 0.5 point. For instance, when there was a lack of transition between the setting of the preceding episode (riding in the street) and the beginning of the new episode (being suddenly within a building of that street). Table 5 reveals that in five reports only, there was spatial-contiguity between all episodes. This contiguity was lacking in four reports with narrative break. For instance in episode I, the dreamer is with his brother in his bedroom, ghosts appear and their voices are recorded. In the second episode, the dreamer is with his sister in the Sleep lab and the dream he has reported raises an unspecified problem.

We also took into consideration the semantic continuity between episodes, because two successive episodes can be spatially and temporally contiguous and not related semantically. In Report "Taxi", first episode for example, the characters ask the taxi driver to stop and they get out of the car. In the second episode, they enter a prison, are led to a cell and escape from the prison. It is absurd to get out of a taxi in order to be put into a jail where one does not want to stay. The two episodes are not semantically continuous. Semantic discontinuity is a bizarreness in the relationship between successive dream events, not in the content of each event. Semantic continuity between episodes could be incomplete, when an unexplained change occurred in the first TU of the new episode. When there was a semantic continuity, one point was attributed to the inter-episode relationship. One point was subtracted from the score for each loose link. As a consequence, a close relationship (i.e., both contiguous and semantically continuous) between two episodes was granted two points, which is twice as many as for a close link within episode. Thanks to that way of scoring, the dream reports that had a narrative break between two episodes, that is, absolutely no relationship between the episodes, lost more points than reports that had one loose link within a coherent episode.

In Table 5, we see that the semantic continuity between episodes is rarer than spatial-temporal contiguity. Semantic continuity was present between all episodes in two reports only, it was not fully complete in six other reports and totally lacking in the four reports with narrative break. In terms of between episodes relationship, on a total of 18 successions

Table 5: Continuity within and between episodes and Total continuity score

Report	TU	Ep	Within	Between		Loose	Score
				ST	SEM		
Visits	17	3	11	2.00	0.50	3	10.50
Dr.'s practice	14	3	11	1.50	2.00	0	14.50
Snow	14	3	10	1.50	1.50	1	12.25
Taxi, prison	12	3	9	2.00	1.00	0	12.00
Motorcycle	10	3	6	1.50	1.50	1	8.00
Train	10	2	8	1.00	1.00	0	10.00
Ghosts, etc.	8	2	6	0.00	0.00	0	6.00
Plates	7	2	4	2.00	1.50	0	7.00
Homer	6	2	4	1.00	0.50	0	5.50
Cat TV	5	1	4	0.00	0.00	0	4.00
Shop	5	1	4	0.00	0.00	0	4.00
Dogs, etc.	4	2	2	0.00	0.00	0	2.00
Archery, etc.	3	2	1	0.00	0.00	0	1.00
Kiss, slap	3	2	0	0.00	0.00	1	-1.00

Ep = Episode, **Within** = Within Episode Close Links, **Between** = Between Episode Spatial temporal (**ST**) and semantic (**SEM**) continuity score, **Loose** = Within Episode Loose Link, **Score**= Total Continuity Score (addition of column 3, 4 and 5, minus column 6)
Within episode: 1 point for each continuous link, 0.5 for incomplete continuity
Between episodes: 1 point for each contiguous and each semantically continuous relationship, 0.5 point for incomplete contiguity or semantic continuity

of episodes, 8 were totally semantically coherent, 4 were incompletely coherent and 6 without any continuity.

The final continuity score attributed to each report permitted us to rank the report according to their continuity. It was calculated in the following way: each close link in the report was attributed one point, these points were added to the two scores of between episodes continuity. One point for each loose link in a report was subtracted from the total. Table 5 shows that the maximum continuity score was 15 points and that seven reports whose total number of TU was between 7 and 17 were scored above average, which was 6.9 . One report above 7 units (Ghosts) was below average because of the narrative break between its episodes. The continuity score was strongly correlated to the total number of TU (Spearman rank R=0.97, p<.001).

3.2.3 Comments about continuity

The predominance of Psychological causal and Plausible links reveals two features of dream content. Dreams are sequences of events that deal with the reactions and interactions of living beings and they include unexpected events that create constant change. Let us note that this definition also applies to narratives. More generally, the first striking result of the research was the coherence of the between units relationships. Continuous sequences were not long, they amounted from four to six successive events in most reports. But when each pair of successive events was considered, 85 percent of the 103 pairs of the sample constituted coherent sequences. Within the episodes, the frequency was even higher (93 percent of close connections). This finding clearly reveals that the organization of the sequences of events in dreams is not random, even though these percentages concern a continuity following a principle of adjacency, to use the terms of Seligman and Yellen (1987). The presence of coherent aspects in dreams is in line with the views held by most dream researchers adopting a cognitive approach to dreaming (for example, Foulkes, 1985; Foulkes and Domhoff, 2014), but it does not correspond to the viewpoints of most sleep researchers on that topic. The latter underline the incoherence of dream content and its totally different nature from waking thinking (Hobson et al., 2000). As far as the continuity score was concerned, it permitted us to differentiate the reports – only two of them had an identical score.

3.2.4 Number and impact of complications

As stated in our introduction, in order to be a narrative, a continuous sequence of related events must include unexpected events which change the situation, create tension and entail new actions of the protagonists. This kind of events is dubbed 'complication' in the literary study of stories (Larivaille, 1974). It is one of the five parts of a classical story schema and its most general definition is: a perturbation in an initial situation which entails new actions and heightens the tension. In the present research, we defined the complication as an event which brings a change to a situation and is at the origin of the following temporal unit. We distinguished four degrees or impact of complication:

C* Semi complication (scored 0.5 point). The event elicits an emotion, within the same TU or in the following TU, but does not entail the event of the following TU. Example: "I was looking for a product in a beauty shop / C* At a certain moment, an old woman was standing in front of me, blocking my way. I was irritated. / (Next TU) Later, I asked a saleswoman for a product."

C Simple complication (scored 1 point). Event with a weak consequence in the following TU. Example: "We were riding

Table 6: Frequency (f) and score (sc) for each Complication category and Complication score for each report

Report	TU	Ep		C*	C	C+	C++	Seq	
			Score	0.5	1.0	1.5	2.0	1.0	Coms
Visits	17	3	f	0	2	0	3	2	
			sc	0	2	0	6	2	10.00
Dr.'s practice	14	3	f	0	1	1	2	2	
			sc	0	1	1.5	4	2	8.50
Snow	14	3	f	0	1	2	1	2	
			sc	0	1	3	2	2	8.00
Taxi, prison	12	3	f	0	1	0	2	1	
			sc	0	1	0	4	1	6.00
Motorcycle	10	3	f	0	2	0	2	1	
			sc	0	2	0	4	1	7.00
Train	10	2	f	0	0	2	1	2	
			sc	0	0	3	2	2	7.00
Ghosts, etc.	8	2	f	0	0	0	2	1	
			sc	0	0	0	4	1	5.00
Plates	7	2	f	1	0	1	1	1	
			sc	0.5	0	1.5	2	1	5.00
Homer	6	2	f	2	0	1	0	1	
			sc	1	0	1.5	0	1	3.50
Cat TV	5	1	f	0	0	0	1	1	
			sc	0	0	0	2	1	3.00
Shop	5	1	f	2	0	0	0	0	
			sc	1	0	0	0	0	1.00
Dogs, etc.	4	2	f	1	0	0	1	0	
			sc	0.5	0	0	2	0	2.50
Archery, etc.	3	2	f	1	1	0	0	0	
			sc	0.5	1	0	0	0	1.50
Kiss, slap	3	2	f	1	0	0	0	0	
			sc	0.5	0	0	0	0	0.50

Coms = Complication Score (addition of scores from column 4 to 8)

in a taxi / C Suddenly we asked the driver to stop. / We got out of the taxi."

C+ Impactful complication (scored 1.5 point). Event entailing an important change or entailing a weak consequence but an emotion in the following TU. "I was talking with my mother about my brother / C+ Suddenly I said: Look, Mother, I must sleep because I have to report a morning dream / In another room I threw myself on a bed. There was noise outside, I thought: How shall I manage to sleep!"

C++ Very impactful complication (scored 2 points). They entail both an important change in the following TU and an emotion within the same TU or in the following one. "I was driving on a mountain road / C++ It started snowing / (Next TU) Further on, the snow and the car moved down toward the plain. I was terribly afraid. / (Sequel) I turned the car back."

We added a point in case of 'sequel', when the complication entailed more than one TU. Table 6 shows the frequency of the different complications and the complication score for each report.

The complication score varied from 0.5 to 10 and permitted us to rank the fourteen reports according to their degree of unexpectedness and narrative tension. Most reports of our sample (12 out of 14) included at least one complication. The number of complications depended on the length of the chain of events. The reports including between 4 and 6 TU comprised one complication, the reports of 7 and 8 TU comprised two complications, three complications were observed in two reports of 10 and 12 TU, four complications in three reports between 10 and 14 TU and 5 complications in the longest report (17 TU). The correlation between the complications score and the total number of TU was very important (Spearman rank R=1.00). This was due not only to the higher number of complications in longer reports, but also to their higher quality. Semi complications occurred in half of the dreams reported, those that had less than 8 TU.

Table 7: Mean number of information and impactful complications for the four longest (mean TUs = 14.25) and the four shortest dream reports (mean TUs = 3.75)

Reports	Characters	Objects	Settings	Emotions	Other info	C+ & C++
4 shortest	2.75	4.00	1.75	2.50	12.25	0.25
4 longest	3.75	5.25	3.25	3.25	17.00	2.75

Very impactful complications - the most frequent category – were observed in all the reports over 6 TU and in two reports between 4 and 6 TU long. In longer reports, the increase of proportion of impactful complications stood in contrast with the much weaker increase of pieces of information in the different categories that we distinguished (see Table 7). There were over ten times more impactful complications in the four longest reports than in the four shortest ones, whereas the increase of the mean number of elements of other categories was much lower.

3.2.5 Comment on complications

We hypothesized that complications would characterize the most narrative reports. Actually, all reports over 5 TU long included complications. Unexpectedness - and therefore change – as well as tension appear to be a feature of dreaming products. However, the frequency and the quality of complications increased with the length of the reports, a fact we will refer to in the discussion about the influence of length on the narrative quality.

3.2.6 Emotion score

We had planned to complete the assessment of the narrative tension by taking into consideration the importance of emotions in the reports. We decided that the emotion score was the multiplication of the number of emotions in a report by the mean intensity of these emotions. The results are shown in Table 8. Emotions were present in all the reports, which was no surprise in morning dreams (Cicogna et al., 1998). An unexpected finding was the low dispersion of the number of emotions. Eleven dreams reported had two or three emotions. The mean intensity varied from three to five points on a scale of seven. The most surprising result was that the emotion score had no relationship with the narrative character of the reports. The correlations of the emotion score both with the complication score and the continuity score were non significant (Spearman rank R= 0.25 and 0.18, respectively). For instance, “Kiss”, which was devoid of continuity and true complication and was an undeveloped and fragmented report without narrative quality, had the fourth rank in emotion score. We therefore understood that in these morning dreams the emotion score was not relevant in order to score the narrative quality of reports.

Table 8: Number of Emotions, Mean Intensity and Emotion Score

Report	TU	Ep	Emo	Mi	Es
Visits	17	3	4	3.25	13.00
Dr.’s practice	14	3	4	4.87	19.50
Snow	14	3	2	4.50	9.00
Taxi, prison	12	3	3	5.00	15.00
Motorcycle	10	3	2	4.75	9.50
Train	10	2	5	4.80	24.00
Ghosts, etc.	8	2	2	5.25	10.50
Plates	7	2	2	3.50	7.00
Homer	6	2	3	3.33	10.00
Cat TV	5	1	3	4.50	13.50
Shop	5	1	2	3.00	6.00
Dogs, etc.	4	2	3	3.67	11.00
Archery, etc.	3	2	2	5.00	10.00
Kiss, slap	3	2	3	4.50	13.50

Emo = Emotions, Ep = Episodes, Mi = Mean Intensity
Es = Emotion Score (column 3 by column 4)

3.2.7 Comment on the emotion score

The low dispersion of the number and intensity of emotions may be specific to late night dreams, known to be particularly emotional whereas earlier dreams can be devoid of emotion or include one or several of them (Strauch & Meier, 1996). The fact that we did not observe more emotions in REM mental content compared with Stage 2 content, contrarily to previous research (for example, Cavallero et al., 1992; Smith et al., 2004), may be also due to the specificity of late night dreams. However, this result is incompatible with the explanation of emotional aspects of dreams by the activation of the limbic and paralimbic system during REM-sleep (Hobson et al., 2000), since Stage 2 dream reports can be similarly emotional.

3.2.8 Three story-like features

A well structured story obeys an overall planning and has several specific features (for example, Bruner, 1991). We considered three of these features in order to see whether some dream reports of our sample would display several story-like characteristics.

Semantic unity: the dream report deals with a single topic and can be given a single title.

Growing tension: The tension grows or emotions increase during the course of the dream events.

Presence of an ending. The last TU of a report describes a new situation where the preceding activities have no reason to continue.

These features have been chosen because each of them necessitates an overall planning of the dream narrative. The topic has to be maintained, the growing of emotion must

Table 9: Ranking of the reports according to their narrative quality

Report	TU	Ep	Mr	Fr	Ss
Dr.'s practice	14	3	1.5	1	ST2
Visits	17	3	2.5	2.5	REM
Snow	14	3	2.5	2.5	ST2
Taxi, prison	12	3	4.0	4	ST2
Motorcycle	10	3	5.0	5	REM
Train	10	2	5.5	6	REM
Plates	7	2	6.5	7	REM
Ghosts, etc.	8	2	8.0	8	REM
Homer	6	2	9.0	9	ST2
Cat TV	5	1	10.0	10	REM
Shop	5	1	11.5	11.5	REM
Dogs, etc.	4	2	11.5	11.5	ST2
Archery, etc.	3	2	12.5	13	ST2
Kiss, slap	3	2	13.0	14	ST2

Mr = Mean rank (mean of the ranks for continuity score and for complication score), Fr = Final rank, Ss = Sleep Stage

be planned and the end must be related to all parts of the narrative. One report only - "Dr.'s practice".- included the three features.: The title "Looking in vain for a Dr.'s practice" applied to the whole dream reported. There was no growing tension, but the most intense emotion occurred at the end of the dream. The information given to the dreamer that the practice was located on the other side of the city constituted an ending: it put an end to the search. However, even in this report, some aspects of a story were missing. There was no complication in the middle of the report which would raise the stake and the tension. Moreover, in the same part of the report the goal of the activities changed without reason. The dreamer was looking for a vet's and no longer for a doctor's practice.

3.2.9 Ranking the dream reports for narrative quality

Among the features analyzed, two of them only proved to be relevant indicators of narrative quality: continuity and complication. In effect, the emotion score discriminated very little the reports and did not correlate with their narrative aspects and the three story-like features were extremely rare and never fully present. In order to attribute to the fourteen reports a rank for narrative quality, we considered the mean between the rank for the continuity score and the rank for the complication score. The result can be seen in Table 9.

A global assessment of each report, taking into consideration the whole content, confirmed the ranking obtained by a microstructural analysis. The first report in the final ranking, "Looking for a Dr.'s practice", had exceptional narrative quality: unity of topic, development and an unexpected event which put an end to the search. The two next reports were continuous and included a number of events creating tension: unexpected visitors successively present and emotional topic of discussion ("Visits"), or obstacles on the road - moving snow, car stuck in snow, then among other cars – that the dreamer manages to overcome ("Snow"). Reports with the fourth and fifth rank had less continuity but included events creating tension (escaping from a prison, missing a train, forgetting one's luggage). The four reports with the last ranks lacked development and three of them – "Dogs", "Kiss", "Archery" - were the juxtaposition of two completely unrelated episodes.

3.2.10 Comments on the role of the number of TU on narrative quality

One of the striking results of our research was that the relative narrative quality of the reports strongly correlated with their length in terms of number of TU. It is no surprise that longer dreams have more narrative development than short ones. But the presence of a high number of TU should favor narrative breaks, since executive functions – like working memory, cognitive inhibition and divided attention – are impaired during dreaming (Montangero, 2009), which is correlated, on the neurobiological level, by the deactivation of the dorsolateral prefrontal cortex (Braun et al., 1997; Maquet et al., 1996). In another research (Reis et al., 1999), most dreams of 20 TU or more had one or two narrative breaks. Theoretically, long reports could be the addition of short unrelated sequences without narrative aspect. In our sample, the narrative character of longer dream reports stemmed from the presence of longer coherent sequences and of a higher proportion of impactful complications. Longer dreams, in terms of number of TU, were not just the juxtaposition of parts of content similar to shorter dreams. As Foulkes & Schmidt (1983) and Kahn et al. (2000) noted, we cannot know whether short dreams result from a poor recall or from a less developed dream production. If the latter hypothesis is valid, it seems that a high productivity of dreaming production processes creates not only more events, but also longer coherent sequences and more impactful changes in the dream content. The correlations we found between the continuity score and complications score and the length of reports explain qualitatively why the number of TU is closely related to the narrative character of dream reports.

3.3. Comparison of the narrative quality of REM-sleep and Stage 2 reports

3.3.1 Absence of difference

The position of REM dreams and Stage 2 dreams in the list of reports ranked by decreasing narrative quality (Table 9) clearly shows that there were no relationship between the sleep stage of the dreams reported and their narrative quality. REM and Stage 2 dreams can be found among the most narrative as well as among the least narrative reports and, as far as the narrative quality rank was concerned, there was not a significant difference between REM and NREM reports (Stage 2 mean narrative quality rank = 7.22; REM mean narrative quality rank = 7.78, Mann-Whitney U= 22.50; p=.80). By contrast, there was a strong correlation both between narrative quality and the length of the chain of events (total number of temporal units) (Spearman rank R=0.98, p<.001) and between narrative quality and total amount of information (Spearman rank R=0.79, p<.001).

3.3.2 Comments

The fact that the REM-sleep and Stage 2 dreams reported did not differ in terms of narrative organization is congruent with several studies of dreams which concluded that, in the last part of the night, any difference between REM- and non-REM dreams disappeared (for example, Cicogna et al., 1998; Domhoff & Schneider 1999 in their reanalysis of data collected by Hall and Van de Castle in 1964; Antrobus et al., 1995). The increase of cortical activation and concomitant cognitive arousal with the time of the night can explain the observed increase in rate of recall, length and richness of dream reports (Antrobus et al., 1995). Whether the activation correlates strictly with a circadian cycle which approximates the body temperature cycle, or is also under other influences (decrease of sleep pressure, production of cortisol) is not clear (Wamsley & Antrobus, 2008). The comparison of dreams from different stages usually dealt with the frequency of elements of dream content. Foulkes & Schmidt (1983) studied a formal aspect, the continuity and discontinuity across temporal units and Cicogna and colleagues (1998) assessed thematic consistency beside other aspects of the content. The originality of our finding is that it concerned exclusively a formal aspect, the narrative organization, in terms of narrative quality. That quality varied according to the length of dream reports. No difference was observed between two samples of REM sleep and Stage 2 reports of similar length. This results contradicts the assertion of Nielsen et al., 2001, that REM reports were stories more frequently than were Stage 2 reports.

4. Conclusions

4.1. Main findings

Our microanalysis of the content of fourteen dream reports had the aim of understanding which features of dream reports rendered them more or less narrative and could help us to compare dream descriptions from that viewpoint. This analysis dealt with the connections between successive temporal units and with several other elements of the reports content. Our three hypotheses (see end of Introduction) were confirmed. Firstly, coherence is the rule in the relationship between pairs of successive units of dream sequences. Secondly, none of the reports was structured like a canonical story. Thirdly, no differences were observed between REM-sleep and Stage 2 dream reports of similar length in their sequential regulation and other features. This result shows that the process regulating the sequences of dream events is not dependent on the sleep stage, a strong argument in favor of the idea of a single generator which produces dreams across the sleep stages. Our other findings were the following. First, dream sequences appear to have as building blocks two categories of relationship, Psychologically causal links and Plausible links. Secondly, most dreams comprised one or several complications. These events creating change and often tension seem inherent to the dream experience and play an important role in its narrative character. Thirdly, the combination of a continuity score and a complication score permitted us to rank the reports according to their narrative nature or quality, whereas emotions and story-like features were not good candidates to that purpose. Fourth, the narrative quality strongly correlated with the number of TU in these reports with a maximum number of 17 TU. The correlation was not due to the length in itself, but to the highest proportion of continuity and of impactful complications.

The fact that a very high proportion of the successive events of dream reports were coherently related to what preceded them does not mean that dreams are entirely similar to waking narratives. First, between larger parts of dream reports – the episodes – continuity was less frequent, which we attribute to the impairment of the executive functions during sleep, in particular the lack of overall planning. We also observed incongruities of behavior (putting snow tires on the roof rather than on the wheels of a car), of objects (large bedrooms in a train) and unexplained transformations of character or location. They stem from peculiarities of cognitive activity during sleep: the decrease of control, the necessity to represent things in a condensed and concrete way, and the possibility to use relationships of association rather than causality or logic. These oddities were not the rule, in accordance with many experimental results (Domhoff, 2007). They occurred in six reports.

More generally, our results confirmed the idea that dreaming is the production of original sequences of novel representations. Dream production is akin to imagination, a fact that has been underlined by dream researchers (Foulkes, 1985; Hartmann, 2010) and that has been recently acknowledged by neuroscientists (Nir and Tononi, 2010). Dreaming cannot be completely explained by a function of consolidation of recent memories, either replayed (as could be concluded from Wamsley and Stickgold, 2011), or associated with older memories during dreaming (Llewellyn, 2013; Palombo, 1978). In our results, Plausible, that is, unexpected relationships between temporal units were very frequent whereas Script-like ones – sequences of two events that usually follow each other in the dreamer's experience - were rare. Moreover, the answers of the participants to questions about the memory sources of their dream content showed that the great majority of Plausible and Psychological causal sequences had never been experienced by the dreamer. Other experiments revealed that recent events were rarely incorporated in dream content (14.4% of dream report text according to Edwards, Ruby, Malinowsky, Bennet, & Blagrove, 2013) and consisted in the fragmentary incorporation of memory elements (Fosse, Fosse, Hobson, & Stickgold, 2003). We can conclude from what precedes that the sequential organization of the TU of dreams does not follow stored memory sequences, it is regulated during dreaming and reveals an important dreaming production process.

4.2. Caveat

We must specify that our analysis is valid only for dreams that leave a vivid memory trace of a sequence of events. In our initial sample, about half of the reports were either too short or devoid of the mention of the order of succession of events. This may be due to the occurrence of morning awakening before the dream plot had time to develop or it may result from difficulties of memory encoding and retrieval influenced by the transitional state from sleep to wakefulness.

The small size of our sample of dream reports constitutes a limitation of the research. However, the analysis dealt with a high number of data, 118 temporal units and 574 pieces of information and nine aspects of the dream reports were scored. Such a detailed qualitative analysis could not have been conducted on a large sample of dream reports. Moreover, the results concerning the continuity of pairs of TU

and the percentage of the different categories of inter-unit relationships were similar to the results obtained in another research conducted by Reis and colleagues (1999). The latter research studied more reports (twenty) which were collected earlier at night by a forced awakening. As far as our other findings are concerned, further research is needed in order to know whether they would be replicated in the study of dreams reported earlier at night. Another limitation is that after checking that the interrater agreement was at least 80% for three measures, we no longer calculated it.

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Appendix A

Example of report, of segmentation into TU and into episodes and of scoring information

"Falling plates", REM report, Fourth sleep cycle, Female participant, Seven TU

Episode I

/1/ I was in a room very similar to this laboratory, [except that] it had a kind of kitchen, near the wall of the toilets, with a sink above the plates and a bed in that position. My mother and my brother were also present, but I did not visualize them. Plates were falling down.

/2/ At a certain point, I felt I had to get up in order to pick up plates that were falling to pieces, and I was feeling guilty for not having done that earlier.

/3/ I showed to my mother - because she is the more interested in these matters - the plates that were broken and those that had remained intact.

Embedded episode

/4/ Then we made comments about my brother and I asked whether he had behaved properly and

/5/ my mother answered that the preceding night he had not been very nice.

End of episode I

We were still looking at the falling plates, also when we talked about my brother, and I was surprised that my mother didn't get up to pick them up.

Episode II

New episode because there is a change 1/ of acting character (the dreamer instead of dreamer and mother) and 2/ of the action and its topic (Expressing concern for the morning dream).

/6/ At a certain point I said: "Look, Mother, I feel dizzy, I am tired and I have to sleep because otherwise I cannot report the morning dream."

/7/ *New setting but same acting character and concern*.

Then the setting was another room, with a double bed on which I threw myself in order to try to sleep. There were noises outdoors and I thought: "How shall I succeed to sleep now that it is morning?"

Events	Characters	Objects, Natural elements, etc.	Settings	Emotions	Other
1 Plates were falling down	Mother Brother	Plates Sink A bed	A room		Similar to this lab A kind of kitchen Near the wall of the toilets (Sink) above the plates In that position Mother & brother not visualized
2 I felt I had to get up In order to pick up the plates				Guilty	That were fallen to pieces For not having done it earlier
3 I showed to my mother		Broken plates Intact plates			
4 We made comments about brother					I asked whether he had behaved properly
5 Mother answered We were still looking at the falling plates				I was surprised	That the preceding night he had not been very nice My mother didn't get up to pick them up
6 I said					I feel dizzy, I'm tired I have to sleep otherwise I can't report the morning dream
7 I threw myself I thought		On a bed	Another room		Double In order to try to sleep Noises outdoors How shall I succeed to sleep now that it is morning?
Total 7+3=10	2	6	2	2	17
Total information					39 pieces of information

Appendix B

Example of scoring close and loose links between pairs of successive TU within an episode

"Taxi, prison", Stage 2 report, Fourth sleep cycle, Female student, Episode II of 6 TU.

"We entered a prison that outside looked like a normal house / and a well-dressed guy led us to our cell / In the cell there were bunk beds, but we didn't want to sleep there. I was very pleased to have to look for a means to fly away / We found a key behind a brick / We opened the door / and we went away."

"Visits", REM report, Fourth sleep cycle, Female student, Episode II of 5 TU

"At a certain point the doorbell rang / and a friend of mine entered / and she started speaking with us / Then it was no longer her, but a girl I know who works at a neighboring institute. She started reporting terrorist attacks against the Institute… / There was also a professor who talked about terrorist attacks in their lab… I was angry about the terrorist attacks but pleased to see and hear the professor."

Nr of TU in episode	Couple of events	Nature of links	Nr of close links/ Nr of couples
6	We enter prison – we are led to our cell	Plausible Causal psych.	5/5
	We are led to our cell – we want to fly away	Teleonomy	
	We want to fly away – we find a key	Teleonomy	
	We find a key – we open the door	Sequel	
	We open the door – we go away		
5	The doorbell rings - a friend enters	Script	3/4
	A friend enters - she speaks	Script	
	She speaks - she becomes some-one else and speaks	Loose	
	… and speaks - professor talks about same topic	Plausible*	

*But sudden appearance of the professor