

The moment we close our eyes

Personal work 2021-2022

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Chapter 1: Foreword

1. Foreword

My name is Kaat De Wolf, I am 16 years old. Since a couple of years, I am interested in psychology and everything that has to do with brains. Recently, I had a very strange dream and when I woke up, I was wondering and asking a lot of questions about dreams. I asked myself: “Why do we dream?” and “In which part of the brain is that thing that makes us dream?”.

So, I chose this topic “The moment we close our eyes” for my personal work because I am interested in the way dreams work but also because I want to write about sleep too. More specific, I will talk about the types of dreams, the part of the brain that makes us dream and about dreams and their meaning, the sleep stages, the perfect sleep environment and parasomnias. I am very curious to learn about all the functions of dreams.

Chapter 2: Dreams

1. What are dreams?

Dreams are stories, images, ideas, emotions, and sensations that our mind creates during the night and during certain stages of sleep. They can be fun, romantic, bizarre, entertaining, disturbing, and sometimes frightening.

They are a permanent source of mystery for the scientists and the psychological doctors. Why do dreams occur? What causes them? What do they mean? And can we control them? Those questions will be answered later in my personal work.

What they do know about dreams is that people may not remember having had a dream during the night, but everyone is thought to dream between 3 to 6 times per night. Each dream lasts around 5 to 20 minutes and around 95 percent of dreams are already forgotten by the time a person wakes up. On top of that, dreaming can help you learn and develop long-term memories. Lastly, blind people dream more with sensory components compared to people who can see.

Hypotheses say that we often dream about things we experienced during the day, that dreams help to process occurrences. While someone is dreaming, the person creates new ideas because during the night the brain thinks totally different than during the day, our brain thinks more illogical¹ and associative² during the night. Dreaming also brings old memories with new things in relation to each other in a way that would not be conceived in a waking state.

¹ Illogical: not observing the principles of logic

² Associative: of or relating to association especially of ideas or images

2. Why do we dream?

Experts say that people dream because it is good for the human's body. Dream experts such as, Ann Faraday, Ian Wallace, Dean Clift and Matthew Walker, see dreams as a form of inner therapy for processing our thoughts and feelings in order to achieve emotional and psychological balance. However, there are also experts who believe that dreams offer a form of protection, in the sense that people “practise” different scenarios while dreaming so that they are better prepared for the real life.

There has been research into the emotional regulation of dreams, in other words that dreams may have an influence on how we feel during the next day. Dreams help us to process our emotions, maybe because in dreams we can express in other ways our feelings whereas in real life we may want to hide or may be repressed. Aside from the fact that dreams have a therapeutic effect on people, it also appears that they may solve problems and enhance our creativity. The fact that people wake up and suddenly have an inspiration to do something. It is unlikely that there will ever be a definitive theory explaining what dreams are and why we dream, as they probably have many functions. What experts do know is that there are clear correlations between active dreaming and increased well-being.

“The more intense and vivid your dreams are with your eyes closed, the better you feel when you wake up.” – Theresa Cheung

3. Who can dream?

Everyone is capable of dreaming but the people who believe that they don't dream is false. The answer to that is that they just easily do not remember their dreams. It is normal that as we age, our ability to remember our dreams decreases, but that does not mean that we actually dream less whether we recall them or not.

A large study from 2012 where more than 28,000 people participated, found out that it is more common for men to forget their dreams than for women.

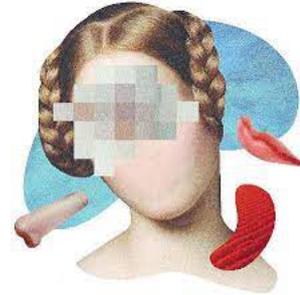
Besides from human beings' animals probably dream too. Researchers think that it is most likely that most animals including mammals, birds, reptiles, and fishes go through sleep stages including REM and non-REM, which means that they dream. It is possible that animals might not experience dreams the way human beings' do.

But do blind people dream too? The answer to this question, researchers believe is very complex. People who lost their vision after the age of 4 or 5 can "see" in their dreams. There is further evidence that people who are blind since they were born (congenital blindness) may also have visual experiences while they are dreaming.

In 2014 a study found that people with congenital blindness and late blindness experience dreams more with vivid sounds, smells and sensations than people who have a vision.

4. The science behind dreaming

The opinion of the scientists is that dreams are just as essential and important to our physical, mental and emotional well-being as food, water and air. Neuroscientists have proofed those parts of the brain are stimulated while dreaming. Scientists found out that there are some active parts of the brain during the time that we are dreaming and they researched which parts relate to dreams. It looks like that when you are asleep that our *limbic*³ and our emotional part of the brain are much more active than the logical or rational part of the brain. That's the reason why we might rather remember feelings than pictures when we wake up. Recently scientists got to know that the dreaming brain might work together with the waking brain, mostly when it comes to recognizing faces, since the waking brain is used to recognize faces. That must mean that both brains are connected.



“We might rather remember feelings than pictures when we wake up” -Theresa Cheung

³Limbic: The limbic system is the part of the brain involved in our behavioural and emotional responses

Chapter 3: Types of dreams and their meaning

There are a lot of different types of dreams but these are the most common dreams people have: normal dreams, daydreams, lucid dreams, false awakening dreams, nightmares, night terrors and sleepwalking. Most of the time you dream every time during the REM sleep⁴. Whether you remember them or not.

1. Normal dreams

Normal dreams are common dreams that we have every night. Without them, we would eventually die. These dreams are based on our thoughts, experiences from the day(s) before, memories, fears and anxieties, about people and our strongest desires and urges. As the name already says, these above topics may show up while you are dreaming and it seems normal in the context.

2. Daydreams

During all types of daydreams, you enter in a sort of hypnotic trance and you allow your unconscious thoughts to rise and escape from reality and visualise the past, present and future throughout the day. Your creative brain becomes dominant and you have less awareness of the things that are happening around you. Daydreaming is when you are semi-awake. You are clearly not a sleep but not checked-in with reality. There are studies that shows us that the average person has daydreams for around 70-120 minutes of their waking time. A daydream is when you have a compelling thought of a memory, or a fantasy and you let go of your imagination. The longer you daydream, the deeper you dipped in your own fantasy land.

3. Lucid dreams

A lucid dream is a dream in which, you are physically asleep, but you know that you are dreaming and you can control the dream. Sometimes, you can control a lot of aspects of a dream,



⁴ REM sleep: Re-energizes your mind

like the location, the plot, or the characters. Lucid dreaming is also something you can practise.

4. False awakening dreams

This is a type of dream that feels like you have woken up but you're still asleep. So basically, you wake up as normal, go to the bathroom, get dressed, eat breakfast before you realise you are still dreaming. It often takes something obvious to shock you out of such dreams.

5. Nightmares

Nightmares are like normal dreams but with a scary twist. Common themes for a nightmare are being chased, falling or feeling lost or trapped. Nightmares can cause a lot of different feelings such as: anger, sadness and fear. Even if you wake up, you can still have this feeling. Everyone has nightmares; however, nightmares are more common for children.

Causes of nightmares:

There are a lot of causes why people have nightmares. Nightmares can be triggered by:

- Scary movies, books, or video games
- Alcohol or drug abuse
- Stress, anxiety, or depression
- PTSD⁵, an anxiety disorder that often develops after witnessing or experiencing a traumatic event, such as a rape or murder

⁵ PTSD: Post-traumatic stress disorder

6. Night terrors

Night terrors also called sleep terrors are episodes of screaming, intense fear and flailing while you are sleeping. They often are brief (30 seconds) but can last a few minutes. Sleep terrors are often connected to sleepwalking, they are considered as a parasomnia⁶

There is a difference between a night terror and a nightmare. The dreamer of a nightmare wakes up knowing some details from the nightmare, perhaps the dreamer of a night terror remains asleep.

During a night terror the dreamer may have different symptoms, which are for example sweating a lot or breathing heavily, having a racing pulse. What is also very common is that people who are having a sleep terror scream or shout or sit up in bed and are frightened. While screaming and shouting the dreamer also might kick with their legs or arms. It is very hard to awake them while they are having a night terror, often they are confused when they wake up. Usually, the person has no or little memory of the event that took place during the night.

Often night terrors are linked to stress, trauma, or mental health problems and after taking certain types of medication, such as antidepressants.

⁶ Parasomnia: A parasomnia is a sleep disorder that involves unusual and undesirable physical events or experiences that disrupt your sleep.

Chapter 4: Sleep

1. Stages of sleep and their meaning

Each night we take a rollercoaster ride through different stages of sleep. Though we are unaware of what happens during the time we are sleeping, our



body and the brain are in an active state. There exist four different stages of sleep: awake time, light sleep, deep sleep, REM sleep (REM sleep stands for “rapid eye movement”). Each stage of sleep has its own role in maintaining our mental and physical health.

Non-REM Stage 1: Falling Asleep

The falling asleep stage is a transition period between being awake and being asleep. During this period of time our eyes keep continuing with their movements but the movements of our body slowly slow down. That means, our heartbeat and our breathing will slow down. It is easily to awake someone during this stage of sleep. A little noise can awake us. This period of sleep lasts for around five to ten minutes. At this time, the brain is still active and producing high amplitude theta waves, which are slow brainwaves occurring mostly in the frontal lobe of the brain.

Non-REM Stage 2: Light sleep

The first and the second sleep stage is *the Light sleep*. The Light sleep is the same as the “*Awake sleep*” stage. Our muscles start to relax, our heartbeat will slow down, our body temperature drops. The *Light sleep* stage guides you into deeper sleep stages.

Non-REM Stage 3: Deep sleep

The third a sleep stage is *the Deep sleep* stage. At this point, we are no longer aware of our surroundings and only wake up if we hear a loud noise or are firmly shaken. Our

blood pressure drops, our body promotes muscle growth and repair. This sleep stage lasts about half of the total sleep.

REM sleep: Re-energizes your mind

The last stage of sleep is *the REM sleep*. It is the moment when you are most deeply asleep. The muscles are totally relaxed, while the brain, as for it, must manage an overflowing activity. In fact, the *REM sleep* resides in the fact that you sleep while the waves emitted by the brain are the same as those emitted during the awakening period; in a word, it is a little like as if you sleep awake. It is during this phase that the longest and most striking dreams will be created. The first phase of *REM sleep* occurs about 2 hours after falling asleep and lasts about a quarter of an hour. This is followed by another sleep cycle of about 90 minutes during which there is a dream of 15-20 minutes. We will therefore, during a night, go through four or five cycles alternating sleep and dream. In total, the *REM sleep* is about 20% of the total sleep.

2. The ideal sleep environment

There are a lot of people who can't enjoy or remember their dreams because of their bad night rest. With the consequences that their brain finds it difficult to remember dreams, therefore here are a few tips how to increase a better night rest and to make it easier for our brain to remember our dreams.

Temperature

In the late afternoon our body heat peaks and then starts to drop in the evening to prepare our body for sleep. The ideal bedroom temperature is around 16-18°C.

Too hot, too cold or draughty bedrooms can seriously impact our sleep, in particular the REM (rapid eye movement) sleep. Cold rooms of 12°C will make it difficult for our body to drop off, while rooms over 24°C cause restlessness.

Especially for young children and elderly people it may require a slightly warmer environment.

Lighting

Our body wakes up when it sees light and wants to sleep when it's dark. Light and dark are strong clues in telling our body when it's time to go sleep or to wake up.

On one hand, studies have shown that the sleeping environment can have a big impact on our sleep patterns. When we see light, our bodies think that it is time to wake up which is why artificial light in an evening disrupts our circadian rhythms. It is because even if we are sleeping, our eyes can detect light through our eyelids.

On the other hand, when it is dark, our body releases melatonin (a hormone that helps to regulate the body's circadian rhythm), which helps our body to relax and to drop off.

Lighting helps in the morning too. Natural light helps to reset our body clock. It helps us to get over that groggy feeling when we have just woken up and makes us more alert

Bed & pillows

A bed is by far the most important element to get a good night's rest. It is near impossible to get a deep, effective sleep on an old, uncomfortable bed. When we're asleep it is good that we maintain a good posture. A too firm mattress can apply a lot of pressure to our shoulders and our hips. Furthermore, a mattress that is too soft will cause us to slouch. Generally, it is recommended to replace your mattress every 7-8 years.

To avoid having neck pain, stiff necks and even headaches a good pillow is very important. A good pillow should hold our head within the correct alignment, within the same reference to our shoulders. A pillow which is too soft will allow our head to flop, which means it will curve our neck. A pillow that's too hard will offer you a crick within the neck.

Noise

To achieve having a good night rest, most people generally need a quiet bedroom. Internal or external noise or sound that disturbs our sleep can come from a lot of things, for example people, TVs, too loud music, traffic, etc.

Noises tend to be most destructive in the lighter sleep stage of sleep, when our body starts to drop off. This can affect our mental health and has negative consequences on our body. Sudden and respective noises can interrupt us while sleeping having the consequence waking up feeling less refreshed in the morning. Noises that awakens us in our deepest sleep does the most damage.

There are studies that prove that noise-interrupted sleep can limit our creativity, impair our judgement and even make it difficult to remember things. Another study according to Sleep Science prove that there are also biological consequences of noise pollution. It increases your body's production of adrenaline, a faster heart rate, depression, even a risk to get diabetes and hyperactivity.

Messy room

A messy room can affect us more than we think, in fact especially when it comes to bedtime. A study, conducted by the New York's St. Lawrence University, shows that a messy bedroom can increase anxiety and can lead to a poor night rest.

A bedroom should be tidied up before going to bed, clothes should be sorted, piles of books should be cleared and toys should be hidden. A bedroom is designed as a place to relax and to rest, it is not your office, gym or playroom.

Electronic devices

Electronic devices can also affect our sleep in a negative way. It is the best to avoid electronic devices in your bedroom including the TV. Ideally electronic devices should be avoided in the hour before bedtime. There are three main reasons why to avoid electronic devices in the bedroom.

Blue light keeps you awake:

Electronic devices such as a phone, a computer or other electronic devices put off blue light that suppress our melatonin levels, which stimulates our brain and keeps us awake.

Technology is time-consuming:

Before we go to bed, we always check our phone for the last time, but before we know it, you have spent hours scrolling through social media or other applications. This affects our sleep in a negative way by keeping us from getting the hours of sleep we need.

A bedroom should be for rest and relaxation:

We keep our minds on the stresses of life and work by those constant vibrations and dings on our phone while we should be winding down for sleep. It affects our body's circadian rhythm. To avoid it and help combat the stress that constant communication can bring, a technology-free bedroom could have a huge impact on it.

3. How many hours of sleep do we really need?

Sleep is very essential for our health; it is like eating and drinking at the same time.

Sleep is the basis for a good health

Sleeping is not only a way let your mind and a time for your body to rest, while you are asleep your body mains still active. While you are sleeping your body rebuilds muscles and removes toxins in the brain that cumulate while you are awake. It also keeps our memories intact.

Sleep is not only good for our health, our mind to rest but sleeping also helps to regulate essential functions such as our immune system, metabolism and our body weight. Furthermore, it also regulates your emotions by increasing emotional responses to negative feelings by 60%.

Sleeping at an odd time of the day, not sleeping long enough and exposure to bright light at night can affect our internal clock and a lot of processes it regulates.

Not prioritising sleep has negative health consequences

Not prioritising sleep may encourage poor decision-making, being less creative and increase a risk of having a motor vehicle accident.

A study shows that getting 5 hours per night for 4 nights in a row negatively affect our mental performance the same as having a blood alcohol content of 0.6%.

Even worse, by having a poor sleep you can increase your chances of developing chronic diseases such as diabetes, obesity and heart disease.

How much sleep our body needs depends on several things

The amount of sleep you need during the night is determined by our age.

New-borns (0-3 months): 14-17 hours
Infants (4-12 months): 12-15 hours (including naps)
Toddlers (1-2 years): 11-14 hours (including naps)
Pre-schoolers (3-5 years): 10-13 hours (including naps)
School children (6-13 years): 9-11 hours
Teenagers (14-17 years): 8-10 hours
Adults (18-64 years): 7-9 hours
Older adults (65+): 7-8 hours

4. Sleep experiment

Introduction

In order to personalize this personal work, I decided to do a practical experiment with a few members of my family. In this personal work, I previously talked about the perfect sleep environment and I wanted to test if the instructions and advice that scientists give us, to get a better sleep, really has an impact on our sleep.

Description

For my practical experiment I asked two female members of my family and one male family member to participate. Two adults and one teenager, being myself.

I send following e-mail to all the participants:

Dear participant,

As you might know, for my school I must write a personal work. The main topic for my personal work is about dreams and about sleep. To finalize my personal work, I would like to do a practical experiment. For my practical experiment, I looked up how our bedroom is supposed to be, to have the best sleep. To test if that is true, I would like to experiment night 1: the perfect environment, how our bedroom is supposed to be perfect and night 2: the most disagreeable sleep environment, to see if we really do sleep better with the tips, scientist suggest to us.

It would be amazing if you could participate :)

If you are willing to participate you only need to do the following:

- you need a sleep tracker such as (Fitbit, Apple Watch, etc.)*

I am going to ask you:

- First night: To change your bedroom for one night into the most disagreeable sleep environment (room temperature as warm as possible or as cold as possible (you can also try to sleep without a blanket, sleep with more/less clothes), try to make as much mess in your room as possible, sleep with the windows open, as much lightening as possible (open all blinds/curtains), sleep with your electronic devices next to you (use 1 hour before going to bed an electronic device) and track your sleep with the sleep tracker*
- Second night: To change your bedroom for one night into the perfect sleep environment (room temperature 19, cleaned room, silent environment (windows closed), no lightning (stores down, room as dark as possible), no electronic devices in bedroom (1 hour before sleep no electronic use)) and track your sleep with the sleep tracker.*

If you did both you can send me the results from your tracker app and it would be nice if you could fill in my survey and give me your feedback.

PS: It would be nice if you could finish the experiment before the 22 April 2022:)

Thank you 😊

In the e-mail, I asked the participants to install their room for two nights with the following instructions:

Night 1: The opposite of the perfect sleep environment

- room temperature as warm as possible or as cold as possible (you can also try to sleep without a blanket, sleep with more/less clothes)
- try to make as much mess in your room as possible
- sleep with the windows open
- as much lightening as possible (open all blinds/curtains)
- sleep with your electronic devices next to you (use 1 hour before going to bed an electronic device)

Night 2: The perfect sleep environment

- room temperature 19
- cleaned room
- silent environment (windows closed)
- no lightning (stores down, room as dark as possible)
- no electronic devices in bedroom (1 hour before sleep no electronic use)

In order to receive the opinion of my participants, I created a survey:

Night 1: The opposite of the perfect sleep environment

1. *Objective question: Please provide me with your sleep tracker for night 1*
2. *Subjective question: How was your personal feeling about how you slept in night 1?*
 - *Scoring: 1 until 10 (1; bad and 10; great) How did you sleep?*

Night 2: The perfect sleep environment

1. *Objective question: Please provide me with your sleep tracker for night 2*
2. *Subjective question: How was your personal feeling about how you slept in night 2?*
 - *Scoring: 1 until 10 (1; bad and 10; great) How did you sleep?*
 - *Did the perfect sleep environment advice helped you to get better sleep?*

General question after both nights:

1. *Did you experience any difference(s) between night 1 and night 2? Explain your answer:*

Analyses of the sleep trackers and survey

In order to analyse the results regarding the sleep trackers, I particularly look at the numbers of how many times the people woke up and how long they slept.

The first night, the night where the participants including me, installed their bedroom into the opposite of the perfect bedroom, I could clearly see that the participants slept less in number of hours compared to the second night. The Fit Bit trackers (sleep trackers) showed that the participants were much more awake in the first night than in the second night. Moreover, the time that the participants were asleep, were less in the first night compared to the second night. With a difference of 1 hour and 2 hours.

The second night, the night where the participants including me, installed their bedroom into the perfect sleep environment, I could see that the participants slept more. However, most of them were more awake than in the first night. In the first night, they only woke up once and in the second night they even woke up more than three times.

In general, the participants informed me after doing this experiment that they felt more comfortable in the perfect sleep environment. They also had the (subjective) feeling they slept better without noise, light, no electronic devices, etc.

Conclusion

It was exciting to do this experiment and I was very surprised by the results that I got from this experiment. One of the family members woke up during night because of some electronic device making some noise. Into the objective fit bit screen, you can see exactly the moment of waking up and thus being cut off from dreams due to the environmental circumstances.



Chapter 5: Parasomnia

1. What is a parasomnia?

A parasomnia is a sleep disorder that involves unusual behaviours, undesirable physical events or experiences that disturbs people's sleep. A parasomnia can occur before falling asleep, while asleep, or during the arousal period between sleep and wakefulness. Someone who has a parasomnia, might have abnormal, weird movements, talk, do unusual things, or express emotions.

2. Different types of parasomnias

Parasomnias are grouped by the stages of sleep in which they happen, there are three general groups of Parasomnias: non-REM – Related Parasomnias; REM – Related Parasomnias and there are also other parasomnias that fall into “another” category.

3. Parasomnias during the REM sleep stage

Parasomnias that occur during the REM sleep stage are likely to recall partly or all of it. These parasomnias happen later during the night.

- Nightmare disorder: Nightmares are dreams that cause feelings of fear, terror and anxiety. It is more likely to have a nightmare if you are under a lot of pressure or experienced something traumatic or after alcohol consumption.
- Recurrent isolated sleep paralysis: If you have this sleep disorder you are not able to move your body or limbs during sleep. Professionals think that the paralysis might be caused by an extension of REM sleep, a stage where our muscles are already in a relaxed state.
- REM sleep behavior disorder (RSBD): While you are asleep you react to violent dream by acting out or you might make aggressive movements (such as punching, kicking and grabbing). This sleep disorder is common among older adults and many of them with this sleep disorder have neurodegenerative diseases (Parkinson's disease, Lewy body dementia or multiple system atrophy)

4. Parasomnias during Non-REM sleep stage

Non-REM parasomnias include physical and verbal activity. You are not conscious or awake during these events, you are not responsive to other's attempts to interact with you and mostly you do not remember the event the following day.

Parasomnias that occur during non-REM sleep include:

- Sleep terrors: When you experience a sleep terror you wake up in a terrified state. Which leads you to screaming and crying in fright, but your heart rate might also be high, you breathe faster and sweating.
- Sleepwalking (somnambulism): A sleepwalker is someone who moves around with their eyes wide open when they are actually asleep. Sleepwalking can be dangerous and can lead to injuries because you are not conscious about your actions and your surroundings.
- Confusional arousals: Someone who has confusional arousals is someone who appears to be awake but is confused and disoriented to time and space.
- Sleep-related eating disorder: A person who has a sleep-related eating disorder eats and drinks while being partially awake. It can be dangerous because the person might eat inedible or toxic food, eating unhealthy or too much food.

Chapter 6: Conclusion

1. Conclusion

First of all, the aim for my personal work was to find answers regarding the main questions about dreams; how we dream, why we dream and the different types of dreams. During my research, I was able to find more information and details about the different types of dreams and I even learned more about some types of dreams that I didn't know before. However, it was very difficult to answer a few questions such as what are dreams and how do we dream. This difficulty to find some clarity, because even scientists are not sure and did not discover all the details and cannot explain everything about dreams.

Secondly and as I already mentioned before, I am very interested in psychology and I would like to become a psychologist later. To enlarge my knowledge in psychology, I really wanted to be able to answer the questions I had before starting this personal work, which part of the brain is active while we are dreaming and how our brain functions while we dream. Thanks to the research I've done, I was able to find answers on these questions and I learned again other topics and parts about the brain thanks to this personal work on the dreams.

On top of the theory about dreams, and in order to personalize this personal work, I did an experiment with a few members of my family. In this personal work, I talk about the perfect sleep environment and I wanted to test if the instructions and advice that scientists and other people give us, to get a better sleep, really has an impact on our sleep. It was very exciting to do this experiment and I was very surprised by the results that I got from this experiment. One of the family members woke up during night because of some electronic device making some noise. Into the objective fit bit screen, you can see exactly the moment of waking up and thus being cut off from dreams due to the environmental circumstances.

Last but not least, I want to thank all the people that supported and helped me during my personal work. A special word of thanks goes to my tutor for supporting me during the whole year in order for me to be able to finalize this personal work. I also would like to thank the family members that participated to my experiment.

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