

# **Dreaming and Consciousness: Testing the Threat Simulation Theory of the Function of Dreaming**

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**KEYWORDS:** function of dreaming, dream content analysis, nightmares, evolution of consciousness, evolutionary psychology, threat perception.

**ABSTRACT:** We tested the new threat simulation theory of the biological function of dreaming by analysing 592 dreams from 52 subjects with a rating scale developed for quantifying threatening events in dreams. The main predictions were that dreams contain more frequent and more severe threats than waking life does; that dream threats are realistic; and that they primarily threaten the Dream Self who tends to behave in a relevant defensive manner in response to them. These predictions were confirmed and the theory empirically supported. We suggest that the threat simulation theory of dreaming may have wider implications for theories about the function of consciousness.

## **1. Introduction**

### **1.1. Dream Research and Consciousness Studies**

Dreaming is a state of consciousness consisting of complex sequences of subjective experience during sleep. It constitutes a potentially important source of information for the attempt to develop a scientific description and understanding of consciousness. First, the mere existence of a full-scale hallucinatory world of subjective experience during sleep has implications as to which physical and physiological phenomena are sufficient for conscious experience to be brought about and which are not necessary at all (Revonsuo, 1995, 1998). Dreaming effectively isolates conscious experience from the external physical world, sensory processing and motor behavior; therefore, the dreaming brain could be treated as a useful "model system" in consciousness research (Revonsuo, 2000b). Second, the composition and structure of phenomenal dream images and their interrelationships within the dream world can be systematically content analysed and quantified (Domhoff, 1996; Strauch & Meier, 1996). The concept of "bizarreness" as it appears in dream content analysis research can be fruitfully connected to the concept of "binding" in consciousness research (Revonsuo & Salmivalli 1995; Kahn et al, 1997; Revonsuo, 1999). Typical "bizarre" dream images manifest anomalous or incoherent combinations of perceptual features, or appear in inappropriate contexts, or are temporally discontinuous. Such dream images can be theoretically interpreted as phenomenal representations that show different types of failures or errors in binding the representational elements coherently together<sup><1></sup>. Therefore, dream bizarreness may constitute an important database for theories of perceptual binding and the unity of conscious experience (Revonsuo 1995).

A third connection between consciousness studies and dream research is the question of the function and the evolution of dreaming and consciousness. When it comes to explaining the function of consciousness, theories often run the risk of slipping into some form of epiphenomenalism: either the strong, philosophical variety of epiphenomenalism - according to which phenomenal properties have no causal powers whatsoever in the physical realm - or the weaker, biological variety - according to which phenomenal consciousness does not have any causal effects that would be biologically functional, i.e. that would in any way contribute to the organism's reproductive success. If a theory states that phenomenal consciousness is epiphenomenal in one or both of these senses, then it follows from the theory that also dreaming - which essentially consists of phenomenal experience - also must be epiphenomenal. Conversely, if it could be shown that dreaming is biologically functional (i.e. that it causally contributed to the reproductive success of our ancestors) then it would follow that at least some forms of phenomenal consciousness do have causal powers and functional significance in the natural world. Thus, theories of the function of dreaming might have important implications for the more general theories of the possible functions of consciousness.

## **1.2. The Function of Dreaming**

The function of dreaming has remained a mystery for a very long time, and by now cognitive neuroscientists appear to have given up the search for the biological functions of dreaming. Practically all theories put forward in cognitive neuroscience imply that dreaming is biologically epiphenomenal (e.g. Hobson 1988, Crick & Mitchinson 1983, 1995; Foulkes 1985, Antrobus 1993, Flanagan, 1995). Dreaming is seen by these

theorists as a mere reflection of low-level neurobiological or neurocognitive processes going on in the brain during REM sleep. Thus, the received view in cognitive neuroscience is that dreaming as a conscious experience has no natural functions and it has not been selected for during evolution. It is simply a random and useless (but harmless) by-product of the neurophysiological processes associated with REM-sleep.

In opposition to these theories, [Revonsuo \(2000a\)](#) has put forward a novel evolutionary hypothesis according to which the biological function of dreaming is the simulation of threatening events and the repeated rehearsal of threat perception and threat avoidance responses. A dream production mechanism that tends to select threatening waking events and simulate them over and over again in various combinations would have been valuable for the development and maintenance of threat avoidance skills during human evolutionary history. This threat simulation hypothesis is supported by several lines of empirical evidence on dreaming, including normative dream content, recurrent dreams, nightmares, post-traumatic dreams and children's dreams (for a thorough review, see [Revonsuo, 2000a](#)). The evidence shows that dreams are too well organized to be mere random by-products of physiological processes; that dreams are systematically biased towards overrepresenting negative and threatening elements; that most recurrent dreams and nightmares are simulations of primitive dangers (pursuits, fights, attacks); that real threatening events encountered during waking invariably modulate subsequent dream content; post-traumatic nightmares simulate past threats over and over again, even for years after the original trauma was experienced.

[Revonsuo \(2000a\)](#) interprets this evidence as showing that the original adaptive function of dreaming is to rehearse such threat perception and threat avoidance skills that were crucially important for the reproductive success of ancestral humans. In the ancestral environment the constant nocturnal rehearsing of threat perception and threat avoidance skills increased the probability of successful threat avoidance in real situations, and thus led to increased reproductive success. Therefore, threat simulation is the biologically adaptive function of dreaming.

While the previous literature on the content of dreams lends at least indirect support for the threat simulation theory of dreaming, the predictions of this novel theory have not been directly tested so far. In order to test the threat simulation hypothesis of dreaming empirically, we should find out in more detail how the various threatening situations are in actual fact represented in dreams. For example, we would need to find out answers to the following questions: How frequently are threatening events encountered in the dreams of different populations? What types of threats are there in dreams? Who or what is typically threatened in dreams? How do the dream characters usually react to the threatening situations? How severe are the losses resulting from the threats? Some existing rating scales do give some information about related matters (e.g. scales measuring aggression, misfortunes, victimization; Hall & Van de Castle, 1966; Domhoff, 1996). However, since these categories are empirical, developed with no theoretical intentions in mind (Domhoff, 1996), they are not ideal for testing the predictions derived from a specific theory<sup>3</sup>. The theoretical category of "threatening event" is directly derived from the threat simulation theory of dreaming and for the purposes of the present

study we have therefore developed a content analysis scale specifically designed to identify and describe all sorts of threatening events in dreams. In the present study we report results from the content analysis of threatening events in home-based dream reports of Finnish university students.

### 1.3. Hypotheses

[Revonsuo \(2000a\)](#) outlines several testable predictions derived from the threat simulation theory. The present study was designed to test some of them. We hypothesized that if the threat simulation hypothesis of dreaming is correct, then we should find that (1) the *frequency of threatening events is relatively high* even in the dreams of normal subjects and that (2) the content of threatening events should reflect the original function of this system as a threat simulator in human evolutionary history. Thus, we expected to find that (2.1.) the dream production system tends to simulate not only trivial mishaps encountered in our everyday life, but also *extremely dangerous events* that are likely to be especially critical for survival. That is, we should find that normal subjects encounter severe, life-threatening dangers in their dreams with a higher frequency than they would be expected to encounter in their real life. Furthermore, we assumed that (2.2.) the dreamed threats should predominantly threaten the Dream Self and people on whom the reproductive success of the dreamer is most dependent: close relatives and friends rather than people or physical resources only remotely related to the future success of the dreamer. We expected (2.3) the dreamed threats to be relatively realistic rather than overly bizarre fantasies or science fiction stories, and that (2.4.) the dream Self is likely to take at least some defensive action against the impending threats. If these predictions turn out to be correct, then the threat simulation hypothesis of the function of dreaming receives considerable support, but if they turn out to be false, then the theory either must be rejected or at least thoroughly modified.

In order to test these hypotheses, we first developed a detailed rating scale for identifying and classifying threatening events in dreams. We subsequently identified all threatening events in almost 600 home-based dream reports from 52 subjects and then analysed their content by using the DreamThreat rating scale we had constructed. The present paper thus documents the first study explicitly designed to test [Revonsuo's \(2000a\)](#) threat simulation theory of dreaming and introduces the novel content analysis method that can be used to test the theory in future studies.

## 2. Methods

### 2.1. Subjects

The subjects were 52 students (Female/Male: 34/18; age  $M = 23.3$ ,  $SD = 3.7$ , range = 19-38) at the University of Turku who volunteered for systematically writing down their dreams for research purposes. The students participated in a one-hour lecture on how to report their dreams as carefully and accurately as possible. They were instructed to write

down any recalled dreams every morning immediately after awakening for a period of four weeks. The subjects were not told about the content or hypotheses of the present study. The procedure for collecting the reports, and a part of the subjects and reports were the same as in the study by Revonsuo and Salmivalli (1995).

## **2.2. Dream Reports**

The material consisted of 592 dream reports. The average number was 11.4 reports per subject (SD = 5.0, range = 4-32). The average word count per report was 141 words (SD = 71.4, range = 37-509). Females reported a slightly greater number of dream reports per person (M = 12.3, SD = 5.4, range = 4-32) than males (M = 9.6, SD = 3.8, range = 5-19). This difference was significant (Mann-Whitney U = 173,  $p < 0.05$ ). However, the reports produced by females were about as long (M = 141 words, SD = 47.6, range = 57-241) as those produced by males (M = 142 words, SD = 71.4, range = 37-509).

## **2.3. The Rating Scale and Scoring Procedure**

The analysis of threatening events in dreams was carried out in two stages: (1) Identification of descriptions of threatening events in dream reports and (2) Classification of the identified events with regard to content. Both stages were carried out by three judges independently. The judges first practised the procedure until they reached a sufficient degree of agreement. The detailed rating scale is available from the authors; only the basic principles and outlines of the scale are described below. Summaries of the threatening events identified in the dream reports of four illustrative subjects are provided in <Appendix A>, and a few examples of complete dream reports scored by using the present rating scale are provided in <Appendix B>.

## **2.4. The Identification of Threatening Events in Dream Reports**

A threatening event in a dream is one which meets at least one of the following two criteria:

**Objective threat:** An event in a dream where, if the event was real, the physical or mental well-being of any person would be endangered or where any person's physical resources or territory would be jeopardized (i.e. any event that would be considered threatening if it should really occur in the waking life). Such an event may be directly witnessed by the dreamer reporting the event or only indirectly heard about in the dream.

**Subjective threat:** An event in a dream that is interpreted or emotionally experienced by the dreamer (i.e. the dream Self) to be somehow dangerous. Any event in which the subject reports the feeling of danger or threat even if no objective threat (as defined above) is reported to accompany this feeling.

At this stage, the judges identified all those sentences in the dream reports which described an event fulfilling at least one of the above criteria. The identified descriptions were marked by underlining the respective parts of the dream reports. Those descriptions

which were identified by at least 2/3 judges were selected for the next stage of content analysis, while those identified by only 1/3 judges were rejected from further analyses.

## **2.5. The Content Analysis of Threatening Events in Dream Reports**

The identified threatening dream events were analysed by using the following eight separate rating scales:

- I. The Nature of the Threatening Event
- II. The Target of the Threat
- III. The Severity of the Threatening Event for the Self
- IV. Participation of the Self in the Threatening Event
- V. Reaction of the Self to the Threatening Event
- VI. Consequences of the Threatening Event to Self
- VII. Resolution of the Threatening Event
- VIII. The Source of the Threatening Event

These scales are described below in more detail. The final scores that a threatening event received in these scales were designated on the basis that at least 2/3 judges had assigned the same score for the event. In case all judges disagreed (i.e. all judges had assigned different scores), the event was regarded as unscorable and dropped from further analyses on that scale. The average proportion of rejections in the rating scales was 3.4 % (SD = 2.8, range = 0.1 - 7.6).

### **I. The Nature of the Threatening Event**

What kind of a threatening event is in question?

**1. Escapes and pursuits**  
Events in which a person is pursued by other human beings, monsters, animals or comparable living beings, or where a person escapes as an outlaw, or acts as if pursued but the nature of the pursuer is unknown or obscure.

**2. Accidents and misfortunes**  
Uncontrollable events and dangerous activities that are described as having actually caused or that can be otherwise regarded as including a high risk of causing physical injuries for humans or damage to physical resources.

**3. Failures**  
Events in which a person actually fails or runs the risk of failing in achieving an important goal or carrying out an important task. Includes cases of being late or running the risk of being late for significant events.

**4. Catastrophies**  
Events in which uncontrollable natural, technological or social forces are involved and a

great number of human lives might easily be lost or great damage to physical resources might easily result.

**5. Disease**  
Events in which persons are afflicted with physical illness or where they run the risk of catching a disease.

**6. Aggression**  
Events in which a person is involved in indirect aggression (e.g. verbal threats, blackmailing, public disgrace, teasing, bullying, forcing somebody to do something, imprisoning, stealing resources from somebody, trespassing on somebody's private territory, threatening behavior) or direct physical aggression (e.g. assault, rape, fist-fight, stabbing, shooting, combat).

## II. The Target of the Threat

Who or what is being threatened by the threatening event? The categories are non-exclusive: an event might threaten one or several of the following:

1. Self
2. Close relatives or friends, or other persons significant for the self
3. Physical resources significant for the self (private property or territory)
4. People and resources not significant for the self

## III. The Severity of the Threatening Event for the Self

How risky for the self would the threatening event be considered if it happened in real life?

**1. Life-threatening or physically highly dangerous threat**  
An event that could cause death or serious physical injury for the self if it happened in real life.

**2. Socially, psychologically or financially severe threat**  
An event that does not cause physical injuries for the self but which could result in significant losses in social status, psychological well-being, or physical resources.

**3. Trivial threat**  
An event that does not threaten the self at all, or only threatens the self mildly, involving no risk of significant physical injuries or of losses of resources for the self. People not significant for the self might still experience severe losses or be in mortal danger.

#### **IV. Participation of the Self in the Threatening Event**

Does the Self participate in the course of events?

1. The dream self actively participates in the course of the threatening event.
2. The dream self does not or cannot actively participate in the course of the threatening event.

#### **V. Reaction of the Self to the Threatening Event**

How does the Self react to the threatening event?

1. The Self reacts in a way that would be possible and reasonable in a comparable real situation.
2. The Self reacts in a way that would be physically impossible in a comparable real situation, but still is efficient in the dream (e.g. escapes by flapping arms and flying away)
3. The Self reacts in a way that is physically possible but irrelevant or inefficient in a comparable real situation (e.g. laughs).
4. The Self does not or cannot react in any way or the reactions are not reported.

#### **VI. Consequences of the Threatening Event to Self**

What kind of losses does the Self suffer in consequence of the threatening event?

1. No losses or damage to Self
2. Minor losses or damage to Self - inconsequential physical injuries to Self or significant others - mild negative psychological consequences to Self (e.g. guilt, loss of self- esteem, shame) - loss or damage of physical resources belonging to Self - death or serious injury of insignificant strangers
3. Severe losses to Self - death or serious injury of Self or significant others
4. Consequences of the threatening event not adequately reported

## **VII. Resolution of the Threatening Event**

What is the situation at the end of the dream?

1. Happy End: The impending threat was actively driven back or the threat otherwise dissolved during the dream.
2. Unhappy End: The impending threat was realized in the course of the dream.
3. Discontinuity within the dream: The focus of the dream suddenly shifts away from the impending threat and the resolution remains unclear.
4. The dream ends in the middle of the threatening situation: The dreamer woke up and the dream was interrupted.

## **VIII. The Source of the Threatening Event**

What is the likely source of information in the real life for learning about the the types of threatening events that the dream represents?

1. Personal life: A realistic event of the kind that the dreamer or any person in a similar position could personally encounter in one's own life. The dreamer is likely to have personally experienced or likely to have heard in social intercourse about somebody else who has experienced this type of threat.
2. Media: A realistic event of the kind that the dreamer or a person in a similar position is very unlikely to encounter personally in one's own life, but the kind which could really happen somewhere in the world and of which the dreamer is likely to have heard about through the mass media
3. Fiction and Fantasy: A fantastic event that could not really happen to anybody anywhere in the world, but of the kind that could be represented in e.g. fairy tales, comics, science fiction, or fantasy.
4. An event whose source cannot be classified.

## **3. Results**

### **3.1. Reliability**

In estimating the reliability of interrater agreement, simple percent agreement as well as statistical Kappa tests, where applicable, were computed. Inter-rater agreement was at acceptable levels with respect to all ratings<4>.

### 3.2. The Frequency of Threatening Events

The average number of threatening events per subject was 13 (SD = 6.6, range 3 - 36). The average number of threatening events per dream reports was 1.2 (SD = 0.43, range 0.23-3.75) indicating that there was slightly more than one threatening event per dream. There was no significant difference between females (M = 1.1, SD = 0.43) and males (M = 1.3, SD = 0.82) in the frequency of threatening events. The distribution of threatening events across the dream reports was not uniform. There were 393 dream reports (66.4% of all reports) including at least one threatening event. Conversely, 199 (33.6%) of the reports included no threatening events. There were no subjects whose reports did not include at least a few threatening events. On the average there was one threatening event in every 122 words of dream reports (calculated for each subject by dividing the the overall number of words in the dream reports by the overall number of threats), while the average length of a report was slightly longer, about 140 words.

### 3.3. The Content of Threatening Events<5>

#### I. The Nature of the Threatening Event.

The distribution of the threatening events according to their nature is depicted in Figure 1.

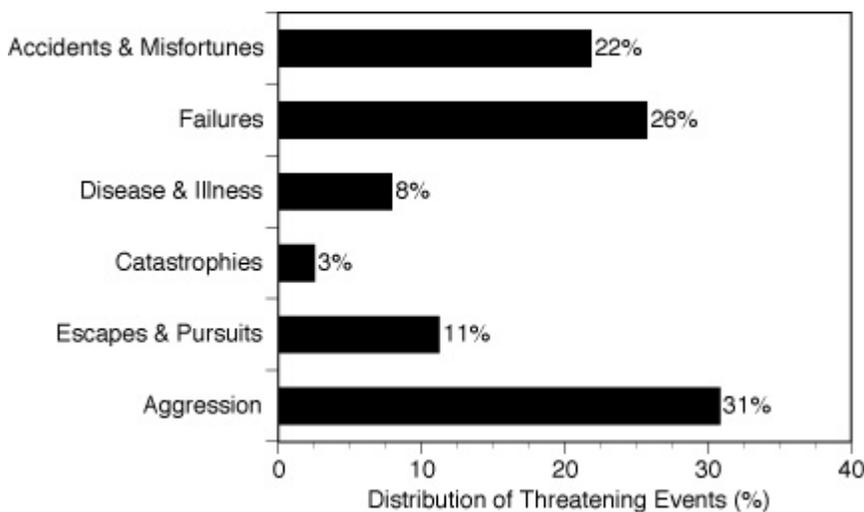


Figure 1. Nature of the Threatening Event. The relative distribution of the 672 threatening dream events,

found in the 592 dream reports of the present study, according to the type of situation that the event depicted. Aggression was the most common type of threatening event in dreams, especially if Escapes and Pursuits are regarded as a form of Aggression. Failures, Accidents and Misfortunes were also quite frequent, whereas Diseases and Catastrophies were rare.

## **II. The Target of the Threat.**

Self was the most frequent target of the threat; the well-being of the Self was being threatened in 73% of the threatening events. Significant Others (27%) was the next most frequent target category, followed by Insignificant Strangers (20%), and Physical Resources significant for the Self (12%), and not significant for the Self (7%). Thus, of all the targets of threats, the well-being of the Self is most likely to be threatened. In general, the threats are more often directed against people than physical resources or objects. If other people than the Self are threatened, they are more likely to be Significant Others than Insignificant Strangers for the Self. The targets of dream threats are thus highly self- and people-centered.

## **III. The Severity of the Threatening Event for the Self.**

Many threatening events were quite severe considered from the point of view of the dreamers' waking reality: Life- Threatening or Physically Highly Dangerous threats accounted for 22% of the threats. Socially, Psychologically or Financially Severe threats accounted for 17%. The rest were considered Trivial threats (61%). Thus, in dreams about 40% of the threatening events reported by our normal subjects were either life-threatening or otherwise more severe than they would be expected to encounter during waking. Even so, trivial everyday threats still are the most frequent category of dream threats. Furthermore, we also analysed individual differences in the frequency of life-threatening events. 79% of our subjects reported at least one life-threatening situation. These subjects had the average of 3.6 life-threatening events ( $SD = 2.9$ , range 1-16) in their reports. Thus, only 21% of subjects in the present sample did not report any life-threatening events in dreams at all.

## **IV. Participation of the Self in the Threatening Event.**

This scale revealed that in 56% of the threatening events, the Self is an active participant in the event, trying to do something about it, whereas in 44% self-participation either did not occur, was not possible, or was not reported.

## **V. Reaction of the Self to the Threatening Event.**

In 46% of threatening events the dream Self did not or could not react to the situation for various reasons (e.g. Self was not present in the scene of threat; the dream was discontinuous or disrupted by awakening, etc.). If the events in which participation of the Self was not possible or did not occur are left out and the reaction of the Self is considered only when at least some reaction actually occurred, then in 94% of these the Self reacted in way appropriate and relevant to the threatening situation. Irrelevant reactions (4%) and physically impossible reactions (2%) were rare.

## **VI. Consequences of the Threatening Event to Self.**

Threatening events did not often have very damaging consequences to the Self. In 37% of threatening dream events there were no reported damages or losses. Mild losses were reported as follows: non-physical harm to Self in 12% of threatening events, mild physical injuries to Significant Others in 4%, injuries or death of Strangers in 5% and losses of the Physical Resources of Self in 5% of threatening events. Severe losses were reported very rarely: serious injury of Significant Others in < 1%, and death of Significant Other in < 1% of dream threats. It is remarkable that there were no dreams in which the Dream Self suffered fatal injuries or death, although some of the threats reported were very serious ones. In 28% of the threatening events, the consequences of the threat were not adequately reported for various reasons (e.g. discontinuity, disruption of dream etc.). In sum, most of the threatening events in dreams do not usually have very serious consequences.

## **VII. Resolution of the Threatening Event.**

This scale revealed that 32% of threatening events have a "happy end" within the dream, 37% have a nonhappy end. The rest 31% do not represent the resolution, for 14% of the events were discontinuous and 17% were disrupted. This amount of discontinuous and disrupted threatening events in the dream reports also partly explains why not all dream reports give information about the Reaction and the Consequences of the threatening events.

## **VIII. The Source of the Threatening Event.**

The ingredients of threatening events were mainly traced back to the everyday life of the subjects (63%), i.e. information about these types of threats is likely to be personally encountered in real life. Additionally, a considerable proportion of threats was traced back to information probably acquired through the mass media (33%), but almost none could be traced back to fantasy or other unrealistic sources (4%). The source was unidentifiable in less than 1%. Thus, threatening events in dreams are predominantly

constructed on the basis of the dreamer's everyday experience; they are frequently events that might really happen to a person like the dreamer, not often events that really happen only in remote places and are heard about through the media, even more rarely are they complete figments of imagination. Threatening events in dreams are primarily constructed from real-life sources.

### **3.4 Gender Differences**

A significant gender difference was found in the Nature of Threatening Events. Overall, Direct Physical Aggression was described in 11 % of the threatening events, Indirect Aggression in 31%, and the rest 58% of the threatening events did not involve aggressive behaviour. Men reported direct physical aggression twice as often as women (17% vs. 8%), but both reported almost the same amount of indirect aggression (31 % vs. 32%). Correspondingly, men had a smaller proportion of other types of threats (53% vs. 60%). These differences were significant (chi-square = 11.93, df = 2,  $p < 0.01$ ). This finding is in line with previous ones consistently reporting gender differences in direct physical aggression in dreams (e.g. Hall & Van de Castle 1966; Domhoff, 1996), suggesting that our database and scoring system are comparable with other ones previously reported in the literature. No other significant gender differences were found in any of the rating scales.

### **3.5. Relationship Between Severity of Threat to Self and Reaction of Self to Threat**

The Severity of Threat (Fatally Dangerous vs. Not Fatally Dangerous) was crosstabulated in a 2x2 table with the Reaction of the Self (Relevant Reaction vs. No Reaction). When the threatening event was Not Fatally Dangerous, the Self realized a Relevant Reaction in 47% of events and did not (or was not reported to) react in 54%. However, when the threatening event was Fatally Dangerous, Relevant Reaction by the Self became much more likely (67%) than No Action (33%). The difference is significant (chi-square = 18.58, df = 1,  $p < 0.001$ ). Thus, when our physical well-being is seriously threatened within the dream, we tend to react to the threat more efficiently (i.e. defend ourselves and/or others against the threat) than when it is not.

## **4. Discussion**

### **4.1. Predictions of the Theory Confirmed**

The purpose of the present study was to describe the frequency and nature of threatening events in the dreams of normal subjects in order to test the hypothesis presented by [Revonsuo \(2000a\)](#) that the original evolutionary function of dreaming is threat simulation. We predicted that if we are on the right track with the threat simulation hypothesis, then we should find (1) a high frequency of threatening events in the dreams of normal subjects, relative to what the frequency of threatening events is likely to be in their waking life, and (2) the content of threatening events in dreams should reflect the original function of this system as a threat simulator. Therefore, we hypothesized that normal subjects should (2.1) encounter severe, life-threatening dangers with a higher frequency in dreams than in real life; (2.2) that the dreamed threats should predominantly threaten the Dream Self and the people closest to and most significant for the dreamer in real life, that (2.3) dream threats should be relatively realistic, and that (2.4) the Dream Self should be likely to take at least some defensive action against the impending threats.

The main results of the present study are well consistent with these predictions. Threatening events in dreams were found to be surprisingly frequent (which confirms prediction 1): on the average there was about one threatening event per dream report. Thus, let's say about fifteen minutes of average dreaming is quite likely to contain a threatening event of some kind, whereas the waking life of the same subjects cannot possibly include such a constant flow of threatening events. Two thirds of dream reports included at least one threatening event, but two thirds of our average waking episodes of comparable length obviously do not include threatening events. Although it is clear in the light of these results that dream episodes overrepresent threatening events, we did not, however, measure the frequency of threatening events in the waking lives of the subjects. Therefore an exact comparison between the frequencies of threatening events during dreaming and waking could not be carried out. This should be done in future studies by collecting comparable reports from both waking and dreaming [\(6\)](#).

Aggression was the most common type of threatening event in dreams. If the category "Escapes and pursuits" is also regarded as a form of aggression, then Aggression accounted for 42% of threatening events in the present study. Failures, Accidents and Misfortunes are also quite frequent, whereas Disease and Catastrophies are relatively rare types of threatening event in dreams. This finding probably reflects the most common types of threatening events both in the ancestral environment and in the actual waking life of our subjects. Threatening events in dreams were found to include a substantial proportion of severe and even fatally dangerous situations (which confirms prediction 2.1.). Over 20% of the dream threats consisted of life-threatening situations. Since there was on the average about one threat per dream report, then about every fifth dream includes a mortal threat. An average normal subject would thus experience several life-threatening situations in their dreams within a few days or weeks, whereas comparable situations are, fortunately, much more infrequent in waking life. Events such as being assaulted, stabbed, shot at, pursued by strangers or animals, or participating in combat probably are extremely rare or nonexistent in the waking lives of our subjects, average Finnish university students, but are not very uncommon in their dream lives. Therefore, severe threats are grossly overrepresented in their dream life.

Threatening events were found to be quite heavily self-centered (confirming prediction 2.2.), which makes sense in the light of our hypothesis: If the point of the system is to simulate real- life threats critical to the survival and reproductive success of the individual, then it is expected to simulate threats in which the Self is often directly jeopardized, and people important for the reproductive success of the Self are also often involved. In earlier studies it has been found that, first, the dreamer is more often the victim than the aggressor in aggressive interactions; second, that in 70% of the cases the misfortunes in dreams happen to the dreamer (Hall & Van de Castle, 1966; Domhoff, 1996); and third, that the dream Self is nearly always the victim also in nightmares (Hartmann, 1993). These previous findings are well consistent with the present ones according to which threatening events in dreams are predominantly directed at the dream Self. Obviously, the simulation of threatening events only targeted at strangers or insignificant physical resources would not be relevant for the future survival of the Self and thus could not serve as a rehearsal of the dreamer's threat perception and threat avoidance skills.

Threatening events in dreams were found to be based on relatively realistic rather than fantastic information (confirming prediction 2.3). A threatening event in a dream is not a simple replay of the fictional threats that we regularly encounter in the movies and television. In those imaginary cases, the threat is very often remote from everyday life (e.g. a comet hitting the Earth, a remote war, a space battle, fighting off vampires, aliens or other supernatural intruders, witnessing rare natural catastrophies, fictitious crimes etc.) and certainly not self- centered: our own personal well-being is not threatened by what goes on in a movie. In TV and movies we often see strangers threatened by exotic threats, whereas in dreams it is typical that we ourselves and our closest ones are most often threatened by familiar and realistic dangers.

In most cases the Self is an active participant in the threatening event, and when the Self in some way reacts to the situation, it is likely to react in a relevant way (confirming prediction 2.4). Remarkably, if the threatening event is fatally dangerous, then the Self is significantly more likely to show appropriate defensive responses than if the situation is less dangerous. These observations are well consistent with the predictions of the threat simulation hypothesis: if threat avoidance behavior is being rehearsed during dreaming, then the dream Self needs to be active, especially when its own life is directly in danger.

The threatening event is almost equally likely to have a happy or an unhappy end. In about one third of the reported dream threats the threatening event was disrupted by awakening - that may be one reason why these dreams were remembered at all - or by discontinuities within the dream. Thus, it was not always possible to evaluate what happens in the dream *after* the threatening event was encountered. However, when the consequences of dream threats could be evaluated on the basis of the dream report they were not particularly severe if any at all.

Taken together, the findings of the present study support the idea that dreaming is a threat simulation mechanism shaped by selection pressures during human evolutionary history ([Revonsuo, 2000a](#)). The dream production mechanism constructs the content of dreams

in such a way that threatening events get included with considerable frequency and constitute fairly realistic simulations of threat perception and threat avoidance responses even in the dreams of normal young adults living in non-traumatic conditions. Threatening events are more frequent and more severe in our dreams than in our waking lives; they are self-centered, realistic, and often include defensive responses by the Dream Self.

## 4.2. Limitations of the Present Study

Although the present study does give support to the threat simulation hypothesis, it has its limitations, and alternative interpretations of the data are conceivable. First, the sample of dreams that was analysed was obtained from the home-based dream diaries of university students. Thus, it is not a representative sample of dreams during different stages of sleep or different REM-periods. Representative samples might reveal that threatening events in dreams do not occur throughout the night with the same frequency. Second, our criteria for what should count as a threatening event may have been fairly liberal, which explains why threatening events were found to be so abundant in the dreams. A more restricted definition may be more useful in other studies. However, our goal was to extract *all* threat-related content in the dreams; the detailed content analysis we carried out was then used to reveal which proportion of these events were highly threatening and which not. Had we only included e.g. life-threatening situations, we could not have compared their frequency with less severe threats, but now we were able to do it. Third, it is possible that part of the content that we classified as "threatening events" did not result from the operation of the threat simulation mechanisms, but from the formal characteristics of the dream (e.g. bizarreness). For example, some threatening events may have resulted from a failure of the dream production system to adequately simulate e.g. the operation of some mechanical device, rather than from an active organization of a specific threat simulation around that theme. If my car does not work properly in the dream, this may be because the dream production system is not proficient in simulating the operation of automobiles, or it may be because the system constructed a threat simulation around the theme "what happens if I lose control of my car in full speed on a slippery road". In any case, only a small proportion of the dream threats could have been the side effects of the formal characteristics of the dream.

Fourth, it could be argued that our data was biased to include more material from subjects with good dream recall and therefore only reflects threatening events in such subjects' dreams. However, we also analysed a balanced sample of material (exactly seven threatening events from all subjects whose dream diaries included at least this number of threats, for details see Note 3), and found only one statistically significant difference compared to the unbalanced sample; even this difference seemed to be of little if any theoretical consequence. Therefore, we reported the results from the unbalanced sample in order to increase the cell frequencies for the statistical analyses; the results are not in any systematic way different from the balanced sample. Fifth, the judges that scored the reports were not blind to the threat simulation hypothesis, which may have generated

some unintentional biases in scoring. However, we did use three independent judges (which is more than in many other studies on content analysis) and we report the levels of inter-rater agreement in detail (see Note 2). Therefore, we believe that even with these limitations in mind, the present study offers a trustworthy description of the threatening events that normal subjects encounter in their dreams. And sixth, the present study only demonstrates that even in the absence of severe threats in waking life, the dream production system nevertheless shows a clear bias towards simulating threatening events (supporting Proposition 1 in [Revonsuo, 2000a](#)), but it cannot test the claims concerning the activation of the threat simulation mechanisms in response to actual threats (Proposition 3 in [Revonsuo, 2000a](#)). The latter claim is the central tenet of the whole theory; the most critical tests of the theory will have to confirm or disconfirm it. Although the present study does not constitute such a test, the DreamThreat rating scale (or suitable parts of it), developed in the present study, could well be used in future studies that concentrate on describing the threat simulation response in individuals who have been exposed to severe real threats. In such individuals, we should find the threat simulation mechanisms fully activated and the simulations consequently to be much more frequent and efficient than in normal subjects. Our aim is to test these ideas in future studies.

We did not pay particular attention to individual differences, apart from the category of Severity of Threat, in which we found that the majority (79%) of subjects had at least one life-threatening event in their dreams. If the threat simulation hypothesis is correct, people might differ greatly in the frequency and/or severity of threats in their dreams, depending on their personal history, current stressors, and possible traumatic events they have encountered. If there is a continuum from "ordinary" dreams to post-traumatic ones in terms of the degree of activation of the threat-simulation mechanism, then interindividual differences may be considerable in any larger group of subjects. The degree of activation of the threat simulation mechanism may be different in individuals with different basic personalities (e.g. on the dimension of "thick" vs. "thin" boundaries, Hartmann 1984; or different levels of trait anxiety, Schredl et al., 1996) or with different degrees of traumatic real-life experiences. This should be taken into account in future studies of threatening events in dreams, and groups of subjects with different levels of current life stress or history of traumatic events could be studied separately and compared with each other.

Unfortunately, no present-day researcher can really have access to what would be a truly representative sample of dreams from the point of view of the threat simulation hypothesis, for that would imply access to the dreams of ancestral hunter-gatherer populations who lived in the original evolutionary context. All dream samples collected by present-day researchers are necessarily biased in this sense, for they are collected from subjects whose everyday environment is so remote from the environment in which the dream production system originally evolved and fulfilled its purported biological function. The dream reports collected from contemporary hunter-gatherers (e.g. Gregor, 1981) may however give hints as to what kind of dangers our ancestors might have dreamt about.

### 4.3. Conclusions

In conclusion, the present study reports the results of a content analysis of threatening events in dreams, specifically designed to test [Revonsuo's \(2000a\)](#) threat simulation theory of dreaming. We found threatening events to be surprisingly frequent in the dreams of normal subjects. The threats often involve some sort of aggression or accidents or misfortunes, but only rarely catastrophes or disease. The threats mostly endanger the Self and other people significant to Self, they are relatively often quite severe, and they are mostly drawn from personal life and media, not from pure fantasy. The dream Self usually actively participates in the events, and if the dreamer's own life is endangered in the dream, the dream Self is very likely to react to the threat in an appropriate way. Dreams do not often concentrate on representing the consequences of the threats, and the threats hardly ever have any severe consequences for the dream Self. Thus, the predictions derived from the threat simulation theory of dreaming ([Revonsuo, 2000a](#)) were confirmed by our findings.

In the light of the present results (and the multiple commentaries and thorough theoretical discussions in the Special Issue of *Behavioral and Brain Sciences*, see Revonsuo, forthcoming), we think that the threat simulation hypothesis of dreaming can be regarded as one of the least implausible explanations for why we dream. This means that dreaming as a phenomenal experience causally contributes to a complex biological process, the adaptive function of which is to maintain and rehearse the threat perception and threat avoidance skills of the individual [\(7\)](#). If dreaming in actual fact did have these real causal effects on the inclusive fitness of ancestral humans, as [Revonsuo's \(2000a\)](#) theory implies, it follows that *phenomenal experience cannot be epiphenomenal either in the biological or in the philosophical sense of the word*. On the contrary, according to this view dream experience is causally efficacious in the physical world, and furthermore, efficacious in ways which promoted to the reproductive success of ancestral humans. This naturalistic view of consciousness treats phenomenal experience as a real biological phenomenon that resides within the brain rather than some exotic property that will forever escape all natural-science approaches to the study of the mind (Revonsuo, 2000b). Therefore, the threat simulation theory of dreaming may have important implications to the study of consciousness at a more general level. Since many dream phenomena (e.g. bizarreness) can best be described and explained in a wider multidisciplinary context, dream research and consciousness research might both gain much by closer interaction and by establishing a common research program in the quest to understand subjective experience.

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## Notes

<1>. Also other theoretical views of bizarreness exist, linking it to e.g. creativity and metaphorical thinking (Hunt, 1989).

<2>. The theory on which the present study was based will be published as a BBS target article forthcoming in 2000 (Revonsuo A: The Reinterpretation of Dreams, *Behavioral and Brain Sciences*, 2000b). A draft version of the paper is already freely available for inspection at the BBS Target Article Archive: <<http://www.cogsci.soton.ac.uk/bbs/Archive/bbs.revonsuo.html>>. Therefore, the reader interested in the details of the theory is referred to that source.

<3>. The Hall/Van de Castle (H/VC) system was not used in the present study because we needed to build a theoretical rating scale around the concept of "threatening event", directly derived from the theory that we set out to test. Furthermore, we noted several features where our threat categories differed from those available in the H/VC system. For example, not all H/VC aggressions constitute threatening events. To kill a bug or to capture (non-dangerous) animals during hunting or fishing constitutes aggression in the H/VC system, but does not constitute a threat in our rating scale. In our scale threatening events always threaten human reproductive success (directly or indirectly). Killing an animal for food increases reproductive resources rather than decreases them. Reactions to threatening events and the consequences of threatening events cannot be appropriately evaluated on the basis of the H/VC categories for reciprocated aggression or on the basis of the consequences of failure and misfortune. The category of "reciprocated aggression" in the H/VC scale only tells us whether the victim of aggression responds with counteraggression. We wanted to find out whether the dream self initiates any kind of defensive action, aggression or otherwise, that might help to escape from the threat or to minimize its negative effects on reproductive resources. Our scale only evaluated whether an action is in principle appropriate as a defense, not whether the action actually led to a successful outcome. Thus, the conflict with the H/VC findings on frequent negative consequences of failures and misfortunes is only apparent. Our scale of "Resolution of the threatening event" shows that threatening events have more often a negative than a positive outcome. As this is the first study on threatening events, some of the scales of the present study may be refined in future studies, or only a subset of the scales may be used.

<4>. We report the range of the value of Kappa (value for the pair of judges with lowest agreement and the pair with highest agreement), but if Kappa could not be computed due to the nature of the data, range of percent agreement is reported. A value of the Kappa statistic < 0.4 indicates poor agreement, 0.4 - 0.75 fair to good agreement, and > 0.75 strong agreement (Fleiss, 1981). The criteria we used for acceptable internal consistency

of the judges were the following. Acceptable pairwise percent agreement: >65%; acceptable value of the kappa statistic: >0.40.

Identification. The agreement between judges in deciding what constitutes a threatening event was fairly good (pairwise agreement range: 76 % - 84%). 672 threatening events altogether were identified by at least two judges. This body of data was then further analysed by content.

Content classification. Inter-rater agreement was at acceptable levels with respect to all eight rating scales. The range of the value of Kappa varied between 0.43 - 0.79 (N = 672,  $p < 0.001$ ), indicating fair to strong agreement. Details of inter-rater agreement in different scales were as follows: I. The Nature of the Threatening Event (K range = 0.70 - 0.74, N = 672,  $p < 0.001$ , computed only for main categories), II. The Target of the Threat (Pairwise agreement in main categories varied between 82% - 85%, computing Kappa was possible only for subcategories (which are not separately reported here), K range = 0.52 - 0.79, N = 672,  $p < 0.001$ ), III. The Severity of the Threatening Event for the Self (K range = 0.53 - 0.62, N = 672,  $p < 0.001$ ), IV. Participation of the Self in the Threatening Event (K range = 0.67 - 0.73, N = 672,  $p < 0.001$ ), V. Reaction of the Self to the Threatening Event (K range = 0.64 - 0.65, N = 672,  $p < 0.001$ ), VI. Consequences of the Threatening Event to Self (pairwise agreement in main categories varied between 66% - 77%, computing Kappa was possible only for subcategories, K range = 0.43 - 0.73, N = 672,  $p < 0.001$ ) VII. Resolution of the Threatening Event (K range = 0.53 - 0.59, N = 672,  $p < 0.001$ ) and VIII. The Source of the Threatening Event (K range = 0.52 - 0.62, N = 672,  $p < 0.001$ ).

<5>. Different subjects produced unequal numbers of dream reports, the length of the reports varied between different subjects and the number of threats per subject varied greatly. Therefore, subjects with good dream recall and good verbal expression abilities were overrepresented in the data. In order to check whether this imbalance would influence the results, we statistically compared the results from the total sample with a balanced sample. The balanced sample was drawn by taking the first seven threatening events from every subject's dream diary (including only those subjects whose dream reports contained at least seven threats). This balanced sample thus consisted of 329 threatening events reported by 47 subjects or seven events per subject. The threatening events in this sample were not significantly different from the total sample, apart from one subcategory in the *Target of the Threat* scale: Insignificant People were threatened more often in this balanced sample than in the total sample (chi-square = 6.330,  $df = 1$ ,  $p < 0.012$ ). This difference does not seem to be theoretically meaningful in itself. Thus, since balancing the sample did not significantly change the results, we report the results as calculated from the total sample.

<6>. We tend to selectively recall emotionally charged (especially threatening) events and forget mundane ones. This applies to both waking and dream events (Chapman & Underwood, in press). How well do we remember non-threatening events in dreams? We estimated this by calculating the % of words that were used to describe threatening events in a sample of dream reports. About 30% of words described threatening events, which

means that about 70% of words in the written reports did not describe threatening events. This indicates that we do remember also other types of dream events fairly well. If many non-threatening dream events are, however, forgotten, it might be difficult to estimate the density of threatening events in dreams. But even in that case we can assume that all or most threatening events are selectively recalled from both waking and dreaming and compare their frequency in the two states directly, no matter how many mundane dream or waking events are forgotten (Revonsuo, forthcoming). Thus, we can simply count how many life-threatening events typically happen during, say, one month in the dream world as compared to the waking world, and disregard all mundane events in both states, whether remembered or forgotten. On the basis of our results it would seem that life-threatening events must be much more common in the dream world (but in future studies also the threats encountered in the waking world must be measured to conduct a proper quantitative comparison).

<7>. It would be difficult to show that threat simulation is the only function of dreaming, it may just be one of many functions. However, those who claim that dreaming has other biological functions than threat simulation have the burden of proof to show that their hypothesis is supported by a wide range of evidence from normative dream data, typical dreams, recurrent dreams, post-traumatic dreams, children's dreams, hunter-gatherer dreams and so on (Revonsuo, forthcoming). So far as we can see, it is not possible to make as strong a case for any other biological function of dreaming as for threat simulation.

## References

- Antrobus, J. (1993) Dreaming: Could we do without it? In: *The functions of dreaming*, (Eds.) A. Moffitt, M. Kramer & R. Hoffman. pp. 549-558. New York: SUNY Press.
- Chapman P & Underwood G (in press) Mental states during dreaming and daydreaming: some methodological loopholes. *Behavioral and Brain Sciences*.
- Crick, F. & Mitchinson, G. (1983) The function of dream sleep. *Nature*, 304, 111-114.
- Crick, F. & Mitchinson, G. (1995) REM sleep and neural nets. *Behavioural Brain Research*, 69, 147-155.
- Domhoff, G.W. (1996) Finding meaning in dreams. A quantitative approach. New York: Plenum.
- Flanagan, O. (1995) Deconstructing dreams: The spandrels of sleep. *The Journal of Philosophy*, 92, 5-27.
- Fleiss, J.L. (1981) *Statistical methods for rates and proportions*. 2nd Ed. New York: Wiley.

Foulkes, D. (1985) *Dreaming: A cognitive-psychological analysis*. Hillsdale, NJ: Erlbaum.

Gregor, T. (1981) A content analysis of Mehinaku dreams. *Ethos*, 9, 353-390.

Hall, C.S. & Van de Castle, R.L. (1966) *The content analysis of dreams*. New York: Appleton-Century-Crofts.

Hartmann, E. (1984) *The nightmare: The psychology and biology of terrifying dreams*. New York: Basic Books.

Hartmann, E. (1993) Nightmares. In: *Encyclopedia of Sleep and Dreaming*, ed. M.A. Carskadon, 406-408. New York: Macmillan.

Hobson, J.A. (1988) *The dreaming brain*. New York: Basic Books.

Hunt, H.T. (1989) *The Multiplicity of Dreams: Memory, Imagination and Consciousness*. New Haven: Yale University Press.

Kahn, D., Pace-Schott, E.F. & Hobson, J.A. (1997) Consciousness in waking and dreaming: The roles of neuronal oscillation and neuromodulation in determining similarities and differences. *Neuroscience*, 78(1), 13-38.

Revonsuo, A. (1995) Consciousness, dreams, and virtual realities. *Philosophical Psychology*, 8, 35-58.

Revonsuo A (1998) Visual perception and subjective visual awareness. *Behavioral and Brain Sciences*, 21(6), 769-770.

Revonsuo A (1999) Binding and the Phenomenal Unity of Consciousness. *Consciousness and Cognition*, 8(2), 173-185.

Revonsuo A (2000a) The Reinterpretation of Dreams: An Evolutionary Hypothesis of the Function of Dreaming. *Behavioral and Brain Sciences*, 23(6). <http://www.cogsci.soton.ac.uk/bbs/Archive/bbs.revonsuo.html>(in press).

Revonsuo A (2000b) Prospects for a Scientific Research Program on Consciousness. In: Metzinger T (Ed.) *Neural Correlates of Consciousness*. Cambridge, MA: MIT Press.

Revonsuo A (forthcoming) Did ancestral humans dream for their lives? -Author's Response. *Behavioral and Brain Sciences*.

Revonsuo A. & Salmivalli C. (1995) A content analysis of bizarre elements in dreams. *Dreaming*, 5(3), 169- 187.

Schredl M, Pallmer R & Montasser A (1996) Anxiety dreams in school-aged children. *Dreaming*, 6(4), 265-270.

Solms M (1997) *The neuropsychology of dreams*. Mahwah, NJ: Lawrence Erlbaum.

Strauch, I. & Meier, B. (1996) *In search of dreams: Results of experimental dream research*. New York: SUNY Press.

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## **Appendix A: Summaries of threatening events identified in the dream diaries of four illustrative subjects (2 female and 2 male)**

### **Subject 09, female, 23 years**

1. S. is out on a street with two friends. One friend is left behind, and S. and the other suddenly notice that a man is raping her. They run to help her. S. is enraged, takes her belt and whips the rapist.
2. S. is in a restaurant with friends. They find out that a group of youngsters there are drug dealers and users. They start to quarrel with them. S. and her friends leave, but call the police.
3. The police enter the restaurant. A violent encounter breaks out, causing even some casualties.
4. S. meets a girl whose dog is sick and needs to be taken to the vet.
5. S. is in an apartment in a skyscraper. She needs to find an explosive there and render it harmless. She manages to do so.
6. A terrible storm or some other natural force breaks out. The house in which the S. stays starts swaying from side to side. Finally the building collapses, but S. and her friends remain unhurt.
7. S. and her friends are walking through a ruined city. They have to be very careful and stay alert so as not to be buried under the collapsing ruins.
8. S. is in a bar. She goes to the backyard, where a drunk tries to abuse her sexually. She punches him with her fists so that blood flows and in the end the man lies on the ground. Back inside, she asks somebody to call the police.
9. S. is at a student party. A guy has fallen for her. Some other, unknown girls are extremely jealous of and angry with her.

10. S. finds herself in her own old primary school together with some friends. In the yard there is a small cottage. They go in, but S. has a strong feeling that the teachers would not allow them to be there. She gets angry and wants everybody to leave.
11. S. is on a train and notices that she ought to have got off already. She starts running towards the exit.
12. S. has to jump off a moving train. She succeeds in doing so unhurt.
13. S. realizes having left her backbag on the train. All her money was in it. She informs the personnel at the station of this.
14. S. sits on the lap of a young man, but falls down and hits her head against the floor, and loses consciousness for a moment.
15. S. is in a car with two friends. A girlfriend is driving. The road is extremely slippery, S. tells her friend to drive very carefully
16. S. is in a nuclear power plant with two friends. One of them has lost her good looks. She explains to the others that she has got cancer.
17. S. hears a hissing sound, a sign of radioactive steam escaping from the power plant into the air.
18. S. with her friends tries to leave the nuclear power plant, but an old woman closes a metallic door in order to stop them. S. offers her some money, and after a while they can get out.

**Subject 51, Female, 22 years**

1. S. is on a bus, running through a suburb dangerously fast.
2. S. notices that the police have been following the bus she is riding.
3. S. is steering a motorboat, trying to keep it on course. The buoys and beacons are confusing and the boat gets out of control, running around in a circle. S. calls her boyfriend for help.
4. S. is sick in bed receiving intravenous medication.
5. S. is in her parents courtyard. Some cars from the street are taking a shortcut through the yard, and she only just avoids being run over.
6. S. is getting off a bus at a bus-stop. She has a lot of baggage, but the bus starts off before she can fetch one of the bags. She remembers that her wallet containing

- \$100 was in the bag as well as all her anatomy textbooks. She goes home, calls the lost-and-found and also tries to call the bus company.
7. S. finds out that mathematics, the subject she has always been a failure at, has become obligatory at the medical school where she is presently studying.
  8. S's friend has been kidnapped. A man is holding her hostage in a car. S is talking to her friend and the kidnapper through a telephone.
  9. The grandfather of S's boyfriend has had a heart attack in the yard and died. S comes to the scene afterwards and asks the others whether everything that could have been done was done. She was angry that nobody had called for her for help.

**Subject 78, male, age 20.**

1. S. is with his father and brother at a summer cottage. When they are outside, they hear noises from inside the cottage, but find nobody there.
2. S. finds barrels full of some flammable liquid inside a barn. They start throwing them out, and the barrels explode as they hit the ground.
3. S. escapes from a bar where friends have made him drink too much. He hides in a parking lot. The friends come to look for him and eventually find him.
4. S. is with other medical students in a museum, listening to a presentation. Behind them there are students from the School of Economics who start to insult them. Finally an open fight breaks out. S. escapes from the room.
5. S. is walking at the bottom of a valley. Suddenly arrows are being shot at him, and he tries to ward off. He notices an opening in the stony wall, runs towards it and steps in.
6. S. falls from a high place and crashes into the ground.
7. S. is riding a motorbike in a desert. His bike stops and won't start again.
8. S. returns to his motorbike only to notice that there are big lizards eating it.
9. Gasoline is leaking from the tank of the motorbike. The lizards catch fire.
10. S. goes to his old school. When he steps to the classroom, he finds his old history teacher holding an exam there. He realizes that he has forgotten all about the exam.
11. S. is in a passenger boat with friends. He tries to go in to his cabin, but after he opens the cabin door there is a barred metal door blocking the way.

12. S. finds that all his luggage has disappeared.
13. S. is on the deck of the ship. The deck is icy, the ship heels over, and S. starts sliding towards the edge. His grip doesn't hold and he falls down.

**Subject 80, Male, 37 years**

1. S. fails in an exam. The professor hauls him over the coals, rips his exam paper and throws it into the garbage.
2. The professor promises to arrange an extra oral examination, but when it takes place S. cannot remember anything and has to go home disappointed.
3. S. returns his dream diary to the researchers, but he has only recalled three dreams during the whole month. The principal investigator hauls him over the coals. S. apologizes, but the P.I. says it is too late, years of work is now going to be wasted.
4. S. sees a woman with a baby on the street. The baby has a terrible vomiting fit, and the woman tries to save her clothes from being totally spoiled. S. goes and asks if any help is needed.
5. S. notices that a car has run through a fence and dropped into a river 50 meters below. S. watches the rescue operation taking place.
6. S. is pushing a baby carriage with a baby in it. When he is going downhill, his grip loosens, the carriage escapes, and he runs as fast as he can to catch it. Finally he makes it.
7. S. comes to a place where the road is very narrow and steep. He helps a woman with her two baby carriages to pass this point safely.
8. S. is in his old school classroom, an English lesson is going on. Nobody knows the correct answers, and the teacher forces the pupils to crawl on the floor begging for mercy.
9. S. is looking at a great dam. He sees a small crack in it. A man says that the whole dam is useless and needs to be demolished.
10. S. sees that a tooth in his mouth is broken.
11. S. is in a big department store and notices that his child has suddenly disappeared. He sees a hooded man carrying the child out of the store. The kidnapper escapes in a van. S. goes to the police station, but everybody is very reluctant to help him. Desperate and angry, he decides to find his child by himself.

12. S. is in a shop trying to find the things he was supposed to buy, but fails to find any of them. Finally, he sees a bag of frozen corn, which was one item in his list.

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## **Appendix B: Examples of the Identification and Scoring of Threatening Events in Dreams**

### **Subject 07, Female 25 years.**

#### **Crash**

I am driving my father's car in the center of Turku (the streets are not real ones). Beside the car a young man is riding a bike. The road I am driving along on forks into two, left and right. I would like to turn to the right. The man next to my car does not turn. Thus *we both crash straight into a wooden house in front of us. The front of my car is crushed. I am horrified about what my father will now say; how will he go to work tomorrow, how long will the repair take etc. I ask the young man how he is. He says that he is okay but that his bike needs major repairs. I promise I will have it repaired.*

- I. The Nature of the Threatening Event: Accident / Misfortune
- II. The Target of the Threat: Self & Physical Resources & Insignificant People
- III. The Severity of the Threatening Event for the Self: Life-Threatening or Highly Dangerous
- IV. Participation of the Self in the Threatening Event: Self Actively Participates
- V. Reaction of the Self to the Threatening Event: Possible and Reasonable Reaction
- VI. Consequences of the Threatening Event to Self: Mild Negative Psychological Consequences to Self & Loss Or Damage of Physical Resources Belonging to Self
- VII. Resolution of the Threatening Event: Threat Realized (Unhappy End)
- VIII. The Source of the Threatening Event: Personal Life

### **Subject 16, Female, 22 years**

#### **Shopping Bag**

I was living in a block of flats on a street near the University of Turku. I came near this building by bus and stepped out of the bus. *I noticed however that I had left my shopping bag on the bus. I quickly ran back to the bus (from the front, although I had got off from the back) and shouted that I had left my bag. Somebody kindly handed it over to me. I walked up the steps to my flat. There I met a friend I shared the flat with in the dream.*

- I. The Nature of the Threatening Event: Failure

- II. The Target of the Threat: Self & Physical Resources Significant for Self
- III. The Severity of the Threatening Event for the Self: Trivial
- IV. Participation of the Self in the Threatening Event: Self Actively Participates
- V. Reaction of the Self to the Threatening Event: Possible and Reasonable Reaction
- VI. Consequences of the Threatening Event to Self: No Losses Or Damage to Self
- VII. Resolution of the Threatening Event: Threat Dissolves (Happy End)
- VIII. The Source of the Threatening Event: Personal Life

## **Subject 52, Female, 22 years**

### **Escape**

I was in the cityblock where I live. There was somebody else with me. *I was being followed by a panther. The hay was rustling when I moved forward. I stood still. The panther was closing in upon me. I had to get over the fence. I started towards the fence. (Why didn't I run?). I was only barely over the fence when the panther attacked. It started running towards me. (When I woke up the phone rang and I forgot the rest of the dream. I was escaping the panther near where I live. It was summer, since everything was green. The escape was frightening and it lasted longer than the written report indicates).*

- I. The Nature of the Threatening Event: Escape /Pursuit
- II. The Target of the Threat: Self
- III. The Severity of the Threatening Event for the Self:Life-Threatening Or Highly Dangerous
- IV. Participation of the Self in the Threatening Event: Self Actively Participates
- V. Reaction of the Self to the Threatening Event: Possible and Reasonable Reaction
- VI. Consequences of the Threatening Event to Self: Not Adequately Reported
- VII. Resolution of the Threatening Event: Dream Ends in the Middle of the Threatening Event
- VIII. The Source of the Threatening Event: Media

## **Subject 75, Male, 24 years**

### **The Hearing**

I was in a lecture hall where the Professor of Anatomy examined me about the different parts of the vertebra. *He threatened to hit me with the stick if my answers were incorrect. I was overcome by panic, but fortunately I knew the right answer.*

- I. The Nature of the Threatening Event: Aggression
- II. The Target of the Threat: Self

- III. The Severity of the Threatening Event for the Self: Socially / Psychologically Severe
- IV. Participation of the Self in the Threatening Event: Self Actively Participates
- V. Reaction of the Self to the Threatening Event: Possible and Reasonable Reaction
- VI. Consequences of the Threatening Event to Self: No Losses or Damage
- VII. Resolution of the Threatening Event: Threat Dissolves (Happy End)
- VIII. The Source of the Threatening Event: Personal Life

### **Subject 60, Female, 22 years**

#### **Exam**

I went to the lectures in the morning. I decided to take a look to see if the results of the anatomy exam had come. There was a crowd in front of the board. I reasoned that the results must have come. I pushed myself through the crowd. The others were looking at me in a strange way. I wondered what that was all about. *To my horror I noticed that I was the only one who had failed in the exam. My name was underlined in the result list. There were hearts drawn around my name. In addition, the points I had been given for all the answers had been written down on the notice board. I got only one point for almost every part of the test. A friend of mine said: "You didn't do so badly in one of the questions". I was utterly ashamed.*

- I. The Nature of the Threatening Event: Failure
- II. The Target of the Threat: Self
- III. The Severity of the Threatening Event for the Self: Socially / Psychologically Severe
- IV. Participation of the Self in the Threatening Event: Does Not Actively Participate
- V. Reaction of the Self to the Threatening Event: Does Not / Cannot React
- VI. Consequences of the Threatening Event to Self: Mild Negative Psychological Consequences
- VII. Resolution of the Threatening Event: Threat Realized (Unhappy End)
- VIII. The Source of the Threatening Event: Personal Life

### **Subject 81, Male, 22 years**

#### **Violence**

(In this dream report, four separate threatening events were identified and scored)

I was walking on an asphalt road with my mother. I was walking faster, but my mother knew the road, and so I waited for her. We were on our way to a village that had a strange foreign name. The road was leading to a forest. In the forest there was a bus stop, at

which my mother stayed. I returned to fetch her. We were in the forest, the road had disappeared. (1) *A group of dark-skinned foreign men were taking apart a police car and stole its parts. Most of the men were familiar to me from the gym where I go. There was little left of the police car. My mother stayed there, but I went to fetch the police.* (2) *The men noticed my departure and ran after me. I ran away and suddenly I was at home. I ran into the farthest-off room and I tried to close and lock the door, but there was a hole in the door, through which one of the men grabbed me.* (3) *He tried to pull me back and kick me on the head, but I fended him off. I thought that kicks as slow as these were easy to handle, but if the other men came too, I would be in trouble.* (4) *After a moment another assailant appeared. I threw both of them to the floor. I killed one of them by hitting his head against the floor. I dragged his body to the living room by the legs and I got the upper hand of two more men by hitting them with the dead body. When all of the men were lying on the floor, my mother praised my bravery. I was not that pleased, for I knew that from now on I would have to fear for my life when I went to the gym, because the friends of these men often went there.*

- I. The Nature of the Threatening Event:
  - (1) Aggression
  - (2) Escape/Pursuit
  - (3) Aggression
  - (4) Aggression
  
- II. The Target of the Threat:
  
  
- III. (1) Insignificant Resources  
(2) Self  
(3-4) Self & Insignificant People
- IV. The Severity of the Threatening Event for the Self:
  - (1) Trivial
  - (2-4) Life-Threatening or Highly Dangeorus
- V. Participation of the Self in the Threatening Event:
  - (1-4) Self Actively Participates
- VI. Reaction of the Self to the Threatening Event:
  - (1-4) Possible and Reasonable Reaction
- VII. Consequences of the Threatening Event to Self:
  - (1) No Losses or Damage to self
  - (2) [not scorable]
  - (3) No Losses Or Damage to Self
  - (4) Mild Negative Psychological Consequences
- VIII. Resolution of the Threatening Event:
  - (1) Discontinuity

(2-4) Threat Realized (Unhappy End)

IX. The Source of the Threatening Event:  
(1-4) Media