



Psychology

for Cambridge IGCSE™

COURSEBOOK

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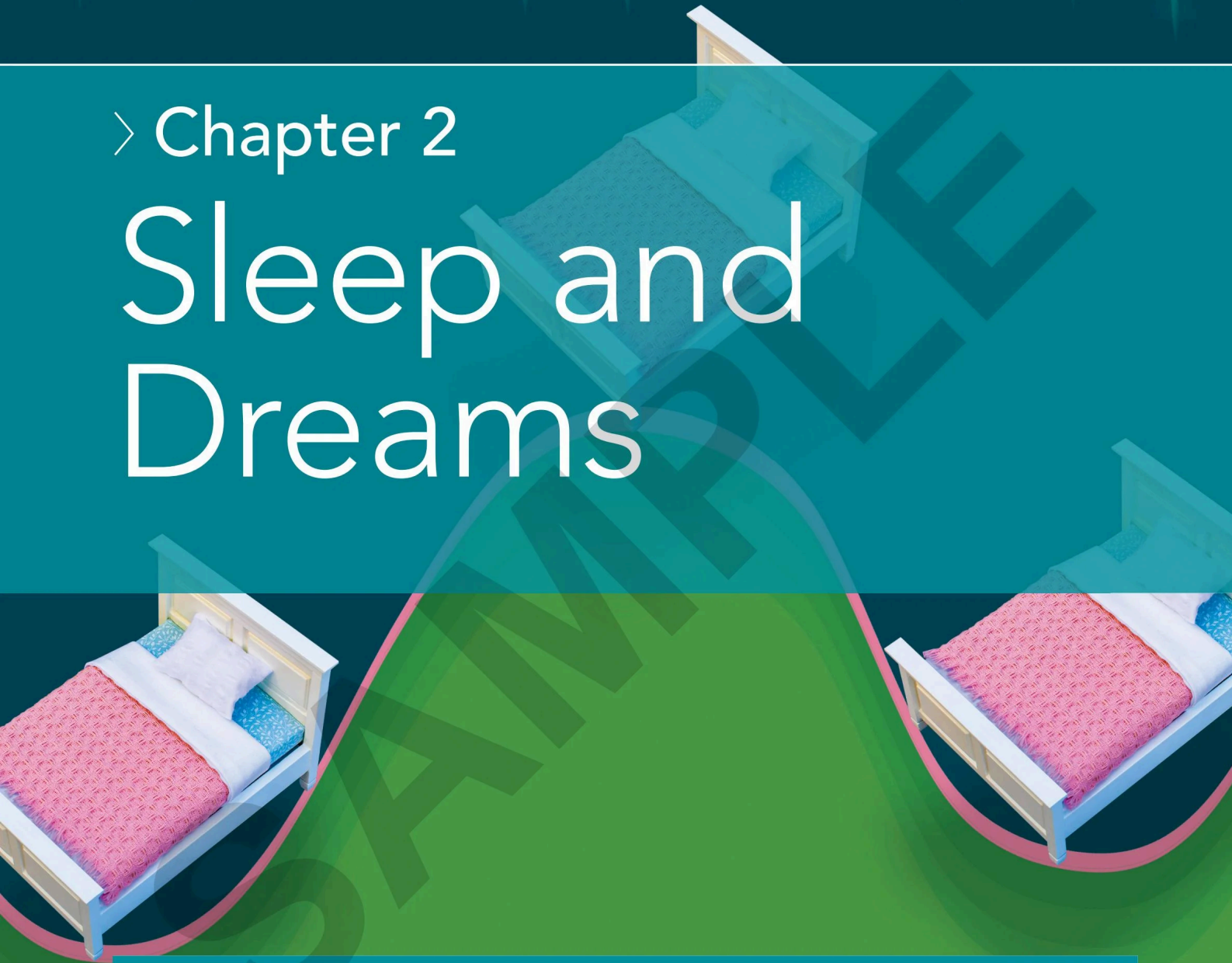


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› Chapter 2

Sleep and Dreams



LEARNING INTENTIONS

In this chapter you will gain knowledge and understanding of, as well as apply, analyse and evaluate:

- key concepts in sleep and dreams
- restoration theory of sleep
- Hobson and McCarley's activation-synthesis theory of dreaming
- psychodynamic theory of dreaming

PSYCHOLOGY IN CONTEXT

A good night's sleep? The power of sleep and dreams

Sleep is something we all experience. Do you ever resist falling asleep? Perhaps you are staying up late to finish homework, playing video games or watching TV? We all fall asleep eventually as the need to sleep is too powerful for us to overcome. The need for sleep is more than feeling tired. Like eating when you are hungry or drinking when you are thirsty, sleep is a basic human need.

You might wonder why we have the urge to sleep. During your lifetime, you will likely spend around one-third of your life asleep. Psychologists believe sleep and dreams have an important role to play, which is more than just recharging our bodies physically. Our brains receive huge amounts of information every day, information that needs to be sorted and remembered, or removed! Without sleep, these processes can become difficult, and can influence how people feel in terms of mood.

In this chapter, we will look at how sleep helps us to function at our best: how it works and what role dreaming plays in our psychological wellbeing. Dreams are one of the most fascinating areas of sleep research: you can do the impossible as you

dream! We will also look at why we dream, and what meaning (if any) our dreams may have.

Discussion questions

- 1 How long do you sleep for on a typical night?
- 2 Think about when you get tired or wake up. Are these usually around the same times each day?
- 3 How do you feel when you have had a late night or very early morning? Consider how your body feels, your reactions, memory and mood.



Figure 2.1: Have you ever felt as though you were flying in your dreams?

2.1 Key concepts

Biological rhythms

Humans and animals have many **biological rhythms**. When we speak of rhythms, we are referring to repetitive biological events (natural processes that occur within the body). Each rhythm has a length or period of duration, which is how long it lasts for, before repeating. In this section we will look at two types of biological rhythms: circadian and ultradian. They both work in relation to the 24-hour cycle, which forms the rough basis of our internal clock.

Circadian rhythms are biological rhythms that repeat around every 24 hours. In other words, they last for about an entire day and night. The main example of a circadian rhythm in relation to sleep is the sleep–wake cycle. Humans cycle between being awake and then a period of sleep.

This is in contrast with the shorter **ultradian rhythms**; biological rhythms that repeat more than once within a 24-hour period (cycles within sleeping and waking, rather than the sleep–wake cycle as a whole). Ultradian rhythms are shorter than circadian rhythms. The example we will refer to in this chapter is sleep cycles, which occur multiple times within the 24-hour period.

KEY TERMS

Biological rhythms: natural cycles of bodily processes regulated by a person's internal 'clock'.

Circadian rhythms: cycle of sleeping and waking (sleep–wake cycle), which repeats every 24 hours.

Ultradian rhythms: cycles within sleeping and waking that repeat more than once in a 24-hour period.

ACTIVITY 2.1

Working in small groups, create a multiple-choice knowledge quiz on biological rhythms. Use facts you have learnt from this section of the textbook on biological rhythms, circadian rhythms and ultradian rhythms.

Write at least five questions, covering all types of rhythms. You can check knowledge and

understanding of definitions and examples. Try to include at least three possible answers for each question, including the correct answer.

When your quiz is complete, swap it with another group and use it to check your own understanding.



Figure 2.2: The sleep–wake cycle is an example of a circadian rhythm.

Types of sleep

Normal human sleep can be divided into two distinct types known as rapid eye movement (REM) and non-rapid eye movement (NREM). The NREM-REM sleep cycle is a classic ultradian rhythm. It recurs around every 90 minutes, with between four and six full cycles each night. However, each 90-minute cycle looks slightly different to the other, as the amount of REM and NREM sleep varies each time.

This section covers the characteristics of each type of sleep and how long each type lasts in the sleep cycle. These timings refer to a typical adult sleep cycle.

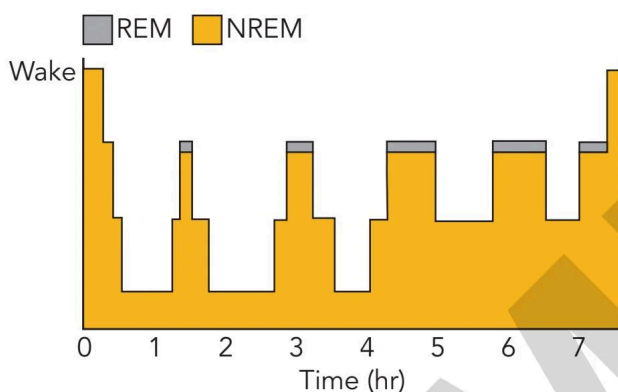


Figure 2.3: Graph to show duration and frequency of REM and NREM sleep periods in a single night.

Rapid Eye Movement (REM) sleep

The duration of REM sleep is around 20–25% of the time we spend asleep. The first REM sleep usually starts around 60–90 minutes after we first fall asleep. At the start of the night, periods of REM are short (around ten minutes). These periods of REM get longer as the night progresses and we experience more sleep cycles. The final periods of REM can last around one hour.

In REM sleep, our brains are highly active, and brain activity looks similar to how it does when we are awake. There is no tension at all in our muscles, and it is as if our bodies are paralysed and cannot move. There can be very occasional muscle twitches, but generally the body is still (this means we do not ‘act out’ what we are dreaming).

The exception to this is eye movement. Although our eyelids remain closed, our eyes move around quickly. We have vivid, complex **dreams** that usually have a narrative

(a storyline) and emotional content (we may experience feelings such as joy or fear). Dreams we experience in REM can often be remembered when we awake up, sometimes in great detail.

KEY TERM

Dreams: thoughts, feelings, images and stories that occur in a person’s mind during sleep.

ACTIVITY 2.2

Take a few moments to recall a dream you had recently, or one from the past which you remember well. What makes the dream memorable? Think about how you felt in your dream, or when you woke up. Did the dream make sense or have a storyline?

Non-Rapid Eye Movement (NREM)

In a typical adult, NREM sleep lasts for 75–80% of the time we spend asleep. NREM sleep is the type of sleep we fall into first. When we first fall asleep, we are in a light sleep where we can be easily awoken or disturbed, for example by sound, light and movement. As we fall into deeper NREM sleep, our brains become deprived of signals from stimuli in the outside world. We stop perceiving sensory information in the same way we do when we are awake and our brain activity slows down dramatically, with muscle activity gradually decreasing in this sleep.

Our eye movements slow down as we fall into NREM sleep and gradually stop altogether. We may experience the perception of some images, but there is no narrative to this type of ‘dream’, nor emotional content. It is unlikely that we can remember these dreams on waking.

Dreams

Dreams are experiences that occur during sleep. As we saw in the previous section, vivid, sensory dreams occur mostly during REM sleep. Dreams are usually characterised by a series of images, thoughts, sensations and emotions. A key feature of dreams is that they usually feel entirely real to us!

We have all kinds of dreams. Some might be boring or repetitive while others can be exciting and joyful. We

may behave in ways that are impossible or undesirable in waking life, and sometimes the stories in our dreams are disjointed or do not make sense. Later in this chapter we will explore reasons why psychologists believe we dream.

Ways of measuring characteristics of sleep

You might wonder how psychologists know so much about sleep and dreams, when these are internal experiences of which we are largely unaware we are experiencing. Researchers have developed a range of methods to record and measure the different characteristics of sleep.

Electroencephalography (EEG) is a type of scan that measures the electrical activity in our brains. To conduct an EEG, electrodes on sticky pads are placed onto a person's head (see Figure 2.4). The electrodes detect electrical activity produced by neurons. The wires from the electrodes transmit these signals as brain waves to a screen display. Psychologists can measure both frequency (how often each wave occurs) and amplitude (how strong the signal is). EEGs are used to identify the type of sleep or wake state a person is experiencing. EEGs readings in REM sleep and wake look very similar, but the waves in NREM show reduced activity.

Electromyography (EMG) is the measurement of electrical activity produced by our muscles. In an EMG, electrodes are placed on the surface of the skin over muscles to monitor activity. In REM sleep, EMG recordings reveal the paralysis of muscles, and in NREM the slowing down of muscular activity is observable as a person falls into deeper sleep.



Figure 2.4: EEGs are used to measure electrical activity in the brain during sleep and wake.

Another method of recording and measurement is electrooculography (EOG). EOG is used to track eye movement and detect REM sleep, because our eyes generate small electrical signals as they move. In an EOG, electrodes are placed carefully around the eyes to measure these changes. This method is particularly useful for observing when a person has transitioned from NREM into REM sleep. Figure 2.5 shows that our eyes are usually still in NREM sleep. As the key characteristic of REM sleep is rapid eye movement, EOG can be used to detect this sudden change in activity. Since discovering these eye movements in sleep, psychologists have used EOGs to investigate the link between eye movements and dreaming that occurs during REM.

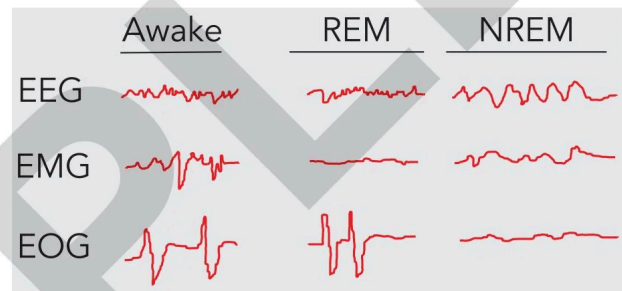


Figure 2.5: Brain activity during REM sleep is more similar to waking measurements than to NREM sleep.

A final method of measuring the characteristics of sleep is known as dream reporting. Dream reporting requires a person to give an account of different aspects of their dreams. This might be an estimate of duration (how long the dream was), the content (objects, events and people in the dream) as well as the narrative or emotional content of the dream. Dream reports can be conducted in a laboratory, with researchers waking participants to ask them questions and record responses about dreams.

Psychologists are aware that studying sleep and dreams in a laboratory can affect the content of dreams. Dream reporting from laboratory studies have shown that images and references to the laboratory environment were present in around 20–30% of dream reports (Domhoff and Schnelder, 1999). People can also undertake dream reporting at home, through keeping a diary of their dreams in which they write down recollections of their dreams when they wake (or are woken up). Sometimes dream journals are kept over a long period of time; this is one method psychotherapists use that we will look at in the psychodynamic theory of dreaming, later in this chapter.

External factors affecting biological rhythms

Circadian rhythms, such as the sleep–wake cycle, are influenced by both internal mechanisms and external factors. External factors are also known as **exogenous cues** or zeitgebers (a German word that means ‘time-givers’). These cues help keep our internal body clocks running to the 24-hour cycle.

One of the most powerful external factors is light. Natural light from the sun as well as artificial light influences the production of the hormone melatonin, which is an internal mechanism. Light is received by our eyes, and a signal is sent to the suprachiasmatic nucleus (SCN), our internal master clock. Exposure to light in the morning reduces melatonin production, so we feel more awake, and this feeling aligns with daylight hours.

Exposure to light in the evening or at night can therefore be problematic if we want to get to sleep. Using artificial light and looking at LED screens such as smartphones in the evening will delay melatonin production. Melatonin is a type of hormone: a chemical substance carried in the blood. Melatonin is the hormone that is responsible for sleep. It is released from the pineal gland, which is a small cone-shaped structure located in the brain. This shifts our internal clocks later and can make it harder to fall asleep.

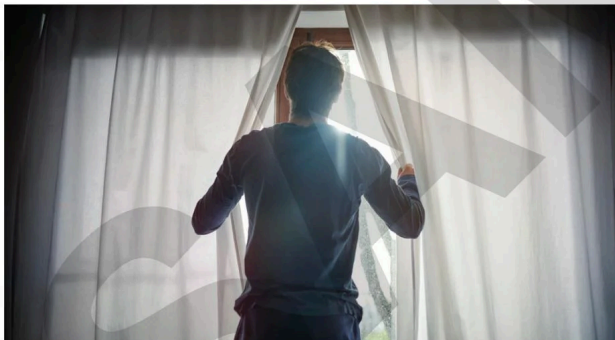


Figure 2.6: Sunlight is an important zeitgeber, which helps us to wake up.

KEY TERM

Exogenous cues: external factors that affect biological rhythms in the sleep–wake cycle.

Social cues are another important external influence on the sleep–wake cycle. Our routines like washing, getting dressed and eating usually follow a routine. Social interactions occur at mealtimes, work, school and other activities. These all act as cues that help reinforce the timing of the sleep–wake cycle.

Some environments have less natural light exposure. This includes locations near the North or South poles where daylight hours can be very short or non-existent during seasonal winter (Figure 2.7), as well as people in occupations such as office work where they remain indoors most of the day. In these situations, social cues and routines provide important external information that helps influence biological rhythms.



Figure 2.7: Near the Earth’s poles, the Sun can remain near or below the horizon for many days.

Internal mechanisms regulating biological rhythms

As discussed in the preceding section, external cues interact with internal mechanisms to regulate the sleep–wake cycle. **Endogenous pacemakers** are internal mechanisms and include the suprachiasmatic nucleus (SCN), pineal gland and the **hormone** melatonin.

KEY TERMS

Endogenous pacemakers: internal mechanisms that regulate biological rhythms in the sleep–wake cycle.

Hormones: chemical substances produced and released by a gland and carried in the blood stream that alter the activity of one or more specific target cells.

The SCN is a very small structure in the hypothalamus which is directly linked to the eyes. This means it can quickly receive information on changes in light and darkness sensed by the eyes. The SCN regulates circadian rhythms and synchronises them with the external cycle of day and night. As well as helping regulate our body temperature, immune function and digestion, the SCN controls the production and release of melatonin.

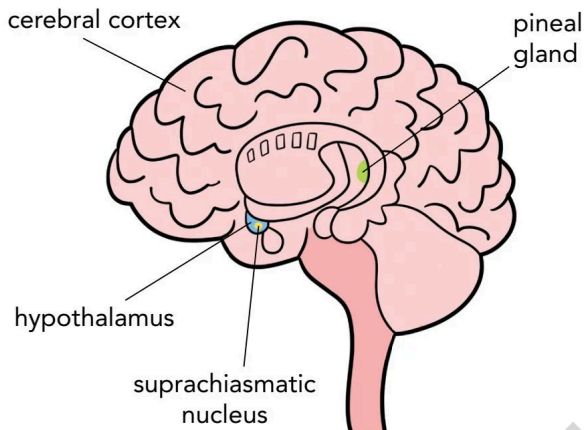


Figure 2.8: Key regions of the brain involved in sleep and dreaming.

MAKING CONNECTIONS

The hypothalamus is a small region in the base of our brains, and an important structure in the limbic system. As you will have learnt in Chapter 1 on Memory and Forgetting, the limbic system is involved in our experience of emotions, behaviour and memory. As we will see in this chapter, parts of the limbic system also have an important role to play in sleep.

When our eyes sense darkness, this is perceived by the SCN, which sends signals to the pineal gland to begin releasing melatonin into the blood stream. Melatonin makes us feel drowsy, and high levels of melatonin are present in our blood as we sleep. As the SCN receives increasing light signals from our eyes, it signals the pineal gland to stop releasing melatonin. By decreasing the melatonin circulating in the body as the sun rises, the SCN helps us wake up in the morning.

PSYCHOLOGY IN REAL LIFE

French adventurer, explorer and scientist Michel Siffre was famous for conducting his own research into sleep deprivation...on himself. Inspired by the conditions astronauts experience in space, as well as his own background in caving, Siffre decided to study the effects of isolation in a confined area, and the effect of darkness on the human sleep-wake cycle.

In one of his experiments in 1962, Siffre entered a cave in the Alps Mountain range, and lived there for two months without a clock or natural sunlight. When he emerged, Siffre believed the date to be a month earlier than it was, suggesting his 24-hour sleep-wake cycle was increased by the lack of external cues.

Inspired by Siffre's experiments, various space agencies have adapted this idea as part of training for their astronauts. The Cooperative Adventure for Valuing and Exercising human behaviour and performance Skills (CAVES training) takes place in

underground caves in Sardinia over three weeks. The training helps astronauts adapt to the stressful and strange conditions of long spaceflights including permanent darkness, reliance on artificial light, lack of time cues and disruption to biological rhythms.



Figure 2.9: The work of Michel Siffre on biological rhythms has influenced astronaut training programmes.

ACTIVITY 2.3

Discuss the following questions in pairs or small groups.

1 Why do you think Michel Siffre took part in his experiments, rather than using participants?

2 Can you think of an issue Siffre would have had with the validity of his research?

3 In what other real-life situations might the CAVES training benefit people?

Biological rhythms in jetlag and shiftwork

Jetlag

There are times when disruption to biological rhythms is unavoidable, and even desirable. If you have ever taken a long-haul flight crossing multiple east-west timezones, you may have experienced this kind of disruption. **Jetlag** is the negative effects we feel in our bodies and minds of a mismatch between our internal 24-hour clock, which is matched to the time at our home or departure location, and the external time at our destination.

The result of this kind of rapid travel is disruption to our circadian rhythms, especially the sleep–wake cycle. When we travel east, our internal clock is behind local time, so it can be difficult to fall asleep in the evening and our bodies want to sleep longer into the mornings. Travelling west creates the opposite effect, and we find ourselves sleepy in the afternoon and waking very early in the morning.

Other symptoms of jetlag include tiredness, reduced concentration, irritability or low mood and confusion. These can last from several days or even weeks, until our internal body clocks are able to align with that of the new timezone. The effects vary from person to person, with some people suffering few effects at all.



Figure 2.10: International travellers can experience the negative effects of jetlag.

Shiftwork

Another disruption to biological rhythms can come from specific work patterns. **Shiftwork** refers to a work schedule of time periods or shifts during the day and night. Disruption from shiftwork is worse when people need to work between the hours of 18:00 and 07:00, or when people are on rotating shifts. This includes jobs in healthcare, air traffic control and factories that operate 24 hours a day.

KEY TERMS

Jetlag: psychological and physical effects felt after travelling rapidly across multiple timezones.

Shiftwork: work schedule involving working during different periods during day and night, including outside normal working hours.

Like jetlag, shiftwork creates a mismatch between our internal clocks and when we feel sleepy, and the times we actually need to be awake. Shift workers may not get enough sleep or have poor quality sleep because of external influences as well. Light and noise from the social and domestic environment present in daylight hours can affect sleep quality of people who work at night but need to sleep during the day.

Tiredness is the main negative effect of shiftwork, and people often report having difficulty staying awake to work throughout the night. Shift workers may also struggle to get to sleep when they need to. As a result of disruption of the circadian rhythms, shift workers often report more problems than those working normal day hours. These include lower productivity at work, increased accidents or mistakes, and less satisfaction with their jobs.



Figure 2.11: Workers on shift frequently experience disruption to biological rhythms.

ACTIVITY 2.4

Create a leaflet explaining disruption to the sleep–wake cycles for a person about to take a long-distance flight at risk of jetlag or a person about to start a job that involves shiftwork. Include the following information:

Jetlag: what it is and how it affects the body.

Shiftwork: how it disrupts sleep and biological rhythms.

Include relevant images and real-life examples to in your leaflet.

SELF-ASSESSMENT

Review your informative leaflet, considering the following questions:

- How clearly is the information presented? What could you do differently next time to make it easy to read and understand?
- Have you used titles and images correctly with labels throughout your design?
- Are key terms used correctly in your leaflet? Would it be helpful to define or describe these in future?

Sleep disorders

The term ‘sleep disorder’ refers to many different conditions that affect the quality, timing, or duration of our sleep. Sleep disorders can also affect our ability to

function well during waking hours. In this section, we will consider the characteristics of three common sleep disorders and the role of biological rhythms in each.

Insomnia

Insomnia is a common but disruptive sleep disorder, which many people experience at least temporarily during their lives. With insomnia, people find it difficult to fall asleep, even when they feel very tired. They may remain awake for many minutes or even hours at the start of the night. Frequent night wakings or very early wakings in which people find it difficult to get back to sleep are also characteristic of insomnia. Insomnia can also cause daytime symptoms as a result of reduced sleep, including tiredness, irritability, reduced concentration and memory.

When our internal clocks are misaligned (for example, due to jetlag or shiftwork) this can lead to insomnia. Trying to sleep at times when our internal mechanisms are making us feel awake, or external cues such as light and noise are present, can make falling asleep difficult. Insomnia can be chronic (experienced frequently over a long period of time) or temporary. Stressful life events can lead to insomnia, as stress responses in the body interfere with the effects of melatonin.



Figure 2.12: Insomnia is a common sleep disorder that can leave us tired during waking hours.

Sleep paralysis

Sleep paralysis occurs when we experience a temporary inability to move or speak while falling asleep or when we are waking up. This sleep disorder can be frightening (but not dangerous), as it often occurs alongside vivid

dream images and uncomfortable feelings of pressure on the chest. Sleep paralysis usually lasts only a few seconds or minutes.

Sleep paralysis is linked to circadian rhythm disruption. As with insomnia, irregular sleep schedules can disrupt the sleep–wake cycle and increase the risk of sleep paralysis. It occurs when there is an overlap between REM sleep and waking consciousness. As you have learnt, the body is usually paralysed during REM sleep. In sleep paralysis, the brain wakes up before this sleep stage ends. This creates the sensation of being trapped in the body while still dreaming.

Sleepwalking

Sleepwalking is a disorder in which a sleeping person performs activities we would only expect to see while they were awake. This includes, but is not limited to, walking. Sleepwalkers may sit up in bed, eat or get dressed, for example. Like sleep paralysis, sleepwalking usually only lasts a few minutes. Unlike sleep paralysis, it is a NREM sleep disorder that occurs during the deepest stages of sleep. This means a sleepwalking person can be very difficult to wake up and may be especially confused when they do! People usually have no memory of sleepwalking events, which are usually automatic, procedural activities. Sleepwalking has the potential to be dangerous or embarrassing as the person is not aware of where they are and what they are doing.

As with other disorders, disruption to biological rhythms can increase the occurrence of sleepwalking. The causes

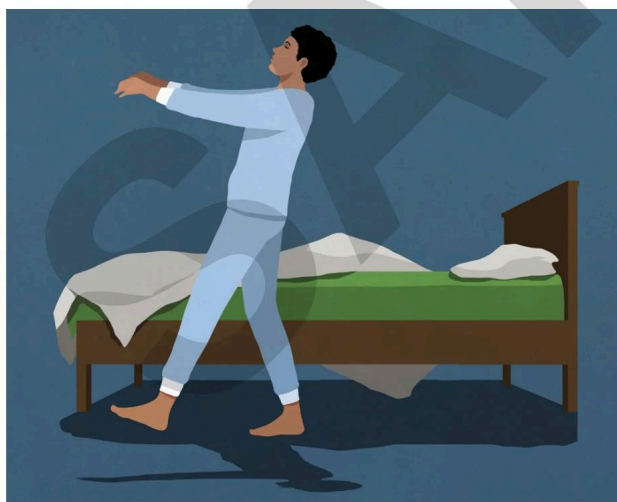


Figure 2.13: Sleepwalking is a common NREM sleep disorder in children.

of sleepwalking are not well understood, but factors that influence NREM sleep, such as sleep deprivation or irregular sleep cycles, can play a role. Psychologists believe that problems with the natural flow of the sleep cycle stages may cause the brain to become more active during deep sleep. This might explain why sleepwalking is more common in young children, who have less well-developed sleep cycle progression, than teenagers and adults.



Figure 2.14: People who sleepwalk may wake up in unexpected places.

Applying knowledge of sleep and waking

We can apply knowledge of biological processes to novel scenarios that involve sleeping and waking, including biological rhythms, types of sleep, measurement of sleep and sleep disorders.

For example, a person who has only just fallen asleep is most likely to be in NREM. If we observe a person who has been asleep a while with their eyes moving under their eyelids quickly, we can make a judgement that they are in REM sleep. You can also interpret information from measures such as dream reporting to determine information about sleep. If a friend reports a fairly long, highly descriptive dream, you can apply your knowledge to recognise this dream occurred during REM sleep.

We have also looked at several other ways to measure features of sleep, including EEGs, EMGs and EOGs. Consider which technique is most suitable for:

- Monitoring eye movements: what movement would we expect in REM and NREM sleep, or waking?
- Monitoring muscle activity: what activity would we expect in REM and NREM sleep, or waking?
- Monitoring brain activity: what activity would we expect in REM and NREM sleep, or waking?

You can also use your knowledge of biological rhythms to explain how to reduce disruption to biological rhythms. For example, someone trying to adjust their internal clock to a destination timezone before flying, to reduce the effects of jetlag. Using external cues, such as increasing exposure to daylight and eating at mealtimes that match those at the new destination, can help. The negative effects of shiftwork can also be reduced through keeping a regular pattern of shifts to help the internal clock adjust more easily and reducing exposure to external cues such as noise and lights by using eye masks, blackout blinds and ear plugs to improve sleep.

Finally, we have looked at a range of sleep disorders: insomnia, sleep paralysis and sleepwalking. Use Activity 2.5 to apply your knowledge of the different characteristics of each disorder, including how they can be explained through your understanding of biological rhythms.

ACTIVITY 2.5

You have been tasked with helping to identify the type of sleep disorder in the following scenarios. For each scenario, select key information that is characteristic of that disorder. Use your knowledge of sleep disorders to name the disorder and explain the role of biological rhythms.

- 1 A week ago, Jermaine returned from a trip to another country with a six-hour time difference. He is waking very early in the morning and is unable to return to sleep.
- 2 Mitra is a four-year-old girl who has recently moved home. Shortly after putting Mitra to bed, her father has been surprised to see Mitra out of her bed wandering into the kitchen asleep.
- 3 Haven tells his brother about a frightening dream he had last night in which he awoke with the feeling of another person pressing on his chest. The dream was very vivid, and Haven says he felt he could not move to push the person away from him.

Questions

- 1 What is meant by biological rhythms? State two examples.
- 2 Outline one difference between REM and NREM sleep.
- 3 Why is sleepwalking thought to be more common in children?
- 4 Explain how internal mechanisms and external cues regulate our internal clock.

KEY POINTS

- Biological rhythms are repetitive, internal processes that include circadian rhythms (lasting around 24 hours) and ultradian rhythms (repeating multiple times within a 24-hour period).
- The sleep–wake cycle is an example of a circadian rhythm; the sleep cycle is an example of an ultradian rhythm.
- REM sleep occupies around 20% of sleep time and occurs after NREM stages of sleep, which occupy around 80% of sleep time. Dreams occur in both stages but are most associated with REM sleep in which they are vivid, realistic and memorable.
- Sleep characteristics in each type of sleep can be measured using EEGs, EMGs, EOGs and dream reporting.
- The sleep–wake cycle is driven by exogenous cues such as light and social cues, which interact with endogenous pacemakers such as the SCN, pineal gland and melatonin.
- Disruption to the sleep–wake cycle can occur through jetlag and shiftwork, creating unpleasant side effects such as tiredness, insomnia and problems with thinking, memory and emotion.
- Sleep disorders include insomnia, sleep paralysis and sleepwalking, which each have different characteristics and can be explained through biological processes.

2.2 Restoration theory of sleep

The restoration theory of sleep argues that the main function of sleep is to repair and restore the body and brain. During sleep, the body undergoes muscle and immune system repair. The brain consolidates memories, learning and processes emotions. Both REM and NREM sleep are thought to be essential in the restoration theory. Without sufficient sleep, humans are unable to function effectively, which means it is essential for health and wellbeing.



Figure 2.15: REM sleep is characterised by rapid movements of the eyes.

Rapid eye movement (REM) and non-rapid eye movement (NREM) sleep

Both NREM sleep and REM sleep play different but important roles in restoring or repairing the function of our brains and bodies. Psychologists believe that both types of sleep perform specific roles, with NREM sleep primarily supporting physical (and some aspects of cognitive) restoration, while REM sleep focuses on restoring emotional wellbeing, memory and other cognitive functions.

In terms of physical restoration, the body spends time in NREM sleep repairing tissues and building new muscle. Growth hormones are released in NREM stages of sleep

to support this function. During NREM, our bodies are conserving energy to allow physical energy levels to return to normal before we awake for the day. Our immune systems (the mechanisms in the body which help prevent or fight illness and infection) are also strengthened during this type of sleep.

Within the brain, NREM sleep is a period in which declarative memory (our memory for knowledge and facts) is consolidated or strengthened. As mentioned in Chapter 1, this process involves the transfer of memory from the short-term memory to the long-term memory.

REM sleep has an arguably bigger role to play in restoring key psychological and brain functions, however. It also facilitates memory and learning, with a focus on consolidating procedural memory. By combining new information received during waking hours with our existing knowledge, REM sleep is the period during which our problem-solving abilities and creativity can be enhanced. The brain is highly active during REM sleep, with neural pathways in the brain being reorganised to fit in new information.

REM sleep is also thought to be essential for mental health and emotional stability. Psychologists believe REM sleep plays a role in processing emotions and managing stress and worry. REM sleep is characterised by vivid dreaming. As discussed later in this chapter, dreaming is likely to play a role in this emotional regulation and memory for emotional events.



Figure 2.16: Reduced sleep can lead to confusion and irritability.

Sleep and the amygdala

According to the restoration theory of sleep, the amygdala plays an important role in emotional processing and recovery. The theory suggests that REM sleep is especially important in regulating emotions.

In REM sleep, the amygdala is active in processing emotional experiences that have occurred in waking life. If an event has upset us during the day, it can often seem to be less important or worrisome the next morning. The amygdala helps us to restore emotional balance. When the amygdala's function is impaired, this reduces our ability to cope with stressful or upsetting situations. You might notice yourself that you are more likely to feel less in control, more impatient or to 'snap' at someone when you are tired or have not slept well.

When sleep is disrupted, the restoration of amygdala function is less effective, as described in the Study summary on restricted sleep (Robinson et al.) later in this chapter.

Sleep patterns over the lifespan

Have you ever heard the phrase 'sleeping like a baby'? Perhaps you have wondered why babies sleep so much, or sometimes, seem to wake so often! Sleep changes as we age. Our requirements for both the length and the type of sleep we get transforms throughout our lives. Sleep can also be specific to the individual and this can persist across that specific person's lifespan. Although humans all have similar needs and patterns of sleep, some people naturally require slightly more or less sleep than others, or naturally prefer earlier or later waking times.

Even in the first year or so of life, sleep patterns are changing and developing. A newborn baby typically sleeps for 16–18 hours in every 24-hour period. Rather than a long period of sleep at night and then longer periods of wakefulness, babies alternate between sleep and wake many times during a 24-hour period. As they get older, babies consolidate periods of sleep and wakefulness, sleeping for longer, and fewer stretches of time until their pattern resembles typical adult sleep (one sleep period a night), although many babies and young children continue to nap (have shorter sleeps during the daytime) up until five years of age or longer. One reason for the long duration of sleep in infancy may be the physical growth of children's bodies, which

occurs at a much faster rate than that of older children and teenagers.

Young babies also experience much higher ratios of REM to NREM sleep than older children and adults. REM sleep accounts for roughly 50% of sleep time in babies (this can be as high as 75% in babies born prematurely), then drops to adult levels by around two years of age. By the time children reach 3–5 years of age, they are usually sleeping around 10–12 hours per night and daytime napping begins to stop. This suggests that REM sleep performs an important role in the growth of the brain, its neural networks, as well as the development of cognitive function in babies and young children.



Figure 2.17: As we become older adults, our sleep patterns change.

Teenage sleep needs are also different from adults. Although they have the same sleep ratio of REM to NREM sleep as adults, their bodies require a longer duration of sleep in the 24-hour period. Research has shown that worldwide, teens usually think they need less sleep and get less sleep than they actually need, particularly males (Gradisar et al., 2011). One reason for this is a shift in circadian rhythms, meaning teenagers' internal clocks shift, so desire for sleep happens later in the day and wakefulness occurs later in the morning than in young children and adults. You might notice that this change may not fit well with schedules of home and school! Later in this chapter, we will study the effects this lack of sleep in teenagers can have on restoring physical, cognitive and emotional function.



Figure 2.18: On average, teenagers typically get less sleep than they need.

As we move into old age, patterns of sleep change again. Although overall requirement for sleep duration is the same, older people tend to sleep less in the single long night sleep and are more likely to nap during the day than when they were younger. Older people also report finding it more difficult to fall asleep than younger adults, and their sleep is characterised by increased night wakings. REM sleep duration also reduces slightly, which is a possible reason older people report feeling less refreshed after sleeping. Psychologists believe that the changes in sleep as we age can help explain problems with memory, and other cognitive and emotional processing, as sleep has a less restorative effect.

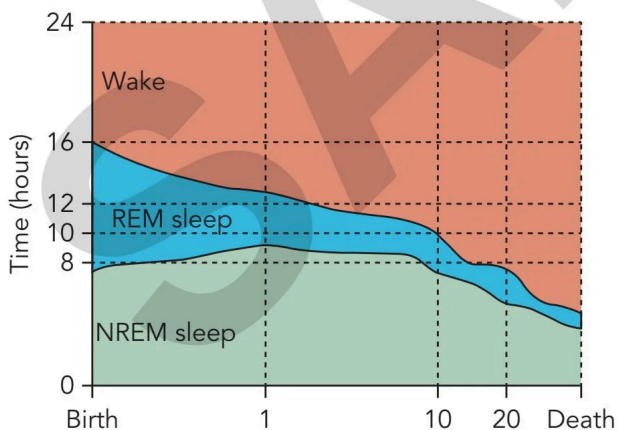


Figure 2.19: The ratio of REM sleep, NREM sleep and wake change as we age.

MAKING CONNECTIONS

You can learn more about drawing and reading information from graphs and tables in Chapter 0: Research Methods. In bar charts and line graphs such as those in Figure 2.19, you will notice that each axis is given a label and unit of measurement, to help the reader better understand the information.

ACTIVITY 2.6

Use the information provided in the graph in Figure 2.19 to answer the following questions. You may wish to use a ruler and calculator.

- 1 In which year of life do people get the most sleep?
- 2 How many hours of REM sleep does the average 20-year-old get per night?
- 3 **Calculate** the range of total sleep time between birth and death.

REFLECTION

Think about how you completed this activity. Did you consider the materials you would need? Does the outcome of the activity show your best work? Think about what you might do differently next time to help you respond to this kind of task.

COMMAND WORD

Calculate: work out from given facts, figures or information.

Robinson et al. conducted research to investigate the effects of reduced sleep. We will consider how even a single night of reduced sleep can influence the ability to restore effective thinking and decision-making.

STUDY SUMMARY

Sleep restriction (Robinson et al., 2008)

Aim: To investigate the effects of one night of restricted sleep on cognitive function.

Participants: 18 healthy European–American and African–American teenagers aged 13–15 years old without any reported sleep disorders, including males and females.

Procedure: Actigraphs (personal, wearable devices that record waking and sleeping times) were used to estimate sleep. A brain scan was used to measure activity in different areas of the brain. Two computerised behavioural tasks were used to measure risk-taking behaviour: a balloon-blowing task and a decision-making task.

Participants slept in their own homes wearing the actigraph to confirm the length of time for which they slept. On a Friday night, all participants were instructed to sleep for at least eight hours before their scan (normal sleep condition). On a different Friday night, the same participants were instructed to only sleep for four hours before their scan (restricted sleep condition).

On Saturday morning, participants came to the laboratory for their brain scan and completed the two behavioural tasks. They avoided naps and caffeine during both Fridays and Saturdays of the experiment.

Results:

- Areas of the brain including the amygdala showed greater efficiency after a normal night's sleep compared to a restricted night's sleep.
- In the behavioural tasks, sleep restriction led to greater risk-taking and less accurate decision-making.

Conclusion: The experiment showed that restricting sleep, even for one night, has a negative effect on how well different areas of the brain work. This provides evidence for the importance of sleep in restoring cognitive function.

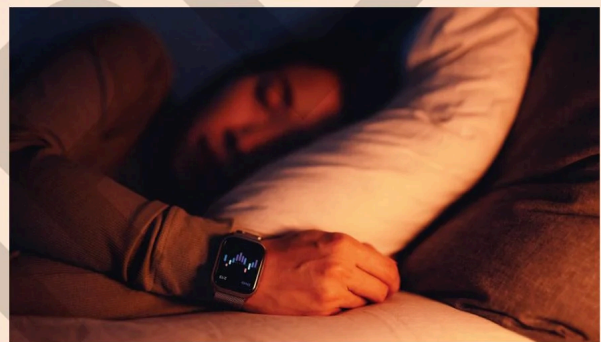


Figure 2.20: Participants wore watches to record the length of time spent asleep.

Argument for the restoration theory of sleep

An argument for the restoration theory of sleep is the named study on restricted sleep (Robinson et al.). The restoration theory of sleep argues that sleep is essential for restoring and maintaining efficient brain and body function. This study found that areas of the brain, such as the amygdala, work better after a normal night's sleep, when compared to restricted sleep. This supports the idea that sleep allows us to recover mentally from the day's activities, ready for the next day.

According to the restoration theory, processes like decision-making are also impaired without sufficient

sleep. The results of the study showed a negative effect of sleep restriction on the accuracy of decision-making and risk-taking. We can therefore conclude that a reduction in sleep leads to a decline in brain efficiency and cognitive functioning.

ACTIVITY 2.7

Create a mind map to summarise the key information from the named study on sleep restriction (Robinson et al.). Use a full sheet of paper and place the named study title at the centre. Extend the map outwards to include all aspects of the study (aim, sample, procedure, results and conclusion), supported by details.

TIP**Revision**

The mind map you created in Activity 2.7 can be used to later to support revision for this named study. You can cover different sections of the mind map and test yourself on each aspect. Or try to explain the study to another person based on your mind map summary.

Argument against the restoration theory of sleep

The restoration theory of sleep argues that NREM sleep is the time for repairing the body, as it helps muscle growth and repair. However, these processes do also occur when we are awake but resting our bodies, sitting or lying quietly. There is conflicting evidence to indicate whether sleep is more effective in this process. If we can achieve the same benefits when we are awake and resting, this should make us consider whether physical restoration is the main function of sleep.



Figure 2.21: Resting throughout the day can help re-energise our bodies and minds.

There is also some evidence to suggest that other restorative processes can take place during waking rest. Some psychologists suggest there are cognitive benefits that result from giving our brain quiet times; restful time

to consolidate and process information. During periods of rest where we significantly reduce external stimuli (no reading, talking, TV and so on), EEG recordings indicate that our brain waves slow down. This could mean that waking rest can also support cognitive processes like memory consolidation.

Applying knowledge of the restoration theory of sleep

The restoration theory of sleep sees sleep as essential for the body's physical and mental recovery. This theory can be applied to new scenarios in several ways, including the following example and Activity 2.8.

Imagine a hospital is planning a new working pattern for its nursing staff. Their jobs are stressful and the risk to patients is high if nurses are not able to concentrate and make good decisions. Nurses need time to repair muscle (it can be physically demanding to move and lift patients), process emotions (they may be giving upsetting news to patients and families) and restore cognitive function (the role is busy and there are lots of important and complex decisions to be made each shift).

When designing the shift patterns, hospital management should consider principles of the restoration theory of sleep. For example, they can schedule longer recovery periods after shifts to help nurses physically recover, as well as give them time to process emotional stress from their work.

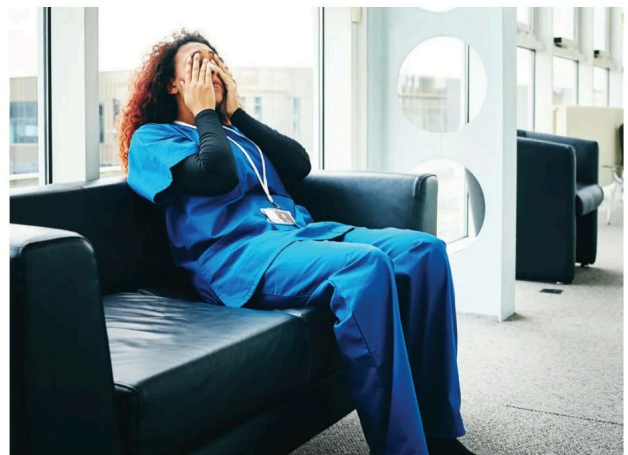


Figure 2.22: Our bodies need sleep to repair and build muscle.

ACTIVITY 2.8

Samu is preparing for his final exams, which will take place over a series of days in the same week. Usually, he has a late bedtime after playing on his mobile phone for a couple of hours. He then sleeps for around five hours each night.

Discuss answers to the following questions with a partner:

- 1 Why might Samu not wake feeling rested after his usual night's sleep?
- 2 How can the restoration theory explain why Samu might underperform in his exams?
- 3 What changes to his sleep routine could Samu make to improve his chances of doing well in his exams?

Questions

- 5 Outline one conclusion from the named study on sleep restriction (Robinson et al.).
- 6 Explain the role of REM sleep, according to the restoration theory of sleep.
- 7 Do you think waking rest can be as effective as sleep? Justify your answer.

KEY POINTS

- The restoration theory of sleep suggests that the function of sleep is to restore physical and cognitive function and repair.
- NREM sleep can help restore physiological function through muscle repair and growth, while REM sleep plays an important role in restoring mental and emotional functioning.
- Sleep patterns change over the lifespan, suggesting that at each stage of life our bodies and brains have different restorative needs, which can be met through sleep.
- The named study on sleep restriction (Robinson et al.) supports the idea that sleep is important for effective functioning, finding that lack of sleep can have a negative effect on problem-solving and brain efficiency.

CONTINUED

- There is other evidence to suggest that waking rest can be as effective in restoring bodily health, such as muscle repair, as well as supporting cognitive and emotional balance.

2.3 Hobson and McCarley's activation-synthesis theory of dreaming

Hobson and McCarley's activation-synthesis theory of dreaming was proposed in 1977. In this theory, dreams are considered the way our brains make sense of random (meaningless) brain activity that occurs during sleep. This leads to the creation of a narrative or story, which we recognise as a 'dream'. In this theory we will consider key brain areas active in dreaming and the process of activation synthesis.

Brain regions involved in dreaming

The activation-synthesis theory of dreaming has a strong biological foundation. This means it explains the role and function of biological factors, such as brain structures, during dreaming.

There are two brain regions that have important roles in sleep and dreams. These are both part of the limbic system, which is a collection of different brain regions that together regulate our emotions, memories and behaviour. One important brain region is the amygdala. As we saw earlier in the restoration theory of sleep, this brain area is important in processing emotions and memory during REM sleep.

Another key region of the brain which psychologists have found to be active during REM sleep is the thalamus. This part of the brain is responsible for the transfer of sensory and motor information to the cerebral cortex, the outer layer of our brain. Scans have shown that the thalamus is active in creating images and transferring this information during REM sleep.

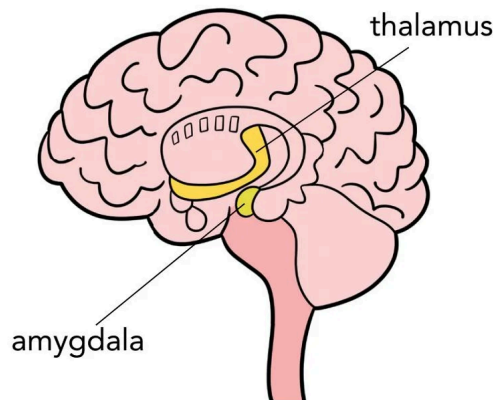


Figure 2.23: The thalamus and amygdala are both important parts of the limbic system.

TIP

Knowledge

As you progress through this textbook and course, you will encounter several brain parts that are relevant to different theories. It can be challenging to remember the key terms for these parts, their function and location. Try drawing a brain and labelling the parts with their functions, using different colours to indicate the topics to which they relate.

Features of the activation-synthesis theory of dreaming

In this theory, dreams are the result of our brain's attempt to make sense of random neural activity, which occurs during sleep.

A key idea in this theory is a sensory input blockade. When we are asleep, our brains are isolated from the outside world. External sensory input such as sight

and sound are largely blocked. Therefore, the brain is processing internal information and signals, not responding to the external environment.

There is also a motor output blockade when we are asleep: muscle activity, especially during REM sleep, is minimal. EMG readings show that our bodies are effectively paralysed (unless we are experiencing a sleep disorder). We do not usually act out what is happening in our dreams for this reason.

Meanwhile, as we sleep, our brains are still generating electrical impulses that activate different regions of the brain. The activation-synthesis theory of dreaming suggests that this electrical activity is random; that is, without pattern or meaning (this is called 'random activation'). It is purely a biological process and does not relate to conscious or deliberate thoughts.

The outer layer of the brain, the cerebral cortex, receives these random signals. It attempts to bring them together in a meaningful way. This process is known as 'synthesis'. Because the electrical signals are random, even a synthesised version can seem totally bizarre and meaningless.



Figure 2.24: Our dreams can be strange and illogical.

The amygdala and thalamus both remain active, especially during REM sleep. The thalamus is active in relaying signals from the brain stem to the cerebral cortex. This helps the cortex to synthesise and create rough narratives out of random activation. The amygdala generates internal signals which contribute to the emotional quality of dreams. For example, its activity can add frightening or exciting feelings to our dreams.

ACTIVITY 2.9

Have a turn at doing the work of your brain in synthesising random signals! In pairs or small groups, write down 20 unrelated objects, events or people. Cut up your list or write these on sticky notes.

The whole class should combine their random ideas in a pile of notes. In your same pairs or groups, select at least ten notes. Create a short story that connects all the ideas you picked up.

Discuss the task as a whole class. How difficult was it? Did your stories make sense? What might this mean for our experience of dreaming?



Figure 2.25: In REM sleep, our brains are active and send electrical signals.

In this next named study, Williams et al. explore the differences between dreams and waking fantasies. This study focuses on the randomness or bizarreness of dreaming.

STUDY SUMMARY

Bizarreness of dream content (Williams et al.)

Aim: To investigate bizarreness in dreams, in comparison with fantasies experienced while awake.

Participants: 12 college students from the USA aged 23–45 years old, mostly females.

Procedure: In their own homes, participants were asked to write down dreams that they remembered when they awoke in the night or the morning after. They were also instructed to record any fantasy they experienced while awake. A fantasy was defined as thinking about or perceiving an event or story without conscious intention or a clear link to the external environment.

120 sets of these reports were analysed by judges who rated each using a scale for bizarreness. 'Bizarreness' was categorised as thoughts, feelings or objects which were unlikely, unexpected or unrelated to previous events.

The researchers also measured the ability of judges to identify reports as either a dream or a fantasy.

Results:

- Participants reported bizarreness in dreams twice as often as in fantasies.
- Judges could accurately distinguish dream reports from fantasy reports.

Conclusion: Dreams contain far more bizarre content than fantasies. The strangeness and illogical content of dreams supports the activation-synthesis theory of dreaming.



Figure 2.26: Participants recorded information about their dreams after waking.

ACTIVITY 2.10

To help you remember key details of this study, have a go at storyboarding! Divide a piece of paper into six evenly sized boxes. In each box, write a label at the bottom:

- 1 Aim
- 2 Participants
- 3 Procedure (data collection)
- 4 Procedure (analysis)
- 5 Results
- 6 Conclusions

In each box, draw or paste in a simple illustration or photo to represent what the researchers did in this part of the named study.

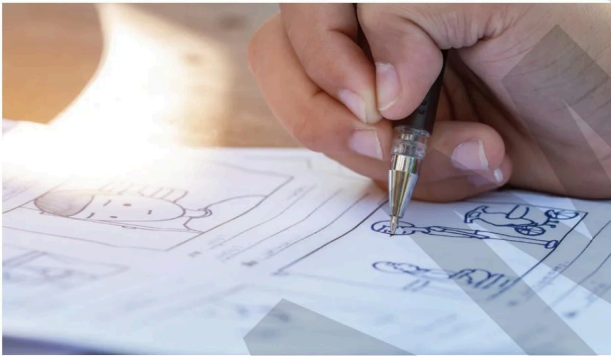


Figure 2.27: Use the storyboarding method to summarise the named study.

Argument for Hobson & McCarley's activation-synthesis theory of dreaming

The argument for the activation-synthesis theory of dreaming is the named study on bizarreness of dream content (Williams et al.)

The bizarreness of dream content study highlights the differences in content between dreams and fantasies. The result that dreams were reported as being significantly more bizarre than fantasies aligns with the

activation-synthesis theory. If dreams are constructed from random signals in the brain, without the logic of our conscious waking state, we can expect that dream content is more disjointed and strange compared to fantasies.

Similarly, the ability of judges to distinguish dreams from fantasies suggests that the content of dreams is quite different. Dreams are more bizarre and illogical, fantasies are more structured and make sense. We can conclude that the findings of the study align with the idea that dreams are the result of our brain's efforts to make sense of random neural activity as we sleep.

Argument against Hobson & McCarley's activation-synthesis theory of dreaming

We have considered evidence for the activation-synthesis theory of dreaming. However, many psychologists reject this theory and argue that many dreams do have coherent and meaningful content.

You may observe yourself that some of your dreams are not bizarre or random. They may make sense to the dreamer, follow a logical sequence or be related to our real-life experiences. If we spent the day playing a game with our friends, the game and our friends may well appear in our dream that night.



Figure 2.28: We may dream about the events of our day and future activities.

If dreams are just the result of random neural firing during REM sleep, we would only ever expect to see content that does not make sense or is unrelated to our experience and emotions. However, dreams can reflect the dreamer's emotional state. For example, if you are nervous about giving a speech in front of your peers, it is not uncommon to dream about actually giving that speech!

These examples suggest that our memories and emotional processing are also likely to play a role in dreaming. In the final section of this chapter, we will explore the psychodynamic theory of dreaming, which agrees with the view that dreams are meaningful and have a purpose beyond random activation.

Applying knowledge of the activation-synthesis theory of dreaming

You have learnt about the activation-synthesis theory, including the role of the brain, sensory and motor blockades, and the processes of random activation and synthesis in the cortex. We will now look at how this knowledge can be applied to real-life situations, which are both familiar and unfamiliar.

Many dreams consist of unrelated images, memories and sensations. For example, in dream reporting, people may say 'I have no idea why or how that person was there' or 'suddenly we were not in the house anymore, we were somewhere completely far away' or 'I knew it was this person, but they did not look or sound like they really do'. The strangeness of dreams means their bizarre quality is so different from our waking reality.

Consider the sensory and motor blockades. You can see in real life that these reduce input from the external environment and stop us from moving. This knowledge can be applied to explain unfamiliar dream scenarios. Have you noticed that in your dreams you can move in impossible ways, travel across time and space in an instant and see things that could not exist in waking life? We will explore this idea further in Activity 2.11.

ACTIVITY 2.11

Explain how the activation-synthesis theory of dreaming can be applied to the following dream. Use key terminology from this chapter and examples from the dream scenario in your explanation.

A person finds themselves walking through the library floating in the sky. The library is made of glass and every book is glowing with light. They open a book, and the words are just triangles, yet the person is able to read the book perfectly. Suddenly, they look down and fish are swimming around their feet.

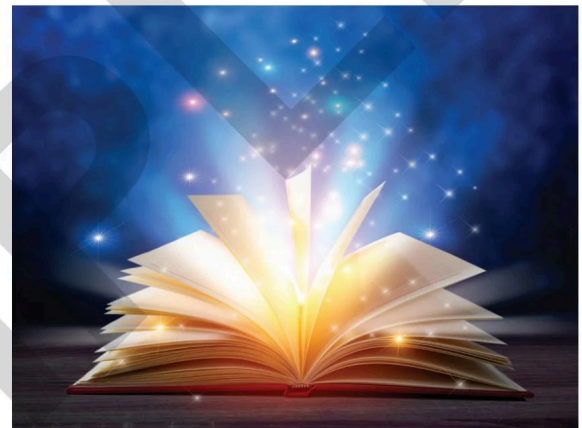


Figure 2.29: How can the processes of random activation and synthesis be applied to dreams?

Questions

- 8 Define the key term 'thalamus'.
- 9 A person's EMG reveals that they have very little muscle activity during REM sleep. Suggest the reason for this, according to the activation-synthesis theory of dreaming.
- 10 How does the brain attempt to make dreams seem logical according to the activation-synthesis theory?

KEY POINTS

- According to the activation-synthesis theory of dreaming, there are several brain regions important for generating dreams during REM sleep. These include the cerebral cortex, thalamus and amygdala.
- When we dream, our sensory input is blocked meaning we do not perceive the outside world. Our motor abilities are also greatly reduced. As we sleep, our brains become active and generate random electrical impulses from the brainstem.
- The brain works to synthesise the random signals, making them into a story and adding emotional elements.
- There is evidence from the named study on the bizarreness of dream content (Williams et al.) that dreams are stranger than waking fantasies.
- The evidence against the activation-synthesis theory of dreaming is that we can perceive meaning in many dreams, which suggests that they are not entirely random and may have a different function.

2.4 Psychodynamic theory of dreaming

Have you ever woken from a dream and been surprised or confused by the content? Later in the day, perhaps you have realised (or a friend has pointed out to you) what led you to that dream. Did it relate to something you were angry about, or that you hoped would happen?

The psychodynamic theory of dreaming was developed by Sigmund Freud and other psychodynamic theorists. It suggests that dreams reflect aspects of the unconscious mind of which we are not aware. Dreams are ways to express hidden desires, fears and conflicts that would otherwise be difficult to acknowledge or deal with in our waking lives. In this topic, the key features of the psychodynamic theory of dreaming are described, including how we satisfy unconscious desires through dreams, wish fulfilment and the influence of the id.

MAKING CONNECTIONS

Some of the terms in the psychodynamic theory of dreaming have been used in other chapters, for example, Topic 5.4: Psychodynamic motivation and marketing and Topic 1.4: Motivated forgetting. You will notice that the same principles of the psychodynamic theory can be applied across each topic (for example, parts of the mind, structure of personality, defence mechanisms). Consider the similarities and differences of how these ideas are applied in each topic.

Parts of the mind

First, we will consider the parts of the mind, according to psychodynamic theory. You have been introduced to these concepts in Chapter 1: Memory and Forgetting. Here we consider the role of each in relation to dreaming:

- **Conscious:** this is the part of the mind that we are aware of while we are awake. When we dream, this part of our mind is not in control of thoughts and perceptions. Some conscious thoughts and recent experiences may appear in our dreams. These are usually altered or appear in different forms. When we are awake, we can bring the literal or actual content of our dreams in our conscious.
- **Pre-conscious:** this is the part of the mind that contains memories and thoughts that are not currently in our conscious awareness but can be accessed if we need them. Freud saw the pre-conscious as a bridge between the conscious and unconscious parts of the mind. As we dream, the pre-conscious focuses on memories or ideas that are not readily available when we are awake, helping to create dream content.
- **Unconscious:** this part of the mind is filled with desires, fears and conflicts of which we are unaware and cannot access. The unconscious expresses the 'hidden' through symbolic objects and messages in our dreams. The true meaning of our dreams is protected through the mechanisms of dreamwork. It prevents us from having to directly experience unpleasant or difficult thoughts and feelings.

Types of dream content

As seen in the previous section on the role of the parts of the mind, psychodynamic theory states that there are two levels within dreams: hidden (from our unconscious) and literal (from our conscious). In dream content, these are described as **latent content** and **manifest content**, respectively.

Manifest content is the events, people and objects we experience in our dreams, and can remember when we wake up. By contrast, latent content is what lies underneath the manifest; it is the hidden meaning behind those experiences. For example, we may dream about an argument with a stranger: this is the manifest content. However, this dream could have a hidden meaning if we had a disagreement with our sibling earlier that day.



Figure 2.30: An argument in real life may transform into latent dream content.

Wish fulfilment and the id

The id is the unconscious part of the mind that works on the principle of instinct and desire. In dreaming, the id plays an important role. While the conscious mind is not active during sleep, we are not as influenced by the rational ego. This means that the id can take a more active role. Dreams allow the id to express our unconscious feelings, although these may still be distorted or disguised. The id is the source of latent dream content.

Wish fulfilment is a key feature of the psychodynamic theory of dreaming. As mentioned before, dreams represent the fulfilment of unmet unconscious desires

of the id. Outside of waking life, dreams allow these wishes to be expressed in symbolic ways. This means that the mind can satisfy our wishes, without us being consciously aware.

Freud (1913) describes an example in which his youngest daughter Anna had experienced an illness and was not given food for the rest of the day. In the night, he heard Anna call out that she was eating her favourite foods. Freud interpreted this as an example of wish fulfilment; denied food due to illness, Anna wished to be better again and satisfy her desire for food.

KEY TERMS

Latent content: hidden, symbolic meaning of dreams.

Manifest content: actual content or events of dreams that can be recalled upon waking.

Wish fulfilment: satisfying the unconscious desires of the id through dreams.



Figure 2.31: An unconscious desire to be brave can be fulfilled through a dream.

Mechanisms of dreamwork

According to the psychodynamic theory of dreaming, ‘dreamwork’ refers to the processes by which the unconscious mind changes latent dream content (true, hidden meaning) into the manifest content (the actual dream as we remembered it). Psychodynamic theorists believe that there are different mechanisms of this dream work: condensation, displacement, wish fulfilment and secondary elaboration.

Condensation is the process by which our minds combine multiple images, desires or emotions into one dream object (an event or image). The conscious brain would require many words to explain these complex thoughts and feelings, but through dreams, these ideas are compressed and condensed to smaller meaningful dream objects.

For example, a conversation in a dream might contain pieces of more than one conversation that actually happened. This allows the dream to represent the dreamer’s combined feelings or conflicts related to multiple different conversations.

Displacement occurs when we transfer feelings about or behaviours towards the original dream object to another. It allows us to unconsciously move the emotional significance to a less threatening or more acceptable person, place or thing. Displacement allows us to cope with unacceptable thoughts or feelings. Freud believed it could occur in waking life as well as in dreams.

For example, if a person has anger towards their parent or teacher, they might dream about being angry at a stranger or an object. The dreamer displaces the emotion from the actual source of conflict, onto something that is safer emotionally.

KEY TERMS

Condensation: combining different images, meanings or emotions into one dream object.

Displacement (psychodynamic): transfer of feelings or behaviours from the original dream object to another.

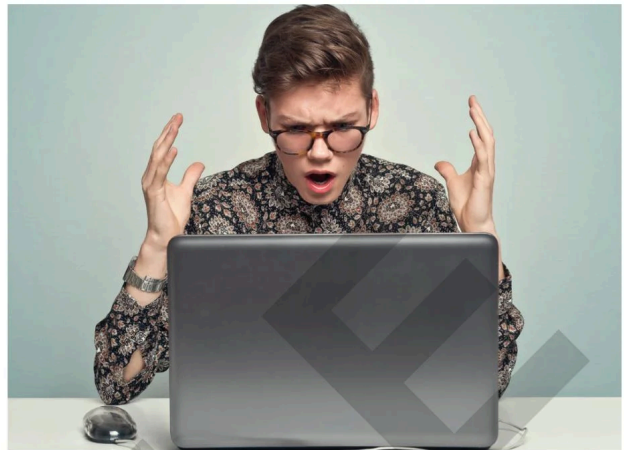


Figure 2.32: A dream of being frustrated by an object might symbolise unconscious anger with someone close to us.

Secondary elaboration is the work the unconscious mind does to add detail and make manifest content seem logical. It occurs as we recall the dream when we are awake, and it is the work that our conscious minds perform to create a narrative. Secondary elaboration can distort the dream further and mean that its true meaning is further hidden from our conscious awareness.

For example, when we wake up, we often remember a dream in part. We then unconsciously add or change details to make the dream seem clearer or easier to explain.

KEY TERM

Secondary elaboration: the work the unconscious mind does to add detail and make logical sense of manifest content.

ACTIVITY 2.12

Write a short paragraph explaining the mechanisms of dreamwork. Make sure you include the following key terms in your work, using your own words:

- condensation
- displacement
- secondary elaboration
- wish fulfilment.

PEER ASSESSMENT

Swap your work from Activity 2.12 with a partner and read through their response. Give verbal or written feedback, considering the following questions:

- Is the explanation for each mechanism clear and correct? Why or why not?
- Is each mechanism of the theory included, or are some mechanisms missing or explained in less depth?
- What could be added to improve the explanations?

KEY TERMS

Free association: technique in which a person expresses any thought that comes to mind, no matter how embarrassing or illogical it is.

Symbol analysis: interpretation based on dream object.

Dream analysis

You may have heard of dream analysis, which is typically used in psychodynamic therapy to help treat people seeking support for their mental health. Psychodynamic theorists believe that understanding the unconscious is important for seeing how it influences our feelings and behaviour.

In the process of dream analysis, a psychotherapist works with the patient to explore the underlying meanings of their dream. Bringing the latent content (the hidden, unconscious meaning) of a dream into conscious awareness, can help the patient gain insight and understanding.

Free association is one technique psychotherapists use. The psychotherapist encourages the patient to speak aloud any and all thoughts that come to mind when thinking about a particular element of their dream. These thoughts do not have to be logical or take the form of whole sentences. The thoughts may be personal and embarrassing, but the idea is to discover connections between the dream content and the patient's experience of conflict and desire in waking life.

Another technique is known as **symbol analysis**. This involves interpreting the symbols from dreams, based on their widely accepted meanings. Psychodynamic theory argues that there are symbols which we all recognise to represent unconscious thoughts, especially those relating to desire and conflict. With an understanding of their patient's waking life experience and reported dream content, the psychotherapist can make interpretations of specific dream objects.



Figure 2.33: Psychotherapists use free association and symbol analysis to interpret client's dreams.

For example, if a patient reported a dream about swimming across an ocean, this might be interpreted as a symbol of achievement, representing the dreamer's unconscious desire for a particular success at work or in their personal life.



Figure 2.34: Dream objects such as rivers can have hidden meanings.

Iorio et al. carried out research into the meaning of dream content. They used questionnaires to explore the role of dreams and how they relate to traumatic waking experiences.

STUDY SUMMARY

Dreaming and trauma (Iorio et al.)

Aim: To analyse the dream content of people with experience of isolation and trauma during the COVID-19 pandemic.

Participants: 796 participants aged 18–79 years old from Italy, mostly females.

Procedure: The participants completed questionnaires online. Participants were first asked to report information about the conditions they experienced during the COVID-19 pandemic, for example, with family members and the size of their home. Participants then gave a detailed report of their most recent dream and completed a dream questionnaire. The dream questionnaire included ratings of frequency, realism, creativity and emotion.

The researchers calculated the mean word count for each participant's reported dreams. Three judges also scored each dream report using the same dream questionnaire.

Results:

- Participants who experienced trauma during the COVID-19 pandemic reported higher emotional intensity in their most recent dreams.

- There were few references to the COVID-19 pandemic in dream descriptions.
- Dream locations were frequently reported to be external to the home or place of isolation.

Conclusion: Events in waking life can be linked to specific experiences of dreaming. Dreaming is one way for people to experience wish fulfilment, which supports the psychodynamic theory of dreaming.



Figure 2.35: During the COVID-19 pandemic, many people isolated at home.

Argument for the psychodynamic theory of dreaming

The argument for the psychodynamic theory of dreaming is the named study on dreams and trauma (Iorio et al.).

The psychodynamic theory of dreaming can explain the results and conclusion of this study. Because dreams are considered to be a manifestation of unconscious desires, fears and conflicts, they are a way for the mind to process issues and fulfil wishes that may be repressed in waking life.

According to the psychodynamic theory, the content of dreams is often symbolic not literal. The absence of direct references to the pandemic might suggest that the mind is using symbolic representation, so the trauma is represented in other, equally distressing but hidden forms. The frequency of external dream locations may also symbolise a wish for escape or return to normality.

Higher intensity dreams in participants with more reported trauma suggest that dreams could be one way people processed COVID-19 related disruption and distress in the unconscious. This conclusion supports the psychodynamic theory by showing that dreams are influenced by waking life experiences, especially those with emotional significance.

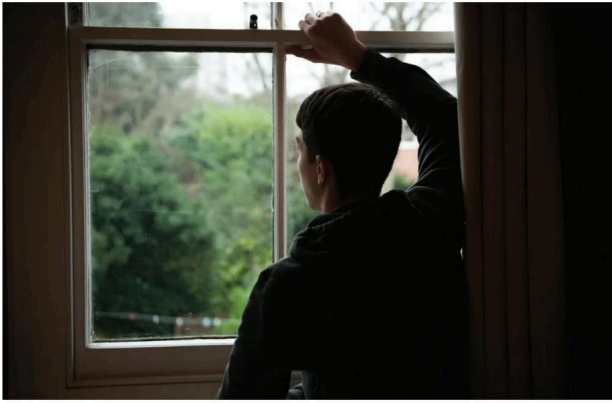


Figure 2.36: Many people experienced trauma and isolation during the COVID-19 pandemic.

Argument against the psychodynamic theory of dreaming

While the psychodynamic theory of dreaming seems to make sense given the way we experience and reflect on our dreams, it has been criticised. Many psychologists argue that the interpretation of meaning in dreams is subjective. This means that the interpretation of a dream is influenced by personal opinions and feelings, rather than objective facts or evidence.

For example, symbols in dreams can be interpreted in many ways, and it is impossible to say which interpretation, if any, is the correct one. Interpretation will be based on a person's background and personal beliefs. There is no objective way of interpreting symbols because they represent unconscious desires or conflicts. Therefore, different people may make different interpretations of the same dream.

To give an example, we know that the meaning of symbols varies across different cultures. In one culture, a symbol such as fire could represent danger, in another it might represent new life and renewal. Interpreters might even disagree as to whether the content of a dream is symbolic or literal. Without consistent, replicable interpretations by different analysts, the psychodynamic theory of dreams lacks objectivity and is difficult to test.

ACTIVITY 2.13

Plan a debate on the arguments for and against the psychodynamic theory of dreaming. Copy and complete the table and leave plenty of space for your points.

Argument for	Argument against
One result from the named study showed...	Interpretation of symbols can vary...
The conclusion of the named study supports the theory because...	We cannot objectively know the influence of the unconscious on dreams because...



Figure 2.37: The psychodynamic theory can help us find hidden meanings in our dreams.

Applying knowledge of the psychodynamic theory of dreaming

Now that you have learnt about the psychodynamic theory of dreaming, you can apply this knowledge to novel situations. The concepts of unconscious desires, dream symbolism and mechanisms such as wish fulfilment can help us to understand different situations.

Start by considering scenarios in everyday life to do with your own dreams. Try remembering your dreams when you wake up. What you can remember, according to the psychodynamic theory, is the manifest content. Does it make sense? If you explain your dream to another person or write it down, are you filling in any gaps? If so, this may be secondary elaboration.

We can also explore ways to interpret hidden meaning within dreams in applied scenarios. A psychotherapist who has a patient who often dreams about being chased might apply knowledge of dream mechanisms to understand what is really happening. The chase may be symbolic of avoiding a real-life situation, like having a difficult conversation with someone. Through techniques such as symbol analysis and free association on dream content, the patient may reveal more information that can uncover their unconscious conflict.



Figure 2.38: Free association and symbol analysis can reveal the meaning of being chased in a dream.

ACTIVITY 2.14

One of the key arguments against the psychodynamic theory of dreaming is that interpretation of meaning can be subjective. Read the following fictional dream and complete the tasks.

I was standing in a large, dark forest, holding a compass. The compass was broken, and I could not find my way out of the forest. A black bird flew overhead, and I followed it to an old bridge over a fast, deep river. As I stepped onto the bridge, it started to collapse and the bird disappeared.

- 1 Write down your ideas about what the latent content might be, and possible meaning for any symbols you notice.
- 2 Compare your interpretation with other students in the class. Were there any similarities or differences?
- 3 What does this tell us about subjectivity in interpreting dreams?



Figure 2.39: What symbols might be present in this dream image?

Questions

- 11 Define what is meant by 'condensation'.
- 12 Which part of the mind contains our hidden, innate desires?
- 13 Outline the process of symbol analysis.
- 14 How does the conclusion of the named study on trauma and dreams (Iorio et al.) support the psychodynamic theory of dreaming?

KEY POINTS

- Each part of the mind, the conscious, pre-conscious and unconscious have a role to play in the psychodynamic theory of dreaming. The conscious allows us to remember dreams when we wake, and the unconscious is the source of hidden meaning in our dreams.
- There are two types of dream content. Manifest content is what we actually perceive and remember from the dream, whereas latent content is the true, hidden meaning.
- Dreamwork is the process in which the latent content is transformed into manifest content. This occurs through displacement, condensation and symbols and secondary elaboration.
- Through dream analysis, therapists can use techniques like free association and symbol analysis to give insight and help patients understand the meaning of their dreams, linked to unconscious desires and conflicts.
- Evidence to support the psychodynamic theory of dreaming comes from the results and conclusions of the named study dreams and trauma (Iorio et al.).
- One argument against this theory is the idea that the interpretation of dreams is a subjective process, which can create multiple conflicting meanings.

KEY SKILLS EXERCISE

Knowledge and understanding

- 1 List the features of the types of sleep you have learnt about in this chapter. Check that you understand the difference between NREM and REM sleep.
- 2 Write notes for a discussion on the 'psychodynamic theory of dreaming'. Include details about the role of the id, wish fulfilment and the mechanisms of dreamwork.
- 3 Write a one-sentence summary of the sleep disorders you have learnt about, using your own words. Share your sentence with the rest of the group and discuss the key features of each disorder.
- 4 Without using this book or your notes, summarise the conclusion from the named study bizarreness of dream content (Williams et al.). Check your answer and add any detail that you missed.

- 5 Using the textbook or other online or print resources, research the amygdala and thalamus. From your research, write a short paragraph explaining the role of these brain regions in sleep and dreaming.

Application of knowledge

- 6 Girad is finding it difficult to get to sleep at night and is waking up very early. He feels very tired in the day and is making mistakes at work. Girad's doctor advises him to attend a sleep clinic to help understand his challenges.
 - a What sleep disorder is Girad experiencing in this scenario?
 - b In what ways could the sleep clinic measure Girad's experience of REM and NREM sleep?

CONTINUED

- c Write a short paragraph to explain how exogenous cues might affect Girad's ability to fall asleep and stay asleep.
 - d Girad recorded his total sleep time each night for one week. Explain how to calculate the range for the number of hours Girad slept during the week.
- 7 Write a short scenario of a person who is experiencing a strange dream (for example, that they have an unusual ability or see a rare animal). Swap your scenario with a partner. Can you explain how a psychotherapist might interpret this dream using symbol analysis?

Analysis and Evaluation

- 8 Explain how the named study on trauma and dreams (Iorio et al.) can be used as evidence for the psychodynamic theory of dreaming.
- 9 Write notes for a debate on whether dreams are meaningful or meaningless. Do dreams make sense, or are they bizarre? What are some indications that dreams can have meaning?
- 10 Create a poster to persuade teenagers of the importance of sleep for restoring cognitive and physical function. Use evidence for the restoration theory of sleep to support your work, including reference to the results and conclusions of the named study.

SELF-EVALUATION CHECKLIST

How confident are you in each of the following areas:

Area	Very confident	Fairly confident	Not confident
What is meant by biological rhythms, including circadian and ultradian rhythms			
Types of sleep including REM and NREM			
Measurements in sleep including EEG, EMG, EOG and dream reporting			
Exogenous cues in the sleep–wake cycle, including light and social cues			
Endogenous pacemakers in the sleep–wake cycle including SCN, pineal gland and melatonin			
Biological rhythms in jetlag and shiftwork			
Sleep disorders including insomnia, sleepwalking and sleep paralysis			
Biological process of sleep and waking as applied to novel scenarios			
The restoration theory of sleep including the role of NREM and REM sleep and the amygdala			
Changes in sleep over the lifespan			
Arguments for and against the restoration theory of sleep			
The restoration theory of sleep as applied to novel scenarios			

CONTINUED

Area	Very confident	Fairly confident	Not confident
The activation-synthesis theory of dreaming including brain regions involved in dreaming			
Sensory and motor blockades, random activation and synthesis			
Arguments for and against the activation-synthesis theory of dreaming			
The activation-synthesis theory of dreaming as applied to novel scenarios			
The psychodynamic theory of dreaming including the parts of the mind, types of dream content, wish fulfilment and mechanisms of dreamwork			
Dream analysis including free association and symbol analysis			
Arguments for and against the psychodynamic theory of dreaming			
The psychodynamic theory of dreaming as applied to novel scenarios			
Applying knowledge of the role of the brain in memory and forgetting			

PRACTICE QUESTIONS

- | | |
|---|---|
| 1 Define what is meant by the term 'dreams'. [2] | 4 Explain the use of free association and symbol analysis in the psychodynamic theory of dreaming. [3] |
| 2 Outline one piece of evidence against the restoration theory of sleep. [3] | 5 Explain the argument for activation-synthesis theory of dreaming. [4] |
| 3 Outline the features of REM sleep. [3] | |

References

- Domhoff, G. W., & Schneider, A. (1999). Much ado about very little: The small effect sizes when home and laboratory collected dreams are compared. *Dreaming*, Volume 9, pp. 139–151.
- Freud, S. (1913). *The Interpretation of Dreams* (AA Brill. Translation) Macmillan, pp. 110–111.
- Gradisar, M., Wright, H., Robinson, J., Paine, S., & Gamble, A. (2008). Adolescent napping behavior: Comparisons of school week versus weekend sleep patterns. *Sleep and Biological Rhythms*, Volume 6 (Issue 3), pp. 183–186.
- Iorio, I., Sommantico, M., and Parrello, S. (2020). Dreaming in the time of COVID-19: A quali-quantitative Italian study. *Dreaming*, 30(3), 199–215.
- Robinson, J., Erath, S., Kana, R., and El-Sheikh, M. (2018). Neurophysiological differences in the adolescent brain following a single night of restricted sleep—A 7T fMRI study. *Developmental Cognitive Neuroscience*, 31, 1–10.
- Williams, J., Merritt, J., Rittenhouse, C., & Hobson, J. A. (1992). Bizarreness in dreams and fantasies: Implications for the activation-synthesis hypothesis. *Consciousness and Cognition*, Volume 1 (Issue 2), pp. 172–185.